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University of Southampton

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**The Role of Linguistic Input in Adult Grammars: Modelling L1 Morphosyntactic
Attrition**

DOI [<https://doi.org/10.5258/SOTON/D2811>]

by

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Thesis for the degree of Doctor of Philosophy

February 2024

University of Southampton

Abstract

Faculty of Arts and Humanities

Department of Languages, Cultures and Linguistics

Doctor of Philosophy

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by

Lewis Mark Baker

Theoretically modelling L1 grammatical attrition – defined in this thesis as the modification of fully acquired L1 grammatical representations due to a significant and prolonged change to a speaker’s linguistic input – remains a considerable research challenge. This thesis seeks to contribute to the modelling of L1 grammatical (specifically morphosyntactic) attrition by investigating the role of linguistic input in this process. To this end, it tests a recent and hitherto untested Minimalist model of grammatical attrition in which input plays a key role: The Attrition via Acquisition Model (Hicks and Domínguez, 2020a, 2020b). In the model, the possibility of attrition is determined by the availability of intake (defined as processed input) and the potential for Feature Reassembly (FR) of a previously acquired L1 structure. Two broad predictions are derived from the model’s assumptions and architecture. Firstly, attrition is in principle only possible for an L1 structure which has an analogous/equivalent L2 form which nonetheless differs in its behaviour due to differences in the respective L1–L2 functional feature specifications. Secondly, attrition is facilitated in linguistic environments in which the L2 is holistically more similar (i.e., in terms of morphosyntax, semantics, phonology, phonetics, and lexis) to the L1. To further develop the predictive power of the model, this thesis also formulates and tests the novel hypothesis that attrition is further facilitated for L1 structures which would need to undergo less complex FR to match a corresponding L2 structure due to greater overlap in the relevant L1–L2 feature specifications (in other words, this predicts that structural similarity at the level of individual morphosyntactic structures modulates the likelihood of attrition).

Three groups of L1 German late-sequential bilingual speakers of either Dutch, English or Spanish are tested. These participants (n=85) have at least 15 years of residence, starting in adulthood, in either the Netherlands, UK or Spain. As well as a native German control group (n=44), this study also uses three further control groups consisting of native speakers of Dutch, English or Spanish (n=94). Two grammatical structures, which are argued to differ in the relative complexity of FR required for them to attrite in the L1, are investigated per L1–L2 pairing. Grammatical properties are tested by means of bimodal Acceptability Judgement Tasks (AJTs). There is a German and

equivalent L2 version of each task. Potential attriters completed both an L1 and L2 version of the relevant AJTs. As such this is the first study to compare attrition of the same L1 under the influence of three holistically different L2 inputs and to investigate the role of FR complexity in attrition. This study also adds to the very small number of attrition studies which test potential attriters in their L2 as well as their L1 in order to further investigate the relationship between L2 acquisition and L1 attrition.

Though results from a series of Culminative Link mixed effects models reveal no significant group-level attrition, attrition is found for a number of individual participants on five out of the six properties tested. Comparison of these individual results within and across the three L1–L2 groups does not suggest that either L1–L2 holistically similarity nor L1–L2 structural similarity – at least as formulated in this thesis – modulate the likelihood of grammatical attrition. The L2 acquisition results of these participants are very varied and indicate a rather complex relationship between L2 acquisition and L1 grammatical attrition. In light of these findings, some modifications to the Attrition via Acquisition model are proposed.

Table of Contents

Table of Contents	4
Table of Tables	10
Table of Figures	12
List of Accompanying Materials	13
Research Thesis: Declaration of Authorship	14
Acknowledgements	15
Definitions and Abbreviations	17
Chapter 1 Introduction	19
1.1 The malleability of native adult grammars	19
1.2 Research context and current challenges	21
1.2.1 Generative (Minimalist) assumptions of language and language acquisition.	22
1.2.2 Minimalism and grammatical attrition	23
1.2.3 L1 grammatical attrition: key issues and characteristics	25
1.2.3.1 Input in L1 grammatical attrition.....	25
1.2.3.2 The vulnerability of L1 grammatical representations	26
1.2.3.3 Manifestations of L1 grammatical attrition	28
1.2.4 The current state of affairs: Two major challenges for modelling L1 grammatical attrition.....	30
1.2.4.1 Challenge I.....	31
1.2.4.2 Challenge II.....	34
1.3 The empirical study	35
1.3.1 Research Questions.....	37
1.4 Broader significance of the study	37
1.5 Organisation of the thesis	39
Chapter 2 L1 Grammatical Attrition and Generative Linguistics	40
2.1 Introduction	40
2.2 Minimalism	40

Table of Contents

2.2.1	Minimalist architecture of the Language Faculty	40
2.2.2	Linguistic variation in Minimalism	43
2.3	Acquisition under Minimalism	46
2.3.1	L1 acquisition	46
2.3.2	L2 acquisition	47
2.4	Minimalist Approaches to L1 Morphosyntactic Attrition	50
2.4.1	The Interface Hypothesis.....	51
2.4.2	The Subset Model	64
2.4.3	Feature Reassembly	69
2.4.4	The Bottleneck Hypothesis	72
2.4.5	Interim summary	75
2.4.6	The Attrition via Acquisition (AvA) Model	77
2.4.6.1	Key Assumptions	78
2.4.6.2	Attrition via Acquisition	78
2.4.6.2.1	Perceptual Intake.....	79
2.4.6.2.2	Acquisitional Intake.....	81
2.4.6.3	Generating predictions	83
2.4.6.3.1	Equivalent L1–L2 grammatical forms.....	83
2.4.6.3.2	L1–L2 holistic similarity	84
2.4.6.3.3	L2 acquisition of an equivalent structure	86
2.4.6.3.4	Sharpening the current predictions of the AvA Model	88
2.4.6.3.5	Bringing it all together	93
2.4.7	Summary: Modelling grammatical attrition within Minimalism	94
Chapter 3	Grammatical properties and analyses.....	95
3.1	Introduction	95
3.2	Selection of languages and morphosyntactic properties	95
3.3	German – Dutch	97
3.3.1	Reflexive Binding	97
3.3.2	Grammatical Gender	101

Table of Contents

3.4 German – English	106
3.4.1 Reflexive Binding	106
3.4.2 Main Clause Verb Position	109
3.5 German – Spanish	114
3.5.1 Predicative Adjective Gender Agreement	114
3.5.2 Negation	119
3.6 Summary	124
Chapter 4 Methodology	126
4.1 Introduction	126
4.2 Experimental design motivations and overview	126
4.3 Participants	128
4.3.1 Potential attriters (German expats)	129
4.3.2 Control participants	133
4.4 Experimental tasks and procedures	137
4.4.1 Language background questionnaires	137
4.4.2 Proficiency measure	137
4.4.3 Acceptability Judgement Tasks	138
4.4.3.1 AJT design	139
4.4.3.2 Experimental conditions	141
4.4.4 Procedures and overview	145
4.5 Predictions	148
4.5.1 Determining L1 Feature Reassembly complexity	148
4.5.2 Patterns of L2 convergence and L1–L2 optionality	149
4.5.3 German – Dutch	150
4.5.3.1 Reflexive Binding	150
4.5.3.1.1 Hypothesis 1: L1 Supplanting → L2 Convergence	153
4.5.3.1.2 Hypothesis 2: L1 Supplementing → L1–L2 Optionality	153
4.5.3.2 Grammatical Gender	154

Table of Contents

4.5.3.2.1	<i>Hypothesis 1: L1 Supplanting → L2 Convergence</i>	155
4.5.3.2.2	<i>Hypothesis 2: L1 Supplementing → L1–L2 Optionality</i>	157
4.5.3.3	Relative FR Complexity	158
4.5.4	German – English	159
4.5.4.1	Reflexive Binding	159
4.5.4.1.1	<i>Hypothesis 1: L1 Supplanting → L2 Convergence</i>	160
4.5.4.1.2	<i>Hypothesis 2: L1 Supplementing → L1–L2 Optionality</i>	160
4.5.4.2	Main Clause Verb Position	161
4.5.4.2.1	<i>Hypothesis 1: L1 Supplanting → L2 Convergence</i>	162
4.5.4.2.2	<i>Hypothesis 2: L1 Supplementing → L1–L2 Optionality</i>	162
4.5.4.3	Relative FR Complexity	163
4.5.5	German – Spanish	163
4.5.5.1	Predicative Adjective Gender Agreement	163
4.5.5.1.1	<i>Hypothesis 1: L1 Supplanting → L2 Convergence</i>	164
4.5.5.1.2	<i>Hypothesis 2: L1 Supplementing → L1–L2 Optionality</i>	165
4.5.5.2	Negation	165
4.5.5.2.1	<i>Hypothesis 1: L1 Supplanting → L2 Convergence</i>	166
4.5.5.2.2	<i>Hypothesis 2: L1 Supplementing → L1–L2 Optionality</i>	167
4.5.5.3	Relative FR Complexity	167
4.5.6	Perceptual Intake, Acquisitional Intake, and FR Complexity: bringing it all together	167
Chapter 5	Results	171
5.1	Introduction	171
5.2	Data analysis	171
5.3	L1 Attrition Models	172
5.4	L2 Acquisition Models	173
5.5	Individual Variation	175
5.5.1	German – Dutch	176
5.5.1.1	Reflexive Binding	177

Table of Contents

5.5.1.2 Grammatical Gender	182
5.5.2 German – English	185
5.5.2.1 Reflexive Binding	186
5.5.2.2 Main Clause Verb Position	191
5.5.3 German – Spanish	197
5.5.3.1 Predicative Adjective Gender Agreement	198
5.5.3.2 Negation	204
5.6 Summary of results.....	213
Chapter 6 Discussion and conclusions	215
6.1 Introduction	215
6.2 Results in relation to the research questions	215
6.2.1 Divergences from baseline: Manifestations and Feature Reassembly	215
6.2.2 The role of input similarity in L1 morphosyntactic attrition	221
6.3 Implications for the Attrition via Acquisition Model.....	223
6.3.1 Perceptual Intake.....	223
6.3.2 Acquisitional Intake and Feature Reassembly	224
6.3.2.1 The role of Acquisitional Intake and the nature of L1 Feature Reassembly in mature grammars	224
6.3.2.2 The complexity of Feature Reassembly in L1 grammatical attrition..	226
6.3.3 The relationship between L1 attrition and L2 acquisition	227
6.4 Future Directions	238
6.5 Summary and conclusions	239
Appendix A Participant exclusion and data quality checks	242
Appendix B Extended summary of potential attriters' background data*	247
Appendix C Extended summary of control participants' background data*	251
Appendix D Catalan vs. non-Catalan-speaking group means on negation conditions	256
Appendix E LHQ3.0 (Li <i>et al.</i>, 2019)	257

Appendix F Additional Background questionnaire	262
Appendix G LexTALE instructions (English version)	270
Appendix H AJT instructions (English version).....	271
Appendix I Full list of AJT items	273
I.1 AJT1: Reflexive Binding and Grammatical Gender (German)	273
I.2 AJT2: Reflexive Binding and Main Clause Verb Position (German)	282
I.3 AJT3: Predicative Adjective Gender Agreement and Negation (German)	292
I.4 AJT4: Reflexive Binding and Grammatical Gender (Dutch)	302
I.5 AJT5: Reflexive Binding and Main Clause Verb Position (English).....	310
I.6 AJT6: Predicative Adjective Gender Agreement and Negation (Spanish)	319
Appendix J Ethics approval	329
Appendix K Inferential statistics: Cumulative Link mixed effects models	331
Model 1: German – Dutch L1 Attrition	331
Model 2: German – English L1 Attrition	332
Model 3: German – Spanish L1 Attrition	333
Model 4: German – Dutch L2 Acquisition.....	335
Model 5: German – English L2 Acquisition	337
Model 6: German – Spanish L2 Acquisition	338
List of References	340

Table of Tables

Table 1.1: Outline of experimental design.....	36
Table 2.1: Experimental design overview.....	94
Table 3.1: Summary of grammatical properties, cross-linguistic differences, and L1–L2 feature specifications.....	125
Table 4.1: Experimental design overview.....	126
Table 4.2: Overview of participant groups.....	129
Table 4.3: Summary of key background variables for the potential attriter groups (Means, Ranges, and Standard Deviations).....	132
Table 4.4: Summary of key background variables for control groups (Means, Ranges, and Standard Deviations).....	136
Table 4.5: Overview of AJTs and experimental conditions. German versions on the left and the corresponding Dutch, English, and Spanish AJTs and experiment conditions on the right.....	144
Table 4.6: Lists of tasks in order for all participant groups.....	147
Table 4.7: Feature specifications and DP structures of German and Dutch reflexives.....	150
Table 4.8: Experimental conditions for German and Dutch reflexives.....	152
Table 4.9: Grammatical Gender features in German and Dutch.....	154
Table 4.10: Experimental conditions for German and Dutch Grammatical Gender.....	155
Table 4.11: Feature specifications of German and English reflexives.....	159
Table 4.12: Experimental conditions for German and English reflexives.....	160
Table 4.13: Feature specifications underlying German and English main clause verb positions.....	161
Table 4.14: Experimental conditions for German and English Main Clause Verb Positions.....	162
Table 4.15: Feature specifications and structures underlying gender agreement on German and Spanish predicative adjectives.....	163

Table of Tables

Table 4.16: Experimental conditions for German and Spanish predicative adjective gender agreement.....	164
Table 4.17: Feature specifications underlying negation in German and Spanish.....	165
Table 4.18: Experimental conditions for German and Spanish negation.	166
Table 4.19: Experimental Design Overview and Predictions.....	170
Table 5.1: Summary of key L1 attrition and L2 acquisition findings from individual attriters.	214
Table 6.1: L1 Feature Reassembly accounts of observed L1 attrition.....	218

Table of Figures

Figure 2.1: The (inverted) Y/T Model of the Language Faculty Architecture.....	41
Figure 2.2: Unified Model of Grammatical Acquisition and Attrition ('Attrition via Acquisition Model') (Hicks and Domínguez, 2020a:152).	79
Figure 4.1: Example English test item with context, response scale and scale labels on dropdown list.	140
Figure 5.1: Reflexive Binding individual variation (L1 Attrition). Bold lines: group mean. Error bars: +/- 1 SD from the mean.	177
Figure 5.2: L2 Acquisition of Reflexive Binding (Individual L1 Attriters only). Error bars: +/- whole group SE.....	181
Figure 5.3: Grammatical Gender individual variation (L1 Attrition). Bold lines: group mean. Error bars: +/- 1 SD from the mean.....	182
Figure 5.4: Reflexive Binding individual variation (L1 Attrition). Bold lines: group mean. Error bars: +/- 1 SD from the mean.	186
Figure 5.5: L2 Acquisition of Reflexive Binding (Individual L1 Attriters only). Error bars: +/- whole group SE.....	190
Figure 5.6: Main Clause Verb Position individual variation (L1 Attrition). Bold lines: group mean. Error bars: +/- 1 SD from the mean.	191
Figure 5.7: L2 Acquisition of Main Clause Verb Position (Individual L1 Attriters only). Error bars: +/- whole group SE.....	196
Figure 5.8: Predicative Adjective Gender Agreement individual variation (L1 Attrition). Bold lines: group mean. Error bars: +/- 1 SD from the mean.	198
Figure 5.9: L2 Acquisition of Predicative Adjective Gender Agreement (Individual L1 Attriters only). Error bars: +/- whole group SE.	203
Figure 5.10: Negation individual variation (L1 Attrition). Bold lines: group mean. Error bars: +/- 1 SD from the mean.	204
Figure 5.11: L2 Acquisition of Negation (Individual L1 Attriters only). Error bars: +/- whole group SE.	212

List of Accompanying Materials

DOI [<https://doi.org/10.5258/SOTON/D2811>]

Research Thesis: Declaration of Authorship

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I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

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3. Where I have consulted the published work of others, this is always clearly attributed;
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6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission

Signature:Date:.....

Acknowledgements

First and foremost, I would like to thank my two supervisors, Glyn Hicks and Laura Domínguez, without whom this thesis would, in many ways, not have been possible. I mean this also literally in two regards. Firstly, it was Glyn who initially interviewed me as a prospective undergraduate at Southampton. If only he'd known at the time that he would be stuck teaching and supervising me for the next nine years in total he may never have accepted my application to the university in the first place! Secondly, the central aim of this thesis is to empirically test a theoretical model which both Glyn and Laura developed during my final year of undergraduate and my MSc year. This coincided with the time I was thinking of a suitable PhD topic. I am therefore grateful that they conceived of the model at this rather opportune moment as it provided me with a far more interesting PhD topic than my own original plans. In addition to his encouragement and patient support with various academic and also administrative aspects of this project, I am indebted to Glyn for his diligent reading of various draft chapters of this thesis and the extremely thorough and helpful feedback he provided. All aspects of this thesis have been much improved by those comments (Glyn, I do apologise for getting carried away with the writing of a number of sections which led to you having to read at least 15,000 words that never made it into the final cut). I am likewise grateful to Laura for her constant encouragement and belief both in me and this project, especially at times when I thought I had bitten off more than I could chew in terms of the scope of this study, and also for her company and support as I presented at a number of conferences during my time as a PhD student. In summary, I am very fortunate to have had such a formidable supervisory team.

In addition to Glyn and Laura, have benefited from the teaching and encouragement of a number of lectures during my time at Southampton. I am particularly grateful to Roumyana Slabakova for her teaching and support over the years. Not only this thesis but also my research skills more generally have greatly benefited from her experience, critical insights and for pushing me to develop my ideas further. Likewise, thanks go to Sarah Rule for her excellent teaching and always having time for my additional questions. Thanks to Adrian Sewell for the enjoyable experience of being taught German by him, and later alongside him (I will miss our almost daily chats in a various array of accents). I am very grateful to Mike Iverson for taking the time to read and exam this thesis and for his very helpful feedback during my viva. Finally, thanks to Ros Mitchell for her support at various conferences.

It has been a pleasure to be part of the CLLEAR research group at Southampton. Completing my PhD (or at least parts of it) alongside James Turner, James Corbet, Amy Wallington, Amber Dudley, Kefan Yang, and Eleonora Bognioni made the experience all the more enjoyable. My time as PhD student very fortunately coincided with the time that two Post-doctoral researchers, initially Eloi

Acknowledgements

Puig-Mayenco and later E Jamieson, were also at Southampton. I am very grateful to them both for their patience with my frequent questioning about various aspects of linguistics and research more generally (in particular to Eloi with whom I shared an office during the first year of my PhD and who therefore had no escape from my interrogations – I hope I didn't distract you too much), and for the advice they both provided work at those key initial stages of my PhD. I am likewise very grateful to Maira Busse, Laura-May Leaf, Mélanie van Barneveld, and Cristina Garcia Hermoso for giving their time and voices to the checking and audio recording of the experimental items, and of course also to everyone who participated in this research and to those who helped with recruitment in various ways. Special thanks go to James Turner for always lending an ear and his time and patience in answering my many questions about R and statistical analyses in general. I will miss our 2am linguistics chats.

I am grateful to the Economic and Social Research Council for funding both me and this project as part of a 1+3 PhD programme (Grant Number: ES/P000673/1) and to the journal Language Learning for a Language Learning Dissertation grant which contributed towards the participant payment costs of this study. Being part of the ESRC SCDTP not only allowed me to meet may researchers other disciplines, but also lead to several friendships which would likely not have happened otherwise.

On this note, it remains to thank my friends and family. I am very fortunate to have shared my PhD journey with James, Lizzie, Charlotte, and Ailish. I am grateful to you and also to Josh, Arjun, Michael, and Laura-May for keeping me (for the most part) just about sane these last few years, in particular through various Covid-19 lockdowns. If any of my family do end up reading any of this thesis, I know it will most likely be these acknowledgements that they read (Lyss, if you do start reading some of the thesis I will fully understand if boredom drives you to give up midway through chapter 1). If any of you are reading this, then thank you for everything else.

Definitions and Abbreviations

AI	Acquisitional Intake
AJT	Acceptability Judgment Task
AvA	Attrition via Acquisition
BH	Bottleneck Hypothesis
BP	Brazilian Portuguese
CLI	Cross-linguistic influence
CS.....	Caribbean Spanish
DN	Double Negation
EEG	Electroencephalogram
EN	Emphatic Negation
EP.....	European Portuguese
FR	Feature Reassembly
FRH	Feature Reassembly Hypothesis
IH	Interface Hypothesis
L1	First language
L2	Second language
LHQ.30.....	Language History Questionnaire 3.0
Ln	Second, third, and subsequent acquisition
LoR.....	Length of Residence
MS	Mainland Spanish
NC.....	Negative Concord
NCI.....	Negative Concord Item
NPI	Negative Polarity Item
NQ	Negative Quantifier
P&P.....	Principles and Parameters
PI.....	Perceptual Intake

Definitions and Abbreviations

PIT.....	Picture Identification Task
PLD.....	Primary Linguistic Data
SD	Standard Deviation
SE.....	Standard Error
TVJT	Truth Value Judgment Task
UB.....	Usage-Based
UG.....	Universal Grammar
WIT	Written Interpretation Task

Chapter 1 Introduction

1.1 The malleability of native adult grammars

A traditional view of language acquisition holds that by adulthood a speaker's first language (L1) is fully acquired and impervious to further change or influence for the remainder of their lifespan. At this stage the grammar is often described as 'stable' and 'end-state' or "'steady state'" (to use the terminology of Chomsky, 1980:37). This is a view that prevails among some researchers even quite recently (e.g., Gregg, 2010:553). Whilst the putative fortitude of a fully acquired L1 may hold for adult speakers who remain for the remainder of their lives in a linguistic environment largely similar to the one in which they grew up, this is not necessarily the case for speakers whose linguistic input changes significantly throughout their lifespan (e.g., people who emigrate in adulthood to a country in which a second language (L2) is spoken). After a period of time in this linguistic environment, such speakers may – whether they are conscious of it or not – comprehend, produce, and process their L1 in a manner that is both quantitatively and qualitatively distinguishable from their L1 counterparts who have not experienced such a change in their linguistic environment. This phenomenon of native language change is broadly referred to as 'L1 attrition', and speakers whose native language exhibits such changes are typically termed 'attriters'.

First language attrition is a multifaceted phenomenon which is modulated by the interaction of a number of intra- and extra-linguistic factors (e.g., length of residence in the L2 country, L1 use, education, affective factors etc.) that can vary significantly on an individual basis (space restrictions prevent a detailed discussion of these factors see, however, contributions in Schmid and Köpke, 2019 for recent overviews). Consequently, there exist various conceptualisations and implementations of the term 'L1 attrition' in multilingualism literature. It is therefore essential to highlight from the outset what is meant by 'L1 attrition' in this thesis.

'Attrition' is often used to refer to linguistic changes observed in the languages of various types of bilinguals. Most notably attrition is used to refer to changes in the L1s of late-sequential bilinguals who emigrate in adulthood to an L2-speaking country, to changes in Heritage language grammars and to changes observed in a previously acquired L2, termed 'L2 attrition' (see contributions in Schmid and Köpke, 2019 for recent overviews of attrition in Heritage grammars and L2 attrition). Schmid and Köpke (2017a, 2017b) propose the broadest conceptualisation of L1 attrition in which essentially all instances of cross-linguistic influence (CLI) detectable in the L1 are considered attrition. Accordingly, attrition can be observed – on some level(s) and to some degree – in the L1s of all late-sequential bilinguals, with some effects, such as those resulting from the co-activation of two languages in a bilingual mind, starting immediately at the onset of L2 acquisition. I

take a different standpoint in this thesis. Whilst acknowledging the potential difficulties – both empirical and conceptual – in making such a distinction (an issue highlighted by Schmid and Köpke), I follow researchers such as Gürel (2017), Montrul (2017), and Tsimpli (2017) i.a. in contending that a distinction between more general CLI on one hand, and attrition on the other, is warranted: thus not every bilingual is an attriter. Due to space constraints, a detailed consideration of the arguments for and against such a position is not provided here but see Schmid and Köpke (2017a, 2017b) and the commentaries on Schmid and Köpke's (2017a) keynote.

With this mind, I employ a much narrower application of the term 'attrition'. Unless otherwise specified, 'attrition' in this thesis is used to refer only to changes in fully acquired, adult L1s of late-sequential bilinguals or bi-dialectal speakers who have moved to a new linguistic environment in adulthood (the inclusion of the latter population will be elaborated further in 1.2.3.1). Likewise, unless otherwise stated, attrition studies referenced in this thesis are studies which test late-sequential bilinguals residing in an L2-speaking country or speakers who have become bi-dialectal in their L1 due to moving to a new linguistic environment in adulthood.

As highlighted by Schmid and Köpke (2017) much of the earlier attrition literature considered only L1 changes at the representational level – equated with linguistic competence – to constitute genuine instances of attrition. This position has since changed significantly in the last two decades, with widespread acceptance in the field that online effects such as changes to L1 processing, including lexical retrieval and fluency effects, should also be considered attrition. Attrition, thus defined, has been found to obtain in the L1s of such speakers for a variety of linguistic domains including the lexicon (e.g., Köpke, 1999; see Jarvis, 2019 for a recent overview), phonetics (e.g., Chang, 2012; De Leeuw, Mennen and Scobbie, J, 2013; see Chang, 2019; and De Leeuw, 2019 for recent overviews of phonetic drift and phonetic attrition respectively), phonology (e.g., De Leeuw, Tusha and Schmid, 2018; see Celata, 2019 for a recent overview), semantics and pragmatics (e.g., Miller and Rothman, 2019), and morphosyntax (e.g., Gürel, 2002, 2004a; Iverson, 2012). Attrition has been investigated and attested using a range of experimental methods including but not limited to: lexical retrieval and lexical diversity tasks (e.g., Ammerlaan, 1996; Schmid and Jarvis, 2014), free speech (e.g., Jackson, McDermott and Schmid, 2011; Bergmann *et al.*, 2016; see Bergmann, Sprenger and Schmid, 2015 for an overview), judgement and interpretation tasks (e.g., Gürel, 2004a; Tsimpli *et al.*, 2004; Iverson, 2012), and in various online processing experiments using a range of methodologies (for eye-tracking see e.g., Chamorro, Sturt and Sorace, 2016; and Dussias *et al.*, 2019 for a recent overview; for EEG studies see e.g., Kasparian and Steinhauer, 2017; and Steinhauer and Kasparian, 2019 for a recent overview). See Schmid (2011) for detailed discussion of methodology in attrition research.

In the field of attrition, it is widely noted that L1 morphosyntax and its interfaces appear particularly impervious to change in late-sequential bilinguals immersed in L2-speaking environments (Tsimpili, 2017:759). Nevertheless, it is acknowledged that fully acquired L1 morphosyntax has been found to be vulnerable – including at the representational level – under certain linguistic input conditions (Gürel, 2008; Hicks and Domínguez, 2020a). Identifying the input conditions that are conducive to such attrition is therefore of particular interest and importance for attempts to model the malleability of native adult grammars throughout the lifespan. With this in mind, this thesis seeks to contribute to the theoretical modelling of grammatical, specifically morphosyntactic, attrition in native adult grammars by investigating the role of linguistic input in this phenomenon within the Minimalist framework (Chomsky, 1993, 1995 et. seq.). The present study aims to investigate this phenomenon by testing the empirical validity of a recent, hitherto untested Minimalist model of grammatical attrition in which input plays a central role: The Attrition via Acquisition (AvA) Model (Hicks and Domínguez, 2020a, 2020b).

As with the more general term ‘attrition’, a number of definitions and conceptualisations of ‘grammatical attrition’ have been proposed. Space restrictions prevent further discussion of these definitions here. For now, it suffices to provide a definition of grammatical attrition which I assume as the starting point of the currently study. I take grammatical attrition to refer to any instance of modification or restructuring of L1 grammatical representations (which may obtain in the L1 phonology, semantics, morphology, or syntax) due to a significant change in the speaker’s primary linguistic data during adulthood (i.e., as a result of emigration where a speaker experiences prolonged exposure to a different linguistic input to the input with which they grew up).¹ Grammatical attrition can therefore be considered a specific instantiation of the broader phenomenon of attrition, which concerns changes to L1 representations i.e., competence, rather than being the result of online performance effects. This study exclusively investigates attrition of morphosyntax and thus, unless otherwise specified, in this thesis grammatical attrition refers only to changes to L1 morphosyntactic representations.

1.2 Research context and current challenges

The research paradigm in which the AvA model, and this thesis more broadly, is couched, is the Generative paradigm, and more specifically its most widely implemented incarnation: Minimalism (Chomsky, 1993, 1995, 1998, 2000, 2001a, 2001b, 2004, 2005, 2007 etc.). 1.2.1 provides a brief introduction to some aspects of the Generative/Minimalist approach which are relevant for

¹ As previously noted, attrition is enabled and conditioned by a complex interplay of multiple linguistic and extra-linguistic factors; however I take it as accepted that prolonged exposure to an input that is qualitatively different to the L1, coupled with decreased exposure to, and use of, this L1, is the single most crucial factor in determining the possibility of L1 grammatical attrition in adulthood (Sharwood-Smith and Van Buren, 1991:22-23).

understanding the key aims of the thesis and its broader theoretical context (2.2 provides a more detailed treatment of the aspects of Minimalism relevant for this study and 2.3 discusses Minimalist approaches to acquisition further). 1.2.2 justifies adopting this particular framework to investigate grammatical attrition. 1.2.3 highlights some key aspects of grammatical attrition as a phenomenon. 1.2.4 summarises the present state of grammatical attrition research and outlines two key research challenges for the field.

1.2.1 Generative (Minimalist) assumptions of language and language acquisition

The generative framework holds that language is a biologically endowed, and therefore innate, cognitive faculty unique to humans (see contributions in Roberts, 2016 for recent generative views on the language faculty). Research within this paradigm has focussed primarily on two broad areas: firstly, establishing an understanding of the cognitive architecture of the language faculty that generates linguistic structures, the nature of these structures, and how these structures are represented in speakers' minds; and secondly, explaining how this knowledge of linguistic structure is acquired by different populations of speakers.

Concerning the first area, two of the key theoretical assumptions of generative linguistics are firstly, that every human is born with Universal Grammar (UG); and secondly, that the mind of every speaker contains a mental grammar or 'I-language' (*Internal* language) representing their implicit and idiosyncratic knowledge of grammar.² In a recent overview, Roberts (2016a:3) highlights that the term 'UG' has been used primarily in two ways: Firstly to describe the innate, genetically endowed aspect of the human capacity for language itself (relating to the first assumption above); and secondly to describe the theory of this capacity (relating to the second assumption i.e., UG in this sense is a general theory of I-language –Freidin and Lasnik, 2011:1–2; Berwick and Chomsky, 2016:90)

Of central importance to this thesis is cross-linguistic morphosyntactic variation. A number of Minimalism-compatible approaches to such variation have been proposed. The thesis broadly assumes the most widely adopted approach, which posits that morphosyntactic information is encoded in functional features. These features are abstract grammatical properties (e.g., Case, Number, Definiteness), which are argued to be available from a universal repository as part of UG (e.g., Adger and Svenonius, 2011). Features are 'assembled' – or 'specified' – in specific combinations onto the functional lexical items (often also termed 'morpholexical items') of a language (Borer,

² Contrasted in the literature with 'E-language', which has been described as the external manifestations of I-language (Gallego, 2011:525). Roberts (2016a:7) highlights that although in UG literature 'I-language' and 'competence', are broadly co-terminus, 'E-language' and 'performance' typically are not, with performance referring specifically to factors relevant for the real-time use of language, such as working memory, lexical retrieval and processing factors, whilst E-language is far broader, referring to 'all notions of language which are not I-language' (ibid:7). However, within generative multilingualism literature (e.g., Kupisch *et al.*, 2020) performance and E-language are often equated.

1984; Chomsky, 1995, 2000, 2001). These features interact with the broader language faculty architecture to generate syntactic structure (discussed in 2.2.1). Whilst the architecture and computational operations of the language faculty are assumed to be invariant cross-linguistically, features are assembled in combinations specific to each language, or more precisely each speaker's I-language. Therefore, in this view, both cross-linguistic and intra-speaker variation are the result of different combinations of features specified on functional lexical items (Borer, 1984; Adger, 2006; Holmberg, 2010; Gallego, 2011).

We turn now to the second area of focus: acquisition. UG is argued to streamline the acquisition process by restricting the set of hypotheses available to the learner. Specifically, when a child attempts to abduct the correct grammar that generated a particular structure, they will only entertain the subset of hypotheses which are sanctioned by UG independent of their linguistic experience. In first language acquisition, the child evaluates these hypotheses through comparison with their Primary Linguistic Data (PLD). In terms of the formal features described above, this involves the learner assembling features into the relevant L1 functional lexical items in such a way that they faithfully match the combinations of form-feature mappings of the speaker's PLD. This ultimately constructs the mental representations of the particular speaker's grammar or I-language.

The prevailing assumption within current generative second language acquisition research – and the view assumed in this thesis – is that acquisition of an L2 grammar proceeds as follows. First the learner makes an identical copy of their L1, which constitutes the initial state of their L2 grammar (Schwartz and Sprouse, 1996). The learner then gradually performs a series of contrastive analyses of L1 and L2 properties as they are exposed to the L2. Based on the similar grammatical function of a particular linguistic structure, the L1 formal feature set is mapped onto the perceived corresponding L2 functional lexical item(s). These initial mappings may not be (fully) accurate. When these initial mappings are not entirely accurate, the task of the learner is to fine-tune the L2 feature sets by reassembling the features so that they faithfully match those of L2 input. This conceptualisation of L2 grammar construction via incremental modification to the initially transferred L1 feature bundles is known as Feature Reassembly (Lardiere, 2009a, 2009b) and this approach has become known as the Feature Reassembly Hypothesis (FRH). Such a view of language acquisition based on UG and an innate language faculty is able to account for a number of well-known observations about child and adult language acquisition (see Guasti, 2016 and Schwartz and Sprouse, 2016 for recent reviews of the role of UG in L1 and L2 acquisition respectively).

1.2.2 Minimalism and grammatical attrition

There are a number of motivations for assuming a Minimalist approach to grammatical attrition in this thesis. As highlighted by Gregg (1996) (following Cummins, 1983), both a *property* theory (a description of the nature of a speaker's linguistic knowledge) and a *transition* theory (an account of

how this knowledge is acquired) are needed for a complete account of acquisition. The same also applies to attrition, with the additional requirement that the transition theory must be able to account for how the previously acquired knowledge can be in-some-way modified or harder to access/differentially accessed in response to further changes in the linguistic input experienced by a speaker throughout their lifetime.

As will be discussed in more detail in 1.2.3.3 and further exemplified in 2.4, grammatical attrition is a highly selective phenomenon in that it appears to affect only certain L1 grammatical properties and the vulnerability of a given property is determined by the specific L1 and L2 cross-linguistic differences, such that the same property may be vulnerable in one L1–L2 combination but not another. Furthermore, grammatical attrition can manifest as intra-speaker grammatical variation. Therefore, any account of grammatical attrition requires a property theory which can adequately account for fine-grained cross-linguistic, as well as intra-speaker, grammatical variation in order to articulate in sufficient detail the nature of the L1 baseline grammar, the L2 grammar, how the attrited grammar deviates from this L1 baseline, and also allow for the formulation of precise predictions as to shape of possible deviations. It is contended here that a Minimalist (though not previous UG frameworks such as Principles and Parameters – see 1.4 for more detail) account of the grammar is the only account available to date which provides a property theory of sufficient granularity compatible with the selectivity of grammatical attrition attested by the empirical investigations. It will be argued in 1.2.4 that until recently Minimalism did not have a viable or adequate transition theory of grammatical attrition, however, the AvA Model investigated in this thesis represents a significant step in this direction. It is therefore reasoned here that Minimalism now has both an adequate property theory and also a viable transition theory of grammatical attrition. Empirically testing the viability of both this transition theory and also the property theory (i.e., the feature-based view of the grammar as applied to grammar attrition) is the central aim of this thesis.

In contrast, it has been acknowledged in the context of acquisition that the property theory provided by Emergentist/Usage-Based (UB) theories is often lacking (O’Grady, Lee and Kwak, 2009). This makes it a less suitable framework with which to model the highly selective modifications to attrited grammars attested in the literature. In particular, it is unclear how or whether mechanisms such as Entrenchment, central to such theories, can account for certain aspects of intra-speaker grammatical variation found in attrition contexts (specifically the optionality of L1–L2 structures in an attrited grammar). MacWhinney (2017) acknowledges that, more fundamentally, the overall resilience of L1 grammars despite long-term L1 disuse presents a challenge to UB approaches, in particular the Unified Competition Model (MacWhinney, 2005 et seq.) (i.e., these approaches predict

attrition to be far more prevalent than is actually the case).³ As de Bot (2017:680) summarises, the Usage-Based approach ‘is too unspecific to be testable’ for attrition at present.⁴ Indeed, as noted Schmid and Köpke (2017:647), the UB approach has so far not been empirically tested for attrition. Though space restrictions prevent further discussion, it is likewise contended here that purely neurolinguistic approaches – notably the Activation Threshold Hypothesis as applied to attrition (Paradis, 2007) – have similar shortcomings to UB approaches regarding attrition.

1.2.3 L1 grammatical attrition: key issues and characteristics

1.2.3.1 Input in L1 grammatical attrition

Two types of input are at play in grammatical attrition: The first will be termed ‘L1a’ (following the terminology of Domínguez and Hicks 2016). This is the input of the linguistic environment in which the speaker grew up. It constituted the speaker’s PLD during L1 acquisition and remained so until they moved to a new linguistic environment in adulthood (e.g., emigrated to a new country). The second type of input is the dominant linguistic input of the linguistic environment in which the speaker now lives, which has replaced the L1a as the speaker’s new PLD. As argued by Domínguez (2013:169), this input can come in two forms. The first is input from a second language (L2), typically the dominant language(s) of a new country into which the speaker has settled. Traditionally, the influence of the L2 on the L1 is the most commonly attributed cause of attrition in adulthood. However, another, lesser-acknowledged and lesser-investigated type of input can also be responsible for L1 change. This input is termed ‘L1b’ (again following Domínguez and Hicks 2016). L1b refers here to a variety (e.g., a dialect or already attrited speech, as may be found in an L1 expat community – see for example Laufer and Baladzaeva, 2015 and Baladzaeva and Laufer, 2017 for an instance of the latter) of the L1 that is to some degree grammatically distinct from the L1a. In both cases, significant L1b/L2 exposure entails decreased L1a exposure in the “new” linguistic environment. As the current study does not focus cases of L1b-induced attrition, the L1a will be referred to simply as the ‘L1’ throughout, unless specific contrast to an L1b is made, in which case L1a is used for clarity.⁵

Examples of L1a changes induced by contact with L1bs are increasingly attested in the literature (e.g., Köpke, 2001; Otheguy and Zentella, 2012; Domínguez, 2013; Laufer and Baladzaeva,

³ This is essentially the opposite problem to the problem the UG approach has: occurrence of attrition in the first place is difficult to reconcile with traditional UG models of the language faculty (to be discussed further in 1.2.4 and 1.4).

⁴ Though, for transparency, it should be noted that he is equally critical of the UG approach, claiming that it has the opposite problem of being ‘too specific’ to account for the ‘messy data’ of L1 attrition (ibid:680).

⁵ Another potential form which an L1b could take would be input provided by non-native speakers of that L1. For example, a native English speaker who has moved to Italy could find themselves communicating primarily or even exclusively in English but with L1 Italian speakers. Depending on the native Italian speakers’ English proficiency, the native English speaker’s PLD could contain a multitude of grammatical features which are not present in their L1a. In principle, this input could affect the L1a in a similar manner to cases where the L1b is a dialect or already attrited speech, or indeed where attrition is L2-induced, as in this case the L1 could plausibly become more L2-like without the speaker actually receiving significant exposure to the L2 directly. To the best of my knowledge, this possibility has not been tested to date and thus this discussion remains anecdotal and speculative. As such, it is not discussed further in this thesis but left to future research.

2015; Baladzhaeva and Laufer, 2017; Castro, Rothman and Westergaard, 2017, 2020 etc.) and acknowledged by many others (e.g., Domínguez and Hicks, 2016; Hicks and Domínguez, 2020a; Köpke, 2004, 2007; Schmid, 2007; Schmid and Köpke, 2017). Although L1b-induced changes may not traditionally be considered as an instance of L1 attrition, such change conforms to the definition of grammatical attrition assumed in this thesis and previous definitions (e.g. Gürel and Yılmaz, 2011:38). I consider L2 and L1b contact-induced attrition to be instances of the same phenomenon. This is partly due to the difficulty and questionable validity of distinguishing dialects of the same language from typologically very similar L2s (Schmid and Köpke, 2017:652), but primarily based on the understanding that the same linguistic processes give rise to attrition in both contexts, which result in broadly the same outcomes in the L1a (Hicks and Domínguez 2020a, 2020b).⁶

1.2.3.2 The vulnerability of L1 grammatical representations

A ubiquitous acknowledgement in L1 attrition literature is that morphosyntax, in particular core syntax, remains largely impervious to change in the mature L1 grammars of late-sequential bilinguals residing in an L2-speaking country (Gürel, 2008; Montrul, 2008; Schmid, 2011, 2013; Domínguez, 2013; Tsimpli, 2017; Hicks and Domínguez, 2020a among many others) even when the length of residence in the L1 environment spans several decades (de Bot and Clyne, 1994; Hutz, 2004). This is particularly striking compared to the prevalence of findings attesting vulnerability of the L1 in areas such as lexical access and verbal fluency in this same population of speakers (see Schmid and Köpke, 2017 for discussion of the latter areas). Nevertheless, research over the last four decades has amassed a wealth of empirical evidence for attrition of L1 morphosyntax and its interfaces in the adult grammars of late-sequential bilinguals and bi-dialectal speakers, as measured by divergences from a baseline of L1 speakers who have not emigrated (see, for example, Klein, 1980; Altenberg, 1991; Grosjean and Py, 1991; Pelc, 2001; Pavlenko and Jarvis, 2002; Schmid, 2002; Jarvis, 2003; Gürel, 2004b; Sánchez-Muñoz, 2004; Tsimpli *et al.*, 2004; Gürel, 2004a; Ramírez, 2007; Negrisanu, 2008; Keijzer, 2010; Ribbert and Kuiken, 2010; Stolberg and Münch, 2010; Cuza, 2010; Gürel and Yılmaz, 2011; Lubińska, 2011; Perpiñán, 2011; Cazzoli-Goeta and Young-Scholten, 2011; Iverson, 2012; Otheguy and Zentella, 2012; Montrul and Sánchez-Walker, 2013; Domínguez, 2013; Montrul, 2014; Kaltsa, Tsimpli and Rothman, 2015; Laufer and Baladzhaeva, 2015; Montrul, Bhatt and Girju, 2015; Kasparian and Steinhauer, 2017; Castro, Rothman and Westergaard, 2017, 2020; Genevska-

⁶ That is not to say there are no potential differences between L2 and L1b contact-induced attrition – see Iverson (2020) and Hicks and Domínguez (2020a:156) for discussion of cases in which the L1b is an L1 dialect, and also Köpke (2001), who proposes a strong distinction in outcomes when the L1b is the speech of other expats in the L2 country. Specifically, she argues, based on her findings, that speakers who have little or no L1 contact (but majority L2 contact) will predominately experience L1 performance changes only, whilst those who have continued L1 contact with other expats in the L2 country (who may themselves be attrited, or speakers of a different L1 dialects) are more likely to experience L1 competence changes.

Hanke, 2017; Caloi, Belletti and Poletto, 2018).⁷ As concluded by Gürel (2008:447) reviewing three volumes of work on attrition: ‘...however slow and limited, L1 attrition of morphosyntax is possible’. Attrition of core syntax appears rarer still, with convincing evidence provided by only a very limited number of the above studies (e.g., Iverson, 2012; Kasparian and Steinhauer, 2017).

In light of this evidence for morphosyntactic attrition effects, an enduring and highly contentious issue in the field is whether such attrition is actually the result of the grammatical representations themselves being modified: the question of whether attrition affects linguistic competence or performance – or both – has long been a point of discussion (e.g., Sharwood-Smith, 1989; Seliger and Vago, 1991b; Sharwood-Smith and Van Buren, 1991; Köpke, 2007). This point is crucial for this thesis which conceptualises grammatical attrition as modification to L1 grammatical representations in adulthood.

A number of scholars, including those within the Generative framework (e.g., Bardovi-Harlig and Stringer, 2019; Stringer, 2020) question whether modification to the L1 grammatical representations of late-sequential bilinguals is in fact attested, whilst others (Chamorro and Sorace, 2019; Sorace, 2020) have outright refuted that such modification is attested or even possible. Bardovi-Harlig and Stringer (2019) and Stringer (2020) for example, suggest that hitherto attested morphosyntactic attrition is actually a result of cross-linguistic influence on the processing of certain grammatical structures or perhaps, in more extreme cases, the result of lexical attrition which can ultimately have morphosyntactic consequences.⁸ Others argue that grammatical competence is never vulnerable, not even indirectly, and processing differences between attriters and (typically monolingual) controls are the sole source of apparent grammatical differences in attrited grammars (see Chamorro and Sorace, 2019 for a recent overview of these arguments in the context of the Interface Hypothesis, which is discussed in detail in 2.4.1).⁹ On the other hand, whilst many researchers remain more agnostic or avoid this issue entirely when interpreting their results, others (often those working within the Generative framework) explicitly interpret their results as indicative of changes to the morphosyntactic representations themselves (e.g., Gürel, 2002, 2004b; Tsimpli *et al.*, 2004; Iverson, 2012; Domínguez, 2013; Domínguez and Hicks, 2016).

⁷ A few notes on this list are warranted: Firstly, care was taken when compiling this list to ensure these studies attest some attrition of morphosyntax and/or its interfaces in adult, late-sequential bilingual grammars (some studies here also test other populations of bilinguals). Many previous reviews and collected volumes of work of this phenomenon, particularly earlier ones (e.g., Seliger and Vago, 1991a), also include studies looking at child Heritage language speakers and/or early bilinguals, however this is often not made clear in their discussions. Secondly, the studies demonstrate very varying degrees of attrition. Many earlier studies did not employ control groups or robust statistical measures, so it is not fully clear whether the attrited grammars actually deviate significantly from a baseline or not; in these cases, studies were mainly included based on their author(s) concluding that grammatical attrition was evident. Furthermore, studies often only analyse results at a group level, thus there may be further evidence for grammatical attrition found only among individual participants in these studies and others.

⁸ Bardovi-Harlig and Stringer (2019) primarily discuss L2 attrition, though in their argumentation they draw heavily on studies of L1 attrition and apply their proposals to all types of non-pathological attrition. Stringer (2020) specifically discusses L1 attrition in late-sequential adult bilinguals.

⁹ Note that although both of these accounts appeal to processing as the cause of apparent morphosyntactic attrition effects, there are key differences in the details. Space restrictions prevent further discussion here.

In a recent review, Schmid and De Leeuw (2019:184) consider that attrition ‘constitutes both online and representational changes’ whilst also making the important point that in many cases it can be difficult to conclude categorically whether a change is representational or due to performance, or both. Whilst acknowledging the issue highlighted by Schmid and De Leeuw (*ibid*), this thesis proceeds from the view that the available findings can be interpreted as indicating that grammatical representations themselves can be vulnerable. This matter is discussed throughout 2.4 with reference to the empirical studies considered there, and again in 6.2.1 in light of the results of the current empirical study.

1.2.3.3 Manifestations of L1 grammatical attrition

L1 grammatical attrition as defined in this thesis can manifest in number of ways depending on the particular cross-linguistic differences of the languages in contact. In 2.4, specific examples of attested changes are considered. For now, it suffices to make one general observation regarding the types of structures that appear to be vulnerable to attrition, and to note that there appear to be two main ways in which attrition can obtain in the L1 grammar for such structures.

Firstly, it is worth reiterating that one of the defining characteristics of attrition is that it affects the L1 in a highly selective and fine-grained manner (often termed the ‘selectivity of attrition’ following Gürel, 2004b): that is, in the same context (i.e., same language pairing, same speakers) certain grammatical properties of the L1 appear to be more vulnerable to attrition, undergoing sometimes quite dramatic change, whereas other properties within the same L1 grammar are more, or wholly, resilient.

Regarding the type of structures which appear vulnerable, it appears that grammatical attrition obtains predominately (perhaps exclusively) for L1a structures which have an in-some-way analogous or corresponding form in the L1a and L1b/L2, yet for which there are differences in their behaviour (for example overt subjects in a null-subject and non-null-subject language pairing). The need for some kind of formal equivalence yet also degree of divergence between an L1 and L2 structure as a pre-requisite for attrition has been widely recognised (Altenberg, 1991; Paradis, 2007; Schmid, 2007; Gürel, 2008; Gürel and Yılmaz, 2011; Domínguez, 2013; Schmid and Köpke, 2017a; Hicks and Domínguez, 2020a; Schmid, Soto and Heimann, 2022). To use the phrasing of Schmid and Köpke (2017a:643), there appears to be a need for ‘a compatible “launch pad” and “landing site” for transfer effects’. Though generally not explicit in many generative theories of attrition, this prediction is made explicit in Paradis’s Activation Threshold Hypothesis as applied to attrition (Paradis, 2007), which predicts attrition only for L1 forms which are in competition with an equivalent L2 form. Likewise, it is argued that, within the UB framework, the Competition Model (MacWhinney, 2005) as applied to attrition would make this same prediction (see Schmid, Soto and Heimann, 2022 for discussion). This will be considered further in the discussion of the empirical

studies reviewed in 2.4 and the concept of equivalent/analogous forms specified more formally in terms relevant for grammatical attrition within a Minimalist approach.

In attrited grammars, the behaviour of these L1a structures may converge (to varying degrees) on the behaviour of the analogous/corresponding L1b/L2 property, resulting in L1b/L2 characteristics manifesting in the L1 grammar. Research to date indicates there to be at least two main ways in which this is achieved. These will be termed ‘supplementing’ and ‘supplanting’ in this thesis. These are similar in their conceptualisation to, and aim to describe the same two patterns of attrition as, ‘restructuring transfer’ and ‘convergence’ respectively in the classification framework outlined in Pavlenko (2000:179). In cases of supplementing, L1b/L2 options may be added to the L1a grammar (e.g., word orders that are grammatical in the L1a and word orders that are only grammatical based on the L1b/L2 grammar may co-exist in the same attrited L1a grammar). This can result in optionality between the L1a and L1b/L2 options in production, comprehension, and judgement tasks (e.g., Pavlenko, 2000:179; Tsimpli *et al.*, 2004; Gürel and Yılmaz, 2011 etc.), which often manifests as a change in the distribution of certain elements or structures without actual “loss” (see also Hicks and Domínguez, 2020a, 2020b for discussion). The choice of which grammatical option is used by the speaker likely depends on a number of linguistic and extra-linguistic conditioning factors (see Smith and Adger, 2005 and Adger and Smith, 2010 for some discussion in the context of grammatical dialectal variation). In the case of supplanting, L1b/L2 grammatical options may replace L1a options (e.g., a word order only grammatical in the L1b/L2 grammar replaces the equivalent L1a word order as the only possible order for in the attrited grammar). The latter appears to be a less frequently attested outcome than the first as L1a grammatical options rarely seem to be completely “lost” or “abandoned” in either production, comprehension, or judgement tasks. For example, it is very seldom reported that attriters categorically reject/no longer use word orders that are grammatical in their L1, or that licit L1 interpretations become wholly unavailable to them. A noted exception to this is the data of Iverson (2012), which presents evidence of very significant L1 grammatical restructuring (to be discussed in detail in 2.4.1).¹⁰

In both cases (supplementing or supplanting), the L1 appears to diverge from the L1s of speakers who have not emigrated by exhibiting influence from L2 grammatical patterns, sometimes even converging on the L2 grammar to the point where the attrited L1 patterns are no longer not statistically distinguishable from the L2 patterns. It remains an open empirical question as to whether further types modification to L1 grammars are possible; a question which further research testing a broader range of grammatical properties and, crucially, with a wider variety of methodological measures is needed to answer (see also 6.4). Significantly then, the results from grammatical

¹⁰ Whether the L1 grammar has been supplanted or supplemented is of course more obvious with certain types of grammatical properties and in certain language combinations, and with certain types of task.

attrition studies suggest that grammatical attrition should be framed in terms of structured and predictable modification, rather than simply “erosion” or “loss”, as has traditionally been the case for describing and understanding attrition more broadly (see Schmid and Köpke, 2017b for recent discussion of the term ‘attrition’).

1.2.4 The current state of affairs: Two major challenges for modelling L1 grammatical attrition

First language attrition has historically been seen as a subfield of research into language contact rather than belonging to the fields of language acquisition and bilingualism (Schmid, 2013:1). L1 attrition in adults has thus until fairly recently received less attention from scholars relative to other areas of multilingualism and language contact. It is a field in which many of the major theoretical and empirical questions remain very much open and a comprehensive, empirically informed understanding of the causes, and mechanisms and outcomes of L1 attrition – as well as its potential insights for other areas of linguistics – remains to be achieved.

This is particularly the case for attrition of grammatical competence in adults, which has generally received less attention than attrition of L1 performance (Hicks and Domínguez, 2020a:143–144; Schmid, 2020:201). Grammatical attrition is thus an under-researched area in an already under-researched field of linguistic enquiry. Consequently (grammatical) attrition remains difficult to adequately account for and in particular predict, as is frequently emphasized in the literature (e.g., Schmid and de Bot, 2004; Schmid and Dusseldorp, 2010; Schmid and Köpke, 2017a; Hicks and Domínguez, 2020a).

Theoretically modelling grammatical attrition therefore remains a significant research challenge. Specifically, there appears to be two key, interrelated challenges for the field. Firstly, there is the matter of predicting which grammatical properties/structures of the L1 will attrite and under what circumstances. This involves not only identifying such structures, but also predicting how they may be modified and what their resultant behaviour will be. Secondly, there is the challenge of accounting for grammatical attrition as a possible, though simultaneously rare, outcome of sustained language contact permitted by the language faculty architecture. This involves describing the mechanisms that not only initially give rise to this process, but also those that constrain it. Subsequently, a further crucial step for the field is to reconcile such L1 changes with models of acquisition and multilingualism (Schmid and Köpke, 2017:639), and also with models of the language faculty more generally (Domínguez, 2013). Considering both Generative and Emergentist/UB theories, de Bot (2017) notes that no existing theory can accommodate both acquisition and attrition. This second challenge is identified and considered in detail by Domínguez (2013, ch.5) and in particular by Hicks and Domínguez (2020a, 2020b), who take up this exact challenge with their conception of the Attrition via Acquisition Model.

1.2.4.1 Challenge I

The field is still in its infancy when it comes to successfully predicting grammatical attrition outcomes. A significant milestone for generative research into attrition was the application of the Interface Hypothesis (IH) (Sorace, 2000, 2011; Tsimplici *et al.*, 2004; Chamorro and Sorace, 2019 etc.) to attrition. This was the first generative (Minimalist) model of attrition. It has been widely tested and has yielded significant insights into attrition research. However, I argue in detail in 2.4.1 that there exists convincing counterevidence to the IH's predictions and viable alternative explanations of the data used in support of this hypothesis. I therefore contend that no existing theory, generative or otherwise, that has undergone robust empirical investigation can adequately and accurately predict and account for the range of attested grammatical attrition outcomes (see 2.4 for a detailed review of key previous study and 2.4.5 for a summary of this review).

A serious challenge for predicting grammatical attrition (and attrition more broadly) is the range of possible linguistic outcomes that may arise in language contact situations and the myriad of factors, both linguistic and extra-linguistic, that are brought to bear on this process. This challenge is further exacerbated by a number of additional findings. Firstly, even when grammatical attrition is attested, results are often subject to significant individual variation (Köpke and Schmid, 2004; Köpke, 2007). Secondly, as noted earlier, grammatical attrition is an especially rare outcome of sustained intra-generational language contact, even for the specific grammatical properties which have been found to be vulnerable and under input conditions which have been found to be conducive to attrition.¹¹ Compared to the interrelated fields of L1 and L2 acquisition, there are considerably fewer empirical (adult) attrition studies, and in particular fewer ones which set out to test various hypotheses rather than having a purely descriptive scope (see Schmid, 2009 for an overview of this earlier research). Furthermore, as will be illustrated in 2.4, many of the studies which do aim to test hypotheses regarding the selectivity of attrition have empirically tested a rather small range of grammatical properties, most noticeably pronominal use/interpretation and predominately in null subject L1s (see Gürel, 2019 for a recent overview of research into the attrition of this property). This results in hypotheses and models being based on a somewhat narrow set of data, reducing the strength of their empirical coverage and explanatory adequacy.

The role of input, specifically that of cross-linguistic similarity, in enabling attrition in the first place, as well as its potential utility in predicting attrition, has featured heavily in previous discussions of grammatical attrition (Sharwood-Smith, 1983, 1989; Altenberg, 1991; Paradis, 2000; Köpke, 2007; Gürel, 2008; Castro, Rothman and Westergaard, 2017; Schmid and Köpke, 2017). Previous research

¹¹ Although, if L1b-induced attrition is also counted as attrition then the phenomenon might not be as rare as often assumed (Hicks and Domínguez, 2020b:236).

has primarily considered cross-linguistic similarity at the level of individual grammatical properties/structures, with the general consensus being that some form of formal equivalence between L1 and L2 structures is a pre-requisite of L2-induced attrition (see 1.2.3.3 for references). A pertinent question here for grammatical attrition is whether structural similarity plays any further role for these equivalent structures which are potentially vulnerable to attrition i.e., are more structurally similar structures more likely to attrite, or/and perhaps more likely to show more significant statistical deviations from a baseline, or/and perhaps likely to undergo attrition sooner compared to structures which, although still having equivalents in the L1 and L2, are more structurally *dissimilar*? Although studies frequently test multiple grammatical properties/structures, to the best of my knowledge no study has yet attempted to quantify structural similarity at the level of individual morphosyntactic properties/structures and explicitly investigate the role of such structural similarity in grammatical attrition.

A closely related question is whether cross-linguistic similarity at the language level (i.e., the overall typological or holistic similarity of the two languages, taking into account also the broader phonological and lexical similarity of the languages in addition to morphosyntactic similarity at the level of individual structures) plays any determinant role in the likelihood, degree, or timing (i.e., how soon after emigration) grammatical attrition begins to set in (a question raised by Iverson, 2020). The role of typological or holistic similarity has featured heavily in debates on cross-linguistic influence in the context of L3 transfer over the last decade and been subjected to rigorous systematic empirical investigation (see Rothman, González Alonso and Puig-Mayenco, 2019 for an overview). However, there has been comparatively less discussion and very few attempts to systematically investigate this in attrition research.

Previous studies have investigated attrition under a variety of different types of input ranging from those that are typologically very similar (yet still distinct in some properties) e.g., those that look at the effect of L1b contact (e.g., Otheguy and Zentella, 2012), to L2 input from languages that are typologically and diachronically closely related e.g., German and Dutch (Ribbert and Kuiken, 2010), to L2 input from typological distant languages e.g., English and Turkish (Gürel, 2002, 2004a, 2007). However, the empirical picture yielded by these studies is rather mixed: Although attrition is attested for closely related languages (e.g., Ribbert and Kuiken, 2010), this is not always the case even with the same L1–L2 combination (compare Ribbert with Kuiken, 2010 and Jackson, McDermott and Schmid, 2011), and attrition is also attested in typologically quite distant languages in some cases (e.g., Gürel, 2002, 2004a, 2004b) but not in others, even for broadly the same properties when the L1–L2 order is reversed (compare the three aforementioned studies by Gürel with Gürel, 2007). Although based on a relatively small number of studies, one pattern which seems to be beginning to emerge is that attrition appears more frequently attested in L1a–L1b contact situations when compared to L1a–L2 contexts. This conclusion is necessarily drawn on the basis of comparison

between separate studies which have tested L1a–L1b and ones which have tested L1–L2 as, to the best of my knowledge, only one study has ever directly compared the two contexts: Domínguez (2013), the results of which are discussed in detail in 2.4.3. For the same grammatical property this study found more attrition in the L1a–L1b group compared to the L1a–L2 group.

It may be the case that only similarity at the level of individual structures (i.e., the availability of analogous yet in some way divergent structures in both languages) modulates attrition, in which case more widespread attrition would likely be expected in cases where the L1b/L2 is holistically more similar simply due to there being a greater number of these potentially vulnerable structures. However, the fact that only a very small number of studies investigate multiple language pairs further limits our understanding of the role of input in attrition (Schmid and De Leeuw, 2019:187). No study has yet robustly compared the influence of two or more L2s of different typological proximity on an L1 grammar.

To the best of my knowledge, only three studies to date investigate grammatical attrition in an experimental design with inputs of varying typological similarity. Gürel and Yılmaz (2011) look at pronominal binding in Turkish under the influence of two different L2s: Dutch and English, which exhibit the same patterns of pronominal binding in the tested structures. They find the same patterns of attrition under the influence of both languages. They argue that this confirms the influence of the L2 in inducing attrition. However, the difference in the degree of typological or holistic similarity between Turkish and English on one hand, and Turkish and Dutch on the other, is very slight, and it is not clear whether such slight differences could be expected to result in detectable differences in the likelihood of attrition obtaining, or the degree of attrition that would obtain, in these two language pairs. Jackson, McDermott and Schmid (2011) investigate L1 German with L2 English and Dutch, however for the syntactic property tested (V2 main clauses) German and Dutch are the same, so attrition would not be expected in this language pair regardless. Therefore, this experimental design does not constitute a fair test of the role of typological similarity (nor, to be fair, was this the explicit intention of the authors in conducting this study). An experimental design in which one of the L2s is clearly more holistically or typologically similar to the L1 than the other L2, and which tests a grammatical property potentially vulnerable to attrition in both language combinations is required to properly investigate this. Exactly this kind of design is utilised in Domínguez (2013), which investigates L1a Cuban Spanish with L1b Miami Spanish and L2 English and finds more widespread attrition in the L1a–L1b pair than the L1a–L2. It would much benefit our understanding of the role of input in attrition to employ this kind of design in studies with multiple L2s, in addition to further dialect-contact situations.

Inevitably structural similarity and holistic similarity are, to a degree, inextricable in that the former contributes to the latter. However, with the appropriate experimental design these factors

can to an extent be teased apart. Results from such an experimental design could prove highly informative for generating more specific predictions regarding grammatical attrition patterns, as well as a greater understanding of the role of input in language contact situations more generally. The experimental design of this current study aims to do just this, as outlined below in 1.3 (see 4.2 for a detailed overview and justification of the experimental design).

1.2.4.2 Challenge II

The second challenge (giving an account of the mechanisms that give rise to and constrain attrition and reconciling these with models of multilingualism and the language faculty) has, until recently, received little attention from scholars. A key problem here is what Hicks and Domínguez (2020a:144) term 'the paradox of L1 attrition': the previously noted observation that although grammatical attrition is a possible outcome of bilingualism permitted by the language faculty architecture, it is relatively seldom attested. They argue that any model of grammatical attrition, bilingualism, and also any comprehensive model of the language faculty in general, must be able to account for this apparent paradox.

As noted in 1.2.4.1, the Interface Hypothesis represented a significant theoretical advancement in grammatical attrition research. However, in addition to arguing that there is convincing counterevidence to its predictions in 2.4.1, I submit here that it is further unsuitable to be a model of grammatical attrition on two grounds. Firstly, in its most up-to-date form it explicitly excludes the possibility of changes to L1 grammatical representations (Chamorro and Sorace, 2019:30). This is precisely the kind of change grammatical attrition refers to in this thesis and the conceptualisation of attrition assumed by the AvA model which this thesis investigates. Secondly, even in its earlier incarnations which permitted modification to L1 representations, it cannot serve as an adequate and complete transition theory of grammatical attrition. That is to say, though it can make predictions as to which grammatical properties are vulnerable to attrition, it is not an account of the linguistic mechanisms (not just the grammatical mechanisms but also the relevant input conditions) which give rise to L1 modifications in the first place. Consequently, the IH is not viable as a model of grammatical attrition. See also Hicks and Domínguez (2020a) who argue that the IH does not meet their three requirements for a model of grammatical attrition.

Recently, Hicks and Domínguez (2020a, 2020b) make a significant advancement in modelling grammatical attrition by conceiving of a model that can address both challenges discussed here: The Attrition via Acquisition Model. The model, based on Lidz and Gagliardi's (2015) model of L1 acquisition, is the first Generative (Minimalist) model of the language faculty architecture which can accommodate both acquisition (L1 and also L2, Ln) as well as attrition by acknowledging a continued role of input in the maintenance of the L1 in adulthood. Specifically, the model gives an account of

how, and under what linguistic and extralinguistic conditions, grammatical representations in adult L1 grammars can be modified.

The AvA model establishes a set of linguistic conditions which must be met for attrition to obtain. From these conditions, ‘specific predictions about the input and intake conditions that favor and disfavor attrition’ can be made (Hicks and Domínguez, 2020a:1). Briefly, in the model, the possibility of attrition is determined by availability of two types of intake (broadly defined as processed input which has been assigned a representation on some linguistic level), the ease with which they can be generated from the input, and the potential for Feature Reassembly (FR) of a previously acquired L1 structure. These factors are mediated by the cross-linguistic similarities and differences between the L1b/L2 input and the native grammar as well as L2 acquisition (Hicks and Domínguez, 2020b:235). More specifically, taken together these conditions entail predictions of attrition for L1 structures which have an analogous/equivalent (yet in some way divergent) L1b/L2 structure, and that the overall holistic similarity of the L2 input will modulate grammatical attrition (to be discussed in detail in 2.4.6.3).

1.3 The empirical study

This study aims not only to test the empirical validity of the AvA in its current form model (Hicks and Domínguez, 2020a, 2020b), but also to contribute to developing its predictive power by systematically investigating the role of cross-linguistic structural similarity at the level of individual grammatical structures. The model assumes a Minimalist, feature-based account of the grammar and that L1 attrition obtains via L2 acquisition – which itself obtains via FR. Therefore, this thesis attempts to formalise and quantify cross-linguistic structural similarity in attrition in Minimalist terms as the relative complexity of FR required for the attrition of a given L1 grammatical structure i.e., as the degree of grammatical restructuring required for the L1 structure to match the feature specifications of the equivalent L2 structure. In this approach then, an L1 structure which requires less complex FR to attrite is more structurally similar in the L1 and L2 relative to an L1 structure which requires more complex FR to attrite. Drawing from previous work on FR complexity in the context of L2 acquisition and work considering the complexity of grammatical changes to Heritage language grammars, a set of criteria which formalises and quantifies FR complexity in L1 grammatical attrition is devised in 2.4.6.3.4.1 and used as the basis of predictions for the empirical study.

An experimental design which utilises multiple linguistic contexts with different input types and with different grammatical phenomena is proposed to thoroughly test the model and the role of cross-linguistic similarity in attrition more generally. Specifically, this investigation will test three groups of L1 German speakers with long-term residence, starting in adulthood, in either the Netherlands, the UK or Spain. The potential attriters’ L2s therefore differ systematically in their

holistic similarity to the L1. Two morphosyntactic properties, which differ in the relative complexity of FR necessary for attrition according to the metric devised in 2.4.6.3.4.1, are tested in each language pair. This design is schematised in Table 1.1 below (the model itself is discussed in detail in 2.4.6, and the experimental design and predictions in Chapter 4).¹²

L1	L2 (Speakers' current PLD)	Grammatical Property and Relative Complexity of Feature Reassembly
German (Germany) – Speakers' native grammar. PLD during L1 acquisition.	L2: Dutch (Netherlands) – Holistically very similar L2.	a) Reflexive Binding Less Complex FR
		b) Grammatical Gender More Complex FR
	L2: English (UK) – Holistically similar L2.	a) Reflexive Binding Less Complex FR
		b) Main Clause Verb Position More Complex FR
	L2: Spanish (Spain) – Holistically less similar L2.	a) Predicative Adjective Agreement Less Complex FR
		b) Negation More Complex FR

Table 1.1: Outline of experimental design.

As such this will be (to the best of my knowledge) the first study to compare attrition under the influence of three holistically different L2 inputs, to test such a range of morphosyntactic properties, and to investigate the role of FR complexity in attrition. Furthermore, it will add to the very small number of attrition studies which test potential attriters in their L2 as well as their L1 – and is the first study to do so across multiple language combinations – in order to further investigate the relationship between L2 acquisition and L1 attrition. Results are analysed in light of the AvA model's predictions and potential modifications to the model are proposed. This study aims to yield informative results regarding the kind of grammatical properties vulnerable to attrition, the nature of the resultant grammatical changes, and the input conditions conducive to attrition. It is also

¹² Following many scholars working on L3 acquisition, the term 'holistic similarity', rather than 'typological similarity', is used henceforth to refer to overall similarity at the language level, as usage of the latter in this manner is frequently more contentious. The second dimension of similarity considered, similarity at the level of individual morphosyntactic structures, will be referred to as simply as 'structural similarity'.

suggested in 6.4 that this study demonstrates the utility of certain methodological considerations for investigating representational changes to mature adult grammars relevant for future experimental research in this area. It is hoped that this thesis can make a significant and novel contribution not only to modelling L1 grammatical attrition, but also to broader attrition research by contributing to our knowledge of the role of input and cross-linguistic differences in this process, and to research into multilingualism across the lifespan more generally.

1.3.1 Research Questions

In order to investigate the AvA model and the role of input and cross-linguistic similarity in L1 grammatical attrition more broadly, this study seeks to answer the following research questions:

- 1) Does the L1 German grammar differ from the baseline on any of the morphosyntactic properties in any of the three linguistic contexts? If so, how are these divergences manifested and how can this be accounted for in terms of reassembly of the L1 features?
- 2) To what extent does the L1–L2 holistic similarity modulate L1 attrition of these morphosyntactic properties?
- 3) To what extent does the structural similarity of the morphosyntactic properties – formalised as the complexity of Feature Reassembly required for the attrition of an L1 structure – modulate attrition of these properties?

1.4 Broader significance of the study

Experimental language acquisition research has had far-reaching ramifications for other areas of linguistics, perhaps most notably in formal linguistic theory, models of processing, and models of the language faculty architecture. L1 grammatical attrition could likewise yield significant insights in these areas and also for first and second language acquisition, in particular relating to our understanding of the role of PLD and linguistic input more generally in adulthood, the maintenance of linguistic knowledge across the lifespan, contact-induced intra-generational linguistic change, and intra- and inter-speaker grammatical variation.

To give some examples, Schmid and Köpcke (2017) discuss at length how attrition can inform theories of bilingual development, considering both UG and Usage-Based approaches.¹³ Both Keijzer

¹³ Though see de Bot (2017) for a more cautious take on how informative attrition data can actually be for linguistic theory at present.

(2017) and MacWhinney (2017) consider the relevance of attrition findings for the UB approach, with Keijzer considering how attrition findings can inform understanding of the UB mechanisms of Entrenchment and Pre-emption.

Earlier work by Sharwood-Smith (1983) and Sharwood-Smith and Van Buren (1991) and more recent work by Domínguez (2013) and Hicks and Domínguez (2020) have considered in detail how attrition can inform generative theorising. They note that traditional generative models of acquisition and bilingualism (and of the language faculty more broadly) do not straightforwardly accommodate grammatical attrition. Such models have typically assumed that input conditions remain stable throughout a speaker's lifespan, that the L1 does not remain sensitive to changes in input conditions in adulthood, and that L1 competence would remain stable once acquired.

In particular, these discussions have considered implications of attrition for accounts of acquisition predicated on a Principles and Parameters view of cross-linguistic variation (e.g., Chomsky, 1981). In these accounts, grammatical acquisition is conceptualised as the setting of parameters to match the grammatical settings present in the input. Parameters are typically considered to be set only once, thus L1 parameters are not able to be reset in response to changes in input later in life. Parameters typically may not take multiple values within the same grammar, thus cannot neatly account for intra-speaker variation evident in attrited grammars (e.g., cases where there is evidence of L1 and L2 options existing concurrently in the same grammar). Furthermore, parameters were traditionally considered to be responsible for a cluster of morphosyntactic properties which should all be affected by the (re)setting of an L1 parameter. However empirical findings from grammatical attrition research do not attest such widespread and cascading patterns of L1 modification (Domínguez, 2013:172). It therefore seems that adult L1 grammars undergoing attrition are affected in ways that are too fine-grained to be accounted for in terms of parametric changes (Hicks and Domínguez, 2020:150–151), suggesting such a view of cross-linguistic variation to be inadequate. This complements existing arguments from comparative syntactic research against the purported clustering effects of parameters (see Gallego, 2011:356 for some brief examples and further discussion). In the same vein, the fine-grained patterns of L1 modification seen in attrited grammars, and the finding of optionality of grammatical options within the same L1 grammar, complement previous research suggesting that a feature-based approach to cross-linguistic, dialectal, and intra-speaker variation to be on the right track (see Domínguez and Hicks, 2016 for further discussion). It is hoped the findings from the current study can contribute in some way to these and similar broader debates.

1.5 Organisation of the thesis

The remainder of this thesis is structured as follows. Chapter 2 further outlines the aspects of Minimalist framework central to thesis, in particular, the feature-based view of the grammar and acquisition under a Minimalist approach, before reviewing previous theoretical models of grammatical attrition and key empirical studies. After an interim summary, the theoretical model tested in this thesis, the AvA model, is presented and discussed. Chapter 3 describes the morphosyntactic properties tested in this thesis and presents a Minimalist account of each in order to account for their behaviour in each L1–L2 pair investigated. Chapter 4 describes the experimental design, participants, methodology, and predictions. Experimental results are presented in Chapter 5. In Chapter 6, these results are interpreted in terms of the research questions and AvA model more specifically. The thesis ends by proposing directions for future research in grammatical attrition.

Chapter 2 L1 Grammatical Attrition and Generative Linguistics

2.1 Introduction

The primary aims of this chapter are to i) elaborate the key concepts of Minimalism relevant for the implementation of this study ii) review and evaluate Minimalist theories of grammatical attrition and a selection of previous empirical studies and iii) to present and discuss in detail the AvA model. 2.2 briefly considers the core aspects of Minimalism pertinent to this thesis, continuing discussions started in 1.2.1. Section 2.3 outlines the relevant concepts of Minimalist approaches to L1 (2.3.1) and L2 (2.3.2) acquisition. With the theoretical background in firmly in place, 2.4 begins by reviewing key Minimalist approaches to grammatical attrition – with the exception of the AvA model – and evaluates a number of previous studies in terms of their theoretical, empirical, and methodological relevance for the current study. 2.4.5 provides an interim summary of the main findings and implications of these studies and gives an evaluative overview of the theoretical accounts of attrition discussed in this chapter thus far. This sets the stage for a detailed explanation of the AvA model in 2.4.6. This discussion first outlines some key assumptions of the model (2.4.6.1) before presenting the model as a whole (2.4.6.2). 2.4.6.3 explicates the predictions of the model which are tested in the empirical component of this study.

2.2 Minimalism

This section discusses the key aspects of Minimalism central to this study: namely, a feature-based view of the grammar and Minimalist accounts of grammatical variation. 2.2.1 elaborates the role of features in Minimalism by briefly outlining how they interact with the broader language faculty architecture to create syntactic structure. 2.2.2 gives an overview of Minimalist accounts of both cross-linguistic and intra-speaker grammatical variation.

2.2.1 Minimalist architecture of the Language Faculty

In simple terms, language faculty architecture has to explain how sound and meaning are mapped to produce comprehensible output. Chomsky (1993, 1995) proposes that the most computationally efficient, and therefore optimally designed, language architecture need only contain a computational component: the Computational System of Human Language (C_{HL} or CS for short) and two external performance systems broadly responsible for sound: the Sensory Motor system (SM) (sometimes still referred to with its original name: the Articulatory Perceptual system), and meaning: the Conceptual Intentional system (CI). Two interface levels, termed Phonetic Form (PF) and Logical Form (LF),

interface between C_{HL} and the SM on one hand, and C_{HL} and CI on the other. SM and CI have no direct interface: sound-meaning mappings are achieved via interfaces with the shared computational component only.¹⁴

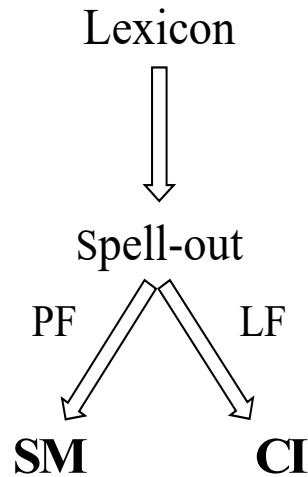


Figure 2.1: The (inverted) Y/T Model of the Language Faculty Architecture.

Figure 2.1 above illustrates the Y model of the language faculty architecture.¹⁵ The C_{HL} selects lexical items from the lexicon (often termed ‘numeration’) to which syntactic operations are applied (hence this highly specialised computational component is also known as ‘narrow syntax’). More specifically, C_{HL} initially generates syntactic objects or ‘derivations’ from these lexical items by means of the syntactic operations Merge and Agree (to be clarified below), which are then passed on to SM and CI via the two interfaces: PF and LF. Spell-out is the point of bifurcation into these two interfaces. PF and LF interface with SM and CI respectively so that the linguistic structure may be pronounced and interpreted.

Features are at the heart of this process. Features have been described as: ‘partial descriptions of linguistic objects’ (Corbett, 2010:18), the DNA of language (Liceras, Zobl and Goodluck, 2008) or, referring specifically to formal features, ‘syntactic atoms’ (Adger and Svenonius, 2011:28). They can be either i) phonological e.g., [Sonorant], ii) semantic e.g., [Definite] – for nouns, [Telic] – for verbs, or iii) morphosyntactic (also known as ‘formal’ or ‘functional’ features) e.g., [Case],

¹⁴ Hauser, Chomsky and Fitch (2002) distinguish between the Faculty of Language Narrow (FLN) and the Faculty of Language Broad (FLB). FLN is argued to contain only the components of the language faculty which are uniquely human. They hypothesise that this is only C_{HL} itself containing solely ‘the mechanisms for recursion’ (ibid:1), whilst leaving it an open possibility that if these mechanisms were found not to be language specific, FLN could be empty. FLB is superset of FLN, containing the C_{HL} plus the SM and CI systems. This is by no means an uncontroversial view: see Jackendoff and Pinker (2005) for critique of Hauser, Chomsky and Fitch (2002), the reply by Fitch, Hauser and Chomsky (2005), subsequent reply by Pinker and Jackendoff (2005) as well as Chomsky (2007) for extensive discussions on what computational operations the language faculty may contain and how it evolved.

¹⁵ This is the original and most widely assumed Minimalist architecture. Other prominent Minimalist-compatible models include Reinhart’s (2006) model and Jackendoff’s (2002) ‘Tripartite’ or Parallel Architecture model.

[Person] which are required for agreement (Chomsky, 2001b:10). As the focus of this study is morphosyntactic attrition, only formal features are considered for the remainder of this discussion.

Most formal features are typically assumed to exist in attribute-value pairs e.g., [Num:Plural] denotes the attribute to be number and the value to be plural. When a morpholexical item is selected from the lexicon it comes already specified with a set of features (Chomsky 1995, cf. Distributed Morphology, Halle and Marantz, 1993 et seq.) and similar exoskeletal approaches).¹⁶ Chomsky (1993, 1995) assumes that features are either semantically interpretable or uninterpretable, with uninterpretable features having a purely syntactic function. For example, [Num:] is uninterpretable on verbs, contributing only to agreement, whilst on pronouns this same feature affects the meaning and is therefore interpretable. Uninterpretable features cannot be read by LF, yet, as they often have a morphological realisation, they must be present at PF. Chomsky (2001b) additionally proposes that when selected from the numeration, features may be valued or unvalued on a morpholexical item. Unvalued features cannot be present at either PF nor at LF and therefore must be valued in the syntax component i.e., within C_{HL} . In this approach, feature interpretability and feature values are interrelated in that uninterpretable features are those which enter the derivation unvalued. These features must therefore be valued within C_{HL} before Spell-out to PF and subsequently deleted upon transfer to LF. This ensures that all features can be read by PF and realised morphophonologically, whilst also ensuring that only interpretable features are present at LF and thus only semantically interpretable derivations are formed (the Principle of Full Interpretation).

In recent Minimalist theorising, two core syntactic operations are typically assumed responsible for the derivation of syntactic structures. The first is Merge, which creates syntactic structures by combining two smaller linguistic objects.¹⁷ The second is the operation for valuing unvalued features, thereby creating syntactic dependencies: Agree (Chomsky, 2001b). Agree can only value unvalued features within certain structural relationships (such as c-command) and within certain locality constraints. Agree is generally argued to work as follows: an unvalued feature (or ‘probe’ e.g., [Num:_]) probes a syntactic domain for a valued attribute-value pairing with a valued version of the same feature as the probe (the ‘goal’ e.g., [Num:plural]). Agree values the probe against the goal so that the probe has the same value as the goal ([Num:plural]). Now the probe feature has been valued, this feature can be deleted upon transfer to LF (which can be written as

¹⁶ It is widely assumed – and is assumed for the purposes of this discussion – that formal features are available from a universal repository as part of UG (e.g., Adger and Svenonius, 2011). However, this assumption is by not uncontroversial nor unproblematic: see Leivada (2020) for a discussion of some issues with this view. See also, Biberauer (2019) and Roberts, (2019) for discussions modified approaches in which formal features are emergent in the sense that they are underspecified in UG but become specified through interaction with factors 2 and 3 of Chomsky (2005).

¹⁷ Chomsky (2004) argues that Merge is further divided into two operations: External/Overt Merge and Internal/Covert Merge, the latter of which assumes the role of the Move(ment) operation in earlier work (e.g., Chomsky, 1993).

[~~Num~~:plural]). Therefore, all features are valued in the narrow syntax, and the uninterpretable features are deleted upon transfer to LF, yet present at PF. This yields a well-formed, legitimate derivation which can be interpreted at CI and SM respectively.

2.2.2 Linguistic variation in Minimalism

The role of cross-linguistic variation in attrition is central to the aims of this thesis, therefore a clear understanding of possible sources of this variation within the Minimalist approach is paramount. The language faculty architecture itself, as well as the syntactic operations which obtain in the computational component, are considered universal and thus cannot be the source of any variation. In the Minimalist approaches briefly considered here, both cross-linguistic and intra-speaker variation do not stem from the parameterised options encoded in UG, as in earlier approaches. Rather, such variation is broadly the result of either variation in the lexicon or variation at the interfaces (both PF and LF). The following is a necessarily brief and highly simplified summary of some prominent Minimalist compatible accounts of variation, based partly on more detailed overviews provided by Gallego (2011) and Slabakova (2016 ch.2).

A widely assumed – though not unanimously accepted (e.g., Baker, 2008) – Minimalist account of variation ultimately attributes cross-linguistic differences to differences encoded in the lexicon. Borer (1984) first proposed that parametric variation could be reduced to differences in the properties of functional morphology. Functional morphemes reside in the functional lexicon; thus, as formulated by Baker (2008:353): ‘All parameters of variation are attributable to differences in the features of particular lexical items (e.g., the functional heads) in the lexicon’. Borer’s proposal was adopted by Chomsky (1993 et. seq., see also Adger, 2006, Holmberg, 2010, Gallego 2011) and is often known as the ‘Borer-Chomsky Conjecture’.

This view therefore contends that variation is the result of differences in how formal and semantic features are assembled on the heads of functional categories and their associated morpholexical items (e.g., T(ense) is the functional head associated with the tense inflection, which might be realised morphologically in English as *-ed*, *-s* etc.). Any differences in the feature assemblies related to the same functional heads or corresponding morpholexical items in different languages will manifest in variation. To cite an example from Ionin (2013:526), the feature [plural] can be realised morphologically as *-s* in English and as *-men* in Mandarin. However, Mandarin *-men* is further

specified with [human] and [definite], placing additional semantic restrictions on its usage which are not imposed on the English plural marker.¹⁸

Gallego (2011) outlines two further, non-mutually exclusive views, both of which are compatible with the general assumptions of the Borer-Chomsky Conjecture. The first view assumes lexical items themselves to be assemblies of phonological, semantic, and morphosyntactic features selected from UG. Simplifying greatly and following Gallego (2011:548), the feature set [F1, F2, F3] might constitute the English plural morpheme, whilst [F1, F4, F5] would constitute the Mandarin plural morpheme. Cross-linguistic variation therefore stems from this initial selection of features assembled into lexical items pre-syntactically i.e., before being manipulated by the narrow syntax component.

Gallego (2011) highlights the morphophonological component as the other possible source of variation (as argued for by Berwick and Chomsky, 2011 and subsequently termed the 'Berwick-Chomsky conjecture' by Boeckx, 2015). This view draws on approaches such as Distributed Morphology Halle and Marantz (1993) in which lexical items are also comprised of features, however these features are distributed across three distinct lists in the lexicon: morphosyntactic, semantic, and phonological. Lexical items which are selected for computation are underspecified in that they lack phonological information at this point (being comprised only of the first two lists). The mapping of these features to their morphophonological forms does not occur until Spell-out to PF, allowing the possibility for variation to obtain in how feature bundles are mapped to different phonetic forms cross linguistically i.e., it accounts for variation in the 'externalisation' of these features (Chomsky, 2007), rather than variation in the specific combination of formal and semantic features). Gallego (2011:544) proposes that variation of this nature can still be considered variation in the lexicon, but only for the list containing phonological features.

Variation at PF is able to capture more than just variation in how features are pronounced, but also *which* features are pronounced. This is argued to account for additional variation, such as some types of word order variation. This can be illustrated by appealing to 'Copy Theory' (see Nunes, 2012 for an overview). Briefly, if we assume that a morpholexical item bearing an unvalued feature is selected, this feature would be valued via Agree between the probe and the goal. However, some features on the goal may have an additional requirement in that they can only value a probe locally (the goal feature is said to be 'strong'). In order for the probe to be valued then, it must move to this

¹⁸ In this example, variation stems from the specification of additional morphosyntactic features on the corresponding morphological item in the two languages. For other grammatical phenomena, variation can also arise when the same feature differs in whether it is valued or unvalued on the corresponding lexical items in different languages e.g., Hicks' (2009) account of reflexive binding, to be discussed in detail in 3.3.1 and 0), when the same feature differs in its interpretability e.g., Zeijlstra's (2004) account of negation, to be discussed in detail in 3.5.2), or when the same feature differs along another dimension: feature strength, as in Adger's (2003) account for the differences in the verb position in declarative main clauses in English and German (to be discussed in detail in 3.4.2).

local position before Spell-out to PF. As it is pronounced in this structural position, this results in overt movement. An alternative assumption is that the probe does not move but rather that the probe feature is copied into this local position to be valued. This results in two identical copies of this feature at two different points in the derivation. Bobaljik (2002) argues that languages could vary in which copy of this feature is phonologically realised: some languages may choose the lower copy, others the higher copy, resulting in word order variation. This choice would be modulated by a number of considerations at PF, potentially including the surrounding phonological context.

Finally, it has been proposed that variation could obtain at the LF interface (Ramchand and Svenonius, 2008). Variation at LF is again argued to be the result of the expression of certain features (here semantic features), however in a different manner to what was described regarding PF variation above. This argument is based on the observation that certain semantic features such as definiteness, specificity, and evidentiality appear to vary cross-linguistically in whether they are expressed overtly (i.e., by means of dedicated functional morphology) or covertly (i.e., through the discourse context). For example, Ramchand and Svenonius (*ibid*) highlight that Norwegian expresses definiteness – or more precisely the features relevant for definiteness in their account – and specificity overtly (through determiners and suffixes respectively), English expresses only definiteness overtly (through the determiners *a* and *the*), whilst Russian typically expresses both meanings covertly. As the semantic features as well as the functional heads are argued to be universal, variation must lie in how, or rather when, these functional heads are valued: either syntactically i.e., through functional morphology, or post-syntactically at LF, leading to covert expression in which their meanings are filled in by the context.

This section ends with a brief consideration of Minimalist approaches of intra-speaker variation, which will become relevant when considering certain empirical studies in 2.4 and also accounting for some of the results of the current study. Minimalism does not need to posit any additional mechanisms in order to account for intra-speaker variation, including dialectal variation (Barbiers, 2005; Henry, 2005; Smith and Adger, 2005; Adger and Smith, 2010). Rather, the possibility for variation to obtain in the morphophonological component, as outlined above, allows for a bundle of formal and semantic features to be expressed as (or spelled out as) different phonological forms, resulting in different forms having the same function (this is essentially the idea behind Adger and Smith's, 2005 and Smith and Adger's, 2010 accounts of *was/were* dialectal variation in Scots). Likewise, it allows for different bundles of formal and semantic features to be expressed as the same phonological form, allowing the same form to have different functions (e.g., Domínguez and Hicks 2016's account of null subject dialectal variation in Caribbean vs. Mainland Spanish, to be discussed in more detail in 2.4.3). The possibility to map essentially the same feature set to different forms, or different feature sets to the same forms, within the same grammar results in what Adger and Smith (2010:1112) term a 'Pool of Variants'. The choice of variant likely depends on a number of linguistic

and extra-linguistic conditioning factors (see Adger and Smith, 2005 and Smith and Adger, 2010 for further discussion). This gives rise to optionality in both multilectal and multilingual grammars. Grimstad *et al.* (2018), Lohndal and Putnam (2021), Lohndal and Westergaard (2021) present further, Minimalist-compatible, accounts of variation in multilingual grammars, in particular Heritage grammars, and also dialectal variation. Their accounts are based on an ‘exoskeletal’ model of the grammar in contrast to the more ‘endoskeletal’ or lexicalist aforementioned approaches to variation. The authors argue that this view of the grammar is more suitable to account for certain types of multilingual and intra-speaker variation.¹⁹

2.3 Acquisition under Minimalism

With the theoretical context firmly in place, we now turn to discuss how acquisition, both L1 and L2, is argued to proceed within the Minimalist framework. This discussion focusses on the mechanisms by which L1 and L2 grammatical acquisition are assumed to proceed under a Minimalist approach, namely: Feature Selection and Feature (Re)assembly.

2.3.1 L1 acquisition

The Minimalist approach assumes a child to be equipped with the innate aspects of the language architecture, including the syntactic operations Merge and Agree, and a universal repository of features.²⁰ The learning task for the child is therefore to select from this universal store the subset of features which are present in grammar of the input and assemble them on/into the appropriate lexical items. Acquisition is thus viewed as involving two distinct computational processes: i) feature selection and ii) feature assembly (Chomsky, 2001a). Chomsky (2001a:4) assumes that each language makes a ‘one-time selection’ of the subset of features available from UG. In contrast, Hegarty (2005) assumes that features can be selected and assembled one at a time over the course of L1 acquisition, resulting in incomplete formal and semantic feature assemblies which differ from those of the adult grammars. This assumption can account for the wealth of evidence of children using grammatical forms in a manner divergent to what is present in the input.

The selection of the appropriate features from the universal set and assembly into the appropriate morpholexical item for the language being acquired is dependent on the child detecting these features in the input in the first place. For example, to correctly acquire the past tense meaning, a child learning English would need to detect that the feature [past] is specified on the

¹⁹ Other accounts of intra-speaker variation which are compatible with most Minimalist accounts of cross-linguistic variation include, among others, the Multiple Grammars approach (Amaral and Roeper, 2014) and Kroch's (1994) Competing Grammars Hypothesis. The Multiple Grammars approach in particular discusses optionality of morphosyntax in both monolingual and multilingual grammars and considers optionality a core property of human language, not just multilingual grammars.

²⁰ In actuality the adoption of Minimalism as a framework with which to study monolingual L1 acquisition has not been as widespread as is the case within multilingualism research, with the majority of studies still assuming a more P&P-based approach (Pearl, forthcoming).

verbal morphology; a child learning Somali however, would have to learn to assemble this same feature on determiners; a child learning Irish on complementisers; whilst a child learning Mandarin would have to learn that [past] is not assembled on any functional morphology, but rather the meaning is expressed through the discourse context and temporal adverbs. The ease with which a feature is detectable in the input can depend on how the feature is encoded in the specific language being acquired. For example, it has been noted that meanings which are *not* expressed on overt functional morphology, like [past] in Mandarin and (for the most part) definiteness in Russian, are typically acquired later than when the same meaning is expressed through overt morphemes e.g., definiteness in Norwegian and to a lesser extent English (see Ramchand and Svenonius, 2008 for references of L1 acquisition studies offering empirical support for this observation).

A number of Minimalist/Minimalist compatible models of L1 acquisition have been proposed. Some prominent examples include Westergaard's (2009, 2014) Micro-Cue Model, the Maximise Minimal Means Model (Biberauer, 2019), the Variational Learning Model (Yang, 2002, 2016), and Lidz and Gagliardi's (2015) model of L1 acquisition. Constraints on space and scope prevent discussion of these models here. However, Lidz and Gagliardi's model forms the basis of Hicks and Domínguez's AvA model tested in this thesis. Relevant aspects of their model are therefore discussed as part of the exposition of the AvA model in 2.4.6.

2.3.2 L2 acquisition

This section further elaborates the Minimalist view of L2 acquisition, first outlined in 1.2.1, which is assumed for this thesis. This view of L2 grammatical acquisition encompasses one hypothesis concerning both the L2 initial state and UG access: the Full Transfer Full Access (FTFA) hypothesis (Schwartz and Sprouse, 1994, 1996), and one further hypothesis regarding the cognitive mechanism by which this L2 initial-state grammar develops: the Feature Reassembly Hypothesis (Lardiere, 2000, 2005, 2007, 2008, 2009a, 2009b).

Schwartz and Sprouse's (1994, 1996) FTFA hypothesis posits that in the first stage of L2 acquisition the learner makes a complete, identical copy of their L1 grammar. This copy constitutes the initial state of their L2 grammar. It further assumes that the learner not only has access to UG via the L1, or more precisely via the copy of the L1 grammar which serves as the starting point of the L2 grammar, but they also have direct, unfettered access to UG independent of the L1 (see Schwartz and Sprouse, 2016 and also Rothman and Slabakova, 2018 for some noted examples of empirical support for this claim). Complete access to UG entails that any aspect of the L2 grammar – including aspects absent from the L1 – is *in principle* acquirable.

In modern generative L2 acquisition research, Feature Reassembly (Lardiere, 2009a, 2009b) is the prevalent view of the mechanism by which L2 grammatical acquisition obtains. Assuming FTFA,

L2 acquisition from the initial state is broadly conceived as a two-stage process: mapping and (re)assembly. For the mapping stage, the learner gradually performs a series of contrastive analyses of L1 and L2 properties as they are exposed to the L2. As part of this process, associations are made between morpholexical items in the L1 and L2 based on similar semantics and grammatical function (rather than phonetic similarities, as demonstrated by Gil and Marsden, 2013). Based on the associations established, the feature set from the L1 morpholexical item is then mapped onto the L2 item – more specifically onto the L2 morphophonological form (or PF) of this item (Lardiere, 2005:190) – in its entirety. Recall from 2.2.2 however, that Ramchand and Svenonius (2008) highlight that in some languages certain semantic features are not assembled on specific morpholexical items but rather are expressed covertly (i.e., through the discourse context). Slabakova (2009) and Cho and Slabakova (2014) develop Ramchand and Svenonius's (2008) proposals to L2 acquisition. They note that for certain semantic features in certain L1–L2 combinations, this initial mapping is not a case of mapping the feature set of one L1 morpholexical item to a corresponding L2 morpholexical item (which they term overt-to-overt mapping), but may instead be from an L1 morpholexical item to L2 context (overt-to-covert mapping), from L1 context to an L2 morpholexical item (covert-to-overt mapping), or even from L1 context to L2 context (covert-to-covert mapping).²¹

In the most straightforward of cases, the relevant L1 and L2 feature bundles are identical. Here the learner need only establish the correct correspondence(s) between the relevant L1–L2 forms and map the L1 feature bundle(s) to the L2 PF(s). Acquisition therefore involves no reassembly of features per se. However, when this initial mapping is not correct or the relevant L1–L2 feature sets are not identical, the task of the learner is to fine-tune the L2 feature sets by reassembling the features so that they faithfully match those of L2 input. This reassembly can take the form of: i) revaluing features in the transferred bundle; ii) disassociating the mapping between features specified on L2 morpholexical items as part of the initial mapping (in other words, “deleting” these features from the initially mapped feature bundle); iii) reassembling in the L2 a feature also instantiated in the L1 grammar, though specified on an L1 form different to the one used in the initial mapping; iv) adding a feature not present in the L1 at all, which therefore needs to be selected from the UG inventory.²²

Regarding (iv), Domínguez, Arche and Myles (2011) highlight that what is at stake here is actually Feature Selection (FS) and Assembly (rather than Reassembly), much in the same way as for L1 acquisition. Lardiere (2009b:214) argues that provided there is positive evidence for a feature, it is

²¹ Whilst the FRH was initially conceptualised to account for acquisition of formal features, it has subsequently been extended to semantic features (e.g., Slabakova, 2009, 2015; Domínguez, Arche and Myles, 2011, 2017; Cho and Slabakova, 2014).

²² As such, the particular conceptualisation/approach to features as well as the adopted syntactic analysis can greatly impact the conceptualisation of the FR acquisition task.

acquirable, even if not in the L1: 'any feature contrast [difference in meaning] that is detectable is, in principle, ultimately acquirable'. Thus, Feature Selection hinges on the availability of sufficient L2 input to alert the learner to the presence of a feature not instantiated in their L1, which must be selected from UG. Presumably once the learner is at the stage where they have detected this feature in the input and selected it from UG, assembling it into the relevant L2 feature matrix is a straightforward process.

Rather than FS, Lardiere (2007:106) argues that 'it is the reassembly of features that poses the main difficulty for L2 learners'. However, there are different types of FR task and, as highlighted by White (2009), the FRH does not make predictions as to the relative difficulty of these tasks:

'[...] can we predict in advance that certain L1/L2 combinations will be easier or harder than others because of the kind of re-assembly that is required for any particular set of features? Are all features of equal status, i.e. equally hard to re-assemble? Does this account predict that the more features there are to be recombined the harder acquisition will be?' White (2009:347).

Like White (2009), Slabakova (2009) recognises the need for the FR approach to be able to formulate more specific predictions. Slabakova (2009) highlights in particular the initial mapping (pre any FR, if required) as a potential source of difficulty for L2 acquisition. She conceives of a cline of difficulty for L2 acquisition that makes explicit predictions as to the relative difficulty of different types of mapping (+ feature reassembly) scenarios. This cline is further specified and empirically tested by Cho and Slabakova (2014) and subsequently by a number of others (e.g., Dudley and Slabakova, 2020; Domínguez and Arche, 2022). In particular, Cho and Slabakova (2014) consider how the relevant features are expressed in the L1 vs. L2 (overtly vs. covertly, directly vs. indirectly) and, to a lesser extent, the complexity of form-meaning mappings (e.g., whether a feature has multiple morphophonological exponents, and conversely whether one morphophonological form is specified with multiple features). The cline is not directly applicable to L1 grammatical attrition and for this reason, as well as space constraints, is not discussed further here.

In summary, the L2 acquisition task can be formalised in terms of at least three distinct operations: Initial mapping, Feature Selection (+Assembly) and/or Feature Reassembly – the latter of which itself subsumes a number of distinct acquisition tasks. Assuming that features can be selected and (re)assembled one at a time allows fine-grained modifications to interlanguage grammars and gradual learning trajectories to be accounted for. Though this discussion has focused on these

operations and the mechanisms of FR, it is worth noting that an array of additional factors impinge on the successful acquisition of a feature, such as the conditioning environment (phonological, morphosyntactic, semantic or discourse related) of the feature(s) (Lardiere, 2009b:175), including prosodic constraints on syllable structure, and semantic complexity (Cho and Slabakova, 2014:8). Slabakova (2016:197–200) provides a succinct overview of many such factors in her summary of discussions presented in Lardiere (2005, 2007, 2008), using the example of the acquisition of the inflection morpheme *-ed* in L2 English (a particularly complex case of many-to-many form-meaning mappings). Here the L2 learner must acquire that, depending on the context, English *-ed* can express several grammatical and meanings including, [+past], but also a [-past] meaning (see Lardiere, 2005 for details), perfective aspect, and pragmatic meanings such as irrealis and politeness. Furthermore, [d] is just one phonetic realisation of these features, other exponents include [t], ablauts, and also suppletion for irregular verbs.

FR has been empirically investigated by a considerable number of studies testing the L2 acquisition a wide variety of grammatical phenomena. In addition to the aforementioned studies which test Cho and Slabakova's (2014) Cline, see also: Choi and Lardiere (2006) and Gil and Marsden (2013) for *wh*-elements, Guijarro-Fuentes (2012) for differential object marking, Hwang and Lardiere (2013) for plural marking, Domínguez, Arche and Myles (2011, 2017) and Slabakova (2015) for aspect, Shimanskaya and Slabakova (2014) for pronominal clitics, Cho and Slabakova (2017) for specificity, and Domínguez, Hicks and Song (2012) for anaphoric binding. The findings of these studies all broadly support the FRH.

2.4 Minimalist Approaches to L1 Morphosyntactic Attrition

This section reviews key empirical studies in grammatical attrition with a focus on investigations of morphosyntactic attrition within the Minimalist framework. The first half of this review is structured around four prominent Minimalist accounts of grammatical attrition in late-sequential bilinguals: the Interface Hypothesis (Sorace, 2000; Tsimpli *et al.*, 2004), the Subset Model (Gürel, 2002), Feature Reassembly (Domínguez and Hicks, 2016), and the Bottleneck Hypothesis (Slabakova, 2019).²³ After an interim summary which takes stock of the empirical and theoretical backdrop against which the Attrition via Acquisition Model (Hicks and Domínguez, 2020a, 2020b) was conceived, a detailed exposition of this model is provided in 2.4.6.

²³ Strictly speaking the Subset Model is Generative but not specifically Minimalist. Nevertheless, it is theoretically and empirically insightful for studying grammatical attrition within Minimalism.

2.4.1 The Interface Hypothesis

The Interface Hypothesis (Sorace, 2000; Tsimpli *et al.*, 2004; Sorace and Filiaci, 2006; Tsimpli and Sorace, 2006; Sorace and Serratrice, 2009; Chamorro and Sorace, 2019 etc.) is a widely investigated account of non-target-like L2 acquisition, particularly residual optionality of certain structures, which is also proposed to account for optionality in the same structures in attrited L1 grammars. It was the first generative account of attrition, and has since become the dominant hypothesis within this framework (Schmid and Köpke, 2017a). Although the predictions regarding the kind of properties which are or aren't vulnerable to L1 attrition have remained broadly the same, the reasoning which underpins these predictions has changed over the last two decades. The relevant conceptual changes to the IH are highlighted throughout the following discussion as these changes have direct implications for the current viability of the IH as a model of grammatical attrition.

Fundamental to the IH is the prediction that the (in)vulnerability of a given grammatical structure to attrition is determined by the interface at which it is derived. Earlier work (e.g., Tsimpli *et al.*, 2004) assumes a distinction between 'narrow syntax' and 'interface properties'. This distinction is predicated on the distinction between uninterpretable and interpretable features (see 2.2.1). As interpretable features are relevant for the interpretation of the derivation at the interfaces (specifically the LF interface), grammatical structures whose behaviour (distribution, interpretation etc.) is conditioned by interpretable features are considered interface properties, whilst those whose behaviour is conditioned only by uninterpretable features manipulated only at the level of C_{HL} (but not at LF), are narrow syntax properties. Interface properties are predicted to be vulnerable to attrition, whilst narrow syntax properties are not.

In later work (e.g., Tsimpli and Sorace, 2006), the dichotomy is reconceptualised as narrow syntax vs. 'internal' vs. 'external' interface properties, though in the majority of subsequent studies a binary distinction is maintained by grouping together narrow syntax and internal interface properties, with the prediction that neither are vulnerable to attrition. The internal vs. external interface distinction is the distinction assumed by the vast majority of IH studies.²⁴ This distinction is problematic based on the representational justification for the interface distinctions outlined above, as syntax-semantic structures are still not predicted vulnerable despite their behaviour being conditioned by interpretable features.

In parallel to this representational account, a computational account of the distinction between internal and external interfaces has been proposed (e.g., Sorace, 2005, 2011; Sorace and Serratrice, 2009). The crux of this argument is that grammatical structures derived at internal

²⁴ In more recent work, the external vs. internal dichotomy – at least for attrition – has been reformulated further, as will be discussed later in this section.

interfaces require at most the integration of information between different linguistic domains (e.g., syntax-semantics), whilst structures derived at external interfaces require the integration from both linguistic and extra-linguistic domains (e.g., of syntax and also discourse at the syntax-discourse interface). Sorace and colleagues contend that bilinguals (specifically L2 learners when processing their L2 or L1 attriters when processing their L1) may not have sufficient processing resources required for the integration of knowledge from these different domains, which may manifest as non-target-like behaviour, in particular L1–L2 optionality, for external interface structures. External interface properties, being more computationally demanding, are therefore predicted less likely to remain stable in the L1, whereas internal interface properties, and in particular properties determined only by narrow syntax, should remain impervious to attrition.²⁵ See Sorace (2011) for a detailed overview of these two accounts.

With the background in place, we turn to some noted empirical studies. Tsimpli *et al.* (2004) tested 19 L1 Greek and 20 L1 Italian near-native speakers of L2 English who had lived in the UK for at least 6 years (no average lengths of residence are reported). There were also 20 control participants for each L1. Knowledge of null and overt subject pronouns and pre- and post-verbal subjects in contrastive, focussed, and topic-shifted environments are tested. The authors assume that null subjects are the default in the L1 and are determined by uninterpretable morphosyntactic features only. Overt and post-verbal subject usage and interpretation, on the other hand, is conditioned by interpretable features (topic-shift and focus). Consequently, they are subject to a number of discourse and pragmatic constraints i.e., used only for topic-shift, and focus. This leads to certain differences in the interpretation and distribution of null and overt subjects. This distribution of null and overt pronouns is also accounted for by the Position of Antecedent Strategy (Carminati, 2002:57, 2005), which was originally conceived to account for this distribution in Italian, but also applied to the Greek structures here. Briefly, embedded null pronouns typically refer to the most prominent Spec(ifier) TP position (the subject), whilst overt tend toward a non-subject interpretation (this is regardless of stress/focus – see Tsimpli *et al.*, 2004:260, fn.3). Use/interpretation of an embedded overt subject as referential to the matrix subject is not ruled out entirely, but the usage is marked and justified only under certain pragmatic conditions. It is crucial to highlight that these interpretations are consistent *preferences* found amongst monolinguals rather than categorical grammatical judgements – a point relevant for further discussions in this review. Intra-sentential null and overt pronoun interpretation preferences with backward anaphora are illustrated with an example from Italian:

²⁵ See Domínguez (2013) for extensive criticism of interfaces as conceptualised by the IH, in particular her argument that there is no clear theoretical justification for the distinction between internal vs. external interfaces properties (or indeed narrow syntax vs. interface properties) in any Minimalist model of the grammar. Furthermore, see Domínguez (2013:87-95) for more detailed discussion of the representation vs. computational accounts of the IH.

1) L'anziana signora_(i) saluta la ragazza_(j) quando *pro*_(i) / lei_(j) attraversa la strada.

The old woman greets the girl when *pro* / she crosses the street.

The old woman_(i) greets the girl_(j) when she_(i/j) she crosses the street. (adapted from Tsimpli *et al.*, 2004:266)

The use and interpretation of pre vs. post-verbal subjects in Italian and Greek is regulated by definiteness, thematic properties of the verb, and pragmatic features. The key point here is that pre-verbal indefinite subjects are interpreted as topics. As for English, neither finite null (*pro*) subjects nor post-verbal subjects are permitted. In the English version of example 1), the embedded subject can refer to either the matrix subject or object.

The results of two offline tasks are reported: The Headlines Task, in which participants formed sentences from given phrases to test definite and indefinite subject placement and interpretation in all-focus contexts, and a Picture Verification Task (PVT), which required them to select pictures that matched given sentences. The first part of the PVT tested null and overt subject pronoun interpretation in forward and backward anaphora contexts, the second tested indefinite subject interpretation in different focus contexts.

Null and post-verbal subjects are predicted to remain stable, whereas overt and pre-verbal subjects are likely to attrite. Specifically, the interpretable features [topic-shift], and [focus], which condition the use and interpretation of overt and pre-verbal subjects, may become optionally unspecified in the L1 grammar as L2 English subjects are not conditioned by these same interpretable features (Tsimpli *et al.*, 2004:263). This would be manifested in L1 overt subjects optionally being used in non-topic-shift/ non-focus contexts (and consequently interpreted as referential with the matrix subject in sentences such as 1) above), and in pre-verbal subjects used in non-topic contexts.

The results of this study are not presented uniformly: for a number of reasons outlined by the authors, Greek data only is presented for the Headlines Task and also indefinite subject interpretation from the PVT (i.e., pre/post-verbal subjects). The Italian data comes entirely from the first part of the PVT (i.e., null/overt subject interpretation). It is therefore not clear whether the missing data supports the authors' predictions or not. The Greek data indicates post-verbal subjects were unaffected, as predicted by the authors. In contrast, pre-verbal subjects showed a significantly increased production rate, suggesting influence from L2 English. Participants also interpreted them as indicating a topic-shift significantly less than the controls.

Regarding null subjects, results show that in forward anaphora contexts these were unaffected, as predicted. The interpretations for backwards anaphora differed significantly between

the control and experimental groups, however neither group behaved quite as expected. In fact, the experimental group's interpretations appear more in line with what would be expected from a monolingual control group and vice versa. It is therefore inconclusive as to whether these results support or contradict the IH (see Tsimpli *et al.*, 2004:273 for discussion of these results). All overt pronoun results supported their predictions, with attriters differing significantly from controls and showing evidence of English influence.

The authors conclude that results on the whole support the prediction of attrition vulnerability only at interfaces and interpret their findings as evidence that the interpretable features have become optionally unspecified. It is claimed that finding no attrition for the narrow syntax structures supports this view. However, in this experimental design – and crucially in the vast majority of studies which find empirical support for the IH – there is a considerable confound between the potential role of interfaces and cross-linguistic differences. This study predicts attrition of L1 Italian and Greek overt and pre-verbal subjects based not only on them being an external interface property, but also due to cross-linguistic differences between overt pronouns in Italian vs. English (English overt pronouns are not specified with the same interpretable features as in Italian) (Tsimpli *et al.*, 2004:263).²⁶ No attrition of the L1 null and post-verbal subjects is predicted due to their status as an internal interface property. However, here the L2, English, does not have null subjects in finite clauses. It is therefore possible that the L2 provides no competing information for these L1 forms and therefore there is nothing in the L2 to engender attrition of the L1 form (as suggested by Hicks and Domínguez, 2020a:157). Thus, in this case either interface considerations or cross-linguistic differences could be responsible for external interface attrition and also for lack of narrow syntax attrition. The overlapping of these two factors makes it impossible to discern which one accounts for these findings. Testing of grammatical structures for which these two factors do not align is needed to tease apart the predictions (e.g., a narrow syntax or internal interface property with an L2 equivalent which differs in its behaviour in the L1 vs. L2). Attrition in this case would count against external interfaces/the interpretability of features as determinant factors in L1 attrition and support an account of selectivity based on cross-linguistic differences alone.

Exactly this is tested as part of Iverson's (2012) study. This study is notable for two reasons: firstly, it shows an extreme case of attrition which illustrates the potential extent of L1 grammatical restructuring permitted by the language faculty under certain conditions. In particular, the results can be interpreted as clear evidence that L1 grammatical representations have been affected, contra the claims of some researchers (see 1.2.3.2). Secondly, the findings and Iverson's discussion

²⁶ In the majority of IH studies, including many by Sorace and colleagues, discussion of any possible role of cross-linguistic differences in predicting attrition is very infrequent and inconsistent. Tsimpli *et al.* (2004), is a rare example of an IH study which is very explicit in stating the cross-linguistic configurations under which an interface property is expected to be vulnerable.

convincingly demonstrate the inadequacies of the Interface Hypothesis as an account of grammatical attrition.²⁷

The data comes from a case study investigating Pablo, a native Spanish speaker who grew up monolingual in Chile before moving to Brazil in his early 20s. At the time of testing, he had lived in Brazil for 30 years and had very limited contact with Spanish during this time. In order to thoroughly test the IH, Pablo completed experimental tasks covering a range of internal (e.g., null subject) and external interface (e.g., overt subjects) as well as narrow syntax properties (e.g., VS/SV word order with different verb types) which either converged or diverged in Spanish and Brazilian Portuguese (BP). There were three experimental tasks: i) A Grammaticality Judgement Task, testing word-orders with different types of verbs, ii) an Acceptability Judgement Task testing null and overt subject pronouns and null and overt objects, and iii) an interpretation task testing relative clause attachment and various types of anaphora resolution with null and overt pronouns in different syntactic positions.

There was a Spanish and BP version and a timed and untimed version of each task. For each language a native speaker control group completed the tasks in their respective L1s only. Pablo completed both language versions of the tasks so that he was tested in his L1 and L2 on equivalent grammatical structures. Attrition studies in which participants are tested in in their L1 and L2 and that also use L2 controls (i.e., native speakers of the potential attriters' L2) are extremely rare. They are, however, very informative as they can ascertain not only whether the attriters' L1 patterns diverge from L1 norms but also, when compared to the results of an L2 control group, whether they converge on the L2 grammar. Convergence of the L1 patterns of the L2 further confirms the influence of the L2 on the L1 as driving the attrition process and suggests a significant degree of L1 restructuring. The fact that this is a case study with only one participant, who arguably demonstrates a very extreme case of attrition, must be borne in mind when considering the generalisability of these results. Nevertheless, as argued by Iverson, case studies are still of value, with numerous examples of highly insightful case studies present in the literature (e.g., Lardiere 2007).

Results indicate that for almost all linguistic properties where Spanish and BP diverge, Pablo not only performed qualitatively different to the L1 Spanish control group in the Spanish versions of the tasks, but his Spanish results also consistently patterned with the L2 BP control group's results on the equivalent BP versions of the tasks. Overall, these results suggest that for each grammatical property tested, his L1 grammar had been restructured to the corresponding L2 settings.

²⁷ This study also investigated, to a lesser extent, the Regression Hypothesis (Jackobson, 1941; Keijzer, 2007) and the Activation Threshold Hypothesis (Paradis, 1997, 2000, 2007). As non-Minimalist theories, these will not be discussed further here.

Furthermore, his BP results also consistently patterned with the BP control results, suggesting native-like L2 acquisition of all properties.²⁸

The findings present a number of problems for the Interface Hypothesis. Firstly, there is clear and convincing evidence of significant attrition not only at external interfaces, but also internal interfaces, including narrow syntax properties. This finding is particularly robust as the study tests a range of properties at each interface and the same pattern of results holds across three types of experimental task and for both the online and offline versions. Particularly striking are the results for the subject-verb word order conditions. On the Grammaticality Judgment Task, Pablo strongly rejects verb-subject order with transitive and unergative verbs in Spanish declarative clauses. These structures are grammatical in Spanish but not in BP. In interrogatives he categorically accepts subject-verb order with transitive and unergative verbs, and strongly accepts this order with unaccusative verbs. These structures are grammatical in BP but generally not in Spanish. Finally, in interrogatives he strongly rejects verb-subject order with transitives and unaccusatives, and categorically rejects this order with unergatives. These structures are grammatical in BP but not in Spanish. This is very robust evidence of attrition of a narrow syntax property. Furthermore, it seems that the BP word order options have supplanted the Spanish options in his L1 grammar, demonstrating that – under the right conditions – the language faculty does in fact allow for very significant restructuring of an adult L1 grammar.

As discussed at the beginning of this section, the predictions of earlier forms of the IH are underpinned by either a representational (e.g., Tsimpli *et al.*, 2004) or computational account (Sorace, 2005 *et seq.*). In more recent work on the IH, it is argued that attrition is not the result of changes to underlying grammatical representations alone (as argued in Tsimpli *et al.*, 2004), but is accompanied by, or exclusively the result of, computationally more demanding external interface properties overtaxing bilinguals' processing capacity (Sorace and Serratrice, 2009; Wilson, Sorace and Keller 2009; Sorace, 2011). In particular, strained processing capacity may lead bilinguals in attrition contexts to resort to choosing what is typically the most salient, easily accessibly antecedent: the subject. For speakers with a null subject L1, such as Greek and Italian, this would manifest as L1 attrition of overt subjects. However, Iverson (2012) argues that this computational account is not supported by Pablo's results as he was not consistently slower than the native speakers on the timed tasks and exhibited no apparent processing issues. From this, Iverson concludes that only his mental representations were affected.

²⁸ These conclusions are based on the descriptive statistics. Specifically, whether Pablo's results fall within the SE range of either control group.

In Iverson (2012), all the properties for which attrition is attested (both at internal and external interfaces) have equivalent grammatical forms but diverging behaviour in the two languages. Properties which do have equivalent forms yet the same behaviour did not attrite. This again points to certain cross-linguistic differences, rather than interfaces, as what determines attrition susceptibility. This possibility has been acknowledged in a number of papers by Sorace and colleagues (e.g., Chamorro, Sorace and Sturt, 2016) and explicitly tackled in a recent review of the IH in L1 attrition by Chamorro and Sorace (2019:33–34). They recognise that in all the attrition studies which support the IH, the L2 is English, which does not have two distinct types of pronominal subjects, in contrast to the L1s used in these studies, which are typically null-subject languages. However, they highlight that the same patterns of optionality at external interfaces found for L1 attriters are also found in the L2s of bilingual speakers of two typologically related languages, including two null subject languages and also two non-null subject languages. On the basis of this, they argue these patterns are the result of more general bilingual processing limitations which manifest as non-native acquisition or L1 attrition in external interface phenomena only.

One problem with this argument is the frequent finding that even in typologically very similar languages (including the languages, null subject or otherwise, in all the studies Chamorro and Sorace, 2019 cite in support) there can be differences in the distribution of pronominal anaphora and differences in the strength of the bias towards of the different referential options (as well as the options themselves). See e.g., Filiaci, Sorace and Carreiras (2010) for Spanish vs. Italian and see Kaltsa, Tsimpli and Rothman (2015:270) and Gargiulo and van de Weijer (2020:3) for further discussion in the context of the IH in attrition).

A second problem is that many of the studies which argue for overloaded bilingual processing capacity as being the cause of the aforementioned attrition patterns do not use online measures. Although processing limitations can be inferred from offline studies, it is perhaps premature to consider that the bilinguals in such studies are *a priori* subject to these processing effects in their L1 simply by being bilingual. Indeed, some studies which do use online measures often unveil a much more nuanced picture in which bilinguals do not have significantly slower reading/listening or reaction times across the board (e.g., Iverson, 2012; Kaltsa, Tsimpli and Rothman, 2015; Gargiulo and van de Weijer, 2020 – all of which test null and overt pronoun interpretation), calling into question whether overburdened computational resources are the cause of the attested attrition patterns. Cross-linguistic differences could in principle still explain such effects, rendering the need to appeal to differences in the cognitive demands of various interface phenomena redundant. The cross-linguistic explanation comes with the additional benefit that it can account for the attested attrition at both external and internal interfaces, including narrow syntax, which the IH does not.

If cross-linguistic differences in general – rather than merely whether a structure is a so-called interface structure or not – determine the selectivity of attrition, then particularly strong evidence in favour of this argument, and counter the IH, would be findings of attrition of L1 null subjects where the L2 grammar also contains null subjects, yet with a different distribution. A convincing example of this comes from Domínguez (2013), which finds attrition of null subjects in L1a Cuban Spanish under the influence of L1b Mainland (Miami) Spanish. In these two varieties there is a different distribution of null vs. overt pronouns due to the availability of different syntactic options in Cuban Spanish (this study is discussed in detail in 2.4.3). Here we see clear attrition of an internal interface property, contra the IH. Furthermore, although no processing measure was used in this study, any argument that apparent L1 grammatical changes are in fact the effect of bilingual processing limitations is particularly unconvincing in the case of L1b-induced attrition where the extremely high degree of overlap in terms of morphosyntax, phonology, and lexis would presumably not strain processing resources (at least likely not to the extent that this would manifest in the L1 morphosyntax). This degree of overlap even allows for the possibility that the same perceptual encoding systems are used to parse both varieties (see Iverson and Miller, 2017 for a discussion of this possibility with reference to Iverson’s 2012 results).

A further relevant finding of Domínguez (2013) is that whilst null subject attrition is found for the speakers in Miami, where the L1b input contains grammatical forms with diverging behaviour, no attrition of null subjects was found when there was no equivalent or corresponding grammatical form in the L2, i.e., when the language pairing was L1 Spanish (a null subject language) and L2 English (a non-null subject language).²⁹ Further support from bi-dialectal data is provided by Castro, Rothman and Westergaard (2017, 2020), who test L1a Brazilian Portuguese L1b European Portuguese (EP) bi-dialectals. These varieties exhibit differences in both null and overt subject as well as objects. Castro, Rothman and Westergaard (2017) find attrition in the interpretation of null objects, which are argued to be semantically conditioned in BP (thus a syntax-semantics property) and a narrow syntax property in EP. Similar to Domínguez (2013), Castro, Rothman and Westergaard (2020) likewise find attrition of null subjects in production. Both are examples of attrition of internal interface properties, contra the IH. However, no attrition was found by Castro, Rothman and Westergaard (2020) for null objects in production, which is predicted by the IH. Further studies testing both production and comprehension of null objects in this language combination is needed to yield a clearer picture.

Kaltsa, Tsimpli and Rothman (2015) is likewise informative when considering the IH in attrition and is particularly informative for the cross-linguistic difference vs. processing debate. The

²⁹ The study finds further evidence against the IH as applied to attrition in a follow-up experiment with the bi-dialectal group testing inversion in post-verbal subjects, however due to space restrictions these findings are not considered here.

study uses a null subject L1 (Greek) and a non-null subject L2 (Swedish). Like English, Swedish does not allow finite null (*pro*) subjects. Furthermore, in the types of backward anaphora sentences tested, the referential possibilities are also the same as English:

- 2) Den unge mannen_(i) hälsade på den äldre herren_(j) när han_(i/j) gick över gatan.
The young man greeted (to) the old man when he crossed (over) the street.
The young man_(i) greeted the old man_(j) when he_(i/j) crossed the street. (adapted from Kaltsa, Tsimpli and Rothman (2015:273))

The referential preferences of null and overt pronouns in Greek for sentences such as 2) are the same as for Italian, which was previously illustrated by example 1).

A self-paced listening task with a sentence-picture matching decision task at the end of each sentence was conducted. The study finds attrition of overt but not null subjects in terms of the matching decisions (i.e., selecting the matrix subject as the antecedent of the embedded overt subject at a significantly higher rate than the controls).³⁰ This pattern is therefore the same as the studies with a null subject L1 and L2 English. The reaction time data, on the other hand, is mixed. Firstly, attriters are not significantly slower than controls when selecting a referent for the embedded overt subject. This again calls into question whether the patterns of attrition attested for overt subjects are due to bilingual processing limitations. Secondly, and most interestingly, although no attrition of null subjects was revealed, the participants were significantly slower than controls at selecting the matrix subject as the antecedent. If reaction times are to be taken as evidence of processing difficulties, then these results the processing of the null subjects to be more challenging than overt subjects, contra the predictions of the IH's computational account. Moreover, this study again demonstrates attrition of overt pronouns in an L1 null subject language when the L2 is a non-null subject language, and therefore has a corresponding overt pronoun with a different grammatical distribution. Lack of null subject attrition could likewise be accounted for in that the L2 has no corresponding form (an explanation the authors assume).

Swedish exhibits an interesting difference to English in the following regard: in sentences such as 2) above, it is possible in Swedish to use certain demonstrative forms in the embedded subject position. These forms can only refer to the object, although the usage is marked and

³⁰ A further interesting finding of this study is that of a significant effect of age at time of testing: older speakers, both monolingual Greek speakers and attriters, had a stronger preference for the subject as the antecedent of the overt pronoun and the object as the antecedent of the null pronoun compared younger monolinguals and attriters. This suggests that null. vs overt pronoun use, at least in Greek, is to some extent also modulated by non-linguistic factors such as age.

predominantly found in formal writing (Kaltsa, Tsimpli and Rothman, 2015:273). In attrition studies where with L1 null subject – L2 English, it appears that an equivalence is established between the L1 and L2 overt subjects, such that the L2 overt subject exert influence on the L1 overt subjects. When the L2 is English, there is no additional pronominal form which occupies the embedded subject position in sentences like 2), thus no additional form which could potentially establish a similar equivalence with the L1 null subject in the same way as appears to happen with overt subjects. In Swedish however, there is an additional pronominal form, the demonstrative, which could, in principle, be in-some-way mapped to the L1 null subject and engender attrition (i.e., result in higher rates of object referent for the L1 embedded null subject). Though highly speculative at this point, the fact that this doesn't appear to occur in Kaltsa, Tsimpli and Rothman (2015) could suggest that an additional aspect of the requirement for equivalence/correspondence of forms argued for here, and in this thesis more generally, is overtness i.e., L1 overt forms can only be engendered L2 overt forms, and L1 null forms can be engendered by L2 null forms. This at least accounts for the overall pattern of L1 pronominal vulnerability to attrition in the studies considered in this review.

A further informative study is Grabitzky (2014), which investigates the predictions of the IH with 15 adult L1 German speakers living in the USA from 5.5–31 years. Four properties were tested: V2, *wh*-question interpretation, Topic Drop, and Topicalisation of direct objects.

The relevant cross-linguistic differences for these properties are as follows:

- i) V2: In German declarative main clauses, the finite verb must always be the second constituent in the sentence, resulting in inverted verb-subject word order when a non-subject constituent is fronted pre-verbally (V2, see 3.4.2 for more details and syntactic analysis), whilst in English, in all but a very limited number of structures, fronting a non-subject constituent does not affect the subject-verb position.
- ii) *wh*-question interpretation: In German, subjects and direct objects in *wh*-questions are disambiguated by case morphology for masculine nouns, whilst non-masculine nouns (and plural nouns of all genders) are ambiguous between a subject and object interpretation due to syncretism in the case morphology. For example, the *wh*-question *Was jagt die Katze?* could mean either a) what is the cat hunting? or b) what is hunting the cat? Contextual information is therefore required for disambiguation. In English, subjects and direct objects in *wh*-questions are disambiguated by means of word order (as in the English versions of the German *wh*-question given above).

- iii) Topic Drop: (colloquial) German allows subject and 3rd person direct object topic pronouns to be dropped. In English, topics can only be dropped in 'diary style' speech or writing.
- iv) Topicalisation: In German a topic object may remain in situ or be fronted, whilst in English it typically must remain in situ (though marginally acceptable and very marked cases can be construed).

In terms of the IH, V2 and *wh*-question interpretation are considered narrow-syntax properties and Topic Drop and Topicalisation of direct objects are external interface properties. The experimental conditions of each property were selected so that some conditions overlapped completely in their surface and/or syntactic structure or their interpretation in the two languages, whilst others diverged.

A bimodal Acceptability Judgement Task (AJT) was employed to test both V2 and Topic Drop. A separate AJT with a short contextualising story followed by a *wh*-question question before the test sentence tested Topicalisation. *Wh*-question interpretation was tested by means of a Picture Judgement Task in which participants selected the picture representing either the subject or object in response to a question. To elicit V2 production data, 5 participants also completed an unstructured interview with the researcher. There was a German and English version of each task. In addition to the 15 potential attriters, there were two control groups: one consisted of 15 L1 German speakers and 15 L1 English speakers. The two control groups and the attriter group completed equivalent versions of experimental tasks in their respective L1s only.

Attrition was attested only for a very limited subset of conditions of some properties. However, the most striking finding from this study is that many results cannot be accounted for by the IH nor by any obvious cross-linguistic structural differences. For V2, attrition was found in only one structure: V2 with a fronted negative operator e.g., 'never have I seen...'. As a narrow syntax property, this is not accounted for by the IH. Furthermore, this fronted negation structure is identical in German and English (both in terms of the surface word order and underlying syntactic structure), therefore it is not initially apparent why or how grammatical restructuring would be engendered or obtain in the L1. Despite this, the attriter group rated it significantly less acceptable than German controls. Interestingly, the English controls also rated the English version of the structure significantly lower than the German controls rated the German version. A possible explanation of these findings is that these structures – though still acceptable – are more stylistically marked in English than in German. This would account for the control group differences and also, if the German attriters were influenced by the markedness of this structure in their L2, why the German attriters gave ratings in line with the English controls. If this explanation is correct, then the results of the Germans in the USA are not actually indicative of grammatical restructuring, but a result of different levels of

markedness for the same structure in the L1 and L2. Furthermore, no V2 violations were attested in the interviews, suggesting no attrition at the level of performance.

Wh-question interpretation results revealed significant differences between the attriters and both control groups on two conditions. For the first condition, a subject interpretation is licit in German and English, and attested by the two control groups' results. However, the attriter group has a significantly lower proportion of subject interpretations than either group. It thus seems unlikely that attrition of this condition was L2-induced. For the second condition, object interpretation is licit in German but not in English – again attested by the control group results. The attriters' proportion of object interpretations is likewise significantly different from both control groups, but for this condition the attriter mean lies in between the control groups. Finally, one Topicalisation condition shows evidence of attrition. This structure is acceptable in German but not in English. This was the only time the attriters' German results not only significantly diverged from L1 controls but also did not diverge significantly from the L2 control results, suggesting their L1 grammar had been significantly restructured to match that of the L2 grammar.³¹ For Topic Drop, no attrition was observed at all.

Little empirical support for the IH was found in this study. Very restricted yet statistically significant attrition affected both narrow syntax properties (though in both cases not likely due to L1–L2 syntactic differences), but only one of the external interface properties. Grabitzky claims that as only extremely limited attrition was detected on individual conditions, but not on any property as a whole, the underlying L1 grammatical representations remained unaffected.

This claim, however, is questionable on a number of grounds: Firstly, as some of the conditions tested are acceptable/the same interpretation available in both the L1 and L2, L1 grammatical restructuring would not be expected here in the first place. Secondly, a restructuring of L1 grammatical representations does not entail that the attriters should diverge from the L1 controls across the board. This would only be the case if the L1 grammatical options for each structure were no longer available in the attrited grammar as they had been completely supplanted by the contrasting L2 options (as appears to have happened for many structures in Iverson, 2012 – see previous discussion). Even then, different structures which are underpinned by the same morphosyntactic features may differ in their frequency, salience etc, such that these factors may prevent or facilitate attrition to differing degrees for the different structures. As discussed in 1.2.3.3, grammatical attrition is perhaps more likely to consist of adding L2 grammatical options to the L1 grammar so that these options co-exist with the L1 options, i.e., this results in L1–L2 optionality, with

³¹ Note that in the conclusions, Grabitzky (2014:180) claims that attrition was found for two conditions (1 and 3) on the Topicalisation test. However, this claim is contradicted by the data and interpretations presented in the results chapter. It is reported therein that there is no significant difference between the attriter and L1 control group results on either Condition 1 or 3, but only on condition 2 (ibid:163).

a number of linguistic and extra-linguistic factors determining which option is used by the speaker (see 2.2.2 for discussion of Minimalist accounts of such variation). In light of these points, attrition manifesting only on certain divergent conditions, but not all, and optionality within a given condition, is entirely expected.

Grabitzky ultimately attributes any attrition to the processing difficulties of the attriters based on their indeterminate and varied responses on the attrited conditions. Indeterminate and varied responses are not in and of themselves conclusive evidence of processing difficulties. However, a convincing case is made that the *wh*-question interpretation results in particular support a processing account. The argument is that a non-attrited interpretation of these sentences, where both subject and object are licit interpretations, requires that two different underlying syntactic structures be calculated from the same surface word order. This is a computationally demanding task for which attriters' may lack sufficient processing resources and as a result, they are either indeterminate in their interpretations or resort to a default interpretation of either the subject or object. The group-level results suggest the attriters select subject and object at an almost 50/50 ratio on both conditions. Though not considered by Grabitzky, looking at the individual results reveals that actually, for the 13/15 participants who did attrite, seven of them give a subject interpretation almost without exception, whilst the remaining six always give an object interpretation. Interestingly then, only 7/13 resort to the interpretation available in both English and German as their default, whilst the remaining 6/13 default to the interpretation only available in German. Taken together, these results suggest it is more likely that attrition of *wh*-question interpretation results from difficulty accessing both underlying syntactic structures, rather than the loss of the underlying object question structure from the grammar.

The IH, as presented most recently in reference to L1 attrition, now identifies processing difficulties as the sole source of attrition of morphosyntax and explicitly excludes the possibility that L1 grammatical representations can be affected in adulthood (Chamorro and Sorace, 2019:30). This claim runs contrary not only to earlier instantiations of the theory (e.g., Sorace, 2000; Tsimpli *et al.*, 2004) but also to a considerable number of studies that indicate representations can be affected (see 1.2.3.2 for references as well as Gürel, 2008 and Domínguez, 2013 for reviews of morphosyntactic attrition). The foremost consequence of this claim is that this version of the IH cannot be considered a model of grammatical attrition as defined in this thesis i.e., L1 representational modification, as it explicitly excludes this possibility. Moreover, Sorace (2020:3) claims the predictions of the IH should be based on 'a continuum of conditions on syntactic realization, ranging from more 'internal' to more 'external' and involving different types of cognitive processes'. As noted by Hicks and Domínguez (2020b:fn.8), predictions stemming from such a conceptualisation seem vague and it is unclear exactly how testable this hypothesis is in reality.

This ‘updated’ version pertaining to attrition has been tested in two recent studies: Chamorro, Sorace and Sturt (2016) and Chamorro, Sturt and Sorace (2016). Both tested the same group of L1 Spanish speakers who moved to the UK in adulthood using offline and online (eye-tracking) measures. Both investigated null vs. overt subject interpretation, whilst the second also investigated an internal interface property: Direct Object Marking. Attrition was found only for overt subject interpretation (external interface) and only for the online but not the offline task. Chamorro and Sorace (2019), reviewing these two experiments together, take them to be strong support for the updated version of the IH and that grammatical representations are not affected by attrition. However, once again attrition was found only for the structure with an L2 equivalent but not for the structures which have no L2 equivalent form, and therefore perhaps no competing L2 information to engender these structures in the L1. As previously argued, this casts doubt as to whether these studies do in fact constitute support for the claim that the vulnerability of a given structure to attrition is determined by the interface at which it is calculated, rather the specific L1–L2 structural similarities/differences.

2.4.2 The Subset Model

Cross-linguistic differences play a deterministic role in the Subset Model (also known as the Subset/Superset Hypothesis or, when applied to attrition, the Set-Theoretic Language Attrition Model) (Gürel, 2002, 2007). Based on the Set Theoretic Transfer Model (Berwick, 1985; Manzini and Wexler, 1987; White, 1989), Gürel (2002) posits that attrition is expected where an L1 grammatical property has an L2 equivalent which allows a wider range of grammatical ‘options’ than the L1 (e.g., where an L2 reflexive form has more potential antecedents than the equivalent L1 reflexive form). In this configuration the L2 is the superset for that property, which affords the possibility of $L2 > L1$ transfer, and the resultant attrition is a case of ‘expansion’ towards the superset options. Where the L1 property has no analogous grammatical structure in the L2, or where the grammatical options are the same or more restricted in the L2, there is nothing that can be transferred to the L1 and hence no attrition predicted for the L1 property.

The explanatory power of this theory is demonstrated by a series of studies by Gürel (2002, 2004a, 2007) investigating pronominal binding constraints in Turkish and English. The data for Gürel (2004a), discussed next, is a subset of the data originally presented in Gürel (2002).³² The data for Gürel (2004a) comes from 24 native speakers of Turkish who moved to North America after the age of 16 (mean = 25.5), with a mean a length of residence (LoR) of 21.5 years.

³² The attrition data from Gürel (2002) is also analysed in Gürel (2004b) from the perspective of the Activation Threshold Hypothesis (ATH). Gürel (2004b) is therefore not discussed here.

Gürel (2004a) considers the interpretation of three Turkish pronouns in the subject position of embedded finite clauses with either referential or quantified antecedents. The pronouns are: *o* ('s/he'), *kendisi* (a gender-neutral form that can appear in pronoun or reflexive positions) and a null subject (*pro*). In the embedded subject position *kendisi* and *pro* can be bound with either the matrix subject or a disjoint antecedent, whilst embedded *o* cannot be bound with the matrix subject. English has no corresponding form for *pro*, nor any pronoun or reflexive whose binding properties correspond to *kendisi*. English embedded subjects may refer to either the matrix subject or a disjoint referent.

- 3) Elif_(i) [o-nun_(*/i/j) / kendi-si-nin_(i/j) / *pro*_(i/j) çok inatçı ol-dug-u] -nu bil-iyor.
 Elif s/he-GEN self-3SG-GEN *pro* very stubborn be-NOM-3SGPOSS-ACC know-PRG
 Elif_(i) knows that [she_(i/j) /*herself/**pro* is very stubborn]. (Adapted from Gürel 2007:101)

Gürel accounts for these facts by assuming that both D(eterminer) P(hrase)s and C(omplementiser) P(hrase)s are possible binding domains in English, but only CPs are binding domains in Turkish. Importantly, Turkish embedded clauses are analysed as DPs, therefore the pronoun *o* and the matrix subject are in the same binding domain and thus binding is prohibited in line with Principle B (Chomsky, 1981).

As English, the L2, has no corresponding form for the null pronoun or *kendisi*, they are not expected to be vulnerable to attrition.³³ As the binding constraints of L2 English (*s/he*) are less restrictive than those of the L1 Turkish equivalent, *o*, English constitutes the superset of the L1 for this property. It is therefore predicted that in the attrited grammar, the binding constraints of *o* will be expanded to also allow binding with the matrix subject, in line with the binding constraints of *s/he* in English.

The L1 Turkish speakers in the US completed three untimed tasks: A Written Interpretation Task (WIT), a Truth Value Judgement Task (TVJT) and a Picture Identification Task (PIT). Their results were compared to a control group of 30 native Turkish speakers. The general patterns of attrition found in the three experimental tasks are the same, with some small differences being attributed to the differences in the response variables. The findings for each pronoun will be discussed in turn. On the WIT, attriters gave significantly more bound readings of *o* than the controls, but only for

³³ To be clear, though in Gürel's analysis the differences between Turkish and English pronominal binding are attributed to the differences in the status of CP and DP as binding domains in the two languages (rather than the properties of the pronominals themselves) when formulating attrition predictions based on subset/superset relationships, the availability of an equivalent pronominal form in the two languages is nevertheless taken into account.

quantified antecedents. This is also the case for the TVJT – except that this difference was seen with both types of antecedent – and for the PIT (which only tested referential antecedents).

Whilst the attriters still allow the disjoint interpretation of *o*, they also clearly allow the co-referential reading of *o*, suggesting their L1 grammar has been restructured based on the L2 grammar. Specifically, they now seem to consider both DPs and CP as possible binding domains for *o* in Turkish, thus the two options provided by the L1 and L2 appear to be co-exist in the same attrited L1 grammar. Nevertheless, the disjoint interpretation is their preferred reading, though to a significantly lesser degree than the controls. Whilst the attriters' results for *kendisi* and *pro* were not statistically compared to the controls, Gürel concludes based on the descriptive results that these forms remain unaffected.

In summary, significant attrition was found for the pronoun with an L2 equivalent in a superset relation to the L1, with the resultant grammatical structuring appearing to take the form of L1 binding options being expanded to match the broader L2 options. No grammatical attrition was evidenced for the two pronouns which do not have L2 equivalents. These results are therefore entirely in keeping with the Subset Model and are particularly robust in that they hold across three different tasks.

It is worth noting that the referential options of these Turkish pronouns are determined by syntactic constraints (i.e., binding domains) and constitute categorical grammatical distinctions, in contrast to the referential patterns of null and overt pronouns in Romance languages seen in 2.4.1, which are general *preferences* based on processing considerations (the Position of Antecedent Strategy and discourse factors i.e., overt subjects are used to mark topic-shift and focus contexts, whilst null subjects are the default). Therefore, the changes in referential patterns for the speakers in Gürel (2004a) which appear to demonstrate modification to L1 binding domains is perhaps more robust evidence of L1 grammatical restructuring as opposed to possible bilingual processing pressures influencing referential preferences.³⁴

Gürel (2007) presents a complementary study to (Gürel, 2004a). This study tests the Subset Model with pronominal and reflexive binding in object positions, possessive pronouns, and embedded subject binding using a WIT and PIT. This time the L1 is English and the L2 Turkish. The experimental group consisted of 15 native English speakers who had lived in Turkey for 10 – 35 years (mean = 18.6) with an equal number of control participants. Contrasting the results of this study with

³⁴ Though admittedly, it could be argued that the use of overt pronouns to illicitly refer to the matrix subject here is in fact a result of bilingual processing pressures: it has been argued that the matrix subject is the easiest antecedent for embedded subjects to access during processing due to their syntactic and semantic prominence (Crawley, Steven and Kleinman, 1990; Kaiser, 2011). Thus, when bilinguals' processing resources are stretched, they may resort to choosing this antecedent by default. However, as argued in 2.4.1, in the absence of processing measures it is perhaps premature to conclude that these attriters have such processing difficulties.

the attrition data of Gürel (2002, 2004a, 2004b) is particularly insightful as they form a very rare instance of attrition being investigated bi-directionally for largely the same grammatical properties.

The binding constraints of embedded subject pronouns are outlined with reference to (Gürel, 2002, 2004a) above. When English is the L1 and Turkish the L2, the L2 is the subset with regards to subject pronouns, and thus no attrition is expected for the embedded clauses in Gürel (2007). This is also the case for the possessive DP structures tested. Both of these predictions were confirmed by the results.

Regarding object pronouns, English and Turkish object pronouns have the same binding options in non-finite bi-clausal sentences. However, according to Gürel, in mono-clausal sentences with two potential local antecedents, Turkish has less restrictive binding options than English e.g.:

4) *Brian_(i) George'a_(j) o-nun^(*i/j/k) bir resm-i-ni göster-di.*

Brian George-DAT s/he-GEN a picture-3SGPOSS-ACC showed-PST

Brian_(i) showed George_(j) a picture of **him**_(**i/**j/k) (Adapted from Gürel, 2007:105–6).

Turkish is therefore assumed to be the superset and these structures predicted to be vulnerable to attrition.

In terms of reflexive binding, Turkish has a true reflexive form *kendi*, and also the form *kendisi*, which has no English equivalent and can refer to any referent (both co-referential and disjoint subjects and objects) in all structures tested here. *Kendi* has the same binding possibilities as English reflexives in bi-clausal structures. However, in mono-clausal sentences with two local referents it has more restrictive options as it must be subject oriented. The English reflexive, on the other hand, can refer also to the object e.g.:

5) *Brian_(i) George'a_(j) kendi_(i/j/*k)/kendi-si-nin_(i/j/k) resm-i-ni göster-di.*

Brian George-DAT self self-3SG-GEN a picture-3SGPOSS-ACC showed-PST

Brian_(i) showed George_(j) a picture of **himself**_(i/j/*k) (Adapted from Gürel, 2007:107).

For reflexives in these monoclausal sentences, it appears that Turkish is the subset of English due to the more restrictive options of the Turkish reflexive *kendi*. However, despite considering English to have no equivalent of *kendisi*, Gürel argues that its presence in Turkish makes Turkish the superset. Consequently, she predicts attrition of the L1 English reflexives as the participants may allow a disjoint interpretation in line with the possibilities of *kendisi*.

Results revealed no statistically significant attrition for pronouns or reflexives on either test. These findings support the Subset Model on the conditions where English and Turkish have the same binding options, or where Turkish is the subset, however the finding of no attrition on the two conditions where attrition was expected (mono-clausal structures with pronouns and reflexives) is taken to be evidence against the Subset Model. Gürel suggests that the lack of attrition could be partly attributed to the fact that the participants had considerable continued exposure to and use of their L1 (unlike the participants in the 2002/2004 study), which may have kept their L1 grammar easily accessible and more immune to restructuring.

Two alternative explanations may actually account for these results, with one explanation accounting for the pronominal results and another for the reflexives. Regarding the pronominal results, the ‘mono-clausal sentences with two antecedents’ in this study are all ‘Picture NP’ structures. Gürel’s analysis of the binding possibilities in these structures does not seem correct. In English, pronouns in Picture NPs are able to bind with either object or the subject antecedent, as well as a disjoint antecedent, contra what Gürel states for the example in 4). These binding possibilities are actually attested in both the English control and the experimental groups’ WIT results. The ‘disjoint only’ interpretation is the preferred interpretation, being chosen 55% of the time, however, this means that 45% of the time the subject or the object are considered possible antecedents (either on their own, in combination with each other, or in a combination with the disjoint interpretation – see Gürel, 2007:113 for the full list of response options and percentages). English is therefore actually the superset for this structure. Under this analysis, the Subset Model would predict no attrition, which is borne out in the results. Interestingly however, the proportion of ‘subject only’ responses is considerably lower for the attriters at 2%. Though not significantly different from the control results, the subject is the only antecedent not allowed in Turkish, thus an argument could be made that there has been some degree of influence from Turkish in the form of restricting the ‘wider’ L1 options, contra the Subset Model.

We turn now to an alternative view of the reflexive results. In Gürel (2002, 2004a), which looked only at pronominals, the L2 was considered the superset based on the English overt pronoun having more referential options compared to the L1 Turkish. In establishing the subset/superset relationship, the two additional L1 pronominal forms (*kendisi* and *pro*) were not taken into account due to lack of equivalent L2 forms, and therefore not predicted to be vulnerable to attrition. When the L1 and the L2 were reversed in Gürel (2007), so were the subset/superset predictions, and *kendisi* and *pro* were not predicted to engender attrition of the L1 pronoun due to lack of equivalent L1 form. However, in an apparent contradiction to the previous work, for the reflexive structures in Gürel (2007) L2 Turkish is considered the superset due to the presence of *kendisi*, even though this form has no equivalent in the L1, and Gürel nevertheless predicts that it will endanger attrition of the English reflexive. It is not clear why this would be the case. Although it is in principle possible that

kendisi could exert some influence on the English reflexive, the most salient L1–L2 equivalence is between the English reflexive and *kendi* (the Turkish true reflexive form). For *kendisi* to engender attrition of the English reflexive some form of equivalence must presumably be established between these two forms. However, the empirical results here imply that no such equivalence is established as no influence from *kendisi* is detected. If, in line with the assumptions of Gürel (2002, 2004a) and also Gürel (2007) for pronominal binding, *kendisi* is excluded from this subset/superset configuration, then L2 Turkish is again the subset and no attrition is predicted for reflexives, which is borne out in the results.

If these alternative explanations of the findings are correct, then, taken together, the results of these two studies make an argument for an ‘additive’ view of grammatical attrition; that is, grammatical attrition is typically a case of adding grammatical options to the L1 grammar which are available in the L2 but not in the monolingual L1 grammars, and crucially, only for L1 structures/forms with an equivalent L2 form. When the L2 is more restrictive or has the same options for a particular property there is nothing to add in terms of grammatical options, and – at least from the standpoint of the Subset Model – no attrition possible (this view is challenged by the results of Domínguez, 2013, to be discussed next in 2.4.3, as well the results of Iverson 2012, discussed in 2.4.1, and the results of the current empirical study, which find attrition in the form of rejection of L1 grammatical options, rather than exclusively acceptance/expansion towards L2 grammatical options). Likewise, these results suggest that where there is no equivalent L2 form, there is nothing to engender attrition of the L1 form, and, conversely, where there is no equivalent L1 form, an L2 form cannot engender attrition in the L1.

2.4.3 Feature Reassembly

More recently, an alternative minimalist account of grammatical attrition has been proposed. Domínguez and Hicks (2016) and Hicks and Domínguez (2020a) argue that grammatical attrition in adult grammars obtains by means of Feature Reassembly (see 1.2.2 and 1.4 for discussion of the advantages of a Feature-based account to grammatical attrition and 2.3.2 for an explanation of FR in L2 acquisition).³⁵

To date only one study (Domínguez and Hicks, 2016) has explored this proposal in detail. The authors re-analyse data from Domínguez (2013), which investigates null and post-verbal subjects in bi-dialectal and bilingual contact situations. The bi-dialectal data was collected from 20 speakers of

³⁵ Putnam and Sánchez (2013) propose a Feature-Reassembly based model of grammatical change in child Heritage grammars. This model describes four broad stages of L1 grammatical change, corresponding to different degrees of restructuring and cross-linguistic grammatical interference that are attested in Heritage grammars. Putnam, Perez-Cortes and Sánchez (2019:23) advocate that this model can in principle also be applied to L1 attrition in the grammars of late sequential bilinguals. Due to space constraints and as – to the best of my knowledge – this model has not been empirically tested with adult attriters, it is not discussed further here.

L1a Caribbean Spanish (CS) – specifically Cuban Spanish – 14 of whom had emigrated from Cuba to Miami in adulthood, who had all resided there for at least 15 years (mean = 32.4 years).³⁶ Miami has a large Spanish speaking community, and these CS speakers were regularly exposed to the variety of Spanish spoken there, which is referred to as Mainland Spanish (MS). These speakers therefore maintained contact with their L1, albeit a different variety i.e., an L1b. They were also exposed to English in Miami (see Domínguez, 2013 for further details of the linguistic contexts) and most were self-reported Spanish dominant Spanish-English bilinguals. The second group, the bilingual contact group, consisted of 11 L1 Spanish speakers from Spain who had resided in the UK for at least 10 years (mean = 38.5 years) (10 had emigrated to the UK in adulthood with one having emigrated earlier). In contrast to the speakers in Miami, these speakers maintained only very limited contact with Spanish. There were two control groups: one of L1 Cuban Spanish speakers still living in Cuba and one of L1 European Spanish (ES) speakers living in Spain.

Domínguez and Hicks (2016) focus primarily on the bi-dialectal data as a way to demonstrate the viability of an FR approach to attrition. The key differences between CS and MS for this study are that CS exhibits a higher frequency of overt pronouns and pre-verbal subjects (null subjects are used around 52% of the time in CS but 70% of the time in MS, Domínguez, 2013:189). To account for these differences, the study adopts the analysis of Sheehan (2006) in which the possibilities of subject realisation in null/non-null subject languages are reduced to properties of the functional head, T. In MS and ES, T is specified with the feature [μ D]. As a consequence, null subjects are the default, and the use of overt subjects is conditioned by discourse considerations such as topic-shift and focus. Domínguez and Hicks propose that CS, on the other hand, has two lexicon entries of the functional head T. One copy of T is specified with a [μ D] feature and one without. When the T with [μ D] is selected, the pronoun is null and the options for subject realisation are the same as MS/ES (to be clear, MS and ES are argued to have the same distribution null/overt subjects and pre-post-verbal subjects). When T without this feature is selected the pronoun is overt. In this case, the distribution is that of a non-null-subject language as the subject is overt and pre-verbal regardless of any discourse considerations (Domínguez and Hicks, 2016:61). A consequence of the availability of the two T heads is that T[μ D] is chosen less often, resulting in a lower proportion of null pronouns and post-verbal subjects in CS compared to MS overall.

One-hour-long oral interviews elicited production data on null and post-verbal subjects, revealing that the L1a CS speakers in Miami used null and post-verbal subjects at an overall significantly higher rate than the controls in Cuba. No significant difference in null subject usage was found for the bilinguals in the UK, however post-verbal subject usage in this group had decreased

³⁶ Domínguez (2013) takes into account the differences in the age of arrival when reporting results.

significantly. This latter finding is interpreted as evidence of a quantitative but not qualitative change and is argued to be due to a different type of L1 modification that likely does not involve L1 grammatical restructuring. This interpretation is predicated on the understanding that there is a relationship between null and post-verbal subjects (which Domínguez and Hicks, 2016:66 demonstrate are highly correlated in their data) and that the same grammatical considerations – in particular the feature specification of the functional head T, following Sheehan (2006) – underpin both properties. The logic is that if the L1 grammar had been restructured, both would be affected. See Domínguez and Hicks (2016) for more details on this line of argumentation.

The authors conclude that the changes observed in the L1a CS speakers in Miami were due to quantitative and importantly also qualitative changes in their linguistic input which resulted in restructuring of their L1a grammars. Specifically, the input that engenders L1 attrition was that of the distinct L1 variety, MS, not the L2, English. English does not allow null subjects in finite clauses nor post-verbal subjects so exposure to this input cannot explain the *increase* in their usage in the L1a CS grammars. In other words, if grammatical attrition was driven by English in the bi-dialectal group, a *decrease* in both of these properties is expected, contrary to fact.

It is argued that these results can be explained in FR terms in that, after sufficient contact with input from MS grammar which does not contain T without [μ D], the CS lexicon has potentially lost the copy of T without [μ D], leaving T[μ D] as the only T head available. An alternative possibility might be that both copies of T are now specified with [μ D] so that the options for subject use are the same no matter which T is selected. This accounts for the change in terms of a specific FR operation, rather than the loss of (a version of) a functional head. In either case, T without [μ D] would no longer be available. As a result, the attrited grammar essentially becomes that of a typical null-subject language in which the distribution of null vs. overt subjects is largely conditioned by pragmatic and discourse factors. This claim is supported by finding that CS speakers in Miami use null subjects significantly more in non-topic-shift contexts compared to the controls. This increase is in line with what is expected in a null-subject language (i.e., Miami Spanish). The change can thus be characterised as a syntactic modification with pragmatic consequences.

No data from a control group of MS speakers was collected, however there is control data for ES, which is argued to have the same distribution of null and overt subjects as MS due to the availability of only T[μ D]. If we compare the CS bi-dialectals in Miami to the ES controls (using the data provided in Domínguez, 2013), we can see that although the distribution of null/overt subject and pre/post-verbal subjects in the attrited bi-dialectal CS grammar appears to be moving towards the distribution of ES grammar, there still seems to be considerable differences between the results of the two groups (bi-dialectal null subject usage 56.6% vs. ES control 70.8%, post-verbal subject usage 16.1% vs. 25.5%). This observation is necessarily based on the descriptive statistics as no inferential

statistics were ran to compare these two groups of results. A finding of no statistically significant differences between the results of these groups would constitute even stronger evidence that the CS grammars had been restructured to pattern with ES/MS grammars and confirm whether only T[*u*D] is now available in the attrited grammar.³⁷ As the attrited CS group results in fact sit somewhere between the CS and ES/MS control results (though still significantly different from the former group), it's possible that only the grammars of some of the participants had undergone the restructuring suggested by the authors, and thus were patterning with ES/MS, whilst others underwent no restructuring, leading to this 'in between' group average. As only the mean percentages for the attriter group are presented it's not possible to ascertain whether this has occurred or not.³⁸

In summary, the results are indicative of attrition at an internal interface where the L1a grammar arguably exhibits the wider grammatical options (the options of both a null-subject and non-null subject language which are restricted under attrition to be more in line with those of a null-subject language). These are findings that the IH and Subset Model do not predict, though for different reasons. FR however is able to account for them and seems here to be a viable explanation of the mechanism of grammar-internal attrition. Hicks and Domínguez (2020a) retrospectively account for the findings of Tsimpili *et al.* (2004) and Gürel and Yılmaz (2011) by means of FR. However, as Schmid and Köpke (2017:649) note, FR is yet to be applied to a wider range of grammatical attrition contexts.

2.4.4 The Bottleneck Hypothesis

In a recent article, Slabakova (2019) discusses the application of another Minimalist acquisition theory – The Bottleneck Hypothesis (BH) (Slabakova, 2008, 2013, 2016) – to grammatical attrition in heritage and sequential-bilingual attrited grammars. Only its application to the latter population is considered here. The BH assumes a feature-based view of the grammar and a FR approach to L2 acquisition (as outlined in 2.2 and 2.3.2 respectively). In this view of the grammar, functional morphemes, both bound and free, are encoded with a multitude of grammatical meanings, including semantic meaning. Importantly, functional morphology is considered the locus of cross-linguistic grammatical variation in that variation stems from differences in how morphosyntactic and semantic features are specified on functional morphemes in different languages/varieties. In contrast, narrow

³⁷ A further possible account of these results not discussed by the authors is that the CS speakers in Miami might actually still retain both T without and T with [*u*D], however the T without [*u*D] is selected for the derivation significantly less than before they emigrated. This would lead to an increase in null and post-post verbal subject usage but not full convergence on the ME/ES grammars, which is what the results seem to indicate. As noted in 2.2.2, the choice of syntactic option would be modulated by a number of additional linguistic and extra-linguistic conditioning factors. If the account suggested here is on the right track then the L1a change would arguably be more sociolinguistic in nature and even perhaps better conceptualised as accommodation rather than grammatical attrition (e.g., Trudgill, 1986; Auer and Hinskens, 2005).

³⁸ See Domínguez (2013) for the results of a context-dependent preference testing subject inversion in different syntactic and pragmatic contexts, which was administered as a follow-up experiment to the bi-dialectal group only. This task reveals significant attrition of post-verbal subjects, further supporting the production data. Domínguez (2013) provides a full breakdown of results by subject type, discourse context, verb type etc. Due to space constraints, this task is not discussed further here.

syntax operations and phrasal semantic operations (e.g., lambda abstraction) are universal, thus the L2 learner can rely on the same mechanisms from their L1. The BH therefore considers the acquisition of functional morphology (more formally, correctly assembling the relevant morphosyntactic and semantic features and supplying their exponent(s) as functional morphemes) to be the most challenging learning task (i.e., the bottleneck of acquisition). For example, for an L1 English–L2 German learner, acquiring the inflectional morphology required for verbal agreement is predicted to be considerably more challenging than acquiring a narrow syntax property like V2 (see Slabakova, 2008, 2013, 2016 for more detailed discussion and overviews of empirical support for the BH from L2 acquisition research).

Applied to attrition, the BH predicts that, should it obtain at all, attrition will be observed in the expression of morphosyntactic and semantic features in the L1 functional morphology, whilst pure syntactic properties and compositional semantics should remain largely impervious. To date no empirical study has set out to specifically test the predictions of the BH for attrition, however Slabakova (2019) considers the implications for the hypothesis by reviewing results from a number of previous studies of attrition in adult grammars.

One such study discussed by Slabakova (2019) is Ribbert and Kuiken (2010), which investigates infinitival complementisers in L1 German grammars in the Netherlands. They tested 52 experimental participants who emigrated in adulthood (mean LoR 4.2 years). Their results on a Grammaticality Preference Task were compared to those of 38 age and education-matched German controls. The authors consider the Dutch infinitival complementiser *om* to be a superset of the German equivalent *um* as there are a number of contexts in which the use of *um* is prohibited in German, but *om* is optional in Dutch. The task revealed that German speakers in the Netherlands chose *um* in contexts where *om* is optional in Dutch at a significantly higher rate than the German controls, suggesting that Dutch grammatical options had been added to the attrited grammar. Thus, as well as documenting attrition of functional morphology, this study also provides further supporting evidence for the Subset Model.

Montrul, Bhatt and Girju (2015) reports attrition of functional morphology in adult late-sequential bilinguals and heritage speakers in the US (L2 English) using bi-modal Acceptability Judgement Tasks. Only the results of the late-sequential bilinguals are discussed here. The property tested is Direct Object Marking (DOM) in L1 Spanish, Hindi, and Romanian, which is subject to broadly the same conditions across the three languages. Briefly, DOM is the obligatory marking (typically with an overt case marker, preposition or postposition) of direct objects with certain semantic properties (e.g., [definite], [animate], [specific]). The relevant finding for this discussion is that thirteen (out of twenty-one) adult L1 Spanish bilinguals consistently accepted omission of DOM in obligatory contexts, which the controls did not. No such findings were found in the adult Hindi or

Romanian group. The authors offer a number of explanations for these results, including differences between the three languages in terms of the phonological salience of DOM, as well as a number of specific structural differences.

Though not discussed by Slabakova (2019), Montrul and Sánchez-Walker (2013) and Montrul (2014) provide further evidence of DOM attrition in late-sequential L1 Spanish bilingual grammars in the USA using a combination of different oral and written production and comprehension tasks. Here a case can be made that the semantic features which condition the use of DOM (typically assumed to be definiteness and animacy in Spanish) have become optionally unspecified in the attrited grammar (e.g., DOM is both used where not required and also not provided where required). As a result, DOM is no longer always subject to these semantic restrictions and optionally produced/acceptable in both obligatory and non-obligatory contexts. Here it seems that the absence of a requirement to overtly mark certain direct objects in English is sufficient to engender a relaxation of the constraints of DOM in the L1.

More recently, DOM has been found to attrite where both the L1 and L2 are DOM languages, yet DOM is conditioned by different semantic features. López-Otero (2022) finds significant differences in the patterns of DOM use between a control group of Romanian monolinguals and in L1 Romanians living in Spain (mean LoR 9.61 years). The study employed an Elicited Production Task and AJT. As inferential statistics are provided only for the production task, only those results are discussed here (no individual-level results are discussed). The task revealed significant differences in the degree to which one of the semantic determinants of DOM in Romanian, referential stability (which relates to specificity and definiteness and interacts with animacy – see López Otero, 2022 for details), conditions the use of DOM for the bilinguals and controls. Specifically, bilinguals' use of DOM is no longer conditioned by referential stability to the same extent as the controls. This is consistent with influence from L2 Spanish, as it is argued that DOM in Spanish is not conditioned by referential stability. A case could be made here that only the features relevant for referential stability have become optionally unspecified. Comparison of these results with those by Montrul and colleagues, discussed above, is particularly informative: In the studies where the L1 is a DOM language but the L2 is not, the pattern of attrition which emerges is one of optionality i.e., the DOM morpheme (a preposition in the case of Spanish) is, arguably, optionally unspecified with any or all of the relevant semantic conditioning features. However, where the L1 and L2 are both DOM languages, a more nuanced pattern of attrition emerges in which the behaviour of DOM changes significantly only in terms of the behaviour conditioned by the specific semantic determinant not shared with the L1.

Slabakova also considers the BH with regards to the findings of two studies into pronominal binding: Tsimpli *et al.* (2004) and Gürel (2004a) (discussed in detail in 2.4.1 and 2.4.2 respectively),

which find attrition of functional morphology; and with regards to Schmid (2014), which investigated a range of morphological and syntactic properties in the free speech of L1 German late-sequential bilinguals in Canada, yet found no attrition overall.

Slabakova concludes that the above studies generally support the BH by demonstrating that functional morphology can be vulnerable to attrition, whilst core syntax appears to be more resilient. Nevertheless, attrition of core syntax is sometimes attested in adult grammars (e.g., attrition of VS/SV word order acceptance in Iverson, 2012, relative clause word orders in Kasparian and Steinhauer, 2017, and, to a far lesser extent, of V2 word order in Schmid, 2002). Furthermore, it is important to note that none of these studies set out to test the predictions of the BH, and as such, most of them do not directly contrast attrition of functional morphology on one hand, versus core syntax and/or semantics on the other using the same participants. Such designs, which have proved illuminating in L2 acquisition research, are likewise needed in attrition to more robustly investigate the BH.

A prominent limitation of the BH in its current conceptualisation is highlighted by Slabakova herself when she acknowledges the BH is currently not fine-grained enough to account for the selectivity of attrition found in studies such as Gürel (2004a) and Montrul, Bhatt and Girju (2015) (i.e., attrition one pronoun/reflexive but not the other others, or attrition of DOM in one language but not the other two). It is likely that a number of factors, including more specific cross-linguistic differences in the relevant functional morphology such as the complexity of the form-meaning mappings and also frequency and salience play a role in explaining these grammatical attrition results (Slabakova, 2019: 47–48).

2.4.5 Interim summary

The studies reviewed here demonstrate a number of key points. Firstly, they highlight that attrition is highly discriminate in the L1 properties it targets, and cross-linguistic differences appear to bear heavily on this. Specifically, the studies strongly suggest that grammatical attrition obtains predominately for L1a structures which have an analogous or corresponding form in the L2/L1b, yet which nonetheless exhibit differences in their behaviour (it appears that this ‘form’ can be an individual functional morpheme, such as a pronoun in many of the studies reviewed above, or a syntactic structure e.g., the L1 and L2 allow VS/SV word order alternations yet with different syntactic determinants).

It has been argued that in Tsimpli *et al.* (2004), and other studies with an L1 null-subject L2 English pairing, the lack of null subject attrition may actually be due to L2 grammar containing no equivalent form of the L1 null subject, and thus no competing/new information which could influence this L1 form. This is also a possible explanation for why the Turkish pronominals *kendisi* and

pro, which have no English equivalents, do not engender attrition in L1 English reflexives in Gürel (2007). On the other hand, when the L2 is another null-subject language yet one which exhibits clear differences in the distribution and interpretation of null subjects, attrition of the null pronoun does seem possible (e.g., Domínguez, 2013; Castro, Rothman and Westergaard, 2020).

In 1.2.3.3 it was suggested that there are at least two main mechanisms by which grammatical attrition obtains: predominantly supplementing and, in rare cases, supplanting. Discussion of these will not be repeated here, though it's important to note that these general patterns are supported the studies reviewed in this section, with the majority attesting supplanting and a small number, most notably Iverson (2012), attesting cases of supplanting.

Secondly, this review illustrates that no one theory can at present adequately account for the data in terms of being able to both accurately predict grammatical attrition and also providing an account of the underlying linguistic mechanisms. The IH makes clear predictions, yet its empirical validity has been demonstrated to be insufficient and alternative explanations based on consideration of fine-grained cross-linguistic differences, which allow for and indeed predict attrition at internal interfaces, are argued to be more empirically viable. Most importantly though, in its most recent form as pertains to attrition (Chamorro and Sorace, 2019:30), the IH cannot be considered a model of grammatical attrition defined as L1 representational changes. Thus we must look elsewhere.

The Subset Model is able to account for the data in Gürel (2002, 2004a) and, as I argued in 2.4.2, also (2007). However, the view that attrition is a unidirectional process of 'adding' options from a superset L2 to a subset L1, whilst maintain the original option, is not able to account for studies that show that L1 grammatical options can in some cases also become more restricted or indeed cases where L1 options are replaced with L2 options given the appropriate cross-linguistic differences (e.g., Iverson, 2012; Domínguez, 2013). The Bottleneck Hypothesis in its current form is acknowledged to be unable to account for a number of fine-grained attrition patterns, however further empirical research directly testing this hypothesis is needed to make more informed conclusions as to the accuracy of its predictions regarding grammatical attrition patterns.

Although it is yet to be applied to a wider range of contexts, Feature Reassembly currently seems to be better able to account for the range of results noted in the aforementioned studies. Notable advantages of an FR approach are that i) it offers the appropriate level of granularity when accounting for highly specific attrition patterns, including those at the level of individual speakers, ii) there is nothing to exclude attrition of narrow syntax or internal interfaces, and iii) it is flexible enough to allow both supplementing and supplanting of grammatical options in an L1 grammar. Though it appears a valid account of the grammatical *mechanism* by which attrition obtains, FR alone does not make explicit predictions as to the selectivity of attrition and has no inherent devices for

restricting attrition.³⁹ It therefore needs to be incorporated into a broader model of attrition in which it functions as the mechanism for grammatical attrition and where it interacts with additional theoretical devices with further stipulations to restrict the occurrence of attrition, thereby allowing the model to generate more specific predictions. Exactly this is proposed with the AvA model.

Finally, three key methodological points also emerge from this review. Firstly, the vast majority of studies, in particular generative studies, have focussed on a rather small range of grammatical properties, most noticeably pronominal use/interpretation (especially in the case of IH studies), which does not allow for thorough and comprehensive hypothesis testing. Secondly, as highlighted by Schmid and De Leeuw (2019:187), studies almost exclusively use a single language pair, limiting the generalisability of their results and the extent to which the role of cross-linguistic differences in input can be investigated. Finally, five studies (Iverson, 2012; Grabitzky, 2014; Castro, Rothman and Westergaard, 2017, 2020; López-Otero, 2022 – of which the latter three are not considered in detail in this review due to space constraints) highlight the potential insights of using L2 controls in attrition studies (i.e., L1 speakers of the attriters' L2, who complete equivalent tasks in their L1). Comparing attriters' L1 results to the results of L2 control results can confirm: a) the directionality of attrition effects i.e., has the L1 grammar shifted away from the L1 and towards the L2? – which confirms L2 influence as the driver of L1 changes, and b) the extent of this shift i.e., does the L1 grammar now converge on the L2 or pattern somewhere in between the L1 and L2? As suggested in this review, the extent of the shift can be highly indicative of the type of restructuring which the L1 grammar has undergone: L2 convergence suggests supplanting of L1 options whilst results in between the L1 and L2 controls are more suggestive of supplementing the L1 grammar with L2 options, resulting in L1–L2 optionality at the group level.⁴⁰ These methodological considerations are borne in mind for the experimental design of the current study, which is outlined in detail in 4.2.

2.4.6 The Attrition via Acquisition (AvA) Model

Hicks and Domínguez (2020a, 2020b), adapting Lidz and Gagliardi's (2015) model of L1 Acquisition, outline the first Minimalist model of the language faculty architecture that incorporates not only first and subsequent language acquisition, but crucially aims to also account for representational changes in L1 adult grammars. To do so, the model necessarily assumes that fully acquired, adult grammars remain sensitive to input changes (including L1 input changes) throughout a speaker's lifespan.

³⁹ Beyond that attrition would not be predicted for properties for which the feature specifications of the L1 and equivalent L2 structure are identical, as there is no potential for FR of the L1 feature assemblies based on the L2 assemblies here.

⁴⁰ Though this can of course depend on the behaviour of the grammatical structure(s) in question, task type, response variable. On tasks such as Acceptability Judgment Tasks, as predominantly used in the aforementioned studies and as are used in the current study, consideration of the specific Likert scale response patterns is always necessary to confirm that attriters are alternating between L1 and L2 rating patterns rather than frequently selecting the mid-point(s) of the scale, which could also lead to their mean responses falling between L1 and L2 control means and being erroneously interpreted as optionality. This point is borne in mind for the analysis of results of this thesis in 5.5.

Before outlining the specific architecture of the model, two key assumptions are first considered below.

2.4.6.1 Key Assumptions

Following Lidz and Gagliardi (2015) the AvA model assumes that a distinction between *input* versus *intake* is crucial. This distinction can originally be traced back to Corder (1967) who argued for the need to distinguish between the linguistic stimulus itself that a learner is exposed to and the specific aspect(s) of input actually ‘taken in’ by the learner and in some way used for acquisition. Debates as to how to define input and intake, and questions regarding exactly which aspects of the linguistic signal are perceived, internalised, and eventually used for acquisition – as well as the exact psycholinguistic mechanisms involved in this process – persist to date (e.g., Carroll, 1999, 2001, 2017; VanPatten, 2000; see Hicks and Domínguez, 2020: 147–148 and fn.7 for further discussion and references). Recognising this, Hicks and Domínguez clarify that what is crucial to their model is the fundamental distinction between input and intake itself, and they therefore set aside the various issues surrounding the conceptualisations of the terms. Nevertheless, broadly following Carroll (1999, 2001), they consider input to be ‘the set of all linguistic data available to a speaker irrespective of what he/she does with it’ (Hicks and Domínguez, 2020:147), whilst intake is considered ‘the processed part of the input which is assigned a linguistic representation’ (Hicks and Domínguez, 2020a: fn.7).⁴¹ Two types of intake are generated at two different stages of the model: ‘Perceptual Intake’, and ‘Acquisitional Intake’. The availability of both is crucial for the modification of grammars in acquisition and attrition, as will be elaborated in the following sections.

The second crucial assumption of the model is a feature-based computational theory of the grammatical component. Specifically, the model assumes a theory of the grammar based on functional features (as discussed in 2.2) and that Feature Reassembly is the underlying linguistic mechanism for acquisition and attrition (as discussed in 2.3.2 for L2 acquisition and 2.4.3 for attrition).

2.4.6.2 Attrition via Acquisition

The AvA model is schematised in Figure 2.2. The model consists of two core systems, ‘Perceptual Encoding’ and ‘Inference’ (also termed the ‘Inference Engine’ or ‘inferential component’) which themselves contain a number of sub-systems/sub-components. The outputs of these systems are Perceptual Intake and Acquisitional Intake respectively. ‘Current grammar state’ can refer to either the L1 or any subsequent grammars, which can be initial, intermediate or end-state.

⁴¹ This definition of ‘input’ is similar to what Carroll (2017) now terms ‘exposure’: she reserves ‘input’ to refer to all the linguistic data a speaker can *potentially* be exposed to, recognising that an individual speaker is only exposed to a subset of this data.

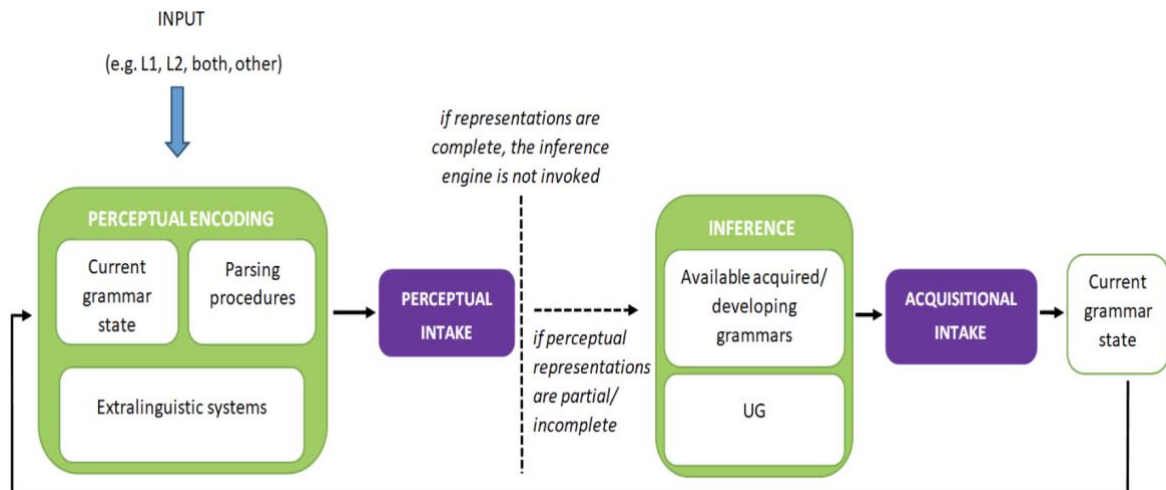


Figure 2.2: Unified Model of Grammatical Acquisition and Attrition (‘Attrition via Acquisition Model’) (Hicks and Domínguez, 2020a:152).

2.4.6.2.1 Perceptual Intake

Perceptual Intake is generated when the speaker is able to perceptually encode the input i.e., to assign a representation to this input on one or more levels e.g., phonetic, phonological, semantic, morphosyntactic to this input. As can be seen from Figure 2.2, perceptual encoding involves various parsing procedures, but also the current grammar state, in that the speaker’s existing knowledge can be used to generate expectations about the input being processed. For example, if a certain aspect of a grammatical property has been previously acquired by the speaker, then they will be more able to reliably extract this aspect from the input in the future, aiding further acquisition of this particular grammatical property or perhaps also a related one. This is suggested by Pearl (2023) who gives a detailed discussion exemplified through the L1 acquisition of *wh*-dependencies.⁴² Furthermore, extralinguistic faculties such as memory and pattern recognition i.e., sensitivity to various statistical distributions of the input, are also brought to bear on perceptual encoding (space restrictions prevent further consideration though this is considered in more detail by Lidz and Gagliardi, 2015 and Omaki and Lidz, 2014 in the context of L1 acquisition). A further crucial aspect of perceptual encoding specific to multilingual acquisition situations is the matter of the parser identifying which languages is present in the input being processed, so that the appropriate perceptual encoding mechanisms for that specific language are selected (Hicks and Domínguez, 2020a:152).

⁴² Pearl’s discussion is in the context of Lidz and Gagliardi’s (2015) model for L1 acquisition, however perceptual encoding is assumed operate in the same way in that model and the AvA model.

Upon initial exposure to the input (whether the L1 or L2) a speaker's perceptual encoding will likely very be minimal and incomplete, with Perceptual Intake becoming increasingly more complete over time by means of the iterative and incremental acquisition process which the architecture affords (discussed further in 2.4.6.2.2). If at any time the Perceptual Intake is complete, meaning the current grammar state fully matches the input on all levels including the extra-linguistic considerations of perceptual encoding, then there is nothing left to be acquired from the particular string of input being processed and Perceptual Intake is not passed to the Inferential Component (dotted vertical line on Figure 2.2).

Though we are concerned with grammatical acquisition and attrition here, presumably the speaker initially has to be able to assign some degree of phonetic/phonological level representation to speech input to allow parsing via initial segmentation of the speech signal into lexical items, before any degree of morphosyntactic and semantic level representations could be assigned.⁴³ In the case of L2 acquisition, a greater degree of phonological and lexical similarity between the L1 and L2 will likely be facilitative to initial phonetic/phonological perceptual encoding and, provided this is sufficiently successful, additional grammatical similarities will subsequently aid the encoding process further. For example, if an L1 Dutch speaker is exposed to L2 German input for the very first time, the similarities between the two languages at the phonetic, phonological, and lexical levels will presumably allow more complete encoding of the input i.e., more complete representations on the aforementioned levels which consequently allows them to more readily begin assigning representations on grammatical levels (and also facilitate parsing for comprehension). Furthermore, encoding on grammatical levels is also facilitated in this case due to the high degree of overlap in this domain. Where the L1–L2 grammars do diverge, their L1 grammar will allow them to make more accurate and reliable inferences about the grammar which generated the L2 input being processed (this of course crucially hinges on the learner noticing these differences in the first place, which in the case of closely related languages can often be rather subtle). Expose this same L1 Dutch speaker to Arabic for the first time and it is likely that very little phonetic, and perhaps no (or again very minimal) phonological or lexical level representations can be assigned at this point and, consequently, no grammatical representations can be assigned at all, regardless of any degree of grammatical overlap. Here there is *in the first instance* no Perceptual Intake and thus no acquisition of any kind is possible. Even with increased exposure over time allowing some degree of perceptual encoding and acquisition, these phonetic, phonological, or lexical representations will likely be much

⁴³ Support for the initial importance of phonological encoding, though in L1 acquisition, can be seen in empirical findings presented in Lidz and Gagliardi (2015:342-343) that indicate that children are sensitive to different aspects of the input at different stages of development, and that this has consequences for the acquisition trajectory. They demonstrate that L1 child learners of Tsez are initially disproportionately sensitive to the phonological features relevant for noun classification. They suggest this is because phonological representations can be assigned to the input prior to any semantic representations, despite semantic features being a more reliable predictor of noun classification (in fact, phonological features are the least reliable type of predictor in this case).

less complete than the same speaker's L2 German representations after the same amount/duration of L2 exposure. Only once a sufficient degree of perceptual encoding on the phonetic, phonological and lexical levels is possible can grammatical encoding begin and the relevant Perceptual Intake for grammatical acquisition be generated.

A consequence of these considerations for L2 grammatical acquisition is that a greater L1–L2 holistic similarity, that is to say, similarity on various linguistic levels (not just semantic and morphosyntactic but also phonetic, phonological, lexical), predicts that the speaker will be sooner and more easily able to identify what kind of featural modifications need to be made for L2 grammatical acquisition before any consideration of the difficulty of the various FR tasks involved in the acquisition of a particular grammatical structure (which is determined by semantic and morphosyntactic similarity alone). These same predictions can be carried over into L1 attrition, as will be explicated in 2.4.6.3.2.

2.4.6.2.2 Acquisitional Intake

Assuming a learner has been able to assign grammatical representations to the input, thereby generating the Perceptual Intake necessary for grammatical acquisition, this intake will in many cases be incomplete due to a partial mismatch between the Perceptual Intake and the current grammar. The most crucial type of mismatch for grammatical acquisition is a mismatch in the feature specifications of the learner's current grammar and the features present in the input. When such a mismatch is detected, Perceptual Intake is passed to the Inference Engine. The Inference Engine compares the existing grammar (L1, L2, Ln) against the Perceptual Intake to generate Acquisitional Intake. Acquisitional Intake is the information used to update the current grammar so that it matches the grammar encoded in the Perceptual Intake. Acquisitional Intake is informed by UG therefore acquisition and also attrition can only obtain in a manner sanctioned by UG.⁴⁴ The feedback-loop between Acquisitional Intake and Perceptual Encoding enables acquisition to be an iterative process, whereby previously acquired knowledge and UG constraints can influence perceptual encoding and subsequently acquisition of new knowledge.

Crucially for L2 acquisition and L1 attrition, both the L1, L2, and any other subsequent grammars are activated in the Inference Engine. As highlighted by Westergaard (2020), this is in keeping with a significant and increasing body of work that demonstrates the coactivation and bi-

⁴⁴ This conceptualisation of the Inferential Component is somewhat different to Lidz and Gagliardi (2015) and Pearl (2023), for whom Acquisitional Intake is part of the component rather than the output. Lidz and Gagliardi (2015) in particular see Acquisitional Intake itself as responsible for making inferences about the grammar which could have generated the Perceptual Intake. Pearl (2023) additionally specifies extralinguistic systems as part of the Inferential Component, though these are of a different nature to those involved in Perceptual Encoding. She provides an extensive discussion of different statistical learning theories and how they interact with UG to enable and facilitate acquisition. Though not specified on the diagram of the model they present, Lidz and Gagliardi (2015) likewise advocate for this approach and discuss at length the interaction between statistical inference and UG.

directional influence of multiple languages in bilinguals, including evidence that the same processing pathways are used for the L1 and L2 (e.g., Kroll *et al.*, 2012; Del Machino and Abutalebi, 2019 etc). This is also in line with proposals arguing that all the grammars of a multilingual function in tandem (e.g., Amaral and Roeper, 2014). A consequence of the coactivation of all grammars within the inferential component is bi-directionality of CLI and transfer in both acquisition and attrition (see Schmid and Köpke, 2017: 641–644 for a recent discussion CLI and L1–L2 coactivation in the context of attrition).

In attested cases of grammatical attrition, a speaker's L2 appears to be their primary and dominant linguistic input. A potential consequence of the model's architecture and the aforementioned interaction of multiple languages in bilinguals is that in these attrition contexts where a bilingual is processing this L2 input over a significant period of time, there is, in principle, the possibility that within the inferential component the L2 Perceptual Intake is compared not just against the L2 grammar and UG, but also the L1 grammar and UG (Hicks and Domínguez, 2020a:157). This Acquisitional Intake generated based on L2 input could subsequently target and 'update' the current L1 grammar.⁴⁵ In other words, instead of the L2 grammar being updated to match the L2 intake, the *L1 grammar* may be updated to match the *L2 intake* (this mechanism, by which Acquisitional Intake generated from L2 input can ultimately update an L1 grammar, is considered further in 6.3.3 light of the results of this study).

Recall that the model assumes Feature Reassembly is the formal linguistic mechanism for updating any existing grammars. As argued in sections 1.2.3.3 and 2.4, grammatical attrition patterns appear to primarily be the result of either supplanting or supplementing grammatical options in the L1 grammar. In terms of FR, supplanting is a case of 'overwriting' the existing L1 grammatical option by reassembling the existing feature specifications of the L1 functional lexical items relevant to the structure in question to match the feature specifications of the analogous/equivalent L2 structure. As the L1 structure now has the complete featural specifications of the L2 equivalent, its behaviour now matches on that of the L2.

Supplementing, on the other hand, would consist of adding to the L1 grammar additional grammatical forms, i.e., additional copies of L1 functional lexical items, including copies of the functional heads, specified with the feature specifications of the analogous/equivalent L2 form. In this case, within the same attrited grammar, one copy of the functional items would bear the original L1 features, whilst a second copy would bear the features of the equivalent L2 grammatical form.

⁴⁵ Precisely what length of time in an attrition context is necessary for attrition to obtain is an empirical question to which we do not yet have a clear answer (see Schmid, 2019 for a recent state of the art on the role of length of residence in attrition). However, it seems that a significant change in input is necessary for grammatical attrition of the kind investigated in this thesis. The same L1 representational changes have, to the best of my knowledge, not to date been found for bilinguals who still live in a linguistic environment similar to the one in which they grew up. This matter is returned to in 6.3.3.

This would result in optionality depending on whether the copy specified with either the L1 or the L2 feature sets is selected (Hicks and Domínguez, 2020a:158).

2.4.6.3 Generating predictions

It is important to note that in its current form, the model does not make *a priori* predictions as to whether a certain grammatical structure is susceptible to attrition or not. Rather, its architecture establishes a set of linguistic conditions which must be met for attrition to be possible and makes predictions regarding the “input and intake conditions that favor or disfavor L1 attrition” (Hicks and Domínguez, 2020a:143). Therefore, through consideration of the internal mechanisms of the model and a detailed understanding of the cross-linguistic differences of the L1–L2 combination in question, predictions can be made as to which L1 structures are potential ‘candidates’ for attrition within a given language pair. Indeed, Hicks and Domínguez, (2020a) demonstrate that the model can retrospectively predict and account for the attrition patterns found in Tsimpli *et al.*, (2004), Gürel and Yılmaz (2011), and also the L1b contact induced attrition of Domínguez and Hicks (2016). The following sections explicate in detail three core predictions from the architecture and assumptions of the model. A hypothesis that makes more precise predictions beyond what is explicit in the model in its current form is then formulated in 2.4.6.3.4.

2.4.6.3.1 Equivalent L1–L2 grammatical forms

The various conditions which give rise to attrition within the model fundamentally stem from the specific mechanism by which grammatical attrition obtains, that is: the generation of Acquisitional Intake from L2 input which modifies L1 feature assemblies. Perceptual Intake is a necessary precursor to Acquisitional Intake. For grammatical attrition as investigated in this thesis, this means that the speaker must be able to assign a grammatical representation to the L2 input (i.e., they must be able to perceptually encode enough of the input to assign some degree of morphosyntactic and semantic representations, as discussed in detail in 2.4.6.2.1). This mechanism whereby Acquisitional Intake generated from L2 input is used to modify L1 feature assemblies ultimately entails that attrition is in principle possible only for an L1 structure which has an analogous/equivalent L2 form (i.e., equivalent morpholexical item(s) or an equivalent grammatical structure, such as a specific word order), yet these forms differ in their behaviour due to differences in their feature specifications (e.g., overt subjects in a null subject and non-null-subject language pairing). These are the structures for which Acquisitional Intake in terms of FR can be generated and whose L1 forms can consequently undergo FR. That the L2 Acquisitional Intake targets the corresponding L1 form, as opposed to any other L1 structure, is due to some form of equivalence being established between these corresponding L1–L2 forms. This prediction bears out a very commonly noted observation in the literature (see 1.2.3.3 and 2.4 for references and further discussion).

On the other hand, when a structure exists in the L1 but there is no corresponding/equivalent L2 form (e.g., null subjects in a L1 Italian – L2 English pairing) there is no new, competing information from the L2 regarding this specific form and no specific L1–L2 structural equivalence can be established. It has been argued throughout 2.4 that this could account for the frequently attested absence of attrition in such cases. In terms of the architecture of the model this can be accounted for in that no Acquisitional Intake can be generated here as there is nothing new in terms of FR to acquire in the L2, and thus no Acquisitional Intake to potentially engender the L1 in this regard.

Conversely, if a form exists in the L2 but not the L1 grammar then there is something to acquire and Acquisitional Intake can in principle be generated (allowing L2 acquisition). In contrast to L2 acquisition, which involves acquiring both the morphosyntactic and semantic features and the new L2 PFs on which they are specified, L1 grammatical attrition involves only the existing L1 PFs which in an attrited grammar behave in a manner more in line with the L2 equivalents due to them being assigned new feature specifications based on these L2 equivalents.⁴⁶ Therefore, the crucial consideration for attrition in cases where there is no L1 equivalent is that the L1 lacks the relevant corresponding morpholexical items onto which the features of the L2 structure could be mapped (adopting Schmid and Köpke's, 2017:643, phrasing, here there would be no compatible 'landing site' for the L2>L1 transfer effects). Hence no attrition is predicted where the L1 has no equivalent morpholexical items – a prediction that seems to be borne out by the results of Gürel (2007), discussed in 2.4.2.

Finally, if exactly the same functional and semantic features underpin the equivalent grammatical structure in both the L1 and L2, then Perceptual Intake is already complete on the relevant morphosyntactic and semantic levels. In this case there is no need for this Perceptual Intake to be passed onto the inferential component of the model as there is nothing to acquire in terms of features, and so no Acquisitional Intake is generated.

2.4.6.3.2 L1–L2 holistic similarity

The ease with which Perceptual Intake is generated is mediated by the overall holistic similarity of the two languages in question i.e., similarity at the language level taking into account not only overall morphosyntactic and semantic similarity, but also phonetic, phonological, and lexical similarity. As Acquisitional Intake is generated from the intake filtered through Perceptual Encoding (i.e., Perceptual Intake), its availability is also dependent on the availability of Perceptual Intake and the

⁴⁶ It could be argued that this is a characteristic which distinguishes L1 grammatical attrition from code-switching, where both L1 and L2 PFs may be used in the same utterance, but these PFs are used in accordance with the grammar of the language to which they belong.

ease with which Perceptual Intake can be generated. Perceptual Intake and Acquisitional Intake relate to two different dimensions of cross-linguistic similarity: Perceptual Intake is modulated by L1–L2 holistic similarity whilst Acquisitional Intake is chiefly modified by structural similarity at the level of the individual grammatical property being acquired/attrited. As with the two dimensions of cross-linguistic similarity, the two types of Intake are to a degree inextricably interrelated.

From this understanding, predictions can be made as to which types of inputs are expected to facilitate L1 attrition. As hinted at, although not discussed in detail, by Hicks and Domínguez (2020a:156), we can make a broad prediction of *relatively* more attrition in cases where the input is very similar to the L1a, such as when the speaker is exposed to an L1b or holistically similar L2 (a prediction of the model also identified by Iverson, 2020). This is based on the assumption that Perceptual Intake is easier to generate from such input as perceptual encoding and also parsing for comprehension is facilitated by the higher degree of phonological, lexical, and structural overlap, leading to more complete representations on all levels. This could in turn make differences in the feature assemblies of the two languages easier to detect, and therefore Acquisitional Intake easier to generate, which in turn promotes quicker and more complete L2 acquisition. In a model in which attrition obtains via acquisition (the attrition–acquisition relationship is considered below in 2.4.6.3.3 and in further detail in 6.3.3), this leads to a prediction of attrition being facilitated in cases of greater L1–L2 holistic similarity.

Furthermore, greater L1–L2 overlap likely causes greater coactivation on all linguistic levels within the inference engine. Where there is coactivation of functional lexical items, there is arguably a greater chance of bi-directional transfer. For attrition, what is crucial is the possibility of L2 to L1 transfer. In terms of the AvA model, this happens when Acquisitional Intake generated for L2 acquisition targets L1 feature bundles (this mechanism is considered further in 6.3.3). Coactivation of functional lexical items due to greater similarity may then increase the chance of this ‘mismatch’ obtaining within the inferential component, increasing the likelihood of grammatical attrition.

Moreover, all, or at least most, of the grammatical phenomena are likely to have analogous forms in both languages/varieties. Many will also have identical behaviour, but a large number will show differences in their featural specifications. In holistically similar L1a–L1b/L2 combinations, there is therefore likely a greater number of structures in the L1 which have the potential to undergo grammatical attrition compared to more holistically dissimilar pairings, and thus more widespread attrition is in principle possible.

2.4.6.3.3 L2 acquisition of an equivalent structure

That there is a relationship between L1 attrition and L2 acquisition seems to an extent axiomatic. Indeed, this relationship was assumed as early as Jakobson (1941) and is explicit in the name of the AvA model itself. The assumption here is that a structure should be acquired in the L2 before it can engender attrition of the equivalent structure in the L1. Westergaard (2020) and (at least implicitly) Gürel (2020) identify this as a prediction of the AvA model in their commentaries on Hicks and Domínguez's (2020a) keynote. The understanding is that, as an L1 structure is modified based on Acquisitional Intake generated for the acquisition of the equivalent structure in the L2, this L2 structure (specifically the featural difference between the L1 and the L2 structures) must first have been acquired (this point is returned to and discussed in detail in 6.3.3 in light of the results of the empirical study).

The relationship between L2 acquisition and L1 attrition has seldom been investigated empirically and as such the exact nature of this relationship is not well understood. This is primarily as potential attriters, particularly those in grammatical attrition studies, very frequently have LoRs of over 10 years (see Schmid 2019 for a recent State of the Art on LoR with adult attriters). Consequently, they are often considered *a priori* to be native-like in all aspects of their L2 on the basis of their LoRs alone. Though it may be reasonable to assume native-like mastery of certain L2 grammatical structures amongst long-term emigrants, this might not be the case for all structures due to factors such as lack of salience, the grammatical complexity of the structure, the computational demands of processing the structure, or due to various extra-linguistic factors which may mean that some, but not all, of the tested participants have L2 grammars which converge entirely on native speaker patterns. If L2 acquisition is required for L1 attrition, then a pertinent question concerns the *degree* of L2 acquisition that is necessary: for example, it may be the case that only L2 structures which have been acquired to a native-like degree, i.e., such that the L2 results for these structures are statistically indistinguishable from native controls patterns, are able to engender attrition the equivalent L1 structures.

To date, only a very small number of grammatical attrition studies have robustly investigated potential attriters' L1b/L2 acquisition by additionally testing them on the L1b/L2 structures (e.g., Ribbert and Kuiken, 2010; Iverson, 2012; Castro, Rothman and Westergaard, 2017, 2020; López-Otero, 2022). The vast majority of studies do not test them in the L2 at all, or perhaps only with a simple proficiency measure. These measures are at best only an extremely rough indication as to whether – and to what extent – the L2 equivalents of the L1 structures under investigation have been acquired in the L2. Moreover, the relationship between L2 proficiency more generally and L1 attrition is to date unclear. See Schmid and Yılmaz (2018) and Yılmaz, (2019) for recent overviews of, and investigations into, this relationship.

The findings from studies which do test attriters' acquisition of the equivalent L2 structures are rather mixed (due to space constraints only the results of three of the studies noted above are discussed here). Ribbert and Kuiken (2010) (L1 attrition results discussed in 2.4.4) gave their L1 German participants a Dutch version of the L1 task and compared the results to native Dutch controls. They found that the L1 German participants' L2 Dutch results differed significantly from the Dutch controls, despite i) these participants studying degree courses in Dutch and having passed the necessary Dutch language exams to do so, ii) the structure being frequent and salient in both languages, and iii), most importantly, despite the L1 German group's results showing clear influence from L2 Dutch. This suggests that acquisition to the degree that the L2 speakers are statistically indistinguishable from native controls i.e., native-like acquisition, is not required for L1 attrition.

The null/overt object results from Castro, Rothman, and Westergaard (2017) (discussed briefly in 2.4.1) are more complex to interpret in terms of an attrition–acquisition relationship. They find that their L1a Brazilian Portuguese speakers residing in Portugal differ significantly from the European Portuguese controls when tested in EP mode on all conditions despite them also diverging significantly from the BP control group in BP mode on all but one context (inanimate referents in simple clauses). In fact, the *EP* null object results of the L1a BP speakers in Portugal are in each instance more similar to the *BP* control group and their own BP results than the EP control results. However, their EP (null and overt) results do also diverge significantly from the BP control results on all but one condition. The authors interpret their EP overt object results as indicating influence from BP, but also their BP overt object results and indicating influence from EP. This bi-directional influence implies at least some degree of successful L2 acquisition. Taken together, these results could suggest that at least some acquisition, but not native-like acquisition, is required for L1 attrition. Nevertheless, on the one condition where the bi-dialectals EP results are not distinguishable from the BP control results (inanimate referents in strong islands), their BP results do diverge significantly from the BP controls. Here then, we see attrition of a grammatical structure in the absence of L2 acquisition of the equivalent L2 structure.

Finally, the results of López-Otero (2022) (L1 attrition results discussed in 2.4.4) reveal a particularly nuanced relationship between L2 acquisition and L1 attrition. An elicited production task found that DOM in L1 Romanian was no longer conditioned by one of its semantic determinants: referential stability (related to specificity) to the same extent as the L1 controls. DOM is not conditioned by referential stability in the L2, Spanish, thus this attrition is expected under influence of the L2. Both Romanian and Spanish DOM are conditioned by animacy, though there are some subtle differences (see López-Otero, 2022 for details) and thus the potential for L1 attrition of the animacy conditioning factors. Unlike referential stability, there was no significant difference in the

degree to which animacy conditioned DOM in the attrited L1 Romanian grammars.⁴⁷ This perhaps initially surprising asymmetry between attrition of referential stability vs. animacy could in fact be neatly accounted for by considering the L2 acquisition data: the degree to which animacy conditioned DOM in the attriters' L2 Spanish differed significantly from that of the Spanish controls and there were clear signs of residual L1>L2 transfer for animacy. The bilinguals had however fully acquired that DOM in Spanish is conditioned by definiteness rather than referential stability (there were no significant differences between the groups regarding definiteness). This indicates that not only is *native-like* acquisition a necessary prerequisite of L1 attrition, but also that this is relevant at the level of individual formal and semantic features of the L2. In light of the findings of the studies briefly considered here, the acquisition–attrition relationship clearly warrants further investigation.

2.4.6.3.4 Sharpening the current predictions of the AvA Model

Whilst the aforementioned considerations limit the number of L1 properties predicted to potentially be vulnerable to attrition within a given L1–L2 pair, these predictions are still rather broad. For example, in its current form, the model does not make more specific predictions regarding the relative likelihood of attrition between multiple L1 grammatical properties *within* the same L1–L2 language pairing which are considered by its architecture to be 'candidates' for attrition. That is to say, the model has nothing concrete to say about whether a structure that has an equivalent L1–L2 form yet differences in the relevant feature assemblies and for which both Perceptual and Acquisitional Intake can in principle be generated, is more likely to attrite than another candidate within the same L1–L2 language pairing which also meets these criteria. To give an example, the AvA model currently predicts that both overt pronominal interpretation and SV/VS word order in an L1 Brazilian Portuguese – L2 Spanish pairing are susceptible to attrition (i.e., they are both candidates for attrition). However, there is nothing explicit in the model's architecture of assumptions which generates predictions as to which of these properties are *more* likely to attrite, or indeed more likely to undergo more significant restructuring.⁴⁸ Therefore, in addition to testing the model in its current form, a logical next step in its development would be to also formulate and test a plausible hypothesis compatible with the model's current assumptions that would allow more specific predictions to be generated. Indeed, a number of commentaries on Hicks and Domínguez's (2020a) keynote article identify the predictive power of the model as an area in which further specification is

⁴⁷ Based on the reporting of the statistical models which found a significant interaction between group and referential stability but not group and animacy. However, based on the less categorical DOM assignment of the bilinguals compared to the monolinguals, López-Otero suggests the L1 animacy feature may be currently in the process of being reassembled. Though individual-level results are not analysed, it may also/instead be the case that the animacy feature has been reassembled for some bilinguals but not others, or even that both features have been reassembled for some bilinguals but neither feature for others. Analysis of individual results would be needed to confirm.

⁴⁸ For two candidate structures in two different L1-L2 pairings, the likelihood of attrition is expected to be modulated by the holistic similarity of the L1-L2 configurations i.e., attrition is more likely for the structure in the more similar L1-L2 pair relative to the structure in the less similar L1-L2. These predictions stem from the role of Perceptual Intake in the model (see 2.4.6.3.2).

required (Gürel, 2020; Iverson, 2020; Lohndal, 2020; Perpiñán, 2020; Putnam, 2020; Westergaard, 2020).

To do so, this thesis further examines the mechanism by which grammatical attrition obtains in the AvA model, i.e., Feature Reassembly. As discussed in 2.3.2, in the context of L2 acquisition it has been noted that there are different types of Feature Reassembly tasks and not all Feature Reassembly is equally complex and therefore equally challenging for the L2 learner. The types of Feature Reassembly task a learner must successfully complete and also the number of FR tasks that must be completed, depend on the specific cross-linguistic differences for the structure being acquired. In light of this, I propose as a hypothesis that grammatical attrition, as conceptualised in this thesis, is facilitated for L1 structures which would need to undergo less complex Feature Reassembly to match the L2 input due to greater overlap in their featural properties. That is, less complex/ less significant grammatical restructuring is required as this structural similarity facilitates the initial generation of Acquisition Intake for L2 acquisition and the subsequent modification of the L1 via FR.

To be clear, structural similarity already plays a key role in the AvA model as formulated in Hicks and Domínguez (2020a, 2020b) in that only structures which have equivalent L1–L2 forms yet differ in their feature specifications are predicted to be susceptible to attrition (as discussed in detail in 2.4.6.3.1). Furthermore, Hicks and Domínguez (2020b:235) note that, ‘Any predictions arising from the AvA model will be constrained by the availability of intake and how readily reassembly can take place; these two issues are mediated by the similarities and differences between structures in the L1 and L2’. I propose to use structural similarity formalised in Minimalist terms – and in a manner compatible with the AvA model architecture – as the complexity of FR required for attrition of an L1 structure, as a way of predicting the relative likelihood that attrition will obtain for two such equivalent yet differing structures. Reiterating the example introduced at the beginning of this section, the AvA model currently predicts that both overt pronominal interpretation and SV/VS word order in an L1 Brazilian Portuguese – L2 Spanish pairing are susceptible to attrition, however it does not predict which is more likely to attrite. Making a case that one of these structures requires more complex FR to attrite relative to the other structure enables the prediction that one of these structures is more likely to attrite than the other. The following section outlines criteria with which FR complexity in L1 attrition can be quantified.

2.4.6.3.4.1 The complexity of Feature Reassembly in L1 grammatical attrition

This thesis is, to the best of my knowledge, the first study to consider the complexity of FR tasks in the L1 attrition of mature adult grammars. Therefore, it draws heavily on previous discussions of FR complexity in the context of L2 acquisition – bearing in mind that the FR mechanism itself is argued to be the same for L1 attrition – and also from previous work on the complexity of grammatical

restructuring in Heritage grammars. To establish a set of criteria with which FR complexity in L1 attrition can be formalised and quantified, this thesis takes certain insights from work in these two areas, considers them from the perspective of L1 grammatical attrition in adulthood, and reformulates them accordingly.

Discussions of grammatical complexity feature heavily in research into Heritage language grammars, as summarised in a recent paper by Lohndal and Putnam (2021) (see also Polinsky and Scontras, 2020 for an overview). Many of these discussions focus on describing and accounting for the varying degrees of morphosyntactic and semantic complexities exhibited by Heritage grammars compared to the baseline (typically a decrease in complexity compared to this baseline). That is, they aim to describe and account for the complexity of the *outcomes* of L1 grammatical restructuring or divergent acquisition which manifest in Heritage grammars rather than the complexity of the grammatical restructuring/acquisition task itself. Nevertheless, certain aspects of Lohndahl and Putnam's (2021) recent approach to modelling complexity in Heritage languages are also informative when considering the complexity of grammatical restructuring in mature L1 grammars.

Lohndahl and Putnam (2021:26) propose three criteria which can be used to determine whether the resultant change in the Heritage grammar is a case of decreased or increased complexity compared to the baseline:

- 1) Number of syn-sem features
- 2) Number of functional projections
- 3) Mapping from syn-sem features to exponents

With regards to the first criterion, they argue that a property which has undergone a reduction in the number of formal or semantic features can be considered less complex. They use grammatical gender as a way to exemplify their criteria. As such, if the grammar contains fewer gender features than the baseline, this can be considered a decrease in complexity. This first criterion can be straightforwardly reformulated for our purposes: In an adult L1 grammar, an L1 structure can be considered to require more complex FR to attrite – relative to another L1 structure – if a greater number of morphosyntactic and semantic features are involved in the restructuring.

Regarding 2), a reduction in the number of functional projections is likewise considered a decrease in complexity. This has been argued to occur for grammatical gender in Heritage languages, where it appears that certain functional projections relevant to gender are fused together or lost entirely (e.g., Scontras, Polinsky and Fuchs, 2018). This criterion is also easily adapted for our

purposes: In an adult L1 grammar, an L1 structure can be considered to require more complex FR to attrite – relative to another L1 structure – if a greater number of functional projections are involved in the restructuring (e.g., if the reassembly requires projecting additional functional projections not presented in an unattrited L1 grammar).

Finally, with regards to 3) Lohndal and Putnam broadly assume that a simplification in the mappings between features and their morphophonological exponents constitutes a reduction in complexity. In approaches to the grammar which consider features separate to their morphophonological realisations, it is widely acknowledged that some types of mappings are more complex than others. Typically, it is argued that there are two dimensions along which such mapping can be considered complex. The first case is where a feature (or in more complex cases again; features) is realised as multiple morphophonological exponents, as opposed to just one (i.e., one-to-many or many-to-many form-meaning mappings are more complex). In such cases, the learner must acquire not only the correct features, but also the additional rules which govern how these features are realised phonetically in various conditioning environments.

The second commonly noted dimension is the transparency of form-meaning mappings. Using grammatical gender in Norwegian as an example, Lohndal and Putnam state that if the number of distinct morphophonological realisations of gender features is reduced, the mapping between gender and declension class can consequently increase in complexity. Transparency of form-meaning mapping is considered in detail by Ramchand and Svenonius (2008). They formalise a distinction between *semantic* features which are overtly expressed (i.e., through overt functional morphology) and those that are covertly expressed (i.e., expressed through context) (see 2.2.2 for more details). As noted in 2.3.2, Slabakova (2009) and Cho and Slabakova (2014) further develop this idea in the context of L2 acquisition by proposing and testing a cline of difficulty based chiefly on whether the features being acquired are overtly or covertly expressed in the L1 and L2. A further aspect of the transparency of form-meaning mappings which they develop is directness: If a feature is the primary meaning of a lexical item/periphrastic expression, it is said to be directly expressed. Directly expressed features are more salient in the input, and therefore in principle easier to acquire (see Cho and Slabakova, 2014 for further details and examples).

Whilst it is highly probable that such factors also influence the likelihood of grammatical attrition obtaining, these factors are not formulated into a criterion here nor tested empirically in this study.⁴⁹ As will become apparent in Chapter 3, all the features relevant to the morphosyntactic structures tested in this thesis are overtly expressed, thus overtness can play no role in adjudicating

⁴⁹ For example, it may be the case that if the relevant features are either overtly or covertly expressed in both languages – and there is therefore cross-linguistic overlap in this regard – they are more susceptible to attrition than in cases where the relevant features are overtly expressed in one language but covertly in the other.

between the relative complexity of FR for the properties in the present study. Directness of feature expression is difficult to quantify, and particularly so with morphosyntactic features whose primary function is to ensure the well-formedness of a derivation, as opposed to with semantic features, whose purpose is to express certain meanings. Thus, directness likely plays little to no role in this study. Furthermore, a criterion based on the number of form-meaning mappings for a particular structure is rather difficult to operationalise in a study with the scope of the present investigation, which tests multiple – sometimes quite different – morphosyntactic structures in multiple language combinations. For our purposes, attempting to formulate and employ such a criterion runs the risk that the criteria themselves become infeasibly complex to apply. Therefore, exploring the potential role of the complexity of form-meaning mappings in grammatical attrition is set aside for future research.

Instead, I propose here that an additional criterion that could be relevant for quantifying the degree of FR complexity in attrition. It was highlighted in 2.3.2 that there are a number of distinct reassembly operations (i.e., adding a new feature vs. re-assembling an existing feature vs. disassociating the mapping between a feature and a PF) and these may also vary in their relative difficulty. To the best of my knowledge, the relative difficulty of the aforementioned reassembly processes has not yet been considered in detail nor explicitly tested empirically for L2 acquisition. However, it is plausible that they are relevant for making more fine-grained predictions regarding the acquisition and also attrition of features which are overtly expressed in both the L1 and L2. Therefore, I hypothesise that in an adult L1 grammar, an L1 structure can be considered to require more complex FR to attrite – relative to another L1 structure – if the FR operations consist of adding new features from the L1 which are not instantiated in the L1 grammar, as opposed to reassembling or revaluing or existing L1 features, or disassociating the mapping between existing features and their functional heads. This therefore assumes that adding a new L2 feature to the L1 grammar is more complex than any operation which involves manipulating only features already instantiated in the L1 grammar.

For clarity, and in summary, these four criteria are presented together here. In this thesis, it is considered that more complex FR is required for the L1 grammatical structure to match the corresponding L2 structure in cases where:

- A greater number of morphosyntactic and semantic features are involved in the restructuring;
- A greater number of functional projections are involved in the restructuring;
- The FR operations consist of adding new features which are not instantiated in the L1 grammar, as opposed to reassembling or revaluing existing L1 features, or disassociating the mapping between existing features and their functional heads.

The complexity of the FR restructuring required is argued to be compounded when the interactions between these factors are taken into account. For example, reassembly involving two features is predicted to be more complex if the features involve different functional projections (i.e., if each feature is specified on a different functional head) as opposed to if the two features were specified on the same head. Likewise, if reassembly requires adding new features to these two heads rather than revaluing existing ones, this further increases complexity.

It is important to highlight at this point that it is not my aim here to conceive of some form of cline of FR complexity in attrition. Thus, the criteria are not presented above in any order of significance. For the purposes of this study, it suffices to justify that based on these criteria the attrition of one grammatical property within a given language pair tested in this study (recall there are two morphosyntactic properties tested per language pair) involves more/less complex FR, and therefore a more/less significant degree of grammatical restructuring, *relative* to the other property in this L1–L2 pair only. In order to apply these criteria to the grammatical structures in this study, a detailed feature-based account of each structure (both in the L1 and L2s) is needed. This is provided in Chapter 3.

2.4.6.3.5 Bringing it all together

By combining the considerations regarding Perceptual Intake, Acquisitional Intake, and FR discussed above – both the considerations arising from the architecture of the model in its current form in addition to the novel hypothesis formulated in this thesis regarding the potential role of FR complexity in grammatical attrition – precise predictions as to the likelihood of attrition both *across* different L1–L2 language combinations as well as *within* given a L1–L2 language pair can be made. To this end, this study investigates attrition in L1 grammars exposed to three L2s of differing holistic similarity to the L1. Furthermore, two grammatical properties which are both ‘candidate’ structures for attrition in terms of the model yet differ in the relative complexity of FR required for their attrition according to the criteria in 2.4.6.3.4.1, are tested in each of the three language pairs. The full experimental design with predictions is presented in Table 2.1. These six properties and their formal analyses are outlined in Chapter 3. The study design and predictions are discussed in detail in Chapter 4.

L1	L2 (Speakers' current PLD) Decreasing Likelihood of Attrition	Grammatical Property and Relative Complexity of Feature Reassembly	Likelihood of Attrition for Individual Property
German (Germany) – Speakers' native grammar. PLD during L1 acquisition.	L2: Dutch (Netherlands) – Holistically very similar L2.	a) Reflexive Binding Less Complex FR	More Likely
		b) Grammatical Gender More Complex FR	Less Likely
	L2: English (UK) – Holistically similar L2.	a) Reflexive Binding Less Complex FR	More Likely
		b) Main Clause Verb Position More Complex FR	Less Likely
	L2: Spanish (Spain) – Holistically less similar L2.	a) Predicative Adjective Agreement Less Complex FR	More Likely
		b) Negation More Complex FR	Less Likely

Table 2.1: Experimental design overview.

2.4.7 Summary: Modelling grammatical attrition within Minimalism

From the review of generative (predominately Minimalist) L1 grammatical attrition studies surveyed in 2.4, it was concluded that i) L1 grammatical representations in mature grammars are susceptible to restructuring, and this includes the representations of narrow syntactic properties; ii) grammatical attrition affects the L1 grammar in a very fine-grained manner, and the specific L1–L2 cross-linguistic structural differences appear to modulate this considerably; iii) modifications to L1 grammars appear predominately take the form of either supplementing the L1 grammar with additional grammatical options based on the L2 grammar, or supplanting existing L1 options with L2 options; iv) no Minimalist theory pre-AvA could adequately account for the attested attrition patterns and simultaneously serve as a transition theory of grammatical attrition. Whilst the AvA model represents a viable transition theory for grammatical attrition, the empirical validity of the model has yet to be established through rigorous experimentation. The remainder of this thesis dedicates itself to this endeavour.

Chapter 3 Grammatical properties and analyses

3.1 Introduction

This chapter presents the six morphosyntactic properties tested in this study. For each property, the key cross-linguistic differences are outlined and a Minimalist analysis which accounts for these differences in terms of the L1–L2 formal feature assemblies is presented. 3.2 provides a brief overview of the languages and properties. By way of summary, Table 3.1 in 3.6 gives an overview of the key cross-linguistic differences and formal features relevant to each property.

3.2 Selection of languages and morphosyntactic properties

Comprehensively testing the predictions arising from the AvA model regarding the role of cross-linguistic input similarity, both holistically at the language level (see 2.4.6.3.2) and at the level of individual grammatical properties (see 2.4.6.3.4), necessitates an experimental design which utilises multiple language pairings and also multiple grammatical structures *within* each language pairing. In order to robustly investigate the role of holistic similarity of input at the language level, this study utilises three L2s of differing holistic similarity to the L1, which is Standard German or *Hochdeutsch*, as spoken in Germany. The three L2s are 1) Dutch, 2) English, and 3) Spanish. In terms of their linguistic proximity, German and Dutch are diachronically and typologically very closely related, with a considerable degree of lexical, phonological, and morphosyntactic overlap. German and English, as West-Germanic languages, are diachronically and typologically closely related, though with a relatively lesser degree of lexical, phonological, and morphosyntactic overlap. Finally, as a Romance language, Spanish is comparatively less closely related diachronically and typologically to German and exhibits a lesser degree of lexical, phonological, and morphosyntactic overlap again.

Previous studies investigating grammatical attrition in L1 German in contact with English (e.g., Köpke, 2001; Schmid, 2002, 2014; Jackson, McDermott and Schmid, 2011; Grabitzky, 2014) have not consistently found attrition, even for the same properties. To date only a limited number of studies have looked at grammatical attrition in an L1 German–L2 Dutch pairing (e.g., Ribbert and Kuiken, 2010; Jackson, McDermott and Schmid, 2011; Bergmann *et al.*, 2015). To the best of my knowledge, the combination of German and Spanish has not been previously investigated in terms of attrition in mature L1 grammars.

As demonstrated by the review in 2.4, Generative studies of grammatical attrition in adulthood have, with a few notable exceptions (e.g., Iverson, 2012) investigated a rather limited number of grammatical properties. This study therefore investigates the role of cross-linguistic similarity at the level of individual grammatical structures using a wider range of morphosyntactic

properties than have previously been investigated in attrition contexts, including some which have not yet been tested. These properties are, broadly:

- German – Dutch
 - 1) Reflexive Binding
 - 2) Grammatical Gender
- German – English
 - 3) Reflexive Binding
 - 4) Main Clause Verb Position
- German – Dutch
 - 5) Predicative Adjective Gender Agreement
 - 6) Negation

To the best of my knowledge, negation has not yet been investigated in attrited adult grammars, nor has predicative adjectival agreement in L1 German. V2 word order in German has been investigated in both production (e.g., Schmid, 2002, 2014; Jackson, McDermott and Schmid, 2011) and with judgement tasks (e.g., Grabitzky, 2014). Taken together, the results show only limited and inconsistent attrition. Reflexive binding was tested by Baker (2019) as part of a case study investigating an L1 German–L2 English bilingual resident in the UK. Attrition was found only for one of the structures predicted to attrite, and only on an AJT but not a Written Interpretation Task. Grammatical gender in L1 German has been found to be overall stable in production (e.g., Schmid, 2002, 2014). Bergmann *et al.* (2015) investigate sensitivity to grammatical gender agreement violations with a group of L1 German speakers in the Netherlands in an EEG study. They find no differences between the ERP measures of the German speakers in the Netherlands and L1 controls.

The six grammatical properties listed above were chosen as they constitute potential candidates for attrition according to the architecture of the AvA Model: They are phenomena for which equivalent/analogous forms exist in the L1 and the L2 but for which there are differences in their behaviour which can be attributed to differences in the relevant L1–L2 feature specifications, and there Perceptual and Acquisitional Intake can in principle be generated for these structures.

3.3 German – Dutch

The two properties for the German–Dutch combination, reflexive binding and grammatical gender, are considered first.

3.3.1 Reflexive Binding

German has one third person (and second person formal) reflexive form, *sich*. Dutch distinguishes between two categories of reflexive: a morphologically Simplex Expression (SE) reflexive, *zich*, and a SELF reflexive, *zichzelf* (to use the terminology of Reinhart and Reuland, 1993).⁵⁰ Dutch *zichzelf* must be locally bound. *Zich* on the other hand can be considered a type of long-distance reflexive in that its binding domain appears to be somewhere between that of *zichzelf* and a pronoun (i.e., the domain is not as local as the domain in which *zichzelf* must be bound but is also more local than the domain in which a pronoun must be free). Moreover, in some structures the domain of *zich* can overlap with those of either anaphor resulting in non-complementary distribution. Finally, *zich* has the additional characteristic of being subject oriented (i.e., it can only refer to subjects). See Hicks (2009: 219–245) for a detailed overview of anaphoric binding in Dutch.

Despite the perceptual similarity between Dutch *zich* and German *sich*, *sich* behaves similarly to *zichzelf* in Dutch in that it must be locally bound. The particle *selbst* (or, more the more formal form: *selber*) can also be used with *sich* i.e., *sich selbst*. It is often assumed, including in some prominent accounts of binding (e.g., Reinhart and Reuland, 1993), that *sich selbst* is a distinct category of reflexive and that German likewise has an SE vs. SELF distinction. However, in any case where *sich* is allowed it may be followed by *selbst* without any grammatical violation and, as noted by Hendriks, Hoeks and Spender (2015:232), *sich selbst* is never obligatory. Nevertheless, depending on additional factors such as context, focus, stress, and verb type, there are cases where one of the forms is preferred over the other (see Lee-Schönfeld, 2020: 502–508 for discussion of reflexives in German vs. Dutch and Hendriks, Hoeks and Spender, 2015 for an empirical study on their distribution, as well as discussion of the aforementioned factors which can influence the distribution of reflexives in both languages). Based on these observations and the results of the empirical investigation of this thesis which likewise support such a view (see 5.5.1.1), this thesis assumes that

⁵⁰ These reflexives are investigated in the current study as they are the only reflexive forms in either language which are not homophonous with an object pronoun, thus the only form which can be used to investigate reflexive binding without the potential confound of pronominal binding. In the structures tested in this study they are only used in the third person. Furthermore, German (but not Dutch) reflexives are marked for case. However, in both the accusative and dative cases the third person reflexive is realised as *sich*. The analyses adopted in this study does not invoke case to account for the differences in the binding possibilities of the German and Dutch reflexives, and case is not assumed to be a potential confound.

German, unlike Dutch, does not have the distinction between SE and SELF reflexives (see also Kiss, 2001).

Lee-Schönfeld (2020:505) glosses *selbst* as an intensifier reflecting the possibility to use *selbst* as such, independent of the reflexive. In the following, *selbst* is glossed as a focus marker. Regardless of the exact analysis of *selbst*, the important point for this study is that it is essentially irrelevant to the core syntactic properties of binding. This study investigates two structures in which there is a clear grammatical difference in the binding domains of *zich* and *zichzelf*, yet where both *sich* and *sich selbst* are equally acceptable in German. These two structures are reflexives in the object position of selected P(repositional) P(hrases) (i.e., PP complements which are grammatically selected by the verb itself, as opposed to adjunct PPs) (6–7) and reflexives with transitive, non-grooming, non-reflexive verbs (8–9). The German structures are illustrated by 6) and 8) and the Dutch structures by 7) and 9):

6) Er_(i) denkt an sich_(i)/sich_(i) selbst.

He thinks about SELF/SELF *Focus*.

He thinks about himself.

7) Hij_(i) denkt aan *zich_(i)/zichzelf_(i).

He thinks about SE/ SELF.

He thinks about himself.

8) Er_(i) fotografiert sich_(i)/sich_(i) selbst.

He photographs SELF/SELF *Focus*.

He photographs himself.

9) Hij_(i) fotografeert *zich_(i)/zichzelf_(i).

He photographs SE/ SELF.

He photographs himself.

Hicks (2009) proposes a feature-based approach to anaphoric binding which accounts for the distribution of *zich* vs. *zichzelf* in Dutch. Though Hicks does not extend his analysis to German, it is argued here that his approach can be straightforwardly extended to *sich* and *sich selbst*.

In Hicks (2009), constraints on binding, both locality and orientation, are accounted for by the feature specifications of anaphors and by utilising derivational phases (Chomsky, 2000a, 2001b, 2004) in construing binding domains. The feature responsible for reflexivisation is an interpretable, semanticosyntactic feature: [Var(iable)] which translates into a logical variable at LF. The

interpretation of this variable is determined by the value of this feature. Building on previous observations that derivational phases coincide with local binding domains, Hicks argues that the domain in which a reflexive anaphor must be *bound* is its minimal LF phase (*vP* or *CP*), whilst the domain in which a referential pronoun must be *free* is its minimal PF phase (*vP* or *CP*, and also certain PPs and DPs). An archetypal, locally bound reflexive anaphor enters the derivation with its variable feature unvalued, i.e., [Var: _].⁵¹ The requirement for local binding of such a reflexive (i.e., that it is subject to Condition A in ‘classical’ Binding Theory) is accounted for in that [Var: _] must attain its value from the variable value (e.g., *x/y/z*) of a *c*-commanding antecedent before completion of its minimal LF phase. The interpretative dependency between the anaphor and antecedent is therefore established by Agree applying locally i.e., within the anaphor’s minimal LF phase. In contrast, referential pronouns enter the derivation with a valued variable feature ([Var:*x/y/z*]). Simplifying here due to space constraints, the approach developed by Hicks precludes the value already specified on referential pronouns from being the same value as (i.e., being co-indexed with) an antecedent within its minimal PF phase. It must therefore be interpreted as a referent of an antecedent outside of its PF phase (in classical Binding Theory this would mean it is subject to Condition B).

Turning first to the Dutch reflexive data, in Hicks’s account, *zichzelf* enters the derivation with an unvalued variable feature [Var: _]. Feature valuation must obtain before the completion of its minimal LF phase. In sentences like 7) and 9), the minimal LF phase is the *vP*. As both the antecedent and reflexive are contained within the same *vP* prior to subsequent movement of the antecedent to a subject position, *zichzelf* can be valued within its LF phase such that the value of the reflexive matches that of the antecedent, as shown by the structure in 10) below (the strikethrough indicates the feature has been valued).

10) [*vP* Hij_{[Var:*x*]] denkt aan zichzelf_[Var:*x*]].}

Hicks argues that *zich*, on the other hand, enters the derivation with valued variable feature and as such must be free within its minimal PF phase. In this regard, *zich* is essentially the same as a pronoun within this analysis (though there are other key differences, to be discussed below). In structures like 7) and 9), the Minimal PF phase is the *vP*, hence binding between *zich* and the subject is illicit (Hicks, 2009:227). However, *zich* is argued to bear an additional feature which distinguishes it from a pronoun and further accounts for the unavailability of *zich* in the above structures. In Hicks’s

⁵¹ The analyses presented in the chapter are proposed by a number of authors, and as such the feature notation used differs slightly between analyses. In this thesis, to facilitate the comparability of the FR operations required for the acquisition and attrition of each property, some minor modifications to the feature notations (but not the properties of the features of themselves), have been made to make the notation more uniform across the different properties.

account this feature is a privative, predicate reflexivising feature: [Reflexive] (drawing from Reinhart and Reuland's 1993 analysis). This feature marks a predicate within its LF phase as reflexive. In other words, any predicate with *zich* as the object will be interpreted as reflexive and the subject within the LF phase interpreted as its antecedent. Specifically, the reflexivising feature ensures that the value of [Var:] on *zich* matches that of the subject of the predicate within the LF phase (provided the phi-features match). Crucially, in Hicks's account, PF and LF phases do not always coincide, thus for some structures *zich* can be bound in a domain outside of its minimal PF phase but still within its LF phase. In the two types of structures tested in this study (7) and 9) above) however, both the LF phase and PF phase are the *vP* (Hicks, 2009: 227 and 230–231). In such cases, the requirement for *zich* to be free in its PF phase and the requirement that the value of [Var:] matches that of a subject within the LF phase presumably cannot both be met, rendering *zich* illicit (see Hicks, 2009: 223–227 for detailed discussion of the features of *zich*).

To be clear, in this analysis the two features specified on *zich* capture three key facts about its behaviour: i) it cannot be bound (too) locally (i.e., is subject to Condition B), ii) it still must be bound, though in a domain that is in many structures more local than that of pronouns, iii) it is subject oriented. Only i) is at stake in the structures tested in the German–Dutch component of this study (i.e., 6–9 above). However, subject orientation is a relevant point of cross-linguistic difference between German and English reflexive binding tested in this thesis, and thus an essential part of the overall account of German reflexives. The analysis developed for German must therefore be able to capture the behaviour of *sich* not only in the structures like 6) and 8) above, but also the structures tested in the German–English component. For clarity and completeness, the analysis for *sich* is described in full here and then also applied to the behaviour of *sich* in the structures tested in the German–English component (see 0).

I propose here that Hicks's (2009: 245–265) analysis of the Norwegian reflexive *seg selv* can be straightforwardly applied to *sich*. Essentially, German *sich*, Norwegian *seg selv* and Dutch *zich* are the same with regards to ii) and iii) above but differ regarding i).⁵² Whereas *zich* can be bound (too) locally i.e., is subject to Condition B, *sich* and *seg selv* cannot. *Seg selv* is therefore possible in the same position as *sich* in 6) and 8) (see Hicks, 2009: 245–265 for the Norwegian facts as well as the following analysis).

Hicks suggests that *seg selv*, like *zich*, enters the derivation with a valued variable feature and [Reflexive]. Recall that in Hicks's approach, Condition B is formalised as a requirement for the anaphor to be free within its PF phase, which are CPs, *vPs* and also certain PPs and DPs. In 6) and 7)

⁵² This might in fact be somewhat simplifying the status of *sich*'s subject orientation in German overall. However, this observation appears to generally hold at least for the structures tested in this study (see 0).

the PPs are selected PPs, which are not considered PF phases. Furthermore, *zich* is considered a simple DP with no complex structure: $[_{D(P)} zich]$ (Hicks, 2009:223). This DP likewise does not constitute a PF phase, thus the minimal PF phase in the Dutch structures 7) and 9) is the *vP*. In line with previous research linking a richer DP structure with exemption from Condition B, Hicks proposes that Norwegian *seg selv* is a more complex DP: $[_{DP} [D seg] [_{NP} selv]]$, where the D-head of *seg* selects *selv* as its NP. Consequently, this type of DP does constitute the minimal PF phase. As such, in the Norwegian equivalent of structures 6)–9) the *vP* subject would be outside of the reflexive's minimal PF phase, hence binding with *seg selv* would be licit (again, see Hicks, 2009: 245–265 for the Norwegian data).

Applying this to German, it is tentatively proposed here that *sich* is also a complex DP and therefore constitutes a PF phase. Unlike *seg selv*, *sich* cannot be decomposed further lexically, however we could assume that *sich* selects a null NP: $[_{DP} [D sich] [_{NP} \emptyset]]$ (this is what Hicks, 2009:223 assumes for Dutch *zichzelf*, though recall the feature specification is that of a true reflexive and thus not subject to any version of Condition B). Furthermore, like *seg selv*, it is suggested that *sich* bears a [Reflexive] feature to give it subject orientation. In terms of the features relevant for binding, there is no difference between *sich* and *sich selbst*. It is speculated that, at least in the structures tested in this study in which *selbst* immediately follows *sich*, *selbst* could occupy the NP position of the structure above as *selv* does in Norwegian i.e., $[_{DP} [D sich] [_{NP} selbst]]$. Though this view is assumed for the purposes of this study, the exact position of *selbst* is not crucial and as such further discussion is left for future research.⁵³

3.3.2 Grammatical Gender

The key differences pertaining to the grammatical gender systems of German and Dutch are as follows: German makes a three-way grammatical gender distinction (masculine vs. feminine vs. neuter), whilst Dutch makes a two-way distinction (common vs. neuter). These grammatical gender distinctions are typically only apparent in the agreement between a noun and other elements, such as determiners.⁵⁴ This study investigates potential changes to the grammatical gender system of German by means of gender concord between nouns and definite articles. Definite articles were chosen as in both languages they have a distinct morphophonological form for each gender. In addition to gender, definite articles inflect for number and, in German only, also for case. In order to isolate the potential effects of cross-linguistic differences in grammatical gender, this study looks

⁵³ Recall that *selbst* can be used independently of *sich* for emphasis and note that when *selbst* is used with *sich* it does not have to immediately follow *sich* (though often does). For example, in some cases an object can intervene. It may be the case then, that *selbst* instead occupies an adjunct position.

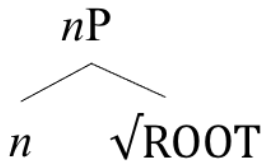
⁵⁴ Morphophonological gender cues (i.e., the association of certain morphological endings on nominals with certain genders) are very inconsistent in German and especially in Dutch (Kupisch *et al.*, 2022).

Chapter 3

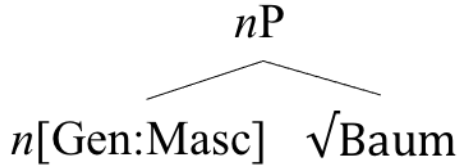
only at singular, nominative definite articles and nouns. 11)–16) below illustrate the relevant differences between German in 11)–13) and Dutch in 14)–16).

- 11) Der Baum.
The.MASC tree(MASC)
The tree.
- 12) Die Flasche.
The.FEM bottle(FEM)
The bottle.
- 13) Das Buch.
The.NEUT book(NEUT)
The book.
- 14) De boom.
The.COM tree(COM)
The tree.
- 15) De fles.
The.COM bottle(COM)
The bottle.
- 16) Het boek.
The.NEUT book(NEUT)
The book

The analysis of grammatical gender adopted here is minimally adapted from the accounts of grammatical gender in varieties of Norwegian outlined in Lohndal and Putnam (2021) and Lohndal and Westergaard (2021), which are themselves based on Kramer's (2015) broadly Distributed Morphology account of grammatical gender assignment. As is typically assumed in Distributed Morphology, lexical categories are formed by merging an uncategorised root with a categorising head – for nouns this categoriser is *n* (see a. below). Following Kramer (2015), Lohndal and Putnam (2021) and Lohndal and Westergaard (2021) assume gender is specified on the categoriser *n*. When *n* merges with a root it assigns the root a gender, yielding an *nP* containing a gendered noun (see b.) below).



a.



b.

Therefore, gender is not listed on each noun in the lexicon – as is the case in accounts in which gender is on N, the head of the lexical projection NP – but is a property of the functional head *n*.⁵⁵

Gender is a multivalent feature. Its values are assumed here to be either masculine, feminine, or neuter in German and either common or neuter in Dutch.⁵⁶ The gender matrices of German and Dutch are thus proposed to be as follows:

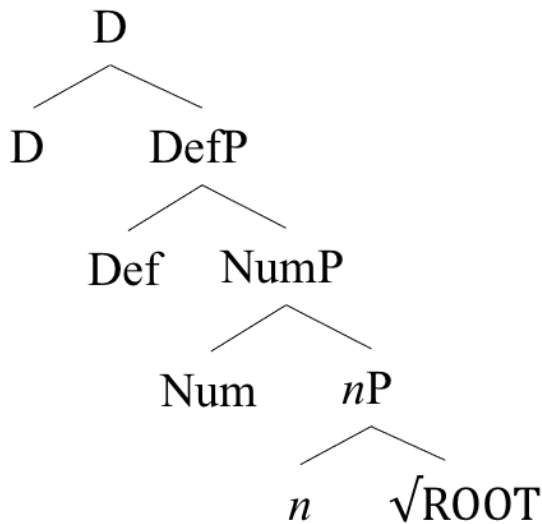
German:	Dutch:
[Gen:Masc]	[Gen:Com]
[Gen:Fem]	
[Gen:Neut]	[Gen:Neut]

⁵⁵ Kramer (2016, 2020) presents numerous arguments for this approach. Grimstad *et al.* (2018) and Lohndal and Putnam (2021) further highlight drawbacks of approaches which assume grammatical gender is specified on each noun in the lexicon (e.g., Carstens, 2000, 2001; Danon, 2011; Moro, 2014) when applied to multilingual contact situations – specifically in instances of DP internal language mixing (e.g., a DP containing a Spanish determiner with an English noun or vice versa) in Heritage languages or cases where a gendered noun can be used with multiple determiners. They submit that these accounts would need to assume the grammar contains duplicate copies of each noun, one specified for gender and one not, or each copy with a different gender (depending on the languages in question). As noted by Lohndal and Putnam (2021), this reduces theoretical parsimony by necessitating a considerable degree of polysemy in the lexicon. Subsequently they argue for exoskeletal rather than lexicalist approaches of gender. As optionality of grammatical gender in attrited adult grammars would arguably also have to be accounted for in the same way, this thesis likewise assumes an approach with gender on *n* rather than N.

⁵⁶ A prevalent approach in describing grammatical gender systems is to assume one gender is the default or underspecified gender. In terms of the approach presented thus far, this would mean that the number of gender values in a language is one less than the number of genders. For example, Lohndal and Westergaard (2021) assume neuter is the default in gender for agreement in standard Norwegian. Consequently, the gender matrix consists of only [Gen:masc] and [Gen:fem]. In the absence of either of these values, gender is realised as neuter. However, there is no agreed upon criteria for establishing default gender. For German in particular there is little agreement as to whether the masculine or neuter is the default, and according to Köpcke and Zubin (2009:148-150) it is even possible to make an argument for any of the three genders as the default (see Kupisch *et al.*, 2022 for further discussion of default gender in German). The matter of default gender is not crucial for implementing the approach outlined here in the current study provided the feature ontology assumed allows for German to have a three-way and Dutch a two-way gender distinction. The predicted changes to the gender system in attrited grammars are in essence the same regardless of the position taken on the default gender (see 4.5.3.2 for predictions). As such, this thesis is agnostic as to which gender is default in both German or Dutch and for simplicity assumes the gender matrices outlined above.

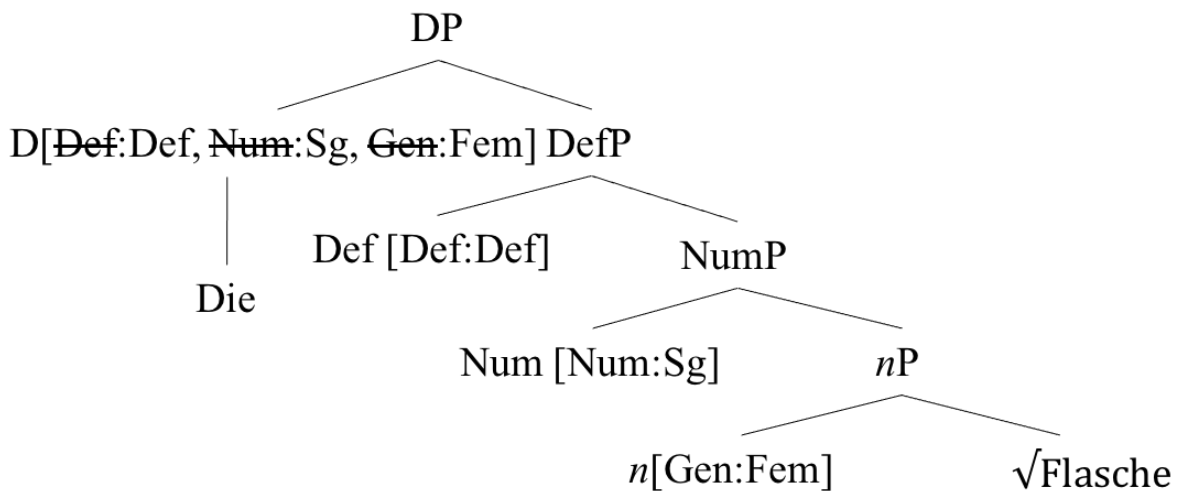
The two-gender system of Dutch developed diachronically from a three-gender system like German in that a distinct masculine and feminine gender were merged into one common gender (Kürschner, 2020:262). Consequently, there is now a considerable degree of overlap in lexical gender assignment in the two languages in the sense that for the vast majority of nouns that are masculine *or* feminine in German, the Dutch equivalent is common gender, and for the vast majority of nouns that are neuter in German, the Dutch equivalent is also neuter. In terms of gender assignment by *n*, this means for the vast majority of nouns, or more specifically roots, for which the German *n* assigns [Gen:Neut], the Dutch *n* also assigns [Gen:Neut] to the Dutch equivalent, and for the vast majority of roots for which the German *n* assigns either [Gen:Masc] *or* [Gen:Fem], the Dutch *n* assigns [Gen:Com] to the Dutch equivalent. A relevant issue here is gender licensing on roots, i.e., which gender is assigned to which root and what modulates this assignment. However, the experimental design of this study excludes – as far as possible – the potential influence of differences in gender assignment cues and lexical gender differences in the two languages (see 4.5.3.2 for details). Therefore any changes to the L1 apparent in this study should stem from changes to the gender feature matrices on *n* (e.g., are both [Gen:Masc] and [Gen:Fem] still available in the L1 grammar or are they collapsed into one, as in Dutch?), rather than from changes to gender assignment cues or due to the equivalent lexical item in both languages having a different gender (i.e., the change should reflect L1 grammatical restructuring rather than L2 lexical influence).

Finally, as any change to the L1 grammatical gender system in this study will manifest in the agreement between the determiner and the noun, this agreement needs to be considered. In terms of the DP structure, it is minimally assumed that the highest projection is the DP which hosts the determiner, followed by a projection which encodes definiteness: DefP, a projection which encodes number: NumP, and finally *nP* itself (see c. below). Additional projections between DefP and DP can host prenominal adjectives, numerals etc., and also include CaseP to encode nominal case in German). As the DPs tested in this study are all definite, singular and nominative, differing between German and Dutch only in gender, the only relevant assumptions regarding the hierarchy of projections here is that in both languages there is an *nP* specified for gender dominated by DP hosting the determiner.



c.

In terms of agreement between the determiner and gendered noun, Lohndal and Putnam (2021), argue for an exoskeletal approach with post-syntactic insertion of lexical items. Specifically, the valued gender feature of *n*, e.g., [Gen:Fem], values the unvalued [Gen:_] feature on D, the valued number feature on NumP, e.g., [Num:Sg], values [Num:_] on D, and the valued definiteness feature of DefP e.g., [Def:Def] values [Def:_] on D. The determiner is then realised phonetically according to these values. This is illustrated in d. below, which depicts the derivation of *Die Flasche* from 12) above (for simplicity case is ignored here). Regardless of the exact mechanics of agreement/valuation, the key point is that the operation results in the gender value of the determiner matching the gender value assigned to the noun by *n*, and that the determiner is realised accordingly.



d.

3.4 German – English

Attention turns now to the German–English language pair and the two properties, reflexive binding and main clause verb position, investigated therein.

3.4.1 Reflexive Binding

Whilst the behaviour of anaphors in German and English is largely identical, some differences can be found in structures such as the following (see 3.3.1 for more general information about reflexives in German):

17) */?Ich zeige Max_(i) ein Foto von sich_(i).

I show Max a photo of SELF

I show Max a photo of himself.

18) I show Max_(i) a photo of himself_(i).

19) *Jonas_(i) will wissen, welche Fotos von sich_(i) veröffentlicht werden.

Jonas wants to know which photos of SELF published will(be).

Jonas wants to know which photos of himself will be published.

20) John_(i) wants to know which photos of himself_(i) will be published.

21) *Er_(i) ist froh, dass du Anna und sich_(i) zum Essen eingeladen hast.

He is happy that you Anna and SELF to dinner invited have.

He is happy that you invited Anna and himself to dinner.

22) He_(i) is happy that you invited Anna and himself_(i) to dinner.

17) and 18) exemplify binding with what was originally termed a ‘Picture NP’ in which the reflexive is contained within an *nP* under a more complex DP structure i.e., [DP [D a [nP photo] [PP of [DP [D himself] [NP \emptyset]]]]]. Such structures have received much attention in the literature (e.g., Reinhart and Reuland, 1993; see also Hicks, 2009: 145–150 for discussion). Adopting Hicks’s (2009) account of anaphor binding, English reflexives are analysed in the same way as the Dutch reflexive *zichzelf*, including the same DP structure (i.e., [DP [D himself] [NP \emptyset]]). Briefly, they enter the derivation with an unvalued variable feature [Var: _] which must receive its value from an antecedent within the minimal LF phase (either a *vP* or CP) in which it is merged (essentially, the fact that in 17) and 18) the reflexive is contained within a more complex DP structure makes no difference to the binding possibilities in this account, as only *vP* or CP can be LF phases). In 18), there are two antecedents

within the LF phase which could provide this value, thus in principle either the subject or object are potential antecedents. However, as the reflexive and antecedent must also match in phi features, the reflexive in sentences like 18) can only bind with the object due to a mismatch with the value of the [Person:] feature of the subject.

As argued by Kiss (2001), whilst binding into Picture NPs in German is possible, the only possible antecedent is the subject. Thus, sentences such as 17), where the only antecedent which matches in phi features is the object, are not possible (Kiss, 2001:185). It is relevant to note here this thesis proceeded under this assumption that *sich* is, at least in these structures, subject oriented (c.f. Lee-Schönfeld, 2020:507, who argues *sich* is not subject oriented and provides an example of it apparently allowing object orientation, though in a non-Picture-NP construction). AJT results from 5 pilot participants (L1 German speakers living in Germany at the time of testing and who had either never lived elsewhere or if so, not for longer than one year) generally supported the view of *sich* as subject oriented: sentences like 17) were judged on the whole unacceptable. However, results from the main study with a much larger sample of 31 participants (with the same profile as the pilot participants) revealed a considerable amount of variation in the judgements of sentences like 17). Whilst for many speakers it is indeed the case that these sentences are consistently ungrammatical, many also displayed a degree of optionality in their Likert response patterns which appear to alternate between what the syntactic literature considers the German (ungrammatical) and English (grammatical) options. Furthermore, a very small number of participants consistently gave these sentences high acceptability ratings, essentially in line with the English grammar. Curiously, the judgments from the group of L1 German speakers with over 15 years LoR in the UK (i.e., the potential attriters) are actually more in line with the judgments present in the syntactic literature: this structure is rated unacceptable overall, though again with individual variation. Setting aside such issues for now, the formal analysis outlined here is argued to capture the attested variability and the implications of the L1 baseline variability for detecting and ascertaining the presence of attrition are considered when interpreting the results in 5.5.2.1.

The analysis for *sich* is outlined in 3.3.1 and thus is not repeated in detail here. Briefly, it enters the derivation with a valued variable feature in addition to a [Reflexive] feature which ensures the value of the variable feature matches that of the subject of a predicate within its minimal LF phase. In 17) there is a subject within the minimal LF phase, however, as it does not also match in values of the [Person:] feature of the reflexive, it is not a possible antecedent. With no other available subject antecedent, the sentence is ungrammatical. It is also suggested that for speakers who seem to also allow the object as an antecedent, their grammar contains an additional copy of the reflexive, this time specified with the same features as the English reflexive, allowing object binding to obtain in the same way as English reflexives. The coexistence of these two forms in the

same grammar and the possibility to select either one for the derivation could give rise to the variation attested in this study.

We turn now to the structures 19–22, which exemplify the (im)possibility of binding across a clause boundary. 19) and 20) illustrate binding into and embedded Picture NP, 21) and 22) illustrate binding with and embedded co-ordinated DP. In these structures, the minimal LF phase is still the vP. For the German structure in 19), this means that there is no other antecedent at all within the minimal LF phase. In 21) there is no subject antecedent within the LF phase which also matches in its person features. Hence in both cases the [Reflexive] feature cannot reflexivise the predicate so that the features of the reflexive match those of a subject antecedent within the minimal LF phase, rendering both structures ungrammatical.

The possibility of binding with the matrix subject across the clause boundary in the English sentences, 20) and 22), cannot be accounted for by the analysis of the English reflexive outlined above (the antecedents are outside of the minimal LF phase in both structures). It has long been noted in the literature that there are number of instances in which reflexives in English, and some other languages (though not German – Büring, 2005:243; Kiss, 2001), appear exempt from the requirement to be locally bound (see Pollard and Sag, 1992; Reinhart and Reuland, 1993 and Büring, 2005: 222–227 for detailed discussions). These anaphors, often referred to as ‘exempt anaphors’ or logophors, are often analysed as pronouns but with the phonetic form of reflexives.⁵⁷ This is likewise the case in Hicks’s analysis: such anaphors bear a valued variable feature and thus must be free in their minimal PF phase. As such, only the matrix subject is a possible antecedent. The empirical results of the current study reveal that the native English control group find both structures acceptable overall, though the structure in 22) is comparatively less acceptable and there is a more considerable degree of individual variation here (see 5.5.2.1 for results).⁵⁸ Conversely, both structures are found to be unacceptable in German, with the structure in 21) being strongly unacceptable and the structure in 19) relatively more acceptable, though still unacceptable overall. Whilst there is very little variation in the judgements of the structure in 21), there is variation in the

⁵⁷ Note that the structure in 18) has also been analysed as one containing logophor in previous approaches (e.g., Reinhart and Reuland, 1993), though Hicks’s account allows it to maintain its status as a true reflexive.

⁵⁸ A possible explanation for this difference in degree of unacceptability between 20) and 22) and the individual variation observed in 22) is that the presence of a DP intervening between the reflexive and intended anaphor in 22). Though the phi features of this DP do not match those of the anaphor, it is nonetheless semantically plausible, which may make the matrix subject less salient as an antecedent and therefore more marginal/not consistently available to all speakers on all test items (see Büring, 2005:226 for brief discussion of intervening antecedents).

judgments of 19) (see 5.5.2.1 for results).⁵⁹ This variation is taken into account when interpreting the results.

3.4.2 Main Clause Verb Position

In German declarative main clauses, and also in *wh*-questions, the finite verb obligatorily occupies the second constituent position. This phenomenon, which is found in all Germanic languages but English, is referred to as ‘Verb Second’ or ‘V2’ (see Haider, 2010 for an overview of V2 in German and Vikner, 2020 for V2 in Germanic in general). Consider the following examples:

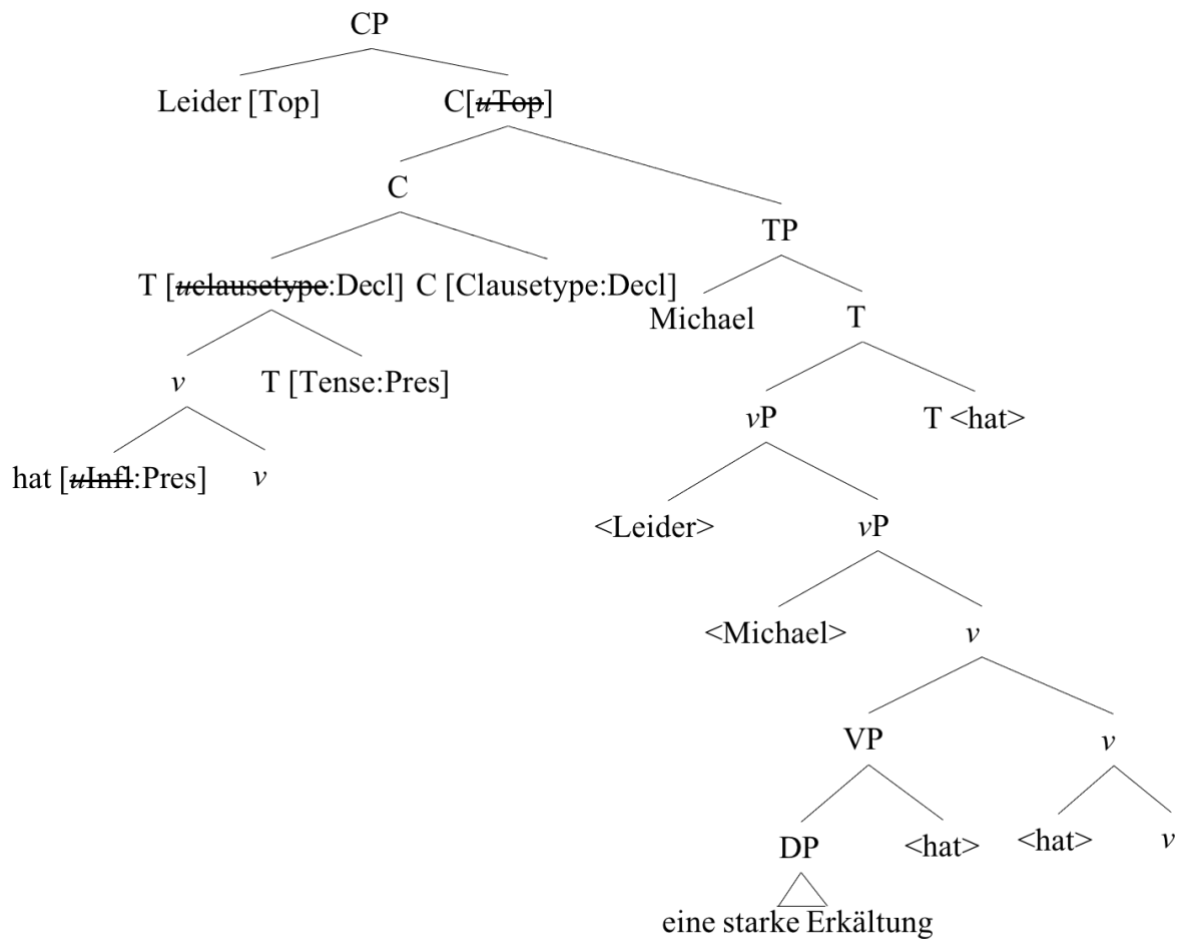
- 23) Der Mann sieht seinen Nachbarn.
 The man sees his neighbour.
 The man sees his neighbour.
- 24) Leider hat Michael eine starke Erkältung.
 Unfortunately has Michael a strong cold.
 Unfortunately, Michael has a bad cold.
- 25) Im Winter fährt Claudia immer nach Spanien.
 In winter travels Claudia always to Spain.
 In winter Claudia always travels to Spain.
- 26) Diese Zeitung liest der Mann immer.
 This newspaper reads the man always.
 This newspaper, the man always reads.
 (unmarked: The man always reads this newspaper)

In 23), the subject is in ‘first position’ giving the canonical SVO word order. Examples 24)–26) show a fronted, non-subject constituent in first position. In German, any non-subject constituent (XP) can also be fronted for discourse-pragmatic purposes such as topicalisation or focus. This includes adverbial phrases (24), including adverbial PPs (25) (not only temporal PPs as in 25) but also locative PPs e.g., ‘in London’ and ‘manner’ PPs e.g., ‘with friends’), objects (26), single verbs, VPs, and

⁵⁹ A possible explanation for this difference in degree of unacceptability between 19) and 21) and the individual variation observed in 19) is that as the anaphor in 19) is located at the edge of the embedded clause, it only weakly violates the locality requirement of anaphors. In other words, the anaphor is “near enough” to the matrix subject that binding is possible for some speakers on some test items. This explanation also neatly accounts for the strong unacceptability and lack of variation found for 21), since in this structure the syntactic distance between the reflexive antecedent is far greater and there is a semantically plausible DP intervening between the reflexive and intended anaphor. This intervening DP may make the matrix subject less salient as an antecedent and therefore more marginal/not consistently available to all speakers on all test items. Additionally, there is perhaps the possibility of a derivation of 19) involving local binding with an optional PRO subject within the Picture NP controlled by the main clause subject, but this is not available for 21).

embedded clauses. Importantly only one constituent can be fronted and appear in a pre-verbal position. When not fronted, the subject must appear post-verbally in third position as in (24)–(26).

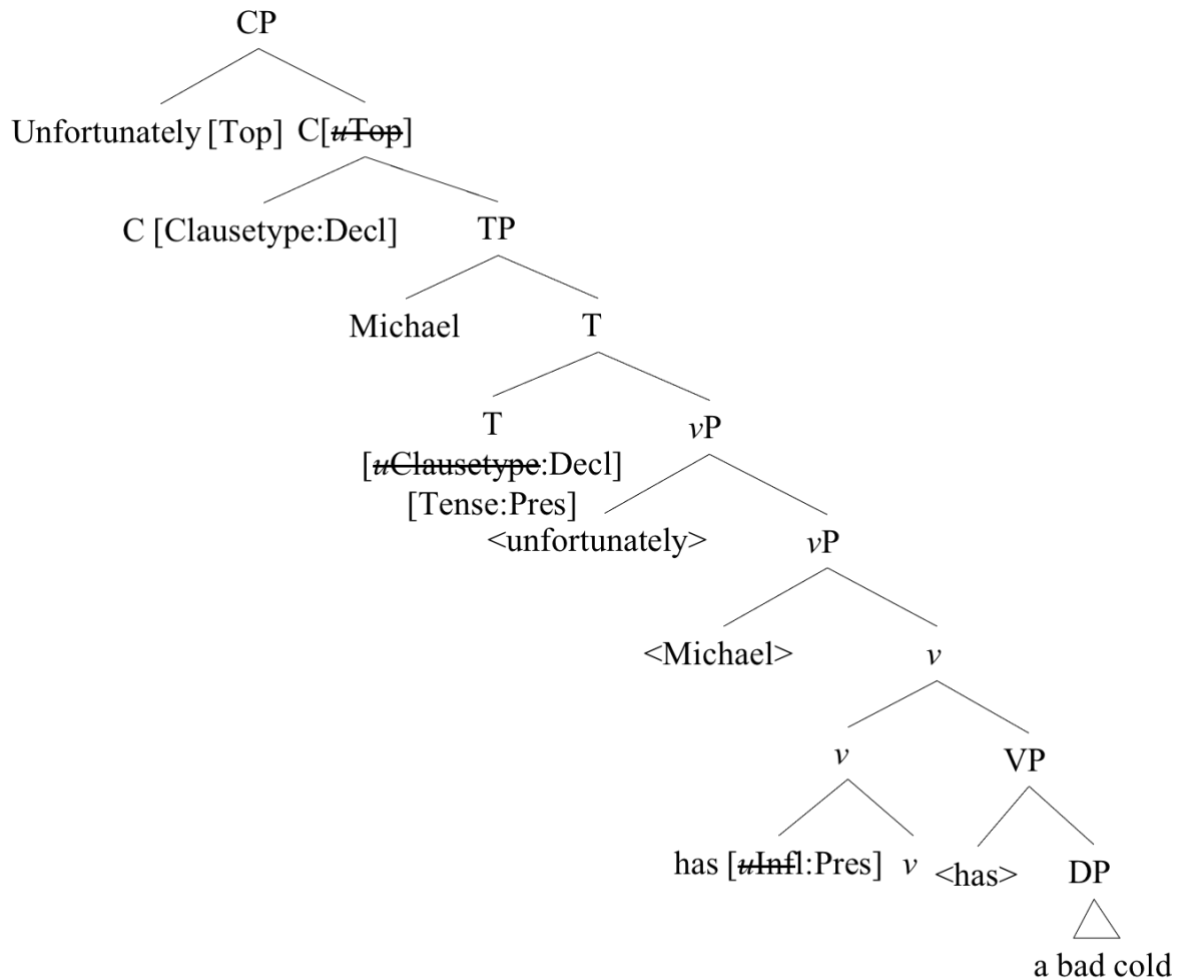
Various analyses have been proposed for V2 (see Holmberg, 2015 for an overview). This study adopts the feature-based analysis of Adger (2003: 329–332) to account for the differences between German and English. The derivation V2 proceeds as follows: the finite verb is generated in the VP head position and raised to vP head position. The finite verb bears an uninterpretable, unvalued [*uInfl*(ection):_] feature which is valued by the [*Tense*:] feature on T. In German, [*Tense*:] values [*uInfl*:_] as strong. Therefore, the finite verb must raise to the T head to value this [*uInfl*:_] feature (Adger, 2003: 166–182, see also Schwartz and Vikner, 1995, for example, for similar arguments for verb raising in German). In the above examples the value of this tense feature is [*Tense*:Present], therefore [*uInfl*:_] is valued as [*uInfl*:Present]. T further bears an uninterpretable, unvalued [*uClause-type*:_] feature. In declarative sentences, this is valued by a [*Clause-type*:Decl(arative)] feature on C. In German, [*Clause-type*:Decl] on C is strong, therefore T raises to C for valuation of [*uClause-type*:_]. This brings the finite verb to second position on the CP head. C in German also bears a strong, privative feature [*uTop*(ic)], which is valued by the raising of any XP bearing [*Top*] to this position. As noted above, this XP can be the subject (for canonical SVO word order), an object, various adverbial phrases etc. With the finite verb in C, there is only one higher position, spec CP, available, thus only one XP can (and must) be fronted to value [*uTop*]. This means that when an XP other than the subject is fronted, the subject does not raise past T and so occurs post-verbally. The derivation of (24) is provided in e. below (non-essential details omitted). Adger (2003) assumes German to be a head-final language with a default SOV word order (see Haider, 2020 for discussion of OV vs. VO base ordering in Germanic). Therefore, complements precede heads the T, V and v projections.



e.

English and German SVO sentences (without an additional XP) share the same surface word order (see 23) above). However, with the fronting of a non-subject XP, as in examples 24)–26) above, the following differences become apparent: In English declarative main clauses the finite verb is not obligatorily in second position. Rather, when a non-subject XP is raised, the verb is in third position after the subject. This is accounted for by assuming that, as in German, the finite verb is generated in the VP head and raised to vP. Also as in German, the finite verb bears [*uInfl*:_] which is valued by the tense feature on T. However, when valued as Tense, [*uInfl*:_] is valued as weak on lexical verbs, meaning it can be valued on v and there is no raising to T (thus English, unlike German, is not a verb-raising language). On the other hand, the [*uInfl*:_] on auxiliary verbs in English is valued as strong and raising to T is required (this is the case for both lexical and auxiliary verbs in German – Adger, 2003: 166–182). However, unlike German, in English declarative clauses [Clause-type:Decl] on C is weak. Thus T does not raise to C to value its [*uClause-type*:_] feature and consequently even auxiliary verbs do not raise from T to C. For all verbs in declarative clauses the subject in spec TP therefore remains structurally higher than the verb. Thus, although the surface word order in the English and German versions of 23) above appear the same, the underlying structural positions of the subject and verb

are in fact not. To derive the English versions of examples 24)–26) with a (non-subject) fronted/topicalised XP Adger (2003) assumes that C bears an *optionally* strong [*u*Top] feature. An XP bearing [Top] can, but need not, move to spec CP for topicalization or focus, for example. These feature specifications mean that even when an element is fronted in English declarative main clauses, the verb is not in second position as it cannot raise to C (see f. below. Non-essential detailed omitted).⁶⁰



f.

⁶⁰ In English, “genuine” V2 (i.e., with the finite verb in C preceding the subject) in declarative sentences is found only in a limited number of stylistically marked sentences such as those with fronted negative operators e.g., *never would I ask him for help* (Haerberli, 2007), and some operator-like, non-subject constituents e.g., *so strong was he, that...* (Vikner, 1995:48-50; Haegeman, 2002). In these cases, spec CP is occupied by an operator/operator-like constituent and C-head carries an obligatorily non-lexical verb as the result of movement (lexical verbs with fronted negative operators require *do*-support). In such structures C likely bears a different feature specification than in main clauses without such operators. V2 is therefore a lexically restricted and marked option in English declarative sentences but obligatory in German. These structures are not tested investigated in the study, thus this possibility is not further discussed here.

The difference in the positions of the finite verb described above gives rise to a further word order contrast between German and English declarative main clauses. Consider the following examples, which have SVO word order but with an additional, non-fronted, adverbial XP:

27) Der Mann sieht nie seinen Nachbarn.

The man sees never his neighbour.

The man never sees his neighbour.

28) The man never sees his neighbour.

In 27), the adverbial XP occurs between the finite verb and the direct object but cannot occur between the subject and the finite verb. In 28) the adverbial XP occurs between the subject and the finite verb but cannot occur between the finite verb and the direct object. The (un)availability of S-XP-V-O word order can be explained as follows: In German the subject is hosted in Spec CP (where it has raised from Spec vP > Spec TP > Spec CP) and the finite verb is in C. Under the assumption that adjunction only targets phrasal categories (such as vP), there is no readily available intervening position between Spec CP and the C-head for an additional XP to adjoin. The adverbial XP must therefore remain in a lower position. In English the subject is hosted in Spec TP and the *lexical* finite verb in v-head. An adverbial XP can therefore adjoin to the left of the v-head (immediately to the left of Spec vP) in vP adjunct position (this is the original position of the adverb depicted in f.), allowing it to intervene between the subject and finite verb as in 28).

Finally, it is worth commenting on the markedness of these word orders. In both languages the unmarked, canonical word order for declarative main clauses is SVO and the fronting of a non-subject constituent is therefore marked. The degree of markedness however, depends on the type of constituent which is fronted. In both German and English, fronting an adverbial as in 24) or a temporal PP as in 25) is very frequent and therefore less marked. In English, fronting of certain locative PPs e.g., 'in London' is likewise less marked. On the other hand, the fronting of locative PPs which indicate the direction of movement e.g., 'to the beach' and also the fronting of 'manner' PPs (e.g., 'with my friends'), is more marked: typically, they are fronted only in specific discourse contexts such as topic-continuity and contrastive focus contexts, though even here they can sometimes sound awkward or even unacceptable in some cases. For this reason, only 'non-directional' locative PPs are tested in this study. In German, fronted locative and 'manner' PPs are arguably slightly more marked than fronted (non-PP) adverbials and temporal PPs – though not to the same degree as in English – and are overall fully acceptable.

Importantly, the same features underpin the fronting of time, ‘manner’ and place adverbial PPs. Therefore, if this underlying syntactic structure has attrited, it could be assumed that attrition would obtain for all of these fronted PP structures. However, due to differences in markedness, this may result in varying degrees of (un)acceptability between these structures. In order to control and account for this, each type of fronted adverbial PP is often tested as a separate experimental condition in acquisition and attrition studies (e.g., Grabitzky, 2014, discussed in 2.4.1). The same will be done in this study (see 4.5.4.2 for experimental conditions). Finally, fronted objects as in (26), are rare and stylistically very marked in English: they typically need to be in topic-continuity or focus contexts in which they are used contrastively and then must also either be followed by a pause in topic contexts, or stressed in focus contexts, and even then can sound awkward/unacceptable. In German, fronted objects are acceptable outside of focus contexts and do not need to be used contrastively but typically must be used in a topic-continuity context, and are therefore still partly discourse dependent. As this thesis aims to investigate morphosyntactic attrition in a narrow sense i.e., in cases where it does not interface to some degree with the discourse/pragmatics, fronted direct objects are not investigated.

3.5 German – Spanish

Finally, we turn to the German–Spanish language pair and the two properties tested therein: predicative adjective gender agreement and negation.

3.5.1 Predicative Adjective Gender Agreement

In Spanish, both attributive (i.e., DP internal) adjectives and predicative adjectives agree with the noun in gender. In German, attributive adjectives agree with the noun in gender. In both languages, this agreement is reflected in the inflectional morphology of almost all adjectives (there are some lexical exceptions). Predicative adjectives in German, however, never inflect for gender or any type of nominal feature and thus always appear as root adjectival (i.e., uninflected) forms. To isolate gender agreement and avoid potential confounds with agreement of other nominal features, only predicative adjectives after singular, nominative, definite articles are investigated in this study.⁶¹ (29)–(33) below illustrate the relevant differences between predicative adjectives in German in (29)–(31) and Spanish in (32)–(33).

29) Der Hund ist schwarz(-∅)
The.MASC dog(MASC) is black-MASC

⁶¹ Spanish predicative and attributive adjectives agree in gender and number. German attributive – but not predicative – adjectives likewise inflect for gender, number and additionally in case and definiteness.

The dog is black.

30) Die Flasche ist klein(-∅)

The._{FEM} bottle(_{FEM}) is small-_{FEM}

The bottle is small.

31) Das Buch ist rot(-∅)

The._{NEUT} book(_{NEUT}) is red-_{NEUT}

The book is red.

32) El perro es negr-o.

The._{MASC} dog(_{MASC}) is black-_{MASC}

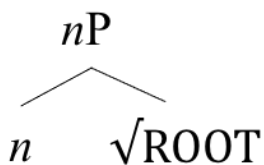
The dog is black.

33) La botella es pequeñ-a.

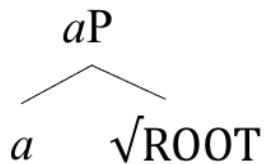
The._{FEM} bottle(_{FEM}) is small-_{FEM}

The bottle is small.

Baier (2015a, 2015b) provides an account of adjective agreement in Noon, which they propose can be extended to also capture the Spanish and German facts (Baier 2015b: 13–14). This approach is adopted here, though it is argued that a minor adaptation is in fact needed to account for the German data. Baier assumes a lexical-decomposition approach to word formation in which uncategorised roots are merged with a categorising head. The relevant heads for this discussion are *n* for nouns and *a* for adjectives) e.g.:



g.

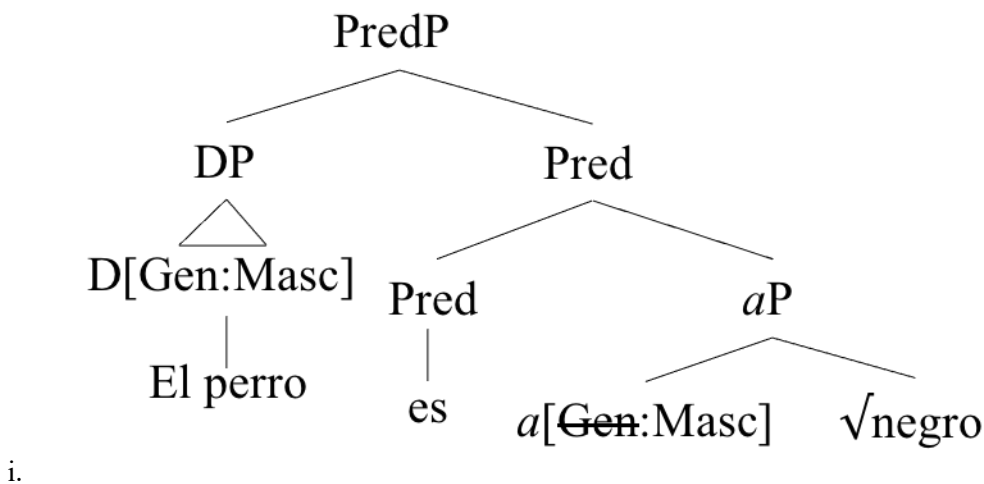


h.

The projection for a noun is therefore *nP* and for an adjective *aP*. Grammatical gender is assumed to be specified on the *n* head (Kramer, 2015, 2016. See also 3.3.2). Baier suggests that the differences between German and Spanish predicative adjective agreement can be accounted for if

one assumes that predicative adjective agreement is licensed by a different agreement operation in both languages, which entails a different location of the gender feature within the hierarchy of projections. The account for Spanish is more straightforward and thus will be presented first.

Baier (2015a) argues that adjectival agreement in Spanish can obtain essentially in line with agreement as conceptualised in Chomsky (2000, 2001) i.e., Agree between a probe and a goal in some form of c-command relationship, as assumed in previous analyses of attributive and predicative adjective agreement (e.g., Carstens, 2000; Danon, 2011), provided Agree is assumed to be bidirectional. We can assume here that the *a*-head hosting the predicative adjective is specified with an unvalued gender feature [Gen:_].⁶² The gender feature on the *a*-head is valued by the valued gender feature of the DP. The derivation of *El perro es negro* from example 32) above is illustrated in i. below (non-essential details omitted. See 3.3.2 for details of the DP structure assumed for German and Dutch, which can be assumed also for Spanish).

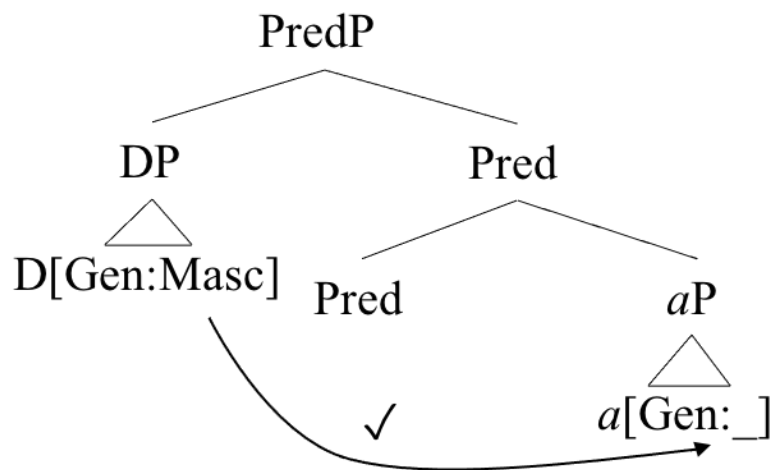
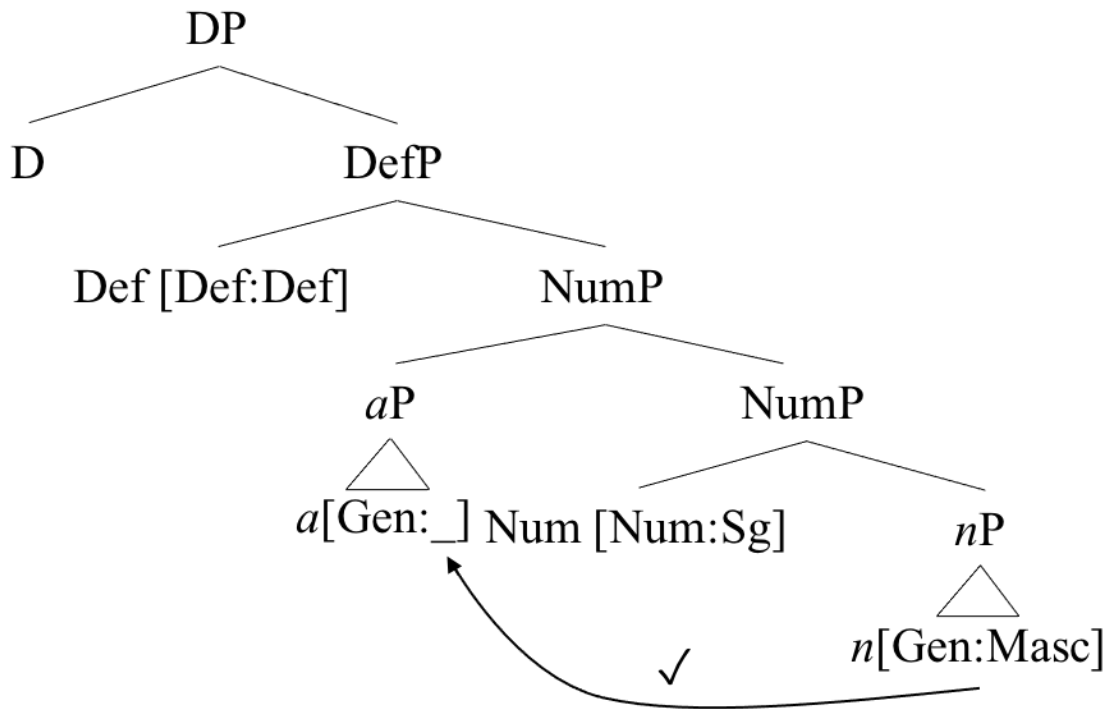


Baier (2015a) argues that this approach can account for both predicative and attributive agreement in languages like Spanish (i.e., via the same Agree mechanism only the agreement is DP internal for attributive adjectives). However, if this agreement mechanism also operated over predicative adjectives in languages like German, the gender feature of DP would always be able to value the gender feature of the adjective. Thus there is, in principle, nothing to prevent predicative adjective agreement, contrary to fact. Baier discusses a similar problem in applying this approach to adjective agreement in Noon. Briefly and simplifying somewhat, in Noon there are two types of adjective agreement morphology: a concord prefix and a definite suffix, which both inflect for

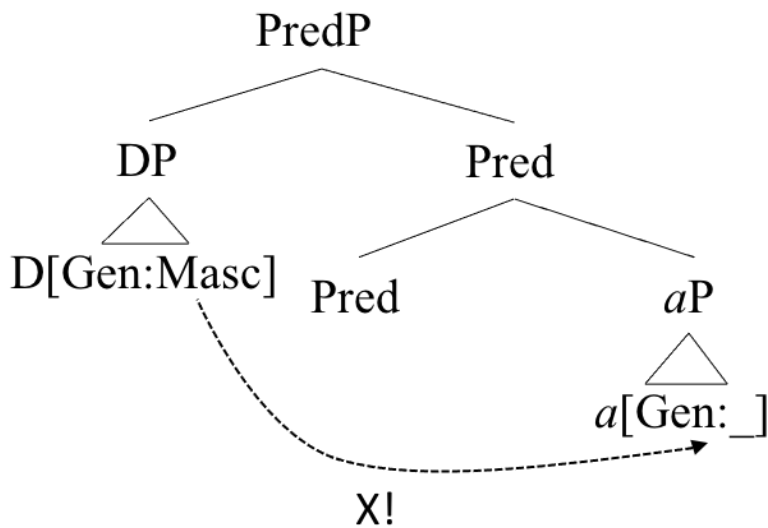
⁶² Baier (2015) claims that the *a*-head merges with an abstract syntactic probe and that the gender feature is specified on this probe rather than *a* itself. However, for simplicity and to be more uniform with the other analyses outlined in this chapter, we can assume the gender feature is specified on *a* itself. It is my understanding that this modification does not change the viability of this analysis as applied here.

gender, amongst other features which are set aside here. The concord prefix inflects in both attributive and predicative structures. The definite suffix only inflects in attributive structures and is only realised as overt morphology for definite nouns (with indefinites and in predicative position it is always null). Baier (ibid) assumes the concord suffix is valued via Agree as described above for Spanish, hence it inflects in both attributive and predicative position. However, definite suffix agreement cannot obtain via the same Agree mechanism as this would result in agreement for definite nouns in predicative structures.

To account for this asymmetry, Baier assumes that for the definite suffix [Gen:_] is valued by a different agreement mechanism and located of a different projection. Baier builds on Norris (2014) which considers DP internal agreement a post-syntactic operation. In this broadly Distributed Morphology approach, adjectival inflection is the realisation of a feature on an Agr(reement)-node which is inserted post-syntactically (e.g., Halle and Marantz, 1993). Specifically, this node is attached to the α -head. Baier argues that the Noon definite suffix is the realisation of an Agr-node which is bears an unvalued gender feature (i.e., [Gen:_] is not specified on the α -head but rather on the Agr-node). Agr-nodes are not valued by Agree (in the syntax component) but in the morphological component by means of Feature Copying. This point is crucial as valuation via Agree and valuation via Feature Copying, as argued for by Norris (2014), obtain under different structural configurations. (Bidirectional) Agree as assumed here is possible only between a probe and a goal in a c-command relationship. Therefore, Agree between the adjective on α and the DP is possible both in attributive structures where the adjective is DP internal (see j. below) and in predicative structures (k. below) (arrows show the direction of valuing, rather than probing. The simplified DP structure depicted in j. is assumed to be broadly compatible with German and Spanish DPs). Attributive adjectives are always prenominal in German (as depicted in j.) but predominately postnominal in Spanish – in either case Agreement between the adjective and DP can be established.



Feature Copying on the other hand obtains when values of features are copied to matching, unvalued features on Agr-nodes. Importantly, Norris (2014) stipulates that Feature Copying is a unidirectional, downward valuation operation in which features can only be copied from dominating projections, and that the closest matching value is to be copied. Baier (2015a) notes that though the adjective is in c-command with the DP in predicative structures, the requisite dominance relationship stipulated by Norris (2014) is not established (see l. below compared to k. above. Recall that the Agr-node is inserted and attached to the α -head).



1.

In Baier's account, the unvalued gender feature being specified on the Agr-node means that in predicative structures it can never value its features via Feature Copying. However, they argue that the Noon definite suffix is in the required dominance position within the DP for an Agr-node to receive its values via Feature Copying (see Baier 2015a:11 for the Noon DP structure assumed as well as illustration of Feature Copying within the DP). Hence with attributive adjectives the definite suffix can agree with the gender of the DP as its features on Agr can be valued. On the other hand, it cannot appear on predicative adjectives as its features on Agr cannot be valued in this structural position.

Applying this approach to German, it is suggested here that predicative adjective inflectional morphology in German is the realisation of an Agr-node attached to the *a*-head hosting the adjective. Agr is inserted post-syntactically with an unvalued gender feature. This feature cannot be valued via Feature Copying in this structural configuration (1. above). As Agr is inserted post-syntactically this should not cause the derivation to crash, rather, simply no phonetic realisation of any of its features. The adjective is therefore always realised a root, uninflected form.⁶³

3.5.2 Negation

Standard German is a type of Double Negation (DN) language: sentential negation is achieved through a single semantically negative element. Spanish is a type of Negative Concord (NC) language:

⁶³ To be precise, in their account of Noon, Baier (2015) actually argues that when Agr cannot attain values via Feature Copying, as occurs in predicative structures, its features are assigned a default value. For definiteness, it is assumed that this value is indefinite. Consequently, in predicative position the Agr-node for the definite suffix is realised as the same agreement morphology as for attributive adjectives with indefinite nouns, which in this case is null morphology, hence the definite suffix never appears in predicative position. However, we will assume here that no default value is assigned for a German Agr-node as, following Baier's assumptions about default assignment, default assignment here would entail that predicative adjectives would always realise the agreement morphology of the corresponding attributive adjectives (all attributive adjective agreement is overt in German), rather than appearing as the root, uninflected forms.

two or more negative elements yield one semantically negative reading. Consider the following example of sentential negation in German (34) and Spanish (35). In the following discussion: NEG – negative marker (i.e., the negative adverbs *nicht* in German and *no* in Spanish), NQ – Negative Quantifier, NCI – Negative Concord Item (an NQ but termed NCI in NC languages for reasons which will become apparent later), NPI – Negative Polarity Item. In the following discussion ‘n-word’ refers NQs or NCIs):

34) Peter schläft nicht.

Peter sleeps not.NEG

Peter doesn't sleep/isn't sleeping.

35) Pedro no duerme.

Pedro not.NEG sleeps

Pedro doesn't sleep/isn't sleeping.

From these examples with intransitive verbs, it appears that sentential negation is achieved in essentially the same manner in both German and Spanish i.e., with a single negative adverb preceding or following the verb (the difference in word order here is due to German being a V2 language – see 3.4.2, whilst Spanish is not). However, in sentences with an n-word, the following differences emerge:

36) Peter trinkt nichts.

Peter drinks nothing.NQ

Peter drinks nothing.

37) Pedro no bebe nada.

Pedro not.NEG drink nothing.NCI

Pedro drinks nothing.

This contrast illustrates that whilst sentential negation is achieved by the NQ (here a negative object) alone in German (36), in Spanish, sentential negation is achieved through an NCI (likewise a negative object here) and a negative adverb together (37). Indeed, as a DN language, in German NQs cannot occur with a negative adverb, as shown in 38) (German V2 word order is maintained here). As an NC language, in Spanish the post-verbal NCI cannot occur *without* another negative element, as

shown in 39).⁶⁴ This other negative element can either be a negative adverb, as in 37), or a pre-verbal NCI as in 40).

38) *Peter trinkt nicht nichts.

Peter drinks not.NEG nothing.NQ

Peter drinks nothing.

39) *Pedro bebe nada.

Pedro drinks nothing.NCI

Pedro drinks nothing.

40) Nadie bebe nada.

No one.NCI drinks nothing.NCI

No one drinks anything.

41) Niemand trinkt etwas.

No one.NQ drinks anything.NPI

No one drinks anything.

In 41), the German translation equivalent of 40), a pre-verbal NQ in subject position licenses a post-verbal Negative Polarity Item. The NPI is itself not semantically negative, therefore sentential negation is still achieved through one and only one negative element. Replacing the NPI with an NQ, which is semantically negative, yields an ungrammatical sentence as in 42). In the Spanish example 43) – the structural equivalent of 41) – a pre-verbal NCI in subject position is used together with a post-verbal NPI. This is ungrammatical; hence it seems that the NCI is not able to licence the NPI.

42) *Niemand trinkt nichts.

No one.NQ drinks nothing.NQ

No one drinks anything.

43) *Nadie bebe algo.

No one.NCI drinks anything.NPI

No one drinks anything.

⁶⁴ Pre-verbal NCIs, on the other hand, cannot occur *with* another negative marker e.g.,

*Nadie no bebe.
No one.NCI not.NEG drinks.
No one drinks.

Spanish is therefore a non-strict NC language according to Giannakidou's (2000) definition of a non-strict NC language as one in which n-words must occur with a single negative marker unless the n-word is in pre-verbal position, where it cannot occur with a negative marker.

Assuming Zeijlstra's (2004) account of negation, the aforementioned differences between DN languages like German and NC Spanish are fundamentally attributed to differences in the interpretability of a privative [Neg(ation)] feature. In DN languages like German, all negative elements bear an interpretable negation feature: [*i*Neg], and there are no elements which bear an uninterpretable negation feature: [*u*Neg]. As all the relevant features for negation are interpretable, they can be read directly at LF. Therefore, sentential negation in German does not involve Agree but obtains by semantic negation alone. In this account, [*u*Neg] features are valued by an [*i*Neg]-bearing negative operator in NegP, which scopes over the whole clause. As there are no [*u*Neg] features in DN languages, Zeijlstra argues that such languages do not project NegP and negation is therefore not a syntactic category in these languages (Zeijlstra, 2004:261). Rather, negative markers are analysed as adverbs which merge as *v*P adjuncts and NQs occupy the same subject or object positions as in affirmative sentences. 44) below shows a simplified structure of the sentence in example 36) above:

44) [_{TP} Peter_i [_T trinkt_j] [_{vP} *nicht* [_{vP} t_i t_j]]]]

Furthermore, since [*i*Neg] is interpretable, each negative element in German is expected to have its own distinct semantic influence on the negation and polarity of a clause. Consequently, negative elements can occur on their own in a clause, as in 34) and 36), or semantically licence NPIs as in 41). To reiterate, NPIs are not semantically negative and when in post-verbal position in DN languages they must be licenced by a semantically negative n-word, e.g., the NQ bearing [*i*Neg] in 41). The licensing of NPIs is thus semantic rather than syntactic. When two negative elements both bearing [*i*Neg] co-occur in the same clause as in 38) and 42) the semantic negation of both elements is applied. In DN languages, this can in principle yield a double negation reading whereby the two negatives can cancel either other out to give an affirmative reading. Crucially, in a DN language not every instance of double negation yields a DN reading. In fact, DN readings are very rare in natural language. Furthermore, it is often difficult to construe contexts in which a DN reading can be available; harder again to find a context in which they sound natural. Consequently, double negatives are instead typically considered ungrammatical in non-NC languages (Zeijlstra, 2004: 58–59). This is

the case for the structures in 38) and 42), which are tested in this study.⁶⁵ It seems that for these structures, the double negative results in some form of redundancy in the semantic negation which makes the sentences unacceptable on semantic, but not syntactic, grounds.

Zeijlstra (2004) assumes that in non-strict NC languages like Spanish, negative markers (here the negative adverb *no*) enter the derivation bearing [*i*Neg] whereas NCIs bear [*u*Neg]. In non-strict NC languages, the negative marker is the phonological realisation of the negative operator. The presence of uninterpretable negation features triggers feature valuing, therefore negation in Spanish obtains by means of Agree and Spanish projects NegP. In 39) there is no negative marker bearing [*i*Neg] to value the [*u*Neg] feature of the NCI, thus the derivation crashes. In a sentence like 37) the NCI is generated in *v*P complement position. The NCI's [*u*Neg] feature is valued by the [*i*Neg] feature on the negative marker which merges in NegP head position, represented below (simplified structure with non-essential details omitted):

45) [_{NegP} Pedro_i [_{Neg} no_[iNeg]] [_{vP} t_i bebe nada_[uNeg]]]

In 40), like 39), there is no negative marker to value [*u*Neg] on the object NCI. However, this sentence is nevertheless grammatical. The sentential negation in 40) is not technically an instance of negative concord but of negative spread: a negative feature is 'spread' over an indefinite expression within its scope (Zeijlstra, 2004:61). More formally, Zeijlstra (2004) assumes that in negative spread structures like 40), the negative operator bearing [*i*Neg] is abstract and null, being hosted in Spec NegP (compare to the structure in 37) where the negative operator is overtly realised as the negative marker on the NegP head and the subject in Spec NegP is raised from spec *v*P). In the negative spread structure in 40), [*u*Neg] on the object NCI is valued by the null negative operator. The pre-verbal subject NCI is generated in Spec *v*P and likewise valued by the negative operator under the assumption of Multiple Agree, but to do so it must raise to Spec NegP where it forms a compound with this operator (Op). 40) is represented below as 46) (simplified structure with non-essential details omitted):

⁶⁵ The empirical findings from the L1 German control group confirm that double negatives in sentences such as 38) and 42) tested in this study are strongly unacceptable in German, thus the DN reading is not available here (see 5.5.3.2). There is a second reading under which the co-occurrence of two negatives as in 38) and 42) could be acceptable in German: an Emphatic Negation (EN) reading. DN languages can be subdivided into those that allow EN and those that don't (see Zeijlstra, 2004: 67–73 for discussion of EN). In EN, two negative elements are considered grammatical by yielding a negative reading – as in NC languages – however this negative interpretation is more emphatic than a single negative element alone – unlike NC languages. EN is also subject to a number of constraints, including certain locality and in some cases prosodic constraints, which do not operate on double negatives in NC languages. Standard German does allow EN, however an EN interpretation structures like 38) is ruled out as EN is not possible if the negative adverb precedes the negative quantifier (as confirmed by the German control group results). An EN reading is in principle possible for 42) however, this structure was also rated ungrammatical by the German control group. Therefore neither EN or DN readings appear available for these structures.

46) [_{NegP} [_{Op}_[iNeg]-Nadie_[uNeg]] [_{VP} t_i bebe nada_[uNeg]]]

Finally, since NCIs, unlike NQs in DN languages, are not semantically negative they cannot license NPIs, ruling out structures as in (43) with post-verbal NPIs on semantic grounds.⁶⁶ However, in the analysis presented here this is still fundamentally accounted for by the (un)interpretability of the negation feature on NCIs vs. NQs.

3.6 Summary

This chapter has outlined the key L1–L2 cross-linguistic differences for the six morphosyntactic properties tested in the current study and presented a feature-based analysis to account for the behaviour of these properties in each language. The key cross-linguistic differences and the features responsible for these differences are summarised in Table 3.1.

⁶⁶ Note that NPIs can also be licensed in certain non-negative contexts (in both DN and NC languages), such as with yes/no questions. In Spanish NPIs can be licensed in these contexts, but not in those which require a licensing by a semantically negative element, as in (43).

Chapter 3

Language Pair	Property	Key differences for this study:		Feature differences:	
		German	L2	German	L2
L1 German – L2 Dutch	a) Reflexive Binding	<i>Sich</i> and <i>sich selbst</i> have the same binding domain. Must be bound locally.	Distinct binding domains for <i>zich</i> and <i>zichzelf</i> . <i>Zich</i> : longer distance binding. <i>Zichzelf</i> : local binding.	<i>Sich</i> : [Var:x/y/z] + [Reflexive] [DP [D sich] [NP Ø]] <i>Sich selbst</i> : [Var:x/y/z] + [Reflexive] [DP [D sich] [NP selbst]]	<i>Zich</i> : [Var:x/y/z] + [Reflexive] [DP] <i>zich</i> <i>Zichzelf</i> : [Var: _] [DP [D zichzelf] [NP Ø]]
	b) Grammatical Gender	Three-way grammatical gender system: <i>Masculine</i> <i>Feminine</i> <i>Neuter</i>	Two-way grammatical gender system: <i>Common</i> <i>Neuter</i>	Gender features on <i>n</i> : [Gen:Masc] [Gen:Fem] [Gen:Neut]	Gender features on <i>n</i> : [Gen:Com] [Gen:Neut]
L1 German – L2 English	a) Reflexive Binding	<i>Sich</i> subject oriented (though variability in baseline). No logophoric reflexives – binding across clause boundary always illicit.	Him/herself not subject oriented. Logophoric reflexives – binding across clause boundary licit in some structures.	<i>Sich</i> : [Var:x/y/z] + [Reflexive]	<i>Him/herself (reflexive)</i> : [Var: _] <i>Him/herself (logophor)</i> : [Var:x/y/z]
	b) Main Clause Verb Position	V2 S-V-XP-O *S-XP-V-O XP-V-S-O *XP-S-V-O	Non-V2 *S-V-XP-O S-XP-V-O *XP-V-S-O XP-S-V-O	[Clause-type:Decl] on C strong. [uTop] on spec CP strong. [uInfl:present] valued as strong on all verbs	[Clause-type:Decl] on C weak. [uTop] on spec CP optionally strong. [uInfl:present] valued as strong on auxiliary verbs but weak on lexical verbs
L1 German – L2 Spanish	a) Predicative Adjective Gender Agreement	Predicative adjectives do not agree in gender with the DP – predicative adjectives are root forms which bear no agreement morphology.	Predicative adjectives agree with the gender of the DP.	[Gen: _] specified on Agr-node.	[Gen: _] specified on <i>a</i> -head. No Agr-node.
	b) Negation	DN language. NQ (<i>niemand/ nichts</i>) *Negative marker (<i>nicht</i>) + NQ (<i>niemand/ nichts</i>) *NQ + NQ (<i>niemand/ nichts</i>) NQ (<i>niemand/ nichts</i>) + NPI (<i>etwas</i>)	Non-strict NC language. *NCI (<i>nadie/ nada</i>) Negative marker (<i>no</i>) + NCI (<i>nadie/ nada</i>) NCI (<i>nadie/ nada</i>) + NCI (<i>nadie/ nada</i>) *NCI (<i>nadie/ nada</i>) + NPI (<i>algo</i>)	Negative marker: [iNeg]. N-words (NQs): [iNeg]. No NegP projection.	Negative marker: [iNeg]. N-words (NCIs): [uNeg]. NegP projection which hosts the negative operator bearing [iNeg].

Table 3.1: Summary of grammatical properties, cross-linguistic differences, and L1–L2 feature specifications.

Chapter 4 Methodology

4.1 Introduction

This chapter describes the experimental design, data collection procedures, and participant profiles. The chapter begins with an overview of and justification for the design in 4.2. Section 4.3 provides background information on participants and participant recruitment procedures. 4.4 outlines the experimental tasks and data collection procedures. Predictions are presented in 4.5. Specifically, this section first discusses how L2 acquisition and L1 attrition could obtain via FR for each property and how attrition is expected to manifest on the different experimental conditions. Subsequently, the predictions regarding holistic similarity and structural similarity are outlined.

4.2 Experimental design motivations and overview

Recall that this study aims to empirically test the predictions of the AvA model and the role of input and cross-linguistic similarity in L1 grammatical attrition more broadly. It does so with the following experimental design, repeated here as Table 4.1 for clarity:

L1	L2 (Speakers' current PLD) Decreasing Likelihood of Attrition	Grammatical Property and Relative Complexity of Feature Reassembly	Likelihood of Attrition for Individual Property
German (Germany) – Speakers' native grammar. PLD during L1 acquisition.	L2: Dutch (Netherlands) – Holistically very similar L2.	a) Reflexive Binding Less Complex FR	More Likely
		b) Grammatical Gender More Complex FR	Less Likely
	L2: English (UK) – Holistically similar L2.	a) Reflexive Binding Less Complex FR	More Likely
		b) Main Clause Verb Position More Complex FR	Less Likely
	L2: Spanish (Spain) – Holistically less similar L2.	a) Predicative Adjective Agreement Less Complex FR	More Likely
		b) Negation More Complex FR	Less Likely

Table 4.1: Experimental design overview.

The theoretical motivations for this design, which stem directly from the architecture of the AvA model and the predictions arising from it, are discussed in detail in 2.4.6.3.5. The key points are recapped here. Fundamentally, the possibility of attrition within the model is determined by the availability of two types of intake: Perceptual and Acquisitional. The ease with which they can be generated, is modulated by L1–L2 cross-linguistic differences.

A core prediction arising from the architecture of the model is that attrition is, in principle, predicted only for L1 grammatical structures which have analogous/equivalent forms in the L2, yet which nonetheless differ in their behaviour: these are structures for which Acquisitional Intake for L2 acquisition can be generated and also those which have an L1 morphological form onto which the relevant L2 features can be reassembled (see 2.4.6.3.1 for further discussion). The architecture of the model is such that in attrition contexts Acquisitional Intake used for L2 acquisition could subsequently target the L1 grammar. The six grammatical properties tested in this study are instances of precisely this kind of structure.

It is posited in this thesis that grammatical attrition is facilitated for L1 structures which would need to undergo less complex Feature Reassembly to match the features of the corresponding structure found in the L2 input due to greater overlap in their featural properties. The complexity of FR is a formalisation of structural similarity within a model in which acquisition and attrition obtain via FR. It is proposed that this structural similarity would facilitate the initial generation of Acquisitional Intake for L2 acquisition and the subsequent modification of the L1 via FR. Testing this hypothesis requires investigating two properties in each language combination, one of which would require comparatively less complex FR to attrite than the other based on the criteria for FR complexity devised in 2.4.6.3.4.1 and assuming the syntactic analyses outlined in Chapter 3. In 4.5 the criteria are recapped and applied in turn to each grammatical structure tested. Finally, the ease with which Perceptual Intake can be generated is modulated by the holistic similarity of the languages in question (i.e., similarity on all levels, including morphosyntactic, lexical, and phonological). Attrition is therefore predicted more likely where there is greater overall similarity of the two languages. This prediction is tested through the use of the three L1–L2 language pairings in which the L1–L2 holistic similarity differs systematically. The L1 is kept constant to allow more reliable conclusions to be drawn regarding the effects of L2 input (dis)similarity in attrition.

Combining the considerations regarding Perceptual Intake, Acquisitional Intake, and FR complexity allows the formulation of precise predictions as to the likelihood of attrition both *across* different L1–L2 language combinations as well as *within* given a L1–L2 language (these predictions are outlined in Table 4.1). This study aims to utilise this experimental design to empirically investigate three key research questions, which are repeated here:

- 1) Does the L1 German grammar differ from the baseline on any of the morphosyntactic properties in any of the three linguistic contexts? If so, how are these divergences manifested and how can this be accounted for in terms of reassembly of the L1 features?
- 2) To what extent does the L1–L2 holistic similarity modulate L1 attrition of these morphosyntactic properties?
- 3) To what extent does the structural similarity of the morphosyntactic properties – formalised as the complexity of Feature Reassembly required for the attrition of an L1 structure – modulate attrition of these properties?

A further, key component of this study the testing of potential attriters on equivalent L2 versions of the experimental tasks in order to further investigate this relationship between L2 acquisition and L1 attrition.

4.3 Participants

This study consists of seven participant groups: three groups of potential L1 German attriters in either the Netherlands, UK, or Spain, one group of L1 German controls, and three further control groups consisting of native speakers of Dutch, English or Spanish (termed ‘L2 controls’ in this study as they are native speakers of the potential attriters’ respective L2s). All controls completed the experimental tasks (AJTs) for their respective L1s only whilst potential attriters completed an L1 and also equivalent L2 version of the tasks for their language combination. L1 control results are taken to be representative of the attriters’ L1 grammar before emigration.

The use of L2 control groups is a key methodological consideration of this study. Comparison of the potential attriters’ German results to both the L1 and relevant L2 control group results allows us to confirm statistically not only whether the potential attriters’ L1 grammars diverge from the L1 baseline, but also – if there are divergences from the L1 baseline – whether their results also converge on the L2 patterns. This enables a more thorough investigation of the nature and extent of any grammatical restructuring (i.e., we can better assess whether the attrited grammars are characterised by L1–L2 optionality or L2 convergence at the group level). See 2.4.5 for further discussion. A further motivation for the inclusion of the L2 controls is that the potential attriters also completed equivalent L2 versions of the experimental tasks. Comparison of their L2 results to the L2 control results allows further investigation of the L1 attrition – L2 acquisition relationship (specifically, whether native-like L2 acquisition is necessary for L1 attrition).

In total, 248 participants were tested as part of this study. Ultimately, 24 were excluded from analysis. 11 participants were excluded for not completing all the required experimental tasks and background questionnaires and therefore only a partial dataset was available for them, and a further 13 were excluded based on the exclusion criteria (see Appendix A for the exclusion criteria and further details of data quality checks). This left 224 participants for analysis, of which 86 were potential L1 attriters (see Table 4.2 below for details).

Participant Group	Languages	Number of participants
L1 Controls	L1 German	44
Potential Attriters	L1 German – L2 Dutch	25
	L1 German – L2 English	31
	L1 German – L2 Spanish	30
	<i>Total</i>	86
L2 Controls	L1 Dutch	30
	L1 English	33
	L1 Spanish	31

Table 4.2: Overview of participant groups.

4.3.1 Potential attriters (German expats)

The three potential attriter groups all have the following linguistic profile:

- 1) Native German speaker.
- 2) Only spoke standard German (*Hochdeutsch*) and/or a dialect of German at home growing up and did not attend a bilingual school.
- 3) Grew up in Germany but now living in either the Netherlands, UK, or Spain.
- 4) 18+ years old when moved to the Netherlands, UK, or Spain.
- 5) Lived in the Netherlands, UK, or Spain for a minimum of 15 years.
- 6) 33–75 years old.
- 7) Are not currently, nor have previously been, a full-time teacher of German as a foreign language.
- 8) Are not currently, nor have previously been, a full-time translator or interpreter of German.

Concerning the first two points above, the participants are all native German speakers from Germany who grew up functionally monolingual (at most bi-dialectal) i.e., they are not childhood bilinguals nor Heritage speakers of any languages but are late-sequential L2 learners of either Dutch, English, or Spanish. Most participants speak additional languages and/or dialects of those languages to varying degrees (see Appendix B for the full lists and counts of additional languages/dialects as well as information about ages of L2 onset).

It is worth noting that in the German–Spanish group seven potential attriters report being exposed to and speaking Catalan, in many cases on a daily basis. Recall that one of the grammatical properties investigated in this study is negation. Catalan, like Spanish, is a negative concord language however it is a different type of negative concord variety (see Zeijlstra, 2004:147 and 149 for a typological overview of negation). Thus, it is in principle possible that the L1 German of these Catalan speakers might be influenced by Catalan and result in different patterns of attrition compared to the non-Catalan speaking participants. However, influence from Catalan should not be seen in the results of this study as the negation structures tested are the same in both Spanish and Catalan (see 4.5.5.2 for the negation experimental conditions and Appendix I for the full list of test items). Furthermore, the descriptive statistics (both averages and individual ratings) of each of these participants on the negation AJT were manually inspected. One of these seven participants spoke Valenciano and another other Balearic Catalan. The results of these two participants appear to be in line with each other and with the five Catalan speakers residing in the Barcelona area. Further statistical modelling confirmed that speaking Catalan did not have an effect on the results of the German or Spanish AJT.⁶⁷ The German expats in Spain are therefore treated as one group in the analysis.⁶⁸ Justification for recruiting participants with the background characteristics detailed in points 5)–8) above is given in Appendix A.

A considerable number of linguistic and extra-linguistic background variables – many not mentioned above – have been found to be significant in L1 attrition (see contributions in Schmid and Köpke, 2019 for recent overviews). Data for a number of key variables (age, LoR, education, L1 vs. L2 use etc.) are collected by the background questionnaires used in this study (see Appendix E and Appendix F for copies of the two questionnaires used). Where possible, any variation in these variables within and between the participant groups is controlled for in the statistical analyses. See

⁶⁷ Cumulative Link mixed effects modelling (see 5.2 for details) confirmed no significant Catalan-speaker*Condition interaction on either the German ($\chi^2 = 3.69$, $df = 3$, $p = 0.3$) or Spanish AJT ($\chi^2 = 1.07$, $df = 3$, $p = 0.79$), nor was there a significant main effect of Catalan-speaker on either the German ($\chi^2 = 1.09$, $df = 1$, $p = 0.3$) or Spanish AJT ($\chi^2 = 0.00$, $df = 1$, $p = 0.97$). Further post-hoc pairwise comparisons for this interaction likewise revealed no significant difference between the Catalan-speaking group and the non-Catalan-speaking group on any experimental condition on either AJT. See Appendix D for descriptive stats of the Catalan vs. non-Catalan-speaking groups on all negation conditions and 4.5.5.2 for the conditions.

⁶⁸ When recruiting participants in the German–Spanish group an effort was made to avoid, to the extent that would still permit recruitment of a sufficient sample size, participants living in one of the many German expat communities in Spain. In these communities the dominant linguistic input is likely the (potentially attrited) German of other expats, rather than Spanish, and native German speakers living there may only speak very minimal Spanish. Avoidance of speakers residing in these communities was to allow fair comparison between the German–Spanish and other two potential attriter groups in this study whose dominant input is their respective L2 (L1 attrition in expat communities with very little/no L2 exposure is attested, though potentially with different patterns or to a different extent than compared to speakers living in L2 speech communities – see Köpke, 2001 and Laufer and Baladzaeva, 2015 for discussion of attrition within such expat communities).

Table 4.3 below for an overview of six key background variables for the potential attriters and Appendix B for more detailed information and further variables.⁶⁹

⁶⁹ Participant background data was collected through the Language History Questionnaire (LHQ) 3.0 (Li *et al.*, 2019) as well as an additional questionnaire – for the potential attriters only – containing attrition specific questions adapted from a selection of those used in Schmid and Dusseldorp's (2010) study (discussed in more detail in 4.4.1). The intention was to use the standardised aggregate scores for language immersion and dominance automatically generated by the LHQ3.0 as variables in the analysis. However, the reliability of these scores is naturally only as reliable as the answers to the component questions used to calculate these scores. Upon inspection of the responses to the individual questions, it emerged that there was a significant degree of variation in how participants, both potential attriters and controls, had interpreted and answered many of these questions. For example, many participants seem to have mixed up the order of their L1 and L2, some put their non-native languages in order of acquisition whilst others put them in order of proficiency, and some even missed out their L1 entirely. Many participants gave answers which were inconsistent both within and between questions, presumably due to some aspects of different questions overlapping yet with different wording used to elicit this information. For many participants, it was often unclear whether their use of '0' as a response to certain questions was actually intended as n/a. Taken together, this considerably diminishes the reliability of the standardised aggregate scores, and it was therefore decided not to use them in the statistical analysis nor report them descriptively in this study. Instead, a dominance ratio for the potential attriters (presented in Table 4.3) was calculated from the results of the additional questionnaire given to attriters only. This score was calculated by assigning a value (1-7) to the frequency of language use (e.g., 'never'=1, 'always'=7) for both the L1 and L2 in three contexts: use with partner, with children, at work. This gave a score out of 21 for each participant for their L1 and L2. These scores were divided by 21, and the L1 scores divided by the L2 scores to give a ratio as in Li *et al.*, (2019:941), who recommend calculating a ratio for language dominance as this is more comparable between participants. This gives a rough idea of their language dominance based on language use in these three contexts but doesn't take into account proficiency etc. A score of 1 indicates 50/50 L1/L2 dominance, a score below 1 is L2 dominant, higher than 1 is L1 dominant.

	L1 German – L2 Dutch (n=25)	L1 German – L2 English (n=31)	L1 German – L2 Spanish (n=30)	Overall (n=86)
Age	53.32 (35-69) (SD 7.81)	51.06 (39-65) (SD 6.41)	56.00 (36-74) (SD 10.20)	53.44 (35-74) (SD 8.46)
Gender	19 Female 4 Male 2 Non- relevant	25 Female 6 Male	17 Female 13 Male	61 Female 23 Male 2 Non- relevant
Education Level (mode)	Master (<i>Master/ Diplom</i>)	Master (<i>Master/ Diplom</i>)	Master (<i>Master/ Diplom</i>)	Master (<i>Master/ Diplom</i>)
Length of Residence in L2 Country (years)	24.64 (16-42) (SD 7.47)	23.79 (15-47) (SD 7.33)	23.77 (15-40) (SD 8.15)	24.03 (15-47) (SD 7.59)
L1 proficiency (LexTALE) (%)	92.40 (57.50-100) (SD 8.67)	92.34 (71.25-100) (SD 5.91)	93.58 (85.00-100) (SD 3.88)	92.79 (57.50-100) (SD 6.25)
L2 Proficiency (LexTALE) (%)	91.20 (43.75-100) (SD 11.53)	94.11 (58.75-100) (SD 8.64)	81.00 (47.50-99.17) (SD 13.83)	88.69 (43.75-100) (SD 12.75)
L1-L2 Dominance Ratio	0.87 (0.14-4.0) (0.53)	0.80 (0.14-2.22) (0.81)	1.77 (0.14-7.0) (1.73)	1.14 (0.14-7.0) (1.24)

Table 4.3: Summary of key background variables for the potential attriter groups (Means, Ranges, and Standard Deviations).

In terms of L1 proficiency scores (see 4.4.2 for details of the proficiency measure used in this study), there are no significant differences between any of the three potential attriter groups, as confirmed by a Kruskal-Wallis rank sum test. The potential attriters grouped together have a significantly higher score than the L1 German controls ($\chi^2 = 10.55$, $df = 1$, $p < .01$). This is the also case for each of the three potential attriter groups compared individually to the control group (Germans in the Netherlands vs. L1 controls: $\chi^2 = 6.07$, $df = 1$, $p < .05$, Germans in the UK vs. L1 controls: $\chi^2 =$

4.70, $df = 1$, $p < .05$, Germans in Spain vs. L1 controls: $\chi^2 = 8.31$, $df = 1$, $p < .01$).⁷⁰ In terms of L2 proficiency scores, there are no significant differences between the Germans in the Netherlands and Dutch controls or Germans in the UK and English Controls – as confirmed by Kruskal-Wallis rank sum tests – however, the Germans in Spain score significantly lower than the Spanish controls, as confirmed by a Yuen Welch's test ($t = 3.18$, $df = 23.31$, $p < .01$).⁷¹ See 4.3.2 for control descriptive statistics.

4.3.2 Control participants

The controls groups in this study all have the following linguistic profile:

- 1) Native speaker of either German, Dutch, English, or Spanish who grew up in Germany, the Netherlands, the UK, or Spain respectively.
- 2) Only spoke either German, Dutch, English, or Spanish (and/or a dialect of one of these languages) at home growing up and did not attend a bilingual school (i.e., are not childhood bilinguals nor Heritage speakers of any languages).
- 3) Have not lived for longer than two years outside of the country in which you grew up.
- 4) 18–75 years old.

Regarding 1), it emerged that one native Dutch control was born and grew up in Belgium (and was still resident there at the time of testing). After manually checking their results and finding that they were entirely in line with the controls from the Netherlands, it was ultimately decided to include this participant.

Regarding 2), in the Spanish control group, 17 L1 Spanish–Catalan bilinguals completed the study. As noted in 4.3.1, though Spanish and Catalan are different types of negative concord languages, they work the same for the negation structures tested in this study and thus are not predicted to affect the Spanish AJT results. Nevertheless, it was decided to exclude the seven of these bilinguals who are Catalan-dominant bilinguals to give a more homogenous control group overall.⁷² Of the remaining 10 Spanish-dominant, Spanish–Catalan bilinguals, two are speakers of Balearic Catalan and two of Valenciano. The descriptive statistics of each of these participants on the negation AJT were manually inspected. The results of these two speakers appear to be in line with each other and with the six other Spanish–Catalan bilinguals. Further statistical modelling confirmed

⁷⁰ The higher proficiency scores are potentially due to each group of potential attriters having a higher average education level than the L1 control group.

⁷¹ Shapiro-Wilk tests confirmed the non-normal distribution of residuals in all groups. Fligner-Killeen tests confirmed equal variances of all comparisons other than for the L2 results of the Germans in Spain and Spanish control comparison.

⁷² Participants who listed Catalan as their L1 and Spanish as their L2 on the LHQ3.0 (the questionnaire does not allow you to state two L1s in the case of childhood bilinguals) were considered Catalan dominant and those who stated L1 Spanish–L2 Catalan were considered Spanish dominant. The language dominance ratio scores calculated by the LHQ3.0 were not used to determine dominance for the reasons outlined in 4.3.1 and the dominance scores reported in 4.3.1 are available for potential attriters only.

that speaking Catalan did not have an effect on the AJT results.⁷³ The 10 Catalan-speaking participants were therefore retained and treated as one group with the non-Catalan-speaking controls.

On this note, two of the English controls were exposed to limited input from an additional language at home growing up (Hindi and Bengali), however they report only passive exposure and do not rate themselves proficient speakers of the languages. Additionally, one participant in the Spanish control group reports being exposed to and speaking some Italian from birth. Manual inspection of the results of these three participants confirms their results to be in line with those of the other participants in their respective groups, thus they were retained.

As noted in 3), none of the participants have lived for more than two years in a country outside of their country of origin. This was to ensure as far as possible that their grammars would be representative of the attriters' grammars prior to emigration. A limit of two years was set due to the common practice of European university students studying or working abroad for a period/multiple periods whilst completing their studies or on exchange programmes during school years. Ideally, at the time of testing, all control participants would be resident in their country of origin. This was the case for all but four of the participants, though none of them had been in another country for more than the two-year limit. One Spanish control was residing in the UK at the time of testing, one Dutch control in the UK and another in Sweden, and one German control in France. Manual inspection of their data confirmed their results to be in line with the other controls in their group, with no apparent influence of their L2s. The one potential exception is the German control living in France at the time of testing. This participant appeared to rate predicative gender-marked adjectives (ungrammatical in German) consistently higher than the controls (see 4.5.5.1 for the experimental conditions).⁷⁴ This participant's results for adjectival agreement were therefore excluded from analysis, but their results on the other properties were retained as these showed no influence from any other language.

Concerning 4), ideally the lower age limit would have been 33 years old so that the controls were more closely age matched with the potential attriters. However, imposing this requirement

⁷³ Cumulative Link mixed effects modelling (see 5.2 for details) confirmed no significant Catalan-speaker*Condition interaction ($\chi^2 = 4.32$, $df = 3$, $p = 0.23$), nor was there a significant main effect of Catalan-speaker ($\chi^2 = 2.43$, $df = 1$, $p = 0.12$). Further post-hoc pairwise comparisons for this interaction likewise revealed no significant difference between the Catalan-speaking group and the non-Catalan-speaking group on any condition. See Appendix D for descriptive stats of the Catalan vs. non-Catalan-speaking groups on all negation conditions and 4.5.5.2 for the conditions.

⁷⁴ These results are possibly due to the influence of French as French predicative adjectives are marked for gender, however gender on adjectives is only realised by means of morphological inflection if the noun is feminine (i.e., an 'e' is added to the end of the adjective, which also results in the preceding consonant beginning phonetically realised). This participant consistently rates gender marked adjectives with both masculine and feminine nouns significantly higher than the other German controls. That adjectives with masculine nouns would also be rated in this way is perhaps unexpected based if influence from French was the cause. Another possibility is that the participant did not use/listen to the audio of the test items (see 4.4.3.1 for AJT design). In this case, they may have not perceived the additional 'e' on the end of adjectives when reading the test items.

would have made participant recruitment too slow and difficult within the timeframe of this study. A consequence of the lower age limit of 18 years old for the controls compared to 33 years old for the potential attriters is that all control groups are on average younger than the potential attriter groups (see Table 4.4 below).⁷⁵ Between-group age differences are controlled for in the statistical modelling. Furthermore, the acceptability of the grammatical properties tested in this study is not expected to vary by age or any other sociolinguistic variable. A possible and partial consequence of the controls being younger is that on average they also have a lower average education level than the potential attriters. Again, these differences, along with any other relevant differences in background variables, are controlled for in the analyses (see Table 4.4 below for an overview of seven key background variables for the potential attriters and Appendix C for more detailed information and further variables).

⁷⁵ German controls completed either one, two, or three of the German AJTs (see 4.4.4 for details). As such, the table shows the data for the control group overall, as well as the subset used in each language comparison. As the vast majority of participants completed two AJTs, the three groups are very homogenous regarding the linguistic background variables.

	L1 German Overall	L1 German (German – Dutch comparison)	L1 German (German – English comparison)	L1 German (German – Spanish comparison)	L1 Dutch	L1 English	L1 Spanish
	(n=44)	(n=31)	(n=31)	(n=32)	(n=30)	(n=33)	(n=31)
Age	25.68 (19-52) (SD 6.57)	26.90 (21-52) (SD 7.28)	24.39 (21-52) (SD 5.79)	26.00 (19-52) (SD 7.27)	30.13 (18-67) (SD 14.80)	27.85 (19-52) (SD 9.88)	25.06 (18-57) (SD 10.17)
Gender	29 Female 15 Male	19 Female 12 Male	19 Female 13 Male	22 Female 9 Male	19 Female 10 Male 1 Non-binary	21 Female 12 Male	24 Female 7 Male
Education Level (mode)	High School Diploma/A-levels (<i>Fach/Hochschulreife</i>)	High School Diploma/A-levels (<i>Fach/Hochschulreife</i>)	High School Diploma/A-levels (<i>Fach/Hochschulreife</i>)	High School Diploma/A-levels (<i>Fach/Hochschulreife</i>)	Bachelor	Bachelor	Bachelor (<i>Licenciatura</i>)
L1 Proficiency (LexTALE) (%)	90.28 (67.50-100) (SD 5.46)	89.23 (67.50-100) (5.68)	90.24 (67.50-98.75) (SD 5.92)	91.37 (82.50-100) (SD 4.28)	92.29 (73.75-100) (SD 6.35)	92.23 (76.25-100) (SD 6.51)	91.64 (71.67-99.17) (SD 7.28)

Table 4.4: Summary of key background variables for control groups (Means, Ranges, and Standard Deviations)

4.4 Experimental tasks and procedures

4.4.1 Language background questionnaires

The Language History Questionnaire (LHQ) 3.0 (Li *et al.*, 2019) was used to gather relevant linguistic and extra-linguistic background information. The questionnaire is available in all the languages investigated in this study and can be administered online via the questionnaire website. The full version contains 27 questions, however there is the option to administer a modular version if not all questions are pertinent to the study being conducted. For this study, one question which asked whether participants had taken any internationally recognised language tests (and the scores of these) was removed as were two further, open questions asking for any additional information. A copy of the version used in this study (in English) is provided in Appendix E, with further details of the questions that were removed (online versions available at <https://lhq-blclab.org>).

The LHQ is not designed specifically for attrition studies. Therefore, to collect further background information relevant for the potential attriters (e.g., how long they have resided in the L2 country, how often/for how long they visit their home country, further questions about L1–L2 exposure and usage etc.) an additional questionnaire was created. The majority of questions therein were adapted from those of a questionnaire used for L1 German attriters in Schmid and Dusseldorp (2010). A full version of this additional questionnaire is provided in Appendix F.

4.4.2 Proficiency measure

In this study, the proficiency measure used is the LexTALE test (Lemhöfer and Broersma, 2012). A standardised version of the LexTALE test is readily available in all the languages of this study. LexTALE assesses proficiency by testing word vs. non-word recognition. Participants see a series of words (displayed one at a time) and select yes/no depending on whether they think the displayed word is a real word or not. The test is untimed, and takes around two minutes to complete. In this study the instructions used were minimally adapted from the original versions so that all participants saw the equivalent instructions for each language version. A copy of the English version of the instructions is provided in Appendix G.

The use of this test is not without its shortcomings. Firstly, the English (Lemhöfer and Broersma, 2012) and Spanish (Izura, Cuetos and Brysbaert, 2014) versions used in this study are fully validated, whilst the Dutch and German versions – though created by the original designers of the English version (Lemhöfer and Broersma) – are not yet validated. However, this is not a problem exclusive to this study, as the majority of proficiency tests that are typically employed in acquisition

and bilingualism research are not fully validated. In any case, the two non-validated versions have exactly the same design and scoring method as the original, fully validated LexTALE.⁷⁶

Secondly, LexTALE is designed for use with L2 speakers (though the Spanish LexTALE is also tested on L1 speakers as part of the validation study by Izura, Cuetos and Brysbaert, 2014). To the best of my knowledge, LexTALE has not been used previously in L1 attrition studies. Despite this, this study found no ceiling effect for any version of the task when testing attriters or the control participants in their L1, with only a very small number of participants within each group reaching ceiling.

Finally, it is important to note that Lemhöfer and Broesma (2012), who created the original English LexTALE, found the results to correlate significantly with both standardised measures of vocabulary size and to a lesser – but still significant – extent, standardised measures of general English proficiency as measured by more extensive proficiency tests. However, some subsequent studies have found only weak to moderate correlations and caution against interpreting LexTALE scores as a measure of global proficiency (see Puig-Mayenco *et al.*, 2023). Nevertheless, LexTALE scores are typically considered a sufficient proxy for general proficiency in studies such as the current one, where proficiency is not the main object of investigation and therefore more extensive proficiency tests would be too time consuming.

4.4.3 Acceptability Judgement Tasks

The main experimental component of this study consists of a number of untimed, bimodal AJTs with context. The results will be used to infer whether grammatical restructuring has obtained in the L1 grammars under investigation as well as ascertain L2 grammatical acquisition. Acceptability judgements are a standard measure for investigating linguistic competence or, as often termed in non-generative research, implicit knowledge (see Gross, 2021 for a recent overview of the use of linguistic judgements in the context of generative linguistic research and Ellis, 2005 for a discussion of judgement tasks as measures of explicit vs. implicit knowledge).⁷⁷ This extends also to L1 attrition research (see Altenberg and Vago,

⁷⁶ Note that the Spanish version contains a higher number of items than the other versions. The authors argue that this higher item number increases its reliability. In this study, the Spanish version was used with original number of test items rather than reducing it to the same number as the other versions to maintain the validity of the original version.

⁷⁷ The terms ‘acceptability (judgement)’ and ‘grammaticality (judgement)’ are used synonymously by many researchers, whilst others make a distinction between the two, or distinguish between them only in certain contexts (see Leivada and Westergaard, 2020 for a recent discussion of ‘acceptability’ vs. ‘grammaticality’).

2004 for discussion of the validity of AJTs as a measure of grammatical competence in L1 attrition).

4.4.3.1 AJT design

The two grammatical properties of each L1–L2 pair are tested with a single AJT. Three language pairs and the equivalent versions both the L1 and L2 gives six AJTs in total. All AJTs were administered online (see 4.4.4 for details). Following the instructions (see Appendix H for the instructions in English) there were six practice items (two for each tested structure and two filler items), half of which are ungrammatical.⁷⁸ Before each test item there were one or two very short contextual sentences. Though the grammaticality of the structures being tested should not, in principle, be affected by context, these sentences were included to ensure that participants are all evaluating the same meaning of the test item (Ionin and Zyzik, 2014:49). If participants were to construe different contexts for the same item this could influence their acceptability ratings. Minimising the potential for this is particularly important for attrition studies as, as noted in 1.1, attrition can be a very individualistic phenomenon that exhibits a considerable degree of intraspeaker variation, even for speakers with broadly the same linguistic background. Contextual sentences also make the whole task seem more natural and better holds the participants' attention throughout the duration of the experiment.

For each item, participants first saw a screen with only the contextual sentence(s) and a 'Play' button. They were required to click on this to play a recording of a native speaker saying the test item. As with the contextual sentences, the obligatory use of the audio as well as written versions of all test items helps keep the participants focussed. A further, very crucial, benefit of the audio is that for ungrammatical test items it is less likely that the participants will gloss over the key component of the sentence that contributes to the ungrammaticality or unconsciously correct it when reading (Schmid, 2011: 154–155). This is particularly important where the ungrammaticality may not be very salient, for example when it is determined by the presence/absence of adjectival morphology (tested in this study). Care was taken so that the test item audio sounded as natural as possible without any particular stress or intonation which could influence acceptability. Once the recording had finished, the test item along with the Likert scale buttons were revealed (as in Figure [4.1](#) below, though the dropdown list displayed in that figure would only be displayed if the

⁷⁸ Though these instructions are rather lengthy and very detailed, as all data collection took place remotely it was important that they were as explicit as possible to avoid any misunderstanding and reduce the need for participants to contact the researcher via email with their questions, which would have delayed data collection and increased the likelihood of them dropping out of the study.

Chapter 4

participant clicked to reveal it). At this point the audio could be played one more time, if desired, by clicking the 'Play' button.

Daniel suggests that you buy your friend new headphones for his birthday. You think that is a great idea. You say:

▶ Play

He always listens to music.

1 2 3 4 5 ?

Continue

Click below if you would like to see the scale descriptions again.

- ✓ 1. It sounds very unnatural. I would never say it like this. This is not a possible sentence for me
- 2. It sounds unnatural. I would probably not say it like this
- 3. It doesn't sound that natural. But I could possibly still say it like this
- 4. It sounds quite natural. I could probably say it like this
- 5. It sounds very natural. I could definitely say it like this
- ? I don't know whether I would say it like this or not. I am really not sure

Figure 4.1: Example English test item with context, response scale and scale labels on dropdown list.

Each test item is followed by a 5-point Likert scale plus an 'I don't know' option (represented by '?' on the scale). This is a key feature of the judgment scale which is often omitted from AJTs. The other key feature of the scale is a distinct mid-point (i.e., point 3 on the scale here), which is intended to represent a genuine 'grey-area' in acceptability. In instances where participants are genuinely not sure what judgment to give and the AJT does not have a distinct 'I don't know' option, they may select the mid-point or be forced to assign an acceptability rating. In AJTs without a mid-point, participants are not able to indicate genuine median acceptability. In these cases, the responses are inaccurate representations of the participants' linguistic knowledge. In attrition studies it is of paramount importance to be able to determine whether deviations from the baseline are due to genuine changes in attriters' judgements of the acceptability of the test items – which is indicative of grammatical restructuring – or deviations due to participants simply becoming less sure of their

judgments in attrition contexts. The use of an ‘I don’t know option’ enables a distinction between a genuine median acceptability and uncertainty of judgment to be made.

The wording of the Likert scale labels (and also the instructions) was chosen with care to try to elicit responses that were as true a reflection of the individual participant’s current mental grammar as possible. In particular, it was important to ensure as far as possible that attriters do not consider how their counterparts in their home country might judge these sentences, and to avoid any participants judging the sentences against prescriptivist norms. The labels were presented with their corresponding scale numbers in the instructions. If participants wished to be reminded of the labels during the test, they could click a dropdown list below the test item to reveal the labels.

4.4.3.2 Experimental conditions

All experimental items were checked by a native speaker of each language. All tasks were piloted with 4–5 L1 speakers of each language with the same background as described in 4.3.2. The pilot results for each experimental item were checked and modifications were made to a small number of test items where required. These modifications were again checked by native speakers of each language.⁷⁹

For all properties but reflexive binding in the German–English pair, the experimental conditions have a grammatical and ungrammatical version: one condition uses the L1 structure and the other uses the structure of the L2 counterpart structure (see Table 4.5 below). Where possible, comparison of these two conditions and versions is insightful for establishing the nature of any grammatical restructuring (e.g., acceptance of both conditions suggest optionality, acceptance of the L2 structure but not the L1 suggests restructuring towards the L2 grammar). As can be seen in Table 4.5, one property for which each L1 structure does not contrast directly in grammaticality with the equivalent L2 structure is grammatical gender in the German–Dutch pair. This is due to the nature of the grammatical gender systems in both languages. Attrition for this property would therefore be evidence by different patterns of AJT results to the other properties, which are outlined in 4.5.3.2. There are 26 experimental conditions in total.

Ideally the test items in the grammatical condition would be identical to those in the counterpart ungrammatical condition other than the specific grammatical contrast under investigation (e.g., the reversed order of the subject and the verb in the test items for main clause

⁷⁹ One condition for reflexive binding in the German–Dutch pair (binding with adjunct PPs) was removed after piloting as there was not a clear enough difference between the German and Dutch controls even when modifications to the original test items had been made. This was not entirely unexpected based on the theoretical literature (Hicks, 2009:231–232). This condition is not discussed further in this thesis.

Chapter 4

verb position in the German–English pair). The test items would be spread across multiple presentation lists so that participants did not see identical contextual sentences with alternative test sentence versions as this would make it very easy for them to notice the contrasting grammaticality and work out what grammatical phenomenon is under investigation, potentially affecting the reliability of the results. Multiple presentation lists were not used in the present study for two reasons: firstly, as noted, attrition is a very individualistic phenomenon, therefore it is desirable that all participants see the same test items; secondly, doing so would require an impractically large number of test items for a thesis with an experiment of this scale. Instead, the following compromise was made: grammatical/ungrammatical versions of the test sentences were made to be *minimally* different (e.g., changing the genders of the subjects, changing the time adverbials etc., depending what was appropriate for the specific property) so that the phenomenon being tested is hopefully less obvious to the participants, whilst the test item versions remain similar enough to allow a fair comparison between the two conditions. As far as was feasible, the same was also done of the contextual sentences. An example test sentence for each condition is provided in the discussion of the predictions in 4.5.

The exact number of conditions varies for each property. For all but one property, there were eight test items per condition. This one exception is the final condition of the main clause verb position property: AvP-V-S-O, which was split into four sub-conditions of five items in order to account for the difference in markedness and subsequent acceptability of the different fronted adverbial XPs (fronted adverbs vs. three type of fronted adverbial PPs). This way it could be ascertained that a rejection of a given structure in German was due to the position of the verb (due to influence from the contrasting verb position in English) rather than any difference in markedness of the fronted elements within German or between the two languages (see 3.4.2 for discussion). Five items were used rather than eight to avoid making these AJTs significantly longer than the others. For each AJT, this gave around 65 test items on average in addition to around 25 filler items consisting of one or two further grammatical properties which differ between the L1 and L2. Roughly half of the filler items in each AJT were ungrammatical. This gave 528 items in total for all six AJTs (392 test items and 136 fillers). Ideally the number of filler items would be equal to the number of test items, however it was decided that for each AJT the number of filler items would be roughly 1/3 of the number of experimental items to keep the overall number of items manageable and the length of the AJTs such that they would not overburden the participants, potentially resulting in them not completing these remotely administered tasks. In any case, the two test properties assessed within the same AJT act as fillers for each other. See Table 4.5 below for an overview of the

Chapter 4

AJTs, properties and conditions and Appendix I for a full list of test items (including filler conditions and items) organised by AJT.

Chapter 4

AJT:	Grammatical Property	Conditions and Grammaticality	Conditions and Grammaticality	Grammatical Property	AJT:		
AJT1: Reflexive Binding and Grammatical Gender (German)	Reflexive	1) <i>Sich</i> as selected PP object	1) * <i>Zich</i> as selected PP object	Reflexive	AJT4: Reflexive Binding and Grammatical Gender (Dutch)		
	Binding	2) <i>Sich selbst</i> as selected PP object	2) <i>Zichzelf</i> as selected PP object	Binding			
		3) Transitive, non-grooming, non-inherently reflexive verb with <i>Sich</i>	3) *Transitive, non-grooming, non-inherently reflexive verb with <i>Zich</i>				
		4) Transitive, non-grooming, non-inherently reflexive verb with <i>Sich selbst</i>	4) Transitive, non-grooming, non-inherently reflexive verb with <i>Zichzelf</i>				
	Grammatical Gender	1) Feminine Determiner + Feminine Noun	1) Common Determiner + Common Noun (German equivalent Feminine)	Grammatical Gender			
		2) Masculine Determiner + Masculine Noun	2) Common Determiner + Common Noun (German equivalent Masculine)				
		3) *Masculine Determiner + Feminine Noun	3) *Neuter Determiner + Common Noun (German equivalent Feminine)				
		4) *Feminine Determiner + Masculine Noun	4) *Neuter Determiner + Common Noun (German equivalent Masculine)				
	AJT2: Reflexive Binding and Main Clause Verb Position (German)	Reflexive	1) */? Picture DP	1) Picture DP		Reflexive	AJT5: Reflexive Binding and Main Clause Verb Position (English)
		Binding	2) *Embedded Picture DP	2) Embedded Picture DP		Binding	
		3) *Embedded coordinated DP	3) Embedded coordinated DP				
Main Clause		1) *S-Adv-V(-O)	1) S-Adv-V(-O)	Main Clause			
Verb Position		2) S-V-Adv(-O)	2) *S-V-Adv(-O)	Verb Position			
		3) *Adv-S-V(-O)	3) Adv-S-V(-O)				
		4) Adv-V-S(-O)	4) *Adv-V-S(-O)				
		5) (temporal) AdvPP-V-S(-O)	5) *(temporal) AdvPP-V-S(-O)				
	6) ('manner') AdvPP-V-S(-O)	6) *(('manner') AdvPP-V-S(-O)					
	7) (locative) AdvPP-V-S(-O)	7) *(locative) AdvPP-V-S(-O)					
AJT3: Predicative Adjective Gender Agreement and Negation (German)	Predicative Adjective	1) *Feminine noun: gender agreement morphology on adjective	1) Feminine noun: gender agreement morphology on adjective	Predicative Adjective	AJT6: Predicative Adjective Gender Agreement and Negation (Spanish)		
	Gender Agreement	2) *Masculine noun: gender agreement morphology on adjective	2) Masculine noun: gender agreement morphology on adjective	Gender Agreement			
		3) Feminine noun: no gender agreement morphology on adjective	3) *Feminine noun: no gender agreement morphology on adjective				
		4) Masculine noun: no gender agreement morphology on adjective	4) *Masculine noun: no gender agreement morphology on adjective				
	Negation	1) Negative Quantifier	1) *Negative Quantifier	Negation			
		2) *Negative Marker + Negative Quantifier	2) Negative Marker + Negative Quantifier				
		3) *Negative Quantifier + Negative Quantifier	3) Negative Quantifier + Negative Quantifier				
		4) Negative Marker + NPI	4) *Negative Marker + NPI				

Table 4.5: Overview of AJTs and experimental conditions. German versions on the left and the corresponding Dutch, English, and Spanish AJTs and experiment conditions on the right.

When designing the test items, it was essential to control for cross-linguistic differences other than the point of cross-linguistic difference under investigation for that particular structure. For example, it was necessary to exclude potential lexical confounds when testing grammatical gender, or the effects of stress for certain German–Dutch reflexive binding structures (further details relevant for these and other structures are provided in 4.5 when discussing the predictions for each property). That way, any deviation in the potential attriters' acceptability ratings of that structure from the baseline could be more reliably attributed solely to the cross-linguistic contrast being tested and be more reliably interpreted as restructuring of the L1 grammatical representations.

If it was not possible to control for an additional point of cross-linguistic difference then this difference was, where possible, used as a filler condition. For example, two of the German–English reflexive binding conditions test binding across subordinate clause boundaries. Subordinate clause word order also differs in German and English. If it was found that the judgments of the potential attriters differed significantly from the baseline for these two reflexive structures, it is not possible to determine whether this difference is due to attrition of binding or subordinate clause word order, or both. Therefore, subordinate clause word order was used as a filler condition. Provided no attrition is found on these filler items, then it can be concluded with relative certainty that any attrition on the reflexive binding conditions is indeed due to attrition of binding. This kind of controlling for additional cross-linguistic differences was done as far as was feasible without making the items sound unnatural in any way. The L1 and L2 versions of the AJTs were also made as equivalent as possible whilst controlling for these additional cross-linguistic contrasts. The most notable difference between the L1 and L2 versions is that the names of the people used in the test items and contextual sentences were changed in the L2 versions to make them more typically Dutch, English, or Spanish names.

A final point to note is that the test items themselves are rather simple in that they consist of only the minimum amount of information required to test the structure under investigation, whilst also ensuring the test items sounded as natural as possible yet still varied enough to reduce the chance of participants identifying the specific grammatical phenomenon being tested. This was done to more easily control for cross-linguistic differences and to minimise processing demands of the test items. Therefore, any attrition of these structures could more reliably be attributed to a change to the underlying grammatical representations of the specific structures under investigation.

4.4.4 Procedures and overview

Prior to any data collection, approval of the research design, participant recruitment, and data collection procedures was granted by the Faculty of Arts and Humanities Ethics Committee at the

University of Southampton. Proof of this approval and a subsequent amendment is attached in Appendix J.

In part due to scale of this project, which requires collection of data from participants in four different countries, but also due to restrictions on in-person data collection stemming from the Covid-19 pandemic, all data collection took place remotely online. The AJTs and LexTALE tests were created and administered using the online experiment software *Gorilla Experiment Builder* (<http://www.gorilla.sc/>) (Anwyl-Irvine *et al.*, 2019, 2021). LHQ3.0 was administered through its website (<https://lhq-blclab.org>). The additional questionnaire for the potential attriters was administered using Microsoft Forms.

Once participants had emailed the researcher/given permission to be contacted by the researcher, they were sent a participant information sheet and consent form. Upon completion of the consent form, participants were sent an email with the links to each task along with detailed instructions. They were also given an individual ID number which were required to log on to the tasks via the given links. Instructions for the AJTs and LexTALEs were provided within the online tasks themselves rather than the email. All sets of instructions prompted participants to contact the researcher if they had any questions and informed them they could resume the tasks from where they left off by using their ID number to log back in. Instructions were provided in the language in which the task was administered (for the English version of the LexTALE instructions see Appendix G and Appendix H for AJT instructions).

The tasks for each participant group and their order are given in Table 4.6 below. Tasks could be completed individually and in the participants' own time. They did not need to be completed in one session, however they were to be completed in the order presented below and each task had to be completed in one sitting once started. Participants were informed that they could take a break after each task if they wished. Each AJT took between 20–30 minutes on average to complete, each LexTALE 2 minutes, LHQ 10–15 minutes, and the additional questionnaire around 5 minutes.

German Controls		
1. AJT1 and/or AJT2 and/or AJT3 2. LexTALE (German) 3. LHQ3.0 (German)		
L1 German – L2 Dutch	L1 German – L2 English	L1 German – L2 Spanish
1. AJT4 2. LexTALE (Dutch) 3. AJT1 4. LexTALE (German) 5. LHQ3.0 (German) 6. Additional Questionnaire (German)	1. AJT5 2. LexTALE (English) 3. AJT2 4. LexTALE (German) 5. LHQ3.0 (German) 6. Additional Questionnaire (German)	1. AJT6 2. LexTALE (Spanish) 3. AJT3 4. LexTALE (German) 5. LHQ3.0 (German) 6. Additional Questionnaire (German)
Dutch Controls	English Controls	Spanish Controls
1. AJT4 2. LexTALE (Dutch) 3. LHQ3.0 (Dutch)	1. AJT5 2. LexTALE (English) 3. LHQ3.0 (English)	1. AJT6 2. LexTALE (Spanish) 3. LHQ3.0 (Spanish)
AJTs		
AJT1: Reflexive Binding and Grammatical Gender (German)		
AJT2: Reflexive Binding and Main Clause Verb Position (German)		
AJT3: Predicative Adjective Agreement and Negation (German)		
AJT4: Reflexive Binding and Grammatical Gender (Dutch)		
AJT5: Reflexive Binding and Main Clause Verb Position (English)		
AJT6: Predicative Adjective Agreement and Negation (Spanish)		

Table 4.6: Lists of tasks in order for all participant groups.

German controls completed either one, two, or three of the German AJTs. Regardless of the number of AJTs, all completed a LexTALE and LHQ. As it was felt too demanding to expect each German control participant to complete three AJTs, the vast majority were asked to complete two, with a small number electing to do a third, and a smaller number again completing only one in order to balance out the number of participants for each AJT. Participants were allocated these tasks at a ratio that ensured an equal distribution of participants for each using a branching function on *Gorilla*. The setup was such that the ordering of the AJTs was alternated between participants to try and factor out any potential task-order effects.

Participants were offered monetary compensation for their time. This amount was proportionate to the estimated total competition time of all the tasks required. The amount therefore differed depending on the participant group and, in the case of the German controls, on how many AJTs they completed. Participants were only compensated if they completed all the tasks required for their group.

As all participant recruitment and data collection took place remotely, additional measures to promote data quality were taken at all stages of this study. These measures focussed on participant profiles, attention, cheating and exclusion. These measures are outlined in Appendix A, section b).

4.5 Predictions

This section outlines how L2 acquisition and subsequent L1 attrition of each structure tested in this thesis could obtain via Feature Reassembly, based on the syntactic analyses presented in Chapter 3. It describes how grammatical attrition is predicted to manifest in the AJT results as some form of either L2 convergence or L1–L2 optionality in terms of the acceptance vs. rejection of certain experimental conditions. This discussion is divided into three subsections: one for each of the three language combinations. At the end of each language-pair subsection, the predictions regarding FR complexity for the two properties tested within that language pair are presented. These predictions are based on the hypothesis developed in this thesis which contends that the likelihood of attrition for a certain morphosyntactic structure is modulated by the complexity of the FR operations necessary for it to attrite, relative to another property. For ease, the criteria – as developed and discussed in detail in 2.4.6.3.4.1– are repeated in 4.5.1 below. 4.5.6 brings together the predictions stemming from the role of Perceptual Intake and Acquisitional Intake assumed in the model, as well as this thesis’s extended hypothesis regarding the role of FR complexity in attrition, to outline the specific within and across group predictions for this experiment.

4.5.1 Determining L1 Feature Reassembly complexity

Recall that it is posited in this thesis that more complex FR is required for the L1 grammatical structure to match the L2 structure in cases where:

- A greater number of morphosyntactic and semantic features are involved in the restructuring;
- A greater number of functional projections are involved in the restructuring;
- The FR operations consist of specifying L1 PFs with new features which are not instantiated in the L1 grammar, as opposed to reassembling or revaluing existing L1 features, or disassociating the mapping between existing features and their functional heads.

Recall also that the complexity of the FR restructuring required is argued to be compounded when the interactions between these factors are taken into account, e.g., when the restructuring involves multiple features on multiple functional projections (see 2.4.6.3.4.1 for more detail on these criteria).

4.5.2 Patterns of L2 convergence and L1–L2 optionality

For each structure tested, it is possible that grammatical attrition could manifest as L2 convergence or L1–L2 optionality. The following considerations regarding the predicted patterns of L2 convergence and L1–L2 optionality pertain to all properties tested and thus are noted here to avoid repetition in the subsequent sections, though they should be borne in mind when considering the predictions outlined therein.

Firstly, whilst the AvA model's assumption of FR as the mechanism by which grammatical attrition obtains allows it to account for both possibilities, the model does not make any claims as to whether L2 convergence or L1–L2 optionality is more likely for a given property. However, research to date appears to find optionality a far more frequent occurrence relative to L2 convergence. Accordingly, it is predicted here that optionality is more likely for each property (see 1.2.3.3 and 2.4 for further discussion of optionality vs. convergence in previous research).

At this point it should be reiterated that, at least two grammatical structures are tested for each property and in each case these different structures are underpinned by the same feature specifications (the one exception is reflexive binding in the German–English pair. See 0 for details). Any reassembly of the L1 feature specifications relevant to a given structure may therefore be expected to manifest as attrition on all the structures which are underpinned by these same feature assemblies. However, any difference in the salience, frequency, markedness etc., of these structures in either the L1 or L2 may help fortify against, or indeed facilitate, attrition of one structure over the other(s), such that attrition is seen at a group level for only some but not all of these structures, or that the same individual participant may attrite on only some but not all of these structures. Where feasible, such differences were controlled for in the design (see 4.4.3.2).

L2 convergence is evidenced by the potential attriters' L1 results not only differing significantly from the L1 control results, but crucially also by there being *no* significant difference between the potential attriters' L1 results and the L2 control results. This would confirm statistically that the L1 grammar has been restructured to the extent that it patterns with the L2 grammar. The one exception to this is grammatical gender in the German–Dutch group. Due to the specific cross-linguistic differences of this property, L2 convergence must be assessed in a different manner. This is discussed with reference to the specific experimental conditions in 4.5.3.2. In light of the discussion in the previous paragraph, L2 convergence may obtain on only some or all of the conditions for which the L1 and L2 differ in their grammaticality. These patterns may obtain for the potential attriter group as a whole, or only for individual participants within this group.

Finally, there are two patterns of results which would be evidence of optionality. Optionality could obtain across conditions i.e., it could be the case that attriters chose the L1 option for one

condition, such that their results pattern with the L1 control group, but chose the L2 option another condition, such that their results pattern with the L2 controls. Alternatively, attriters may switch between the L1 and L2 options within the same conditions, such that their average response for a given condition sits between the L1 and L2 controls and is statistically significantly different from both. The key evidence of optionality within a single condition is not the average score itself, but the individual response patterns. For example, an average score of 3.0 on the 5-point Likert scale could be caused by attriters consistently selecting the midpoint of the scale. Though this indicates a change in the degree of acceptability of this condition, consistently selecting the midpoint is not indicative of the availability of both L1 and L2 options in the grammar. Rather, within-condition optionality arises when the same attriter(s) sometimes give high ratings (4–5) and sometimes low ratings (1–2) for test items within a single condition. Either pattern of optionality may obtain for the potential attriter group as a whole, or only for individual participants within this group.

4.5.3 German – Dutch

4.5.3.1 Reflexive Binding

The feature specifications and DP structures of the German and Dutch reflexives, discussed in 3.3.1, are recapped in Table 4.7 below:

German	Dutch
<i>Sich</i> : [Var:x/y/z] + [Reflexive]	<i>Zich</i> : [Var:x/y/z] + [Reflexive]
[DP [D sich] [NP \emptyset]]	[D(P) zich]
<i>Sich selbst</i> : [Var:x/y/z] + [Reflexive]	<i>Zichzelf</i> : [Var: _]
[DP [D sich] [NP selbst]]	[DP [D zichzelf] [NP \emptyset]]

Table 4.7: Feature specifications and DP structures of German and Dutch reflexives.

The acquisition task for an L1 German speaker acquiring L2 Dutch is assumed to be as follows. For the acquisition of Dutch *zich*, the features of German *sich* are mapped to the L2 PF, *zich*, due to similarities in the function of *sich* and *zich*. It could be assumed that initially this L2 *zich* would be contained within the same type of DP structure as the L1 *sich* i.e., a complex DP structure. To successfully acquire *zich*, the learner would need to no longer project a null NP within the *zich* DP. *Zich* would therefore become a simple DP which does not constitute a PF phase in the approach of

Hicks (2009). No reassembling of the functional features themselves is required, as these are the same for both pronominal forms. The acquisition task is therefore one of mapping and subsequent modification of functional projections, if one assumes that *zich* initially starts off with the same DP structure as *sich* for L1 German learners of L2 Dutch.⁸⁰

For the acquisition of *zichzelf*, it could be assumed that the features of German *sich* are also mapped onto the L2 PF *zichzelf*. In this case, the DP structure of the two reflexives is identical, but FR is required. Namely, the valued, variable feature from *sich* must be changed to an unvalued variable feature, and the mapping between the predicate reflexivising feature transferred from *sich* disassociated from L2 *zichzelf*. Alternatively, it may be the case that German *sich selbst* is mapped to Dutch *zichzelf* due to greater functional similarity (both forms are typically used for contrastive focus) and possibly also perceptual similarity (though see Gil and Marsden, 2013 for evidence that initial mapping is based on functional rather than perceptual similarity in L2 acquisition). In this case, the FR is the same as if *sich* was mapped to *zichzelf*, though the learner would additionally have to acquire that unlike *sich selbst*, *zichzelf* cannot be decomposed further lexically. Instead, it is hosted on the D-head and selects a null NP.

In attrition contexts, there are a number of possibilities as to how the L1 German reflexive forms could be influenced by the L2 Dutch reflexives. These possibilities are considered with reference to the four experimental conditions which are recapped in Table 4.8 below, this time with an example test sentence. Note that in the example sentences here (and in the example sentences for the remaining five grammatical properties) the grammatical and ungrammatical versions of the same structure are identical other than the manipulation of the syntactic contrast under investigation. This is done here for clarity here; however, the grammatical and ungrammatical versions of the actual test items used were more varied to make the phenomena under investigation less obvious to participants (see 4.4.3.2 for detail):

⁸⁰ This remains speculative at this point as the design of the current empirical study, which tests only advanced L2 learners, is not able to ascertain this. This point is left to further L2 acquisition research.

Conditions and Grammaticality: German	Conditions and Grammaticality: Dutch
1) <i>Sich</i> as selected PP object	1) * <i>Zich</i> as selected PP object
Example: Markus denkt nur an sich.	Example: *Markus denkt alleen aan zich.
2) <i>Sich selbst</i> as selected PP object	2) <i>Zichzelf</i> as selected PP object
Example: Sie spricht selten über sich selbst.	Example: Ze praat zelden over zichzelf.
3) Transitive, non-grooming, non-inherently reflexive verb with <i>Sich</i>	3) *Transitive, non-grooming, non-inherently reflexive verb with <i>Zich</i>
Example: Er fotografiert sich.	Example: *Hij fotografeert zich.
4) Transitive, non-grooming, non-inherently reflexive verb with <i>Sich selbst</i>	4) Transitive, non-grooming, non-inherently reflexive verb with <i>Zichzelf</i>
Example: Sie fotografiert sich selbst.	Example: Ze fotografeert zichzelf.

Table 4.8: Experimental conditions for German and Dutch reflexives.⁸¹

Possibility one is that, due to functional, and in this case perhaps also perceptual, similarity between Dutch *zich* and German *sich*, *zich* may engender restructuring of *sich* but not of *sich selbst*. In this case, the feature specification of L1 German *sich* would remain the same, however the null NP would no longer be projected within its DP structure, such that *sich* becomes a simple DP as is the case with *zich* i.e., [D(P) sich]. This would result in attrition of Condition 1 and 3 only.

Possibility two is that, as the functional features and DP structure are the same for *sich* and *sich selbst* (other than that the NP position is occupied by *selbst* in *sich selbst* rather than being null as with *sich*), *zich* could additionally engender restructuring of *sich selbst*. Here, *sich selbst* could be re-analysed as one lexical unit hosted on D as part of a simple DP structure i.e., [D(P) sichselbst]. In this case, Condition 2 and 4 would also show attrition in German in addition to Condition 1 and 3, i.e., all attrition on all conditions. It is suggested that this kind of attrition of *sich selbst* due to influence from *zich*, is more unlikely. Based on greater functional, and also perceptual, similarity, it is more probable that *sich selbst* would be influenced by *zichzelf* rather than *zich* – a possibility considered below.⁸² Secondly, as noted in 3.3.1, *selbst* can be used as an intensifier independently of *sich*, and

⁸¹ For these conditions, it was important to control for the potential effect of stress. Dutch *zichzelf* and German *sich* but not Dutch *zich*, can be stressed. Thus, the distribution/acceptability of these pronouns could change depending on whether they are in a stressed position or not. This has been found in previous studies (e.g., Hendriks, Hoeks and Spenader, 2015). Following Hendriks, Hoeks and Spenader (2015), stress is controlled for in the experimental design by counterbalancing the items within each condition so that for half of the items the reflexive is in the stress-bearing sentence final position, and in half in sentence medial position. Care was taken when recording the audio for these sentences that no additional stress was put on either position. Furthermore, none of the test items were contrastive focus contexts which would have favoured the use of *zichzelf* in Dutch and possibly also *sich selbst* in German.

⁸² In terms of functional similarity, *zichzelf* is the only reflexive form used for contrastive focus in Dutch, and the only form that can be stressed. Whilst both *sich* and *sich selbst* can in principle be used for contrastive focus in German, this role is primarily reserved for *sich selbst*.

therefore can function as a type of adjunct. Thus, it is perhaps unlikely that, due to the influence of *zich*, *selbst* would be reanalysed as a single lexical unit together with *sich* and hosted on the same functional projection.

The final possibility is that *zichzelf* engenders attrition, either of *sich* or *sich selbst*, or both. All three forms are argued to have the same DP structure, however the features of *zichzelf* are different to the German reflexives. In this case then, reassembly of L1 features would be required for attrition. As noted above, *zichzelf* is arguably more likely to influence *sich selbst* than *sich* due to greater perceptual and functional similarity. However, in all the experimental conditions tested here, German *sich* and *sich selbst* as well as Dutch *zichzelf* are acceptable. Therefore, even if the German reflexive forms were to be reassembled to match the feature specifications of *zichzelf*, this L1 FR would not manifest as difference in acceptability judgments between the controls and potential attriters on any of the conditions tested in this study. This prediction therefore cannot be investigated with the current experimental design. Testing of conditions where *zich* but not *zichzelf* is possible in Dutch is needed to explore this possibly, and as such it is left for future research.

Therefore, the most likely case of attrition of German reflexives in this study would be that *sich* undergoes attrition in the form of restructuring its DP to match the DP structure of *zich* i.e., [_{DP} *sich*], whilst *sich selbst* remains unaffected. Two hypotheses as to how this attrition could obtain and be evidenced in the results of the experimental tasks are outlined below.

4.5.3.1.1 Hypothesis 1: L1 Supplanting → L2 Convergence

In the attrited grammar, German *sich*, [_{DP} [_D *sich*] [_{NP} ∅]], may be supplanted by a version of *sich* contained within a DP structure based on Dutch *zich*, i.e., by [_{DP} *sich*], such that [_{DP} *sich*] is the only form of *sich* now available in the grammar. This would lead to L2 convergence on Condition 1 and/or 3.

4.5.3.1.2 Hypothesis 2: L1 Supplementing → L1–L2 Optionality

Another possibility is that, rather than [_{DP} [_D *sich*] [_{NP} ∅]] being entirely replaced in the attrited grammar, a second copy of *sich* is added to the attrited grammar, such that the grammar contains both [_{DP} [_D *sich*] [_{NP} ∅]] and [_{DP} *sich*]. In this case, the supplementing of the L1 grammar with a phonetically identical reflexive form but with an L2 DP structure would result in some degree of optionality depending on whether the version with the L1 ([_{DP} [_D *sich*] [_{NP} ∅]]) or L2 ([_{DP} *sich*]) structure was selected from the numeration. This optionality would be evident in the results of Condition 1 and 3.

4.5.3.2 Grammatical Gender

The German and Dutch grammatical gender feature matrices, as discussed in 3.3.2, are recapped in Table 4.9 below.

German	Dutch
Gender features on <i>n</i> :	Gender features on <i>n</i> :
[Gen:Masc]	[Gen:Com]
[Gen:Fem]	[Gen:Neut]
[Gen:Neut]	

Table 4.9: Grammatical Gender features in German and Dutch.

Recall that the analysis assumed in 3.3.2 posits that nouns are not specified with a grammatical gender feature in the lexicon. Rather, grammatical gender features are a property of the category-assigning head *n*, which assigns a valued gender feature to a nominal root. Thus, the L2 acquisition task in this case does not involve an initial mapping stage between L1 and L2 lexical items which are perceived functionally equivalent/similar by the learner. Rather, an L1 German speaker learning L2 Dutch would need to acquire a different feature matrix for the *n*-head in their L2 grammar. As both the German and Dutch feature matrices contain a neuter gender value (see 3.3.2 for more detail on this assumption), no FR is required for L2 acquisition of neuter, and therefore no grammatical attrition of neuter is possible.⁸³ However, it is in principle possible that in an attrited L1 German grammar the masculine and feminine gender values may undergo attrition due to influence from the common gender value in Dutch. Two hypotheses as to how this grammatical attrition would obtain and be evidenced in the results of the experimental tasks are outlined below. The experimental conditions are repeated in Table 4.10. Recall that grammatical gender is tested through agreement between a noun and other elements: in this study these elements are singular, nominative, definite articles.

⁸³ To be clear, lexical attrition would in principle still be possible e.g., for a German masculine word whose Dutch equivalent is neuter, this individual German lexical item may be assigned neuter based on the gender of the Dutch equivalent. However, this would be a lexical change and not the result of a systematic change in the grammatical gender system stemming from a restructuring of the gender features themselves.

Conditions and Grammaticality: German	Conditions and Grammaticality: Dutch
1) Feminine Determiner + Feminine Noun	1) Common Determiner + Common Noun (German equivalent Feminine)
Example: Die kleine Pizza war viel zu teuer.	Example: De kleine pizza was veel te duur.
2) Masculine Determiner + Masculine Noun	2) Common Determiner + Common Noun (German equivalent Masculine)
Example: Der alte Kaffee war besser.	Example: De oude koffie was beter.
3) *Masculine Determiner + Feminine Noun	3) *Neuter Determiner + Common Noun (German equivalent Feminine)
Example: *Der große Pizza ist völlig verbrannt.	Example: *Het grote pizza is volledig verbrand.
4) *Feminine Determiner + Masculine Noun	4) *Neuter Determiner + Common Noun (German equivalent Masculine)
Example: *Die neue Kaffee hier ist wirklich gut.	Example: *Het nieuwe koffie is hier echt goed.

Table 4.10: Experimental conditions for German and Dutch Grammatical Gender.⁸⁴

4.5.3.2.1 Hypothesis 1: L1 Supplanting → L2 Convergence

In the attrited German grammar, the gender features on *n* could be restructured to match the gender matrix of Dutch *n*. Specifically, the [Gen:masc] and [Gen:fem] features could be fused into [Gen:com], such that the gender system is now a dual-gender system comprising only common and neuter. Although the gender matrix could be restructured in this manner, which leads to the creation of a new gender feature – or more specifically gender value – and loss of the masculine and feminine values, this change is not expected to lead to the creation of new exponents for the common value in

⁸⁴ A number of steps were taken in the experiment design to ensure, as far as possible, that any apparent attrition of gender is the result of grammatical restructuring (i.e., changes to the grammatical gender feature matrix on *n*) rather than the result of L1-L2 lexical differences (e.g., a masculine German noun being assigned neuter in the attrited grammar as the Dutch equivalent is neuter). To factor out lexical confounds, all nouns used in this study have congruent gender i.e., they are masculine or feminine in German, and common gender in Dutch. In each of the test items there is an intervening adjective between the determiner and the noun. This is to prevent participants using memorised determiner–noun chunks, which again helps ensure that any attrition is the result of a structural change to the gender system rather than lexical attrition. Though attributive adjectives in both languages do inflect for gender, the morphological inflection is the same for each gender following singular, nominative, definite articles (the ending is always *-e* in both German and Dutch for all genders). Thus, the presence of the adjective does not interfere with the gender agreement. Changes to gender in the attrited grammar could also plausibly stem from another source: modifications to noun-internal morphophonological gender assignment cues (i.e., the association of certain morphological endings on nominals with certain genders). Such assignment cues have been found vulnerable to attrition/incomplete acquisition in Heritage grammars. For example, Polinsky (2008) finds heritage Russian speakers in the USA significantly overgeneralise these cues (in these Heritage grammars all nouns ending *-a* are assigned masculine, for example). There are arguably two contexts in which changes to L1 morphophonological assignment cues could be induced in adult grammars: i) the L2 has salient and reliable morphophonological gender cues which differ from those of L1 (the L1 cues may be reliable or not), or ii) the L1 has reliable morphophonological assignment cues which could become less reliable due to the L2 having less reliable/no assignment cues. Neither are the case for L1 German–L2 Dutch: German and, in particular, Dutch, have very few consistent morphophonological gender cues (Kupisch *et al.*, 2022). In any case, the nominals tested in this study have a range of morphological endings. Therefore, if attrition is found across the different endings, this is further evidence that the gender feature matrices, rather than assignment cues, have been modified.

the attrited grammar. Rather, a definite article bearing [Gen:_] which is valued by a noun bearing [Gen:com], will still be expounded as an existing masculine or feminine definite article PF, i.e., either as *der* or *die*, or even both. There are arguably three possibilities as to how [Gen:com] on a definite article could be expounded in the attrited grammar. These three possibilities are elaborated further below (in an unattrited grammar, *der* is the masculine, singular, nominative definite article and *die* is the feminine).

Possibility one is that *der* is used as the definite article exponent of [Gen:com] (i.e., *der* agrees with all nouns that were previously assigned either [Gen:masc] or [Gen:fem] but are now assigned [Gen:com]). Therefore, a reduction in number of gender features on *n* results in an erosion of gender distinctions. This is essentially the change that the Norwegian grammatical gender system is currently undergoing (see Lohndal and Westergaard, 2021 for an overview and Lohndal and Putnam, 2021 for details of a proposed syntactic analysis). In the current study this would be reflected by attriters accepting Condition 2 and 3, which use *der*, but not Condition 1 and 4, which use *die*. As Condition 2 uses *der* with what would be masculine nouns in an unattrited grammar, and is therefore acceptable in an unattrited grammar, the crucial evidence of this kind of restructuring in an attrited grammar is the acceptance also of Condition 3 – use of *der* with what would be feminine nouns but are assigned [Gen:com] in the attrited grammar. If the common gender value has supplanted the masculine and feminine values on *n*, and [Gen:com] is expounded as *der*, this condition should be acceptable. Specifically, this would be indicated by a significantly higher acceptability score for the attriter group compared to the control group on this condition.

Possibility two is the opposite: *die* could instead be used as the definite article exponent of [Gen:com]. This would manifest as the reverse pattern of acceptance i.e., acceptance of both Condition 1 and 4 but not 2 and 3. The key support for this kind of restructuring would be a significantly higher acceptance of Condition 4 (i.e., use of *die* with what would be masculine nouns but are assigned [Gen:com] in the attrited grammar) by the attriter group compared to the German control group. Possibility three is that both *der* and *die* can be used alternatively as exponents of [Gen:com]. This could manifest in all conditions being acceptable. Crucially, both Condition 3 and 4 would be significantly more acceptable for the attriter group compared to the control group.

Investigating whether the attrited grammar now converges on L2 patterns is less straightforward for this property than the others due to the nature of the L1–L2 grammatical gender systems. Strictly speaking, the nearest L2 equivalents of the German Condition 3 and 4, are Dutch Condition 1 and 2 respectively. These conditions use the equivalent Dutch nouns, which are congruent in gender in so far as they are masculine or feminine in German and common gender in Dutch. Therefore, the potential attriters' L1 results for Condition 3 could be compared to the Dutch controls' results for Condition 1 and attriters' Condition 4 results to Dutch controls' Condition 2

results. Lack of significant differences between the two groups' results on these contrasts would suggest replacement of [Gen:masc] and [Gen:fem] with [Gen:com] in the attrited German grammar. Whether this is the case for one or both conditions would depend on whether *der* or *die* or both were used as the exponent of [Gen:com], as described previously.

Alternative comparisons would be that of the potential attriters' results on Condition 1 vs. their results on Condition 4 and on Condition 2 vs. Condition 3. No difference between their results on these conditions would likewise suggest the same restructuring as described above. These comparisons are perhaps more valid again in that they compare the same participants on different conditions, rather than two different groups of participants, thus automatically factor out additional sources of potential between-group variation.

4.5.3.2.2 Hypothesis 2: L1 Supplementing → L1–L2 Optionality

The second way in which the grammatical gender system may possibly be restructured is that in the attrited German grammar the masculine and feminine values are maintained, however a common gender value is also added, such that the gender feature matrix on *n* now contains [Gen:masc], [Gen:fem], and [Gen:com]. If this kind of restructuring were to obtain, it seems most likely that [Gen:masc] and [Gen:fem] would still be assigned to the same roots they would be in an unattrited grammar. Likewise, in terms of exponents, it seems most likely that when *n* assigns [Gen:masc], *der* would be the only possible definite article exponent, and when *n* assigns [Gen:fem], *die* would be the only possible definite article exponent. This would result in the same pattern of acceptability as in the table above: Condition 1 and 2 acceptable, but not the mismatched Condition 3 and 4. However, if these same roots could sometimes be assigned [Gen:com] instead, optionality is possible. There are three different possible patterns of optionality depending on whether *der*, *die* or both are used as exponents of [Gen:com]:

- i. [Gen:masc] (*der*) + [Gen:fem] (*die*) + [Gen:com] (*der*). In this case, Condition 1 would exhibit optionality as *die* is only an exponent when [Gen:fem], but not [Gen:com], is assigned to these nominal roots. Condition 2 would be acceptable with no optionality as regardless of whether [Gen:masc] or [Gen:com] is assigned to these roots, *der* is the definite article exponent. Condition 3 would exhibit optionality as *der* is an exponent with [Gen:com] but not [Gen:fem]. Condition 4 would be unacceptable with no optionality as *die* is not a possible exponent when either [Gen:masc] or [Gen:com] is assigned to these roots.
- ii. [Gen:masc] (*der*) + [Gen:fem] (*die*) + [Gen:com] (*die*). In this case, Condition 1 would be acceptable with no optionality as regardless of whether [Gen:fem] or [Gen:com] is assigned to these nominal roots, *die* is the definite article exponent. Condition 2 would exhibit optionality as *der* is only an exponent when [Gen:masc], but not [Gen:com], is assigned to these roots. Condition 3 would be unacceptable with no optionality as *der* is not a possible

exponent when either [Gen:fem] or [Gen:com] is assigned to these roots. Condition 4 would exhibit optionality as *die* is an exponent with [Gen:com] but not [Gen:masc].

- iii. [Gen:masc] (*der*) + [Gen:fem] (*die*) + [Gen:com] (*der* or *die*). In this case, Condition 1 would be acceptable with no optionality as regardless of whether [Gen:fem] or [Gen:com] is assigned to these nominal roots, *die* is a possible definite article exponent. Likewise, Condition 2 would be acceptable with no optionality as regardless of whether [Gen:masc] or [Gen:com] is assigned to these nominal roots, *der* is a *possible* definite article exponent. Condition 3 would exhibit optionality as *der* is an exponent with [Gen:com] but not [Gen:fem]. Condition 4 would exhibit optionality as *die* is an exponent with [Gen:com] but not [Gen:masc]. None of the conditions would be unacceptable with no optionality as *der* and *die* are both possible exponents with [Gen:com], which can be assigned to any nominal root tested in these conditions.

4.5.3.3 Relative FR Complexity

Considering the L1 FR operations required for reflexive binding and grammatical gender to attrite in light of the criteria for establishing L1 FR complexity proposed in this thesis (see 4.5.1), it is argued that grammatical gender requires more complex L1 feature assembly to attrite compared to reflexive binding. Therefore, attrition of reflexive binding is more likely.

Attrition of German grammatical gender under the influence of L2 Dutch minimally requires that a new feature, [Gen:com], be added to the L1 grammar (specifically to the categoriser *n*). In the case of supplanting/L2 convergence, the existing grammatical gender features, [Gen:masc] and [Gen:fem], would be disassociated from the categoriser *n*, such that these features cannot be assigned to any nominal roots, and are therefore effectively removed from the L1 grammar entirely. On the other hand, attrition of reflexive binding as tested here i.e., attrition of *sich* due to influence from Dutch *zich*, requires that the DP structure German *sich* is simplified such that a null NP is no longer projected ($[_{DP} [D \text{ sich}] [_{NP} \emptyset]] \rightarrow [_{D(P)} \text{ sich}]$). This modification to the L1 grammar therefore does not involve changes to the features themselves, but only one change to one of the functional projections of the anaphor. Though less likely, it was also argued that attrition of *sich selbst* due to influence from Dutch *zich* could also occur. In this case, the change to the functional projections would be the same as for *sich*, however it would also require that *sich selbst* is reanalysed as one lexical unit hosted on the D-head ($[_{DP} [D \text{ sich}] [_{NP} \text{ selbst}]] \rightarrow [_{D(P)} \text{ sich selbst}]$).⁸⁵

⁸⁵ Note that if this study also used experimental conditions in which Dutch *zichzelf* was predicted to engender attrition in the L1 grammar, then the predictions regarding the complexity of feature reassembly would be reversed: Feature reassembly of the German reflexives to match Dutch *zichzelf*, would require both revaluing of an existing L1 feature ($[_{Var:x/y/z}] \rightarrow [_{Var:}]$) and disassociating the mapping between an existing feature and PF (dissociating the mapping between [Reflexive] and *sich* or *sich selbst*). According to the criteria, these two operations render the FR required for attrition of reflexives more complex than the FR required for attrition of grammatical gender. As such attrition is not predicted in the experimental conditions tested here (or at least not detectable in the L1), it is assumed in this study that attrition of grammatical gender requires more complex FR to attrite compared to attrition of reflexive binding.

4.5.4 German – English

4.5.4.1 Reflexive Binding

The feature specifications of these German and English reflexives discussed in 0 are repeated in Table 4.11 below:

German	English
<i>Sich</i> : [Var:x/y/z] + [Reflexive]	<i>Him/herself (reflexive)</i> : [Var:_]
	<i>Him/herself (logophor)</i> : [Var:x/y/z]

Table 4.11: Feature specifications of German and English reflexives.

Recall that English is argued to have two types of reflexive anaphor forms. The first is an archetypal reflexive which is specified with [Var:_] and has a local binding domain. The second has an identical PF but is specified with a valued variable feature e.g., [Var:x/y/z]. This is essentially a pronoun in that it has the same binding domain as a pronoun, but with the PF of a reflexive (referred to here as a logophor). L2 acquisition of the English ‘true’ reflexive from requires initial mapping of the German reflexive features onto the English reflexive PF, followed by a revaluing of the variable feature from valued to unvalued, and disassociating of the mapping between the reflexivising feature, [Reflexive], transferred from *sich*, and this PF. Acquisition of the English logophor requires mapping of the German reflexive features onto the English PF and disassociating the mapping between the reflexivising feature and this PF.⁸⁶ Two hypotheses as to how grammatical attrition could obtain in the attrited grammar and be evidenced in the results of the experimental tasks are outlined below. The experimental conditions are recapped in Table 4.12.

⁸⁶ To be clear, the German reflexive is argued to have the same DP structure as assumed for the English (‘true’) reflexive in Hicks (2009) i.e., ((DP [D *sich*] [NP \emptyset]) and [DP [D *himself*] [NP \emptyset]]). Thus, no modifications to the DP structure are required for acquisition or attrition here. Hicks (2009) is not explicit about whether the DP structure of logophors is the same as for true reflexives or is a bare D-head. For simplicity it is assumed here that the true reflexives and logophors have the same DP structure, though assuming a complex D-head would not change the predictions regarding the relative complexity of FR required for the attrition of reflexive binding vs. main clause verb position (see 4.5.4.3).

Conditions and Grammaticality: German	Conditions and Grammaticality: English
1) */[?] Picture DP	1) Picture DP
Example: */ [?] Ich zeige ihm ein Foto von sich.	Example: I am showing him a photo of himself.
2) *Embedded Picture DP	2) Embedded Picture DP
Example: *Er will wissen, welche Fotos von sich veröffentlicht wurden.	Example: He wants to know which photos of himself were published.
3) *Embedded coordinated DP	3) Embedded coordinated DP
Example: *Max ist überrascht, dass ich Lea und sich in die Kneipe eingeladen habe.	Example: Max is surprised that I invited Amy and himself to the pub.

Table 4.12: Experimental conditions for German and English reflexives.

4.5.4.1.1 Hypothesis 1: L1 Supplanting → L2 Convergence

L2 convergence on Condition 1 would require the variable feature of the reflexive to be revalued so that it enters the derivation unvalued, and the mapping between the reflexivising feature and the reflexive disassociated. The German reflexive would therefore match the English ‘true’ reflexive form. Convergence on Condition 2 and 3 would require that the German reflexive form loses the mapping with the reflexivising feature. For the attrited grammar to exhibit both attrition of Condition 1, on one hand, and Condition 2 and 3 on the other, the attrited grammar would need to contain two copies of the reflexive PF, one specified with the English true reflexive features and the other with the English logophor features.

4.5.4.1.2 Hypothesis 2: L1 Supplementing → L1–L2 Optionality

It is also possible that the attrited grammar would exhibit optionality. For optionality of Condition 1, the attrited grammar would need to contain two copies of the German reflexive PF, one specified with the German features ([Var:x/y/z] + [Reflexive]) and one with the English reflexive features ([Var: _]). For optionality on Condition 2 and 3, the attrited grammar would again need to contain two copies of the German reflexive PF, this time one specified with the German features ([Var:x/y/z] + [Reflexive]) and one with the English logophor features ([Var:x/y/z]). As discussed in 0, there is a degree – in some cases an unexpected and considerable degree – of individual variation in some of the control group results for certain conditions. This variation is taken into account when analysing both the group and individual-level results in 5.3 and 5.5.2.1 respectively.

4.5.4.2 Main Clause Verb Position

The feature specifications relevant for German and English main clause verb position, as discussed in 3.4.2, are recapped in Table 4.13 below:

German	English
[Clause-type:Decl] on C strong.	[Clause-type:Decl] on C weak.
[<i>u</i> Top] on spec CP strong.	[<i>u</i> Top] on spec CP optionally strong.
[u infl:present] valued as strong on all verbs	[u infl:present] valued as strong on auxiliary verbs but weak on lexical verbs

Table 4.13: Feature specifications underlying German and English main clause verb positions.

Acquisition of English main clause verb position by an L1 German speaker would require the [Clause-type:Decl] feature on C to be revalued as weak, the [*u*Top] feature on spec CP to be revalued as optionally strong, and for to [~~u~~infl:present] now be valued (by [Tense:present] on T) as weak on lexical verbs. Two hypotheses as to how grammatical attrition could obtain in the attrited grammar and be evidenced in the results of the experimental tasks are outlined below. The experimental conditions are repeated in Table 4.14.

German	English
1) *S-Adv-V(-O) Example: *Er oft trinkt zu viel Bier.	1) S-Adv-V(-O) Example: He often drinks too much beer.
2) S-V-Adv(-O) Example: Ich trinke meistens Bier.	2) *S-V-Adv(-O) Example: *I drink usually beer.
3) *Adv-S-V(-O) Example: *Oft er läuft am Morgen.	3) Adv-S-V(-O) Example: He often runs in the morning.
4) Adv-V-S(-O) Example: Ab und zu laufen wir zusammen.	4) *Adv-V-S(-O) Example: *Occasionally run we together.
5) (temporal) AdvPP-V-S(-O) Example: Freitags arbeite ich bis 4 Uhr.	5) *(temporal) AdvPP-V-S(-O) Example: *On Fridays work I until 4 o'clock.
6) ('manner') AdvPP-V-S(-O) Example: Mit dem Flugzeug verreise ich gern.	6) *('manner') AdvPP-V-S(-O) Example: *By plane, like I to travel.
7) (locative) AdvPP-V-S(-O) Example: Im Kaufhaus gibt er zu viel Geld aus.	7) *(locative) AdvPP-V-S(-O) Example: *In the department store spends he too much money.

Table 4.14: Experimental conditions for German and English Main Clause Verb Positions.

4.5.4.2.1 Hypothesis 1: L1 Supplanting → L2 Convergence

For L2 convergence on any of the seven conditions, the three features relevant to main clause verb position may be revalued to match the corresponding English values: [Clause-type:Decl] on C would be revalued as weak, the [*u*Top] on spec CP would be revalued as optionally strong, and [~~u~~Inf:present] would now be valued (by [Tense:present] on T) as weak on lexical verbs.

4.5.4.2.2 Hypothesis 2: L1 Supplementing → L1–L2 Optionality

A second possibility would be for the attrited L1 grammar to now contain two copies of the functional head C. On one copy, [Clause-type:Decl] would be strong, as in German, and on the other it would be weak, as in English. Likewise, in the attrited grammar two different versions of spec CP could be projected. One copy would bear [*u*Top] with the strong, German value, and on the other copy [*u*Top] would be optionally strong, as in English. Finally, [Tense:present] would value the [~~u~~Inf:present] on lexical verbs as *either* strong or weak. When all three features have the German values, the German word order arises, when all have the English values, the English word order arises, giving rise to optionality.

4.5.4.3 Relative FR Complexity

Attrition of main clause verb position on any of the experimental conditions tested here requires that three features associated with two different functional projections would need to be revalued: [Clause-type:Decl] on C revalued as weak, the [ν Top] on spec CP revalued as optionally strong, and [ν infl:present] would need to be valued as weak on lexical verbs. Attrition of German reflexives on Condition 1 (under the influence of English true reflexives) requires the revaluing of only one feature, the variable feature, and that the mapping with an existing feature, [Reflexive], is lost. Attrition of Condition 2 and 3 (under the influence of English logophors) requires only that the mapping between the German reflexive and the [Reflexive] feature is lost. When considered in light of the criteria for L1 FR complexity established in this thesis, both possible instances of reflexive binding attrition can be considered less complex and therefore more likely to attrite than main clause verb position.

4.5.5 German – Spanish

4.5.5.1 Predicative Adjective Gender Agreement

The feature specifications relevant for German and Spanish predicative adjective gender agreement, as discussed in 3.5.1, are recapped in Table 4.15 below:

German	Spanish
[Gen:_] specified on Agr-node.	[Gen:_] specified on α -head. No Agr-node.

Table 4.15: Feature specifications and structures underlying gender agreement on German and Spanish predicative adjectives.

Recall that the analysis proposed in 3.5.1 argues for a different agreement mechanism for predicative adjectives in German vs. Spanish. As a consequence of these different agreement mechanisms, [Gen:_] is argued specified on the α -head in Spanish but on a post-syntactically inserted Agr-node in German. Thus, to acquire predicative adjective agreement in their L2 grammar, L1 German speakers need to specify [Gen:_] on the α -head, and not insert an Agr-node post-syntactically.

Two hypotheses as to how grammatical attrition could obtain in the attrited grammar and be evidenced in the results of the experimental tasks are outlined below. The experimental conditions are recapped in Table 4.16.

German	Spanish
1) *Feminine noun: gender agreement morphology on adjective Example: *Diese Antwort ist total falsche.	1) Feminine noun: gender agreement morphology on adjective Example: Esta respuesta es completamente incorrecta.
2) *Masculine noun: gender agreement morphology on adjective Example: *Der Kaffee hier ist wirklich gute.	2) Masculine noun: gender agreement morphology on adjective Example: El café aquí es muy bueno.
3) Feminine noun: no gender agreement morphology on adjective Example: Diese Antwort hier ist richtig.	3) *Feminine noun: no gender agreement morphology on adjective Example: *Esta respuesta aquí es correct.
4) Masculine noun: no gender agreement morphology on adjective Example: Der Kaffee hier ist ganz schlecht.	4) *Masculine noun: no gender agreement morphology on adjective Example: *El café aquí está bastante mal.

Table 4.16: Experimental conditions for German and Spanish predicative adjective gender agreement.⁸⁷

4.5.5.1.1 Hypothesis 1: L1 Supplanting → L2 Convergence

In an attrited German grammar, predicative adjective agreement could obtain in the same manner as it does in Spanish. Rather than [Gen:_] being specified on Agr-node and valued post syntactically

⁸⁷ A few remarks about the test items are warranted here. Firstly, in order to keep the AJTs a reasonable length, only masculine and feminine nouns are tested, though attrition would also be predicted for neuter nouns based on the adopted syntactic analysis (see 3.5.1). Secondly, all nouns used have congruent gender in both languages to try and factor out any potential lexical effects. Thirdly, for the German versions of Condition 1 and 2, which are ungrammatical, the illicit adjectival morphology used is that which would be required if the adjective was in attributive position – the logic being that Spanish uses the same agreement morphology in both attributive and predicative positions. Acceptance of such morphology in German is indicative that predicative adjectives are subject to the same agreement mechanism as for Spanish adjectives. On this note, only adjectives which have a distinct morphological masculine and feminine form in both German and Spanish were used in the test items. Finally, it is worth noting here the potential influence of one variety of German and one variety of Spanish on the judgement of these structures. In the dialect of German spoken in Berlin, an additional -e can be added to stressed words. In Condition 1 and 2, acceptance of the German structures with this additional -e is interpreted as attrition. Thus, if an L1 German expat in Spain who was also a speaker of the Berlin dialect accepted these conditions on the German AJT, this could not reliably be attributed to influence from L2 Spanish. Test item audio was recorded in a neutral, north German accent and the adjectives were never stressed; however, to avoid any potential confusion here, the intention was to exclude the results of any German controls and potential attriters in Spain who are speakers of the Berlin dialect. As it happened, none of the Germans in Spain, nor German controls who completed this AJT, reported speaking the Berlin dialect (similar phonological effects may be present in other varieties of German, however none of the participants, control or otherwise, made any comments to this effect). On the Spanish side, three of the German–Spanish bilinguals are resident on the Canary isles. One of these participants reported to be a speaker of the local dialect and informed the researcher that in this variety of Spanish, word-final vowels are often reduced or elided completely. As this is the dominant variety of Spanish they are exposed to, this may result in them rating Condition 3 and 4 in Spanish acceptable and possibly also Condition 1 and 2 less acceptable (though the test item audio was recorded by a speaker from Madrid, which should mitigate against this possible dialectal influence). This may subsequently lead to different L1 attrition patterns compared to L2 speakers of only standard Spanish (e.g., no attrition of Condition 3 and 4 as these would be acceptable in both the L1 and L2 variety, or even no attrition of Condition 1 and 2 if they rate these conditions less acceptable in Spanish). Manual inspection of the results of all three Canary Isles residents did not reveal any such influence of the local variety on their L2 judgements, which were not out line with the other potential attriters' L2 results. It was therefore decided to keep these three participants. Ultimately, these participants' L1 judgements for adjective agreement did not show any L2 influence at all.

[Gen:_] would be specified on the α -head. Consequently, predicative adjective gender agreement would be obligatory. As the restructuring pertains to the location of the gender feature, rather than the value of the gender feature, the same pattern is expected to hold for both genders (i.e., if there is L2 convergence for Condition 1, the same is expected for Condition 2 and if there is L2 convergence for Condition 3 this is also expected for Condition 4.

4.5.5.1.2 Hypothesis 2: L1 Supplementing → L1–L2 Optionality

Alternatively, in the attrited grammar predicative adjective agreement may obtain by either the German or the Spanish agreement mechanism, resulting in optionality. When the Spanish agreement mechanism is used, [Gen:_] is specified on the α -head and gender agreement is obligatory. In this case no Agr-node is projected. When the German agreement mechanism is used, [Gen:_] is specified on an Agr-node (attached to the α -head). This agreement results in the bare, uninflected adjectival form being used.

4.5.5.2 Negation

The feature specifications relevant for negation in German and Spanish, as discussed in 3.5.2, are recapped in Table 4.17 below:

German	Spanish
Negative marker: [<i>i</i> Neg].	Negative marker: [<i>i</i> Neg].
N-words (NQs): [<i>i</i> Neg].	N-words (NICs): [<i>u</i> Neg].
No NegP projection.	NegP projection which hosts the negative operator bearing [<i>i</i> Neg]

Table 4.17: Feature specifications underlying negation in German and Spanish.

The L2 acquisition task for an L1 German speaker learning Spanish is to map the feature specifications of the German negative marker (*nein*) to the Spanish negative marker (*no*), and of German n-words (in this study, the negative quantifiers *niemand* and *nichts*) to the Spanish n-words (in this study, the negative concord items *nadie* and *nada*). In the case of the negative marker, the feature specification is the same. Acquisition of negative concord items requires that the negation feature be revalued from interpretable to uninterpretable in the L2 Spanish grammar. Additionally, the learners need to project a new functional projection (NegP) which is not projected in the L1, on

which the negative operator – either the negative marker or a null negative operator – bearing [*i*Neg] is to be hosted.⁸⁸

Two hypotheses as to how grammatical attrition could obtain in the attrited grammar and be evidenced in the results of the experimental tasks are outlined below. The experimental conditions are recapped in Table 4.18.

German	Spanish
1) Negative Quantifier Example: Wir wissen nichts davon.	1) *Negative Quantifier Example: *Sabemos nada al respecto.
2) *Negative Marker + Negative Quantifier Example: *Ich weiß nicht nichts davon.	2) Negative Marker + Negative Quantifier Example: No sé nada al respecto.
3) *Negative Quantifier + Negative Quantifier Example: *Niemand weiß nichts davon.	3) Negative Quantifier + Negative Quantifier Example: Nadie sabe nada al respecto.
4) Negative Marker + NPI Example: Niemand weiß etwas davon.	4) *Negative Marker + NPI Example: *Nadie sabe algo al respecto.

Table 4.18: Experimental conditions for German and Spanish negation.

4.5.5.2.1 Hypothesis 1: L1 Supplanting → L2 Convergence

As the feature specification of the negative marker is the same in both languages, no L1 reassembly is possible here. However, in an attrited German grammar the negation feature of n-words could be revalued from interpretable to uninterpretable in line with the Spanish grammar and a NegP projected on which the negative operator bearing [*i*Neg] would be hosted. In this case, the attrited German attrited grammar would be that of a non-strict negative concord language like Spanish.

⁸⁸ For the German–Spanish bilingual group, there was the additional stipulation that the potential attriters could not be speakers of Bavarian German (see 4.3.1 for participant profiles). This is as Bavarian is a negative concord variety like Spanish (though with some differences – see Zeijlstra, 2004:147 and 149 for a typological overview of negation). If Bavarian speakers showed acceptance of negative concord structures in the German experimental tasks i.e., acceptance of Condition 2 and 3, this could not be reliably attributed to influence from their L2 Spanish. One potential attriter in this group reported to be a Bavarian speaker. They are therefore excluded from the analysis of the negation data but retained for the analysis of the predicative adjective agreement.

4.5.5.2 Hypothesis 2: L1 Supplementing → L1–L2 Optionality

A second possibility is that the attrited L1 grammar now contains duplicate copies of the n-words *niemand* and *nichts*, with one set being specified with interpretable negation features (as in German) and the other being specified with uninterpretable negation features (as in Spanish). When an n-word bearing an interpretable negation feature is selected, negation obtains by means of semantic negation as in an unattrited German grammar. Under the adopted syntactic analysis, when an n-word bearing an uninterpretable negation feature is selected, this triggers the projection of NegP.

4.5.5.3 Relative FR Complexity

It is argued that based on the criteria for L1 FR complexity in 4.5.1, more complex L1 FR would be required for negation to attrite compared to predicative adjective gender agreement, and therefore predicative adjective gender agreement is more likely to undergo attrition. Attrition of German negation requires that the negation feature be revalued from interpretable to uninterpretable, and that a new functional projection, NegP, is projected in the attrited grammar. Attrition of predicative adjective gender agreement on the other hand, requires only specifying the existing gender feature on a different projection (the *a*-head as opposed to an Agr-node). Though this entails changing the agreement mechanism, the FR itself is very simple.

4.5.6 Perceptual Intake, Acquisitional Intake, and FR Complexity: bringing it all together

This section brings together the predictions arising from the role of Perceptual Intake and Acquisitional Intake within the model's architecture, as well as the hypothesis regarding the role of FR complexity, and applies them to the experimental design in order to outline in more detail predictions for attrition both between the different grammatical properties and across the different language combinations tested.

Recall that the architecture of the AvA model is such that it requires both Perceptual and Acquisitional Intake to be generated from the input in order for L2 acquisition and, subsequently, L1 attrition to be possible. It is assumed that the potential attriters in this study, who have lived in their respective L2 countries for a minimum of 15 years and are, based on the results from the background questionnaires and proficiency measure, proficient L2 speakers, can all generate Perceptual Intake from the L2 input (i.e., they can assign phonetic, phonological, semantic, and grammatical representations to this input). Recall that the architecture of the AvA model is such that grammatical attrition is predicted to be in principle possible only for L1 structures with L2 equivalent forms which differ to some degree in their behaviour due to differences in their feature specifications. All six morphosyntactic properties tested in this study are such properties and are thus candidates for grammatical attrition. Based on the linguistic profiles of these participants, it can likewise be assumed that they have been able to generate Acquisitional Intake required for the L2 acquisition of

each structure (though this will be confirmed experimentally by their L2 task results). It is then in principle possible that this Acquisitional Intake has led to grammatical restructuring in the L1 grammars of these participants.

Considering the role of Perceptual Intake in attrition further, it can be predicted that attrition is facilitated in cases where the L2 input is holistically more similar to the L1. Perceptual Intake is easier to generate from such input as perceptual encoding and also parsing for comprehension is facilitated by the higher degree of phonological, lexical, and structural overlap, leading to more complete representations on all levels (see 2.4.6.3.2 for discussion). Applying this to the current experiment yields the prediction that attrition is more likely to obtain in the German–Dutch pair relative to the German–English pair, and is least likely in the German–Spain pair, such that a continuum emerges for the language pairs tested here. To be concrete, this prediction could be confirmed by the finding of attrition for both properties in the German–Dutch group and no attrition on either condition in the German–Spanish group, with possible attrition in the German–English group.

As highlighted in 2.4.6.3.4, the AvA model, in its current form, does not make explicit predictions regarding the likelihood of attrition for different grammatical structures within a given language pair (beyond the aforementioned pre-requisite that there must be a difference in the corresponding L1–L2 feature assemblies). In the current study, more fine-grained predictions are based on the hypothesis developed in 2.4.6.3.4 that the complexity of L1 FR required for a given L1 structure to match the corresponding L2 structure (essentially structural overlap formalised in terms of FR), may play a determinate role in facilitating attrition. 4.5.1 outlined how – assuming the theoretical analyses presented in Chapter 3 and applying to them the criteria for determining FR complexity in attrition as developed in 2.4.6.3.4.1 – in each language pair one property requires less complex L1 FR to attrite and is therefore more likely to attrite, relative to the other property in the same language pair which requires more complex FR to attrite. Again, to be concrete, this prediction would be confirmed by attrition of property a) but not property b) within each of the three language pairs.

A pertinent question at this point pertains to the relative significance of the roles of Perceptual Intake and FR complexity in determining attrition across and within different language pairs in a design such as this one. If Perceptual Intake plays a greater role than FR complexity, it would be predicted that attrition is more likely in holistically more similar language pairs regardless of the complexity of FR required for any of the specific structures to attrite (i.e., both properties a) and b) in the German–Dutch group are more likely to attrite than both a) and b) in the German–English group etc). If FR complexity plays a more significant role, attrition is more likely for structure which require less complex FR to attrite in each language pair regardless of the holistic similarity of

this language pair (i.e., attrite is more likely for all three a) properties compared to all b) properties). However, the relative significance of these factors in attrition has yet to be established, thus more specific predictions cannot be made at this point. The role of both Perceptual Intake and FR complexity is considered further in 6.3.1 and 6.3.2 respectively, in light of the results of the current study.

A further possibility is that there is an interaction between Perceptual Intake and FR complexity, such that there is a continuum along which attrition is more likely for property a) in the German–Dutch pair, followed by property b) in this pair, then property a) in the German–English group, followed by property b) in this pair etc. However, as the *likelihood* that attrition will obtain can only be confirmed/quantified by a dichotomous outcome (i.e., attrition either obtains or it does not), it does not seem possible that such a nuanced pattern of results could be obtained from the current experimental design, or indeed any other with more than two grammatical properties. In light of this, rather than framing the predictions in terms of the *likelihood* of attrition obtaining at all (a dichotomous outcome variable), the predictions could instead be framed in terms of the *extent* of attrition predicted (a gradient outcome variable) i.e., it could be predicted that Perceptual Intake and the complexity of FR modulate the extent/degree of attrition observed, rather the likelihood that attrition would obtain at all. Indeed, this certainly seems a possibility based on the current architecture of the AvA model and there does not seem to be anything in the discussions of Hicks and Domínguez (2020a, 2020b) which explicitly advocates for a prediction of *likelihood* over or instead of *extent* or vice versa. However, framing the predictions in terms of the expected extent/degree of attrition is not without its own problems. Chief among them establishing a metric, or indeed metrics, by which to quantify the extent of attrition. As such, this possibility is not pursued in the current study, but is left to future research.

Thus, as a starting point for the current investigation it suffices to predict that the likelihood of attrition is modulated by both Perceptual Intake and FR complexity in this experimental design. These predictions are illustrated once more in Table 4.19. The predictions regarding Perceptual Intake are presented in the second column, and the predictions regarding Acquisitional Intake and the relative complexity of FR required for attrition in fourth column. The exact pattern of attrition across and within groups will be determined by the relative strength of these two factors, which is yet to be established, but can in principle be illuminated by the results of this experimental design.

L1	L2 (Speakers' current PLD) Decreasing Likelihood of Attrition	Grammatical Property and Relative Complexity of Feature Reassembly	Likelihood of Attrition for Individual Property
German (Germany) – Speakers' native grammar. PLD during L1 acquisition.	L2: Dutch (Netherlands) – Holistically very similar L2.	a) Reflexive Binding Less Complex FR	More Likely
		b) Grammatical Gender More Complex FR	Less Likely
	L2: English (UK) – Holistically similar L2.	a) Reflexive Binding Less Complex FR	More Likely
		b) Main Clause Verb Position More Complex FR	Less Likely
	L2: Spanish (Spain) – Holistically less similar L2.	a) Predicative Adjective Agreement Less Complex FR	More Likely
		b) Negation More Complex FR	Less Likely

Table 4.19: Experimental Design Overview and Predictions.

Chapter 5 Results

5.1 Introduction

The results of this study are presented in two parts. Group-level results for L1 attrition are presented in 5.3 and for L2 acquisition in 5.4. Individual-level results are then presented in 5.5. Details of the statistical modelling undertaken are outlined in 5.2. A summary of the results is provided in 5.6.

5.2 Data analysis

Data analysis was conducted in *R* (R Core Team, 2023. Version: 4.2.3). AJT data was statistically analysed by means of a series of Cumulative Link mixed effects models with crossed random effects using the *R* package *ordinal* (Christensen, 2022. Version: 2022.11–16) and the package *emmeans* (Lenth, 2023. Version: 1.8.7) for Tukey-corrected pair-wise comparisons. In the regression modelling, the AJT Likert scale response variable was the dependent variable (5 levels after ‘I don’t know’ responses were excluded – see Figure 4.1 for the Likert scale). Each of the three L1–L2 groups was modelled separately, once to compare the potential attriters in their L1 to the L1 controls (i.e., the attrition models) and once to compare potential attriters in their L2 compared to the L2 controls (i.e., the acquisition models). The categorical variables *Group* and (experimental) *Condition* and an interaction between them were included as fixed effects in all of these models. In addition to these two fixed effects required to answer the research questions, the variables *age*, *education*, *gender*, and *grammaticality* were modelled to see whether any differences between either the L1 or L2 controls and potential attriter groups on these variables should be controlled for.⁸⁹ Each of these variables was first modelled separately for each AJT in an interaction with *Group*. Any variables found to be significant were then included in the main models, initially in an interaction with *Group*Condition*. All categorical variables were sum/deviation coded and continuous variables were centred. All models included Participant and Item random intercepts (Baayen, Davidson and Bates, 2008; Linck and Cunnings, 2015). Initial models were fitted with a maximal random effects structure which reflected the fixed effects structure where appropriate i.e., with random slopes for variables

⁸⁹ *Age* is continuous whilst the remaining three variables are categorical. The German version of the LHQ3.0 contains 7 levels for education – which are not strictly ordered – whilst the Dutch, English, and Spanish versions contain 5 education levels. The L1 German controls and potential attriters completed the German version of the questionnaire, and the original levels are used in the models comparing these groups. For models comparing the potential attriters’ L2 results and the L2 controls, the education variable for the potential attriters was collapsed into 5 levels which matched the levels of the Dutch, English, and Spanish LHQ3.0 education levels as far as possible. This was done as a quick and simple solution to allow education level to be controlled for in the L2 models. Though admittedly a rough and imperfect solution, this is sufficient for the purposes of this study. Gender contains 4 levels as per the LHQ.30. Finally, *grammaticality* is a binary variable which refers to whether an experimental condition is grammatical or not in an unattrited L1. This was modelled in order to see whether the two groups being compared differed in their responses to grammatical vs. ungrammatical items, as it may have been the case that the potential attriters differed from the controls only for grammatical or only for ungrammatical items. A significant grammaticality effect would indicate grammatical attrition to predominately be a case of either rejecting grammatical structures or of accepting ungrammatical structures.

which were manipulated within Participant or with Item (following Barr *et al.*, 2013) and which converged. The random and fixed effects structures of the initial models were then stepwise reduced using the drop1 function and manual inspection of the Akaike Information Criterion values. Final model selection was determined by Likelihood Ratio Tests.

Before proceeding with the main statistical analysis of comparing the potential attriters' results to the L1 and L2 control results, models were run to confirm that the results of the L1 and the L2 control groups were significantly different for each experimental condition where the L1 and L2 grammaticality judgments should differ (i.e., to confirm that the expected grammaticality judgments were present in the control data). This was found to be the case for all conditions other than one reflexive binding condition in the German–English pair: reflexive binding into a picture DP. As first discussed in 0, this thesis initially assumed – based on the syntactic literature and the results of the pilot study – that this reflexive binding structure is ungrammatical in German. This assumption is not borne out in the full set of German control participants results. Whilst this structure is less acceptable in German than in English, this difference is not significant ($\beta = 1.43$, $SE = 0.44$, $z = 3.28$, $p = 0.11$).

Ultimately it was decided to retain this condition as it would still be possible to investigate whether the results of the potential attriter group diverged significantly from the L1 controls: the L1 controls rate the structure at the midpoint of the scale (3.12), indicating a genuine grey area in acceptability – thus it is in principle possible that the potential attriters rate the structure even more acceptable than the L1 controls and to a statistically significant degree. Such a deviation could be interpreted as L1 grammatical restructuring due to L2 influence, though this conclusion would necessarily be rather tentative.

5.3 L1 Attrition Models

The final models are presented in Appendix K. For Model 1, which models two German–Dutch properties, and Model 2, which models the two German–English properties, none of the additional variables which were found significant when modelled separately in an interaction with *Group* (see 5.2) were found to significantly improve the fit of the main models, and are therefore not included in the final models. These models thus only contain an interaction between *Group* and *Condition* for the fixed effects structure. In the German–Spanish model, Model 3, *Age* was the only such variable found to significantly improve model fit and is therefore controlled for in the final model.

Recall that there are 26 experimental conditions in total. However, there are 22 conditions where significant deviations from L1 baseline in direction of L2 could be evidence of grammatical

attrition at the group level.⁹⁰ Regression modelling revealed that the potential attriters' results did not deviate significantly from the L1 baseline in the direction of the L2 grammar on any of these 22 conditions (see relevant models in Appendix K for the pairwise comparisons). There is therefore no evidence of L2-induced L1 attrition at the group level.⁹¹

Nevertheless, the potential attriters' results do differ significantly from the L1 baseline on one condition: Reflexive binding Condition 1 in the German–English group (reflexive binding into a Picture DP) ($\beta = 1.33$, $SE = 0.29$, $z = 4.64$, $p < .001$). However, the potential attriters rate this structure less acceptable than both the L1 and L2 controls. This deviation from the L1 baseline is likely not due to the influence of L2 English, as the structure is rated more acceptable in English than in German. In fact – paradoxically – the potential attriter group's judgments of this structure are actually in line with the judgments expected of an unattrited grammar based on the syntactic literature (see 0 for discussion) i.e., they rate it overall unacceptable (mean = 2.29), whilst the L1 control results are in line with what would be expected in a grammar that has been restructured under the influence of L2 English i.e., they rate the structure weakly acceptable overall (mean = 3.12) (see Figure 5.4 in 5.5.2.1).⁹²

5.4 L2 Acquisition Models

The final L2 acquisition models are presented in Appendix K. Model 4 is the model for the acquisition of the two properties in L2 Dutch, Model 5 for L2 English, and Model 6 for L2 Spanish. None of the additional variables tested in separate models in an interaction with *Group* (see 5.2) were found to significantly improve the fit of the main models and thus are not included in the final models.

⁹⁰ In the German–Dutch group, the L1 and L2 equivalent versions of 2/4 of the reflexive binding conditions have the same grammaticality in both languages (the two structures containing either German *sich selbst* or Dutch *zichzelf*), thus any deviations from the baseline on these conditions would not suggest restructuring based on the L2 grammar. In the same group, all of the grammatical gender conditions have the same grammaticality in the L1 and L2. It was argued in 4.5.3.2 that due to the specific L1–L2 gender feature configurations and how these features may be expounded in an attrited L1 grammar under the influence of L2 Dutch, attrition of this property would be evidence by significant deviation from the L1 (and also L2) control results on 2/4 of the conditions (either or both of the two conditions with mismatched determiner–noun gender). This gives 22 conditions where L2-induced L1 attrition may be observed.

⁹¹ Note that no separate modelling of the potential attriter groups' results was conducted to explore the potential effect of additional background variables e.g., L1 proficiency, L1/L2 use etc., as even if such a variable was found to be significant, it cannot be claimed that the variable actually significantly influences attrition due to there being no significant attrition at the group level in the first place.

⁹² In order to investigate some possible causes of these results, the potential attriter's results on this specific condition were modelled separately. A series of univariate models tested the effect of the following variables: *Age*, *Gender*, *Education*, *L1 proficiency* and *L2 proficiency*. None of these variables were found to be significant. Additionally, a variable which looked at a potential task effect was investigated: all potential attriters completed the L2 version of the AJT and LexTALE test before completing the L1 versions of the same tasks (see 4.4.4 for details of procedures). It is hypothesised that if the potential attriters completed the L2 and L1 tasks in one session/ on the same day, this may have highlighted the grammaticality contrasts of the equivalent L1–L2 structures to them, leading them to have more dramatically contrasting ratings for the equivalent L1–L2 conditions than the controls, who only see one version of the AJTs. Though this potential effect does not seem to have obtained in any of the other conditions for which there is no deviation from the L1 baseline, it is still in principle possible that this may have influenced the results of this reflexive binding structure, leading to its stronger rejection by the potential attriters compared to the L1 controls. To investigate this potential effect a binary task effect variable, which was coded for whether the individual participant completed the L2 and L1 AJT on the same day or a different day, was created. This variable, however, was also not found to be significant. The same modelling was carried out on the L1 control results for this structure. No significant effect of *Age*, *Gender*, *Education*, or *L1 proficiency* was found.

The results of the final models revealed that the potential attriters' L2 results differ significantly from the L2 control results on 5/26 conditions (see relevant models in Appendix K for the pairwise comparisons). 20 of these are conditions for which the L1 and L2 grammars differ in the grammaticality of the equivalent structure, and thus the L2 speakers have acquired these 20 conditions to a native-like degree in their respective L2s. The 5 conditions on which the L2 results do not converge on the L2 control results are:

- 1) Dutch: *zich* as selected PP object ($\beta = 2.34$, SE = 0.44, $z = 5.36$, $p < .001$).
- 2) Dutch: Transitive, non-grooming, non-inherently reflexive verb with *zich* ($\beta = 1.51$, SE = 0.42, $z = 3.59$, $p < .05$).
- 3) Dutch: Neuter Determiner + Common Noun (German cognate Feminine) ($\beta = 2.02$, SE = 0.55, $z = 3.67$, $p < .05$).
- 4) Spanish: Negation with a single Negative Concord Item ($\beta = 3.33$, SE = 0.35, $z = 9.60$, $p < .001$).
- 5) Spanish: Negative Concord Item + Negative Polarity Item ($\beta = 1.46$, SE = 0.33, $z = 4.44$, $p < .001$).

In each case, the non-convergence on the L2 grammar is due to a failure to reject an ungrammatical structure to the same degree as the L2 controls. Nevertheless, for 3/5 of these conditions the potential attriters have successfully acquired the relevant grammaticality contrasts in the L2: recall that (other than the reflexive binding structures in the German–English pair) all of the structures tested in this study are in grammatical–ungrammatical pairs, with one structure conforming to the L1 grammar, and the other to the L2 grammar for the equivalent structure. For 3/5 of the above structures, the potential attriters correctly rate the grammatical counterpart overall acceptable and the ungrammatical counterpart overall unacceptable. This is also confirmed by statistically significant differences between the potential attriters judgments of the grammatical and ungrammatical versions of these structures, which is also found to be the case for the L2 control results on the same structures (again, see relevant models in Appendix K for the pairwise comparisons).

For 4) however, potential attriters rate this ungrammatical structure overall weakly acceptable (mean = 3.18), whereas it is rated strongly unacceptable by the L2 controls (mean = 1.35) (see Figure 5.11). However, potential attriters' results on the grammatical and ungrammatical version of the same structure are actually still significantly different ($\beta = -1.91$, SE = 0.40, $z = -4.74$, $p < .05$), as the grammatical structure is rated significantly more acceptable. For 5), potential attriters do correctly rate this ungrammatical structure overall weakly unacceptable (mean = 2.66) – and the grammatical counterpart overall weakly acceptable (mean = 3.4) (again see Figure 5.11) – however here they do not distinguish between the grammatical and ungrammatical versions to a statistically

significantly degree ($\beta = 1.18$, $SE = 0.40$, $z = 2.95$, $p = 0.19$) unlike the L2 controls ($\beta = 3.14$, $SE = 0.44$, $z = 7.21$, $p < .001$).

5.5 Individual Variation

Analysis of the L1 AJT data at a group level revealed no instances of attrition for any of the three German expat groups on any experimental conditions (see 5.3). However, it may still be the case that the L1 grammars of a number of individual participants have undergone attrition. To investigate this possibility, this section identifies individual participants whose results deviate from the L1 baseline and analyses their AJT response patterns in order to ascertain firstly whether L1 grammatical restructuring has obtained, and secondly to consider the nature and extent of such restructuring. To allow further investigation of the relationship between L1 attrition and L2 acquisition, the L2 acquisition results of individual participants argued to have undergone attrition are also presented. Finally, the (extra)linguistic background data of these individual participants are also provided in order to reveal any patterns which may account for the attrition and acquisition results.

When investigating group-level divergences from the L1 baseline, statistical models can be employed to confirm the significance of such divergences and thereby confirm the significance of any attrition. The same is of course not possible when seeking to assess whether the results of a very small number of individual participants – in some cases of only a single participant – deviate significantly from an otherwise rather homogenous baseline, as is the case here. Nevertheless, in order to investigate whether attrition has obtained at the level of individual participants, an objective metric is needed to identify which individual results deviate from the baseline to the extent to which they could potentially be evidence of L1 grammatical restructuring. This metric should be applied uniformly to the results to avoid any bias in the identification of individual attriters.

In this thesis, the following metric was employed: the mean response value of any potential attriter which is outside the range of 1 standard deviation (SD) away from the mean of the L1 control group results for the same experimental condition are considered to be potentially indicative of L1 grammatical attrition. To be clear, it is not being claimed that if an attriter's mean response falls outside of this 1SD range then this should be taken at face value to be evidence of grammatical attrition. Rather, it is suggested that this mean response value warrants further inspection; specifically, inspection of the responses to each individual test item for that given condition. It is crucial to recognise that a number of underlying response patterns can achieve the same mean Likert score, however, only some of these underlying response patterns can be reliably considered evidence of grammatical attrition (the same applies also for modes and median values of Likert judgements). For example, a participant may have a particularly anomalous response to one out of the eight experimental items for a given condition, which may cause the mean to be outside of the 1

SD range if that range happens to be particularly small, however these results should not be considered evidence of systematic L1 restructuring.

The range of 1 SD above and below the L1 control mean is argued here to be the appropriate level at which to identify potential outlying results which could be the result of either L2 convergence or L1–L2 optionality. 2 SD above and below the mean – a range typically used to identify outliers – would be too broad, as this range encompasses 95% of the data and it is therefore likely that the only attriter results which fall outside of this range would be those that converge strongly on the L2 results. This would therefore exclude cases of L1–L2 optionality where the mean response may be well within 95% of the data, yet still clearly diverges from the mean of the control group. 1 SD around the mean, on the other hand, encompasses roughly 68% of the data and is therefore sufficiently lenient to allow identification of optionality or indeed less strong patterns of L2 convergence, whilst arguably also being stringent enough to exclude results which represent a degree of variation that might be expected, and indeed found, in the baseline. In the following figures presenting the attrition results, for each experimental condition the group means and error bars representing 1 SD above and below these means are depicted, and potential attriter mean responses which fall outside the +/- 1 SD of the L1 control mean are labelled on the figures. It is these labelled mean responses which are then investigated in more detail in order to ascertain whether they are evidence of L2-induced L1 grammatical restructuring.⁹³

When considering L2 acquisition, it is informative to know whether the L2 results of the individual potential attriters converge on the L2 control means. To investigate this, the L2 acquisition figures in this section display error bars representing +/- the Standard Error (SE) of the mean for each experimental condition. Potential attriter L2 mean responses within or very close to the SE range of the L2 controls are considered evidence of near-native/native-like L2 acquisition.

5.5.1 German – Dutch

The results of reflexive binding and grammatical gender in the German – Dutch group are considered first.

⁹³ To be clear, the main purpose of plotting the individual means is not to illustrate the distribution of the individual judgments (there are arguably more suited ways to do this). Rather, the primary aim of plotting the individual means is so that these plots can be used as a tool to quickly and easily identify individual potential attriters, with attrition being ascertained by subsequent consideration of these participants' individual Likert responses to each test item. The individual means are therefore a means to an end.

5.5.1.1 Reflexive Binding

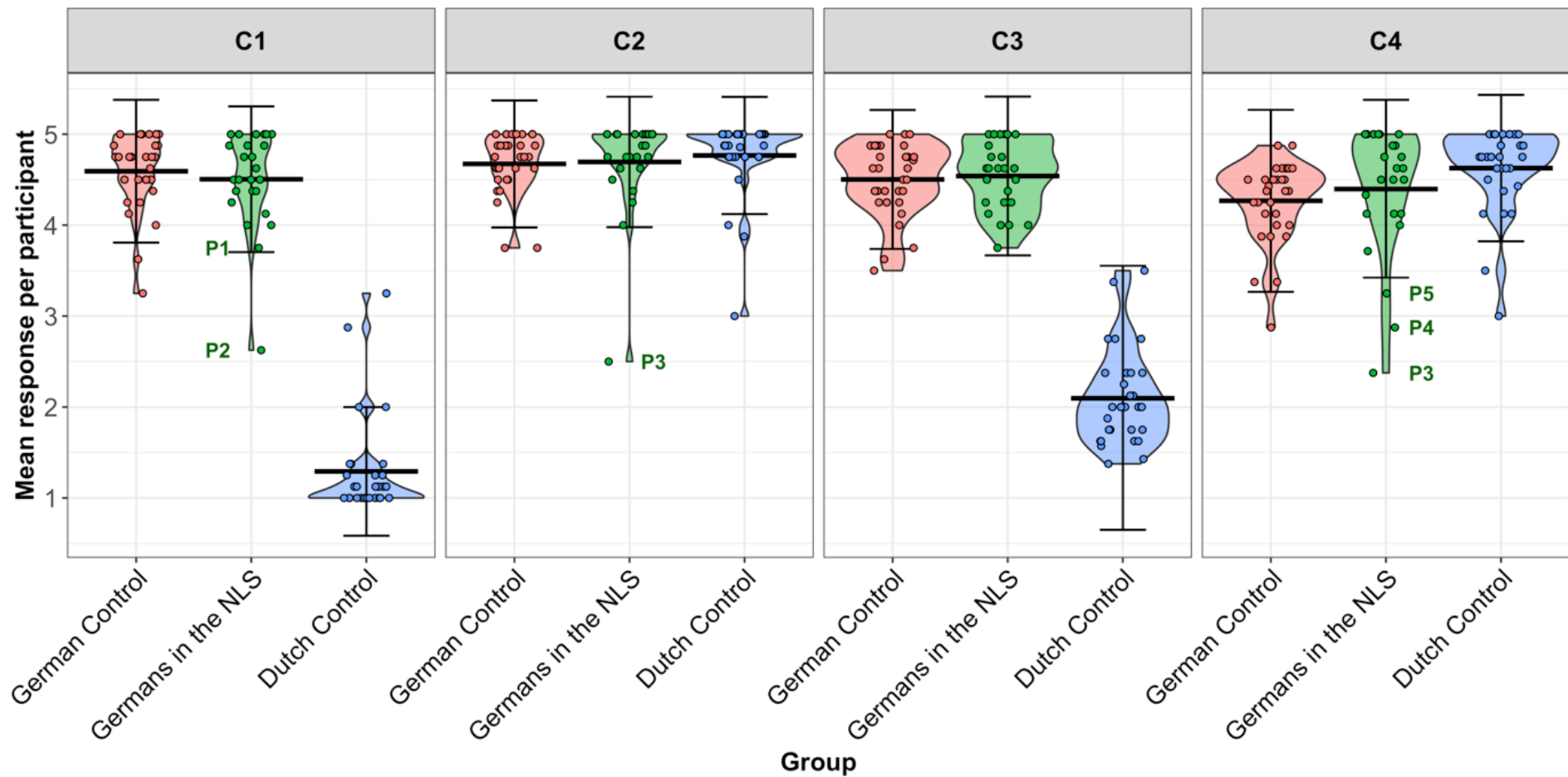


Figure 5.1: Reflexive Binding individual variation (L1 Attrition). Bold lines: group mean. Error bars: +/- 1 SD from the mean.

C1: *Sich* (German) or *zich* (Dutch) as selected PP object.

C2: *Sich selbst* (German) or *zichzelf* (Dutch) as selected PP object.

C3: Transitive, non-grooming, non-inherently reflexive verb with *sich* (German) or *zich* (Dutch).

C4: Transitive, non-grooming, non-inherently reflexive verb with *sich selbst* (German) or *zichzelf* (Dutch).

In Figure 5.1, two potential attriters are highlighted for Condition 1. Their Likert response to each test item is displayed below:

C1		
Participant	Mean	Likert response to each test item (8 items per condition)
P1	3.75	5, 5, 4, 4, 4, 3, 2, 2
P2	2.63	4, 4, 3, 3, 2, 2, 2, 1

P1's mean score indicates that they maintain the unattrited grammaticality judgment (i.e., that the structure is acceptable) overall, and rate only 2/8 test items ungrammatical. These results can therefore not be reliably interpreted as L1–L2 optionality, L2 convergence, nor any other obvious pattern of L2-induced L1 grammatical attrition. P2 however, rates only 2/8 items grammatical and 2/8 are assigned the midpoint of the scale, thus their responses are heavily skewed towards unacceptable in line with the L2 controls. This suggests these results may be best interpreted as L2 convergence; however, their mean score is still far outside of the 1SD range of the L2 control results and in line with the mean scores of only 2/25 individual L2 control participants. These results are therefore perhaps best interpreted as L1–L2 optionality (i.e., they alternate between accepting the test items, in line with the L1 grammar, and rejecting the test items, in line with the L2 grammar), though skewed overall towards the L2 acceptability judgments. P2's mean scores and response patterns on the other grammatical property tested in the same AJT: grammatical gender, and on the filler experimental conditions, reveal no indication of optionality. This suggests that the results on Condition 1 above are in fact due to the participant's underlying grammar differing from to the control groups' grammar for this specific property and the specific structures investigated in this test condition, rather than them giving varied Likert judgments regardless of the test stimuli (in other words, they do not simply give erratic responses but are considering the acceptability of each test item as intended). P2's (extra)linguistic background information is presented in the table below. They have a relatively short LoR for this study (see 4.3.1 for group averages), an L1 Dutch speaking partner and are L2 dominant in terms of use, though have a higher L1 proficiency score.

C1 Participant	P2
Age	36
Gender	Female
Education Level (mode)	Master
Length of Residence in L2 Country (years)	16
L1 Proficiency (Lextale) (%)	92.5
L2 Proficiency (Lextale) (%)	78.75
L1/L2 Dominance Ratio	0.68
Partner's L1	Dutch
German use with Partner (frequency)	Often
Dutch use with Partner (frequency)	Mostly
German use with children (frequency)	Mostly
Dutch use with children (frequency)	Mostly
German use in current employment (frequency)	Rarely
Dutch use in current employment	Always
Frequency of contact with family and friends in Germany	Regularly
Method of contact with family and friends in country of origin	Audio call, Video call, Voice messages
Frequency of visits to Germany each year	3-4
Number of days in Germany each year (average)	8
Other languages/ dialects	English, French

Next, we consider the results of Condition 2 and Condition 4 together (note that there are no individuals who have potentially attrited on Condition 3).

C2		
Participant	Mean	Likert response to each test item (8 items per condition)
P3	2.5	5, 3, 3, 2, 2, 2, 2, 1

C4		
Participant	Mean	Likert response to each test item (8 items per condition)
P3	2.38	4, 4, 3, 2, 2, 2, 1, 1
P4	2.89	5, 4, 4, 3, 2, 2, 2, 1
P5	3.25	4, 4, 4, 3, 3, 3, 3, 2

What is interesting here is that both Condition 2 and 4 are grammatical in both German and Dutch. Therefore, the participants' low ratings of these structures, to the degree to which they fall outside of 1SD of the L1 control mean, cannot be due to any contrasting grammaticality of the

equivalent L2 structure leading to the L1 grammar being restructured based on the L2 grammar. They are therefore not instances of L2-induced L1 grammatical attrition. The two conditions on which these results are found are conditions with *sich selbst* in German. As discussed in 3.3.1, *selbst* can always be used in conjunction with *sich* without a grammaticality violation, however its presence can affect the pragmatics. These participants therefore perhaps disprefer *sich selbst* compared to *sich* in these structures (their results are not outside on the 1 SD range of the controls on the conditions which just use *sich*) on pragmatic – but not strictly grammatical – grounds.

Figure 5.2 shows the L2 acquisition results for P2, the participant who has potentially attrited on Condition 1 i.e., the results which can be reliably interpreted as L2-induced L1 grammatical restructuring. P2 has clearly successfully acquired the correct grammaticality contrast for these reflexive structures in their L2 (i.e., that Condition 1 is ungrammatical whilst Condition 2 is grammatical, and that Condition 3 is ungrammatical whilst Condition 4 is grammatical). For Condition 1, 2, and 4 their results are very near to being within the SE range of the native L2 controls. On Condition 3, their mean score is slightly further from the L2 SE than on any other condition, however it is still in line with the mean scores of some individual L2 controls.

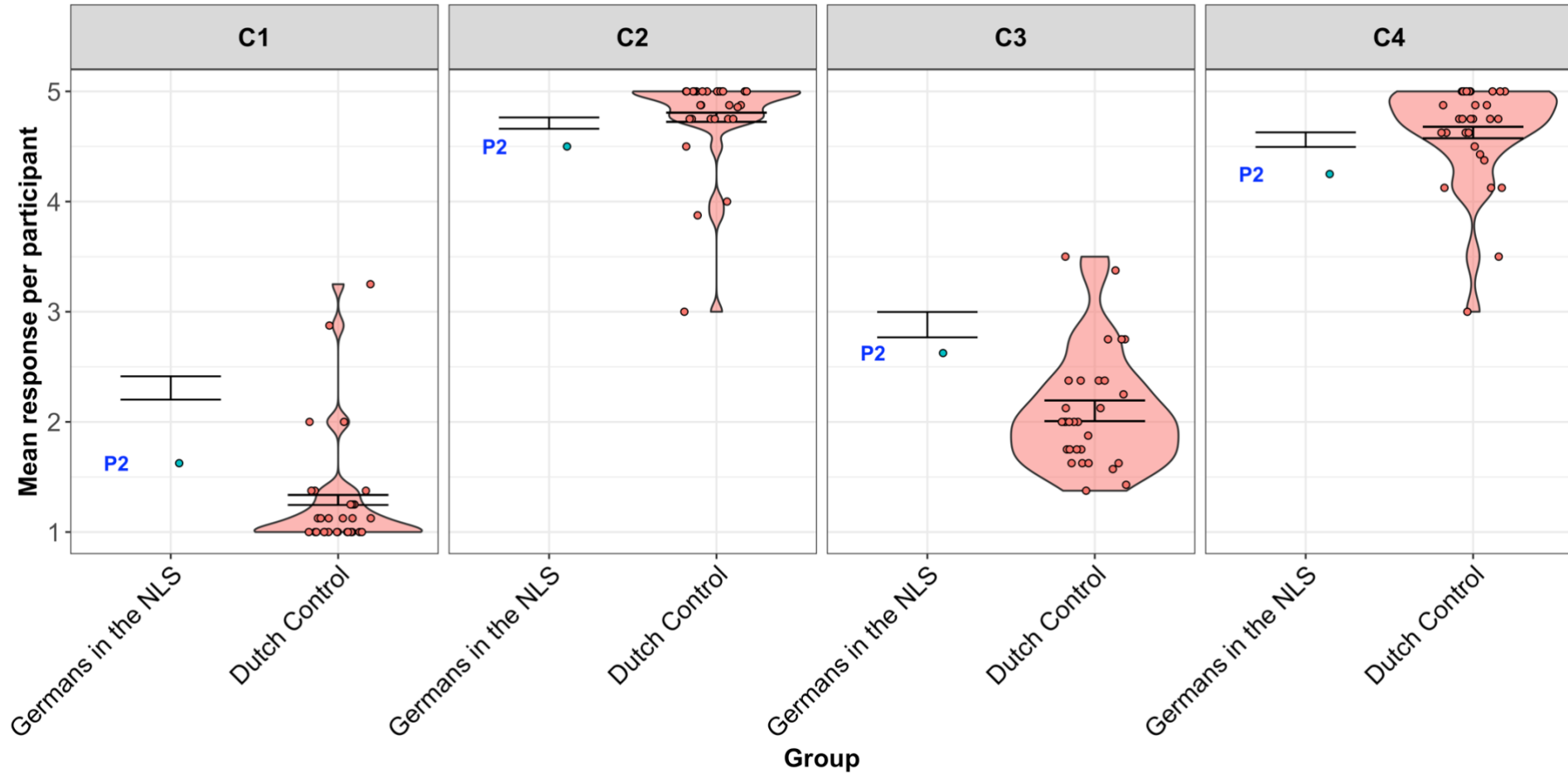


Figure 5.2: L2 Acquisition of Reflexive Binding (Individual L1 Attriters only). Error bars: +/- whole group SE

C1: *Zich* as selected PP object.

C2: *Zichzelf* as selected PP object.

C3: Transitive, non-grooming, non-inherently reflexive verb with *zich*.

C4: Transitive, non-grooming, non-inherently reflexive verb with *zichzelf*

5.5.1.2 Grammatical Gender

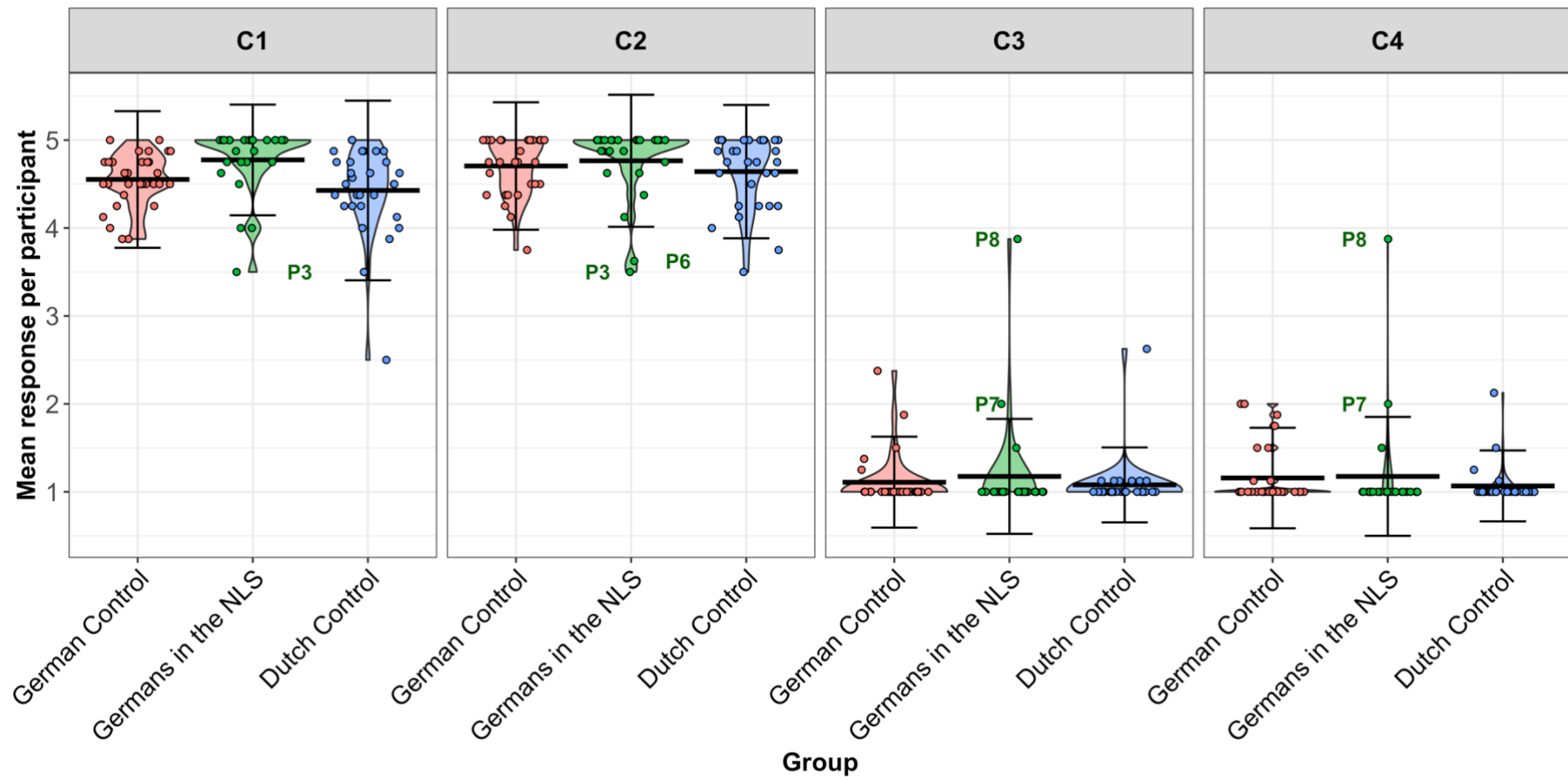


Figure 5.3: Grammatical Gender individual variation (L1 Attrition). Bold lines: group mean. Error bars: +/- 1 SD from the mean.

C1: German: Feminine Determiner + Feminine Noun. Dutch: Common Determiner + Common Noun (German cognate Feminine).

C2: German: Masculine Determiner + Masculine Noun. Dutch: Common Determiner + Common Noun (German cognate Masculine).

C3: German: Masculine Determiner + Feminine Noun. Dutch: Neuter Determiner + Common Noun (German cognate Feminine).

C4: German: Feminine Determiner + Masculine Noun. Dutch: Neuter Determiner + Common Noun (German cognate Masculine).

Recall that for grammatical gender – unlike the other properties tested in this study –the experimental conditions cannot be considered in isolation as in each condition the grammaticality in the L1 and L2 are the same (i.e., C1 and C2 are grammatical, whilst C3 and C4 are ungrammatical, in both German and Dutch). Rather, the results of the same participant(s) must be considered across all four conditions in order to determine whether grammatical attrition has obtained and to assess the nature of any grammatical restructuring. It was proposed in 4.5.3.2 that there are three patterns of responses to these four conditions which would indicate that the L1 grammatical gender representations had been restructured under the influence of L2 Dutch: 1) acceptance of Condition 1, 2 and 3, but rejection of Condition 4, 2) acceptance of Condition 1, 2 and 4, but rejection of Condition 3, 3) acceptance of all conditions. We will now consider whether any of these three patterns emerge in the individual results. The means and individual Likert responses of each potential attriter highlighted in Figure 5.3 are presented in the tables below:

C1		
Participant	Mean	Likert response to each test item (8 items per condition)
P3	3.5	5, 5, 5, 4, 3, 3, 2, 1

C2		
Participant	Mean	Likert response to each test item (8 items per condition)
P3	3.5	5, 5, 5, 4, 4, 2, 2, 1
P6	3.63	4, 4, 4, 4, 4, 4, 4, 1

C3		
Participant	Mean	Likert response to each test item (8 items per condition)
P7	2.0	2, 2, 2, 2, 2, 2, 2, 2
P8	3.89	4, 4, 4, 4, 4, 4, 4, 3

C4		
Participant	Mean	Likert response to each test item (8 items per condition)
P7	2.0	2, 2, 2, 2, 2, 2, 2, 2
P8	3.89	5, 5, 5, 4, 3, 3, 3, 3

In Condition 1 and 2 there are two potential attriters (participant numbering is continued from the reflexive binding results (5.5.1.1), so P3 here is the same participant as discussed there). Whilst there is potentially some degree of optionality for P3 on Condition 1 and 2, P6 exhibits no optionality on Condition 2: they clearly maintain the unattrited grammaticality judgment for that

condition overall though never give these test items the highest possible acceptability rating. The mean scores for same two participants do not, however, fall outside of the 1 SD range of the L1 control mean on either Condition 3 or 4. As argued in 4.5.3.2, this pattern of results is not evidence of restructuring of grammatical gender due to L2 Dutch influence.

P7 and P8 are identified as potential attriters on both Condition 3 and 4. Inspection of P7's results reveal that they rate every test item ungrammatical, yet never give these items the lowest possible acceptability rating. Thus, though this structure may be more acceptable to them than the potential attriters not highlighted on Figure 5.3, they clearly maintain the unattrited grammaticality judgment overall. Hence these results are not suggestive of any grammatical restructuring.

P8's mean score on both Condition 3 and 4 reveals that they rate this ungrammatical structure as grammatical. These mean scores are in fact high enough to be within the 1 SD range of some of the German and Dutch control groups results for Condition 1 and 2, which are in both languages fully grammatical and acceptable versions of the structures tested in Condition 3 and 4 respectively. Nevertheless, P8's mean scores on C1 and C2 (structures fully grammatical/acceptable in unattrited German) are 5.0 in both cases. Therefore, though they rate Condition 3 and 4 as overall acceptable, they are not quite acceptable to the extent of Condition 1 and 2. In terms of the individual response patterns, they never give these structures a rating lower than the scale midpoint, and in particular on Condition 3, they only chose the midpoint once. The significant finding here then, is that none of the 32 test items across any of the four conditions are ever rated ungrammatical by this participant (9/32 are given a midpoint rating). This pattern of results is one of the patterns argued in 4.5.3.2 to be evidence of restructuring of grammatical gender.

At this point it appears that we have fairly robust evidence of attrition of grammatical gender for this one individual participant. The key evidence of this attrition is acceptance of structures which are ungrammatical in the unattrited grammar i.e., Condition 3 and 4. However, inspection of their response patterns on the ungrammatical filler conditions and ungrammatical L2 structures cast doubt on whether their L1 grammatical gender results can actually be interpreted as evidence of grammatical restructuring. For the ungrammatical filler condition (which tested word order inversion with modal verbs – see Appendix I for the structures and test items) the participant never gives these ungrammatical structures a rating lower than 3 on the Likert scale (potential attriter group mean: 1.18, L1 control group mean: 1.14). This in itself is not conclusive as there is the possibility that the participant has undergone attrition of this structure also, leading them to rate the ungrammatical structures as acceptable. However, inspection of their response patterns on the L2 version of the AJT, where two of the grammatical gender conditions are ungrammatical in Dutch, reveals that for these ungrammatical structures only 1/16 test items is given a rating lower than 3. For the two ungrammatical reflexive binding conditions in the L2 version of the AJT, as well as the ungrammatical

L2 filler condition, no test items are given a rating lower than 3. Here there is the possibility that this participant has not acquired these three grammatical properties in their L2, leading them to again consistently rate ungrammatical structures as acceptable. However, the fact that this same general response pattern of never selecting below the midpoint of the scale (with only one exception on a single test item) regardless of the grammaticality of the structure holds for three unrelated grammatical properties in both the L1 and L2, suggests that the participant has a general response bias whereby they simply avoid giving any acceptability rating below the midpoint of the scale. If this is indeed the case, then their responses cannot be reliably interpreted as a reflection of their underlying linguistic knowledge and no firm conclusions as to the occurrence of grammatical attrition can be made. For grammatical gender then, it seems that there is no compelling evidence of grammatical attrition even at the level of individual participants.

5.5.2 German – English

We now turn to the results of reflexive binding and main clause verb position in the German – English group.

5.5.2.1 Reflexive Binding

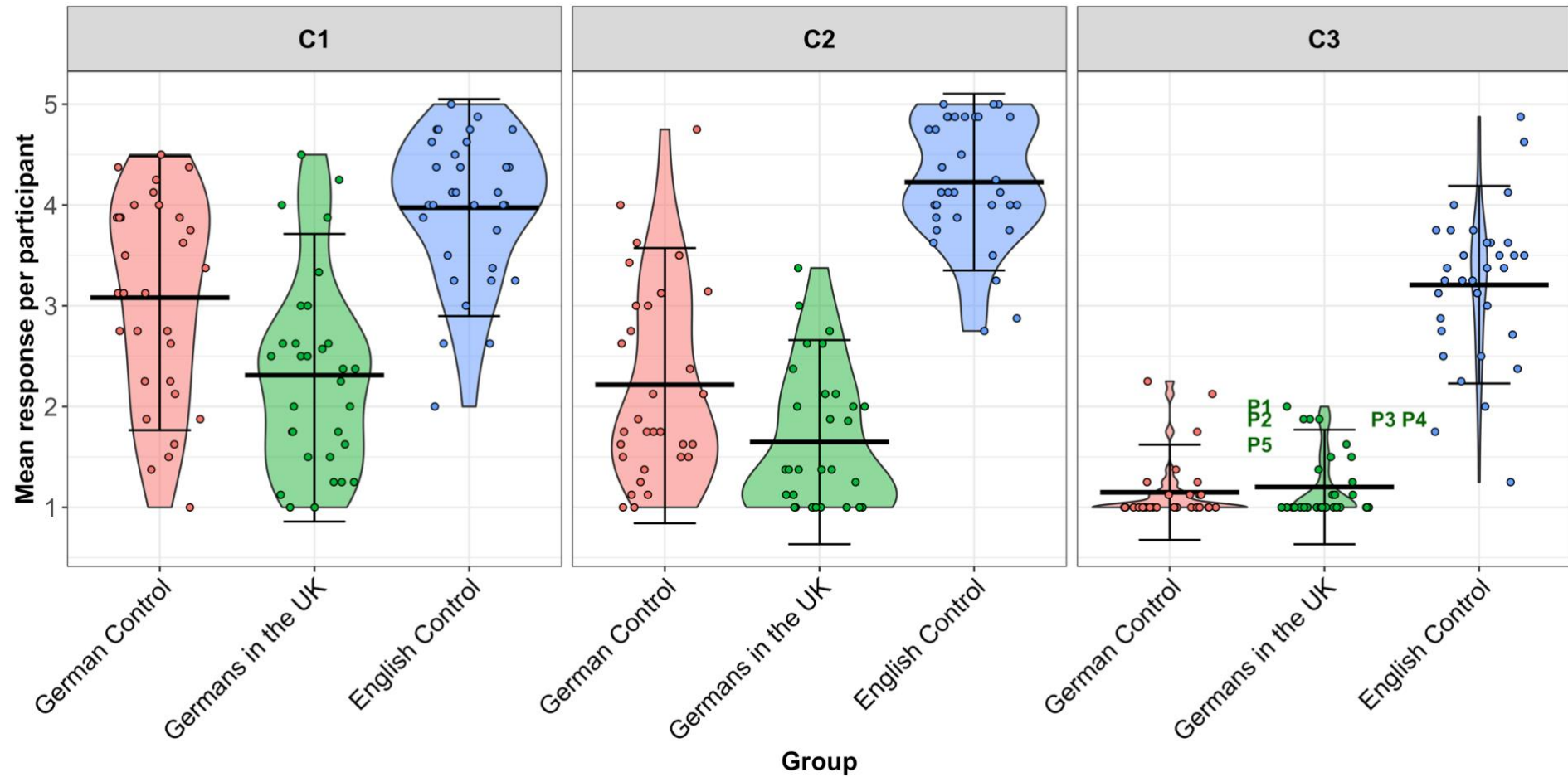


Figure 5.4: Reflexive Binding individual variation (L1 Attrition). Bold lines: group mean. Error bars: ± 1 SD from the mean.

C1: Picture DP.

C2: Embedded Picture DP.

C3: Embedded Coordinated DP.

Chapter 5

There is a considerable degree of individual variation for Condition 1, as displayed in Figure 5.4, and in fact greater variability amongst the L1 controls than the potential L1 attriter group. Due to this L1 control variability, none of the potential attriter means fall outside of the 1SD range of the L1 controls. Inspection of the individual response patterns of the L1 controls reveals that whilst many participants consistently reject both structures, many also exhibit varying degrees of optionality, and a very small number consistently accept these structures, essentially in line with the majority of the English controls (see 0 for the formal analysis proposed to capture this variability). As the L1 control results exhibit patterns which would be interpreted as L1–L2 optionality or indeed L2 convergence if found in a group of potential attriters, there is no clear, uniform L1 baseline against which to compare the attriters and detect L1 grammatical attrition for individual participants on this condition.

Whilst Condition 2 is overall unacceptable in German, there is again here a degree of individual variation in the L1 baseline: the majority of participants rate this structure strongly unacceptable, at least two participants consider it strongly acceptable, and around seven participants find it marginal/weakly acceptable and appear to exhibit some degree of optionality (see 0 for an explanation of the variability found for this structure). As with Condition 1, there is a greater degree of variation amongst the L1 controls than the potential attriters and it is not possible to reliably identify attrition for individual participants on Condition 2. In any case, the degree of variation in the L1 control results means that once again, none of the potential attriter mean scores fall outside of the 1SD range. Therefore, it is only on Condition 3, which the German controls uniformly rate as strongly unacceptable, that we can investigate attrition at level of individual participants.⁹⁴

The following five participants are highlighted on Figure 5.4 as having potentially undergone attrition on Condition 3. Their responses for each test item are displayed below:

⁹⁴ On Condition 3 there is a greater degree of individual variation amongst the English controls. See 0 for discussion of this.

C3		
Participant	Mean	Likert response to each test item (8 items per condition)
P1	2.0	4, 3, 2, 2, 2, 1, 1, 1
P2	1.89	2, 2, 2, 2, 2, 2, 2, 1
P3	1.89	5, 4, 1, 1, 1, 1, 1, 1
P4	1.89	2, 2, 2, 2, 2, 2, 2, 1
P5	1.63	2, 2, 2, 2, 2, 1, 1, 1

P2, P4, and P5 clearly maintain the unattrited grammaticality judgment in rating these structures unacceptable in every instance. Their mean scores fall outside of the 1 SD range due to them frequently avoiding selecting the lowest possible acceptability rating on the Likert scale for these structures. These structures are therefore likely more acceptable for these participants compared to the vast majority of potential attriters. However, as every single test item is still rated unacceptable overall, these results do not suggest that any reassembly of the L1 feature specifications based on the L2 grammar has occurred. P1 rates one of the test items acceptable and selects the midpoint for another, but rates the remaining six test items as unacceptable. Their judgment patterns are therefore clearly very skewed towards unacceptable, in line with the unattrited L1 grammar, and it would be a stretch to interpret these ratings as evidence of attrition.

P3 rates 2/8 test items as acceptable and the remainder as unacceptable with the lowest Likert rating. Here the argument could be made that this pattern is evidence of L1–L2 optionality as there does appear to be alternation between distinct L1 and L2 grammatical options when judging these sentences, however the judgment pattern is again strongly skewed towards unacceptable in line with the unattrited L1 grammar. This argument is therefore not particularly compelling, though the possibility that these results do represent L1–L2 optionality, and therefore attrition, should not be dismissed outright. Indeed, this participant shows no attrition at all on the other grammatical property (main clause word order, see 5.5.2.2) and their results on the filler conditions are in line with the L1 control group's.⁹⁵ Thus the results on Condition 3 are not due to this participant giving varied Likert judgments regardless of the test stimuli. P3's (extra)linguistic background data is presented in the table below. Interestingly, in contrast to the potential attriter for reflexive binding in the German – Dutch group, P3 here is an L1 dominant bilingual, though with a higher L2 proficiency score.

⁹⁵ Importantly, there is no attrition of the filler conditions which tested subordinate clause word order (see Appendix I for test items). Therefore, any attrition on Condition 3 can be reliably interpreted as attrition of reflexive binding due to the different binding possibilities in English, rather than actually being attrition of word order stemming from the differences in subordinate clause word order in German and English.

Chapter 5

C3 Participant	P3
Age	59
Gender	Female
Education Level (mode)	Apprentiship / Professional training
Length of Residence in L2 Country (years)	15
L1 Proficiency (Lextale) (%)	71.25
L2 Proficiency (Lextale) (%)	73.75
L1/L2 Dominance Ratio	2
Partner's L1	German
German use with Partner (frequency)	Mostly
English use with Partner (frequency)	Sometimes
German use with children (frequency)	Mostly
English use with children (frequency)	Sometimes
German use in current employment (frequency)	N/A
English use in current employment	N/A
Frequency of contact with family and friends in Germany	Regularly
Method of contact with family and friends in country of origin	Audio calls, Video calls, Texts, Voice messages, Email
Frequency of visits to Germany each year	1-2
Number of days in Germany each year (average)	7
Other languages/ dialects	N/A

In terms of the L2 acquisition, Figure 5.5 below shows that P3 rates the three English structures acceptable in line with the English controls. For Condition 1 and 2 their mean score is near to being within the L2 control SE. For Condition 3 their mean rating is higher than the SE range of the control group, though still in line with some individual control participants.

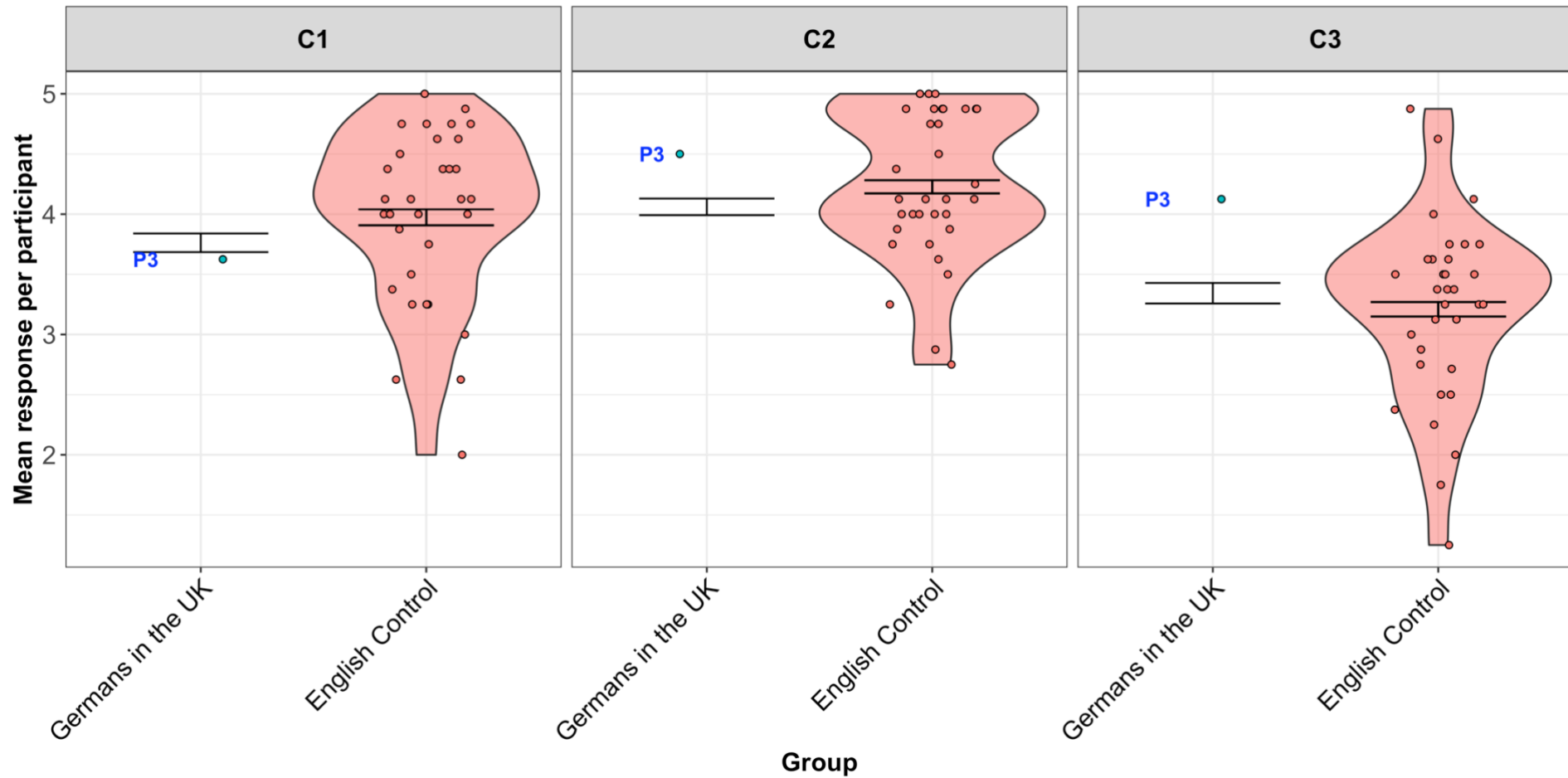


Figure 5.5: L2 Acquisition of Reflexive Binding (Individual L1 Attriters only). Error bars: +/- whole group SE

C1: Picture DP.

C2: Embedded Picture DP.

C3: Embedded Coordinated DP.

5.5.2.2 Main Clause Verb Position

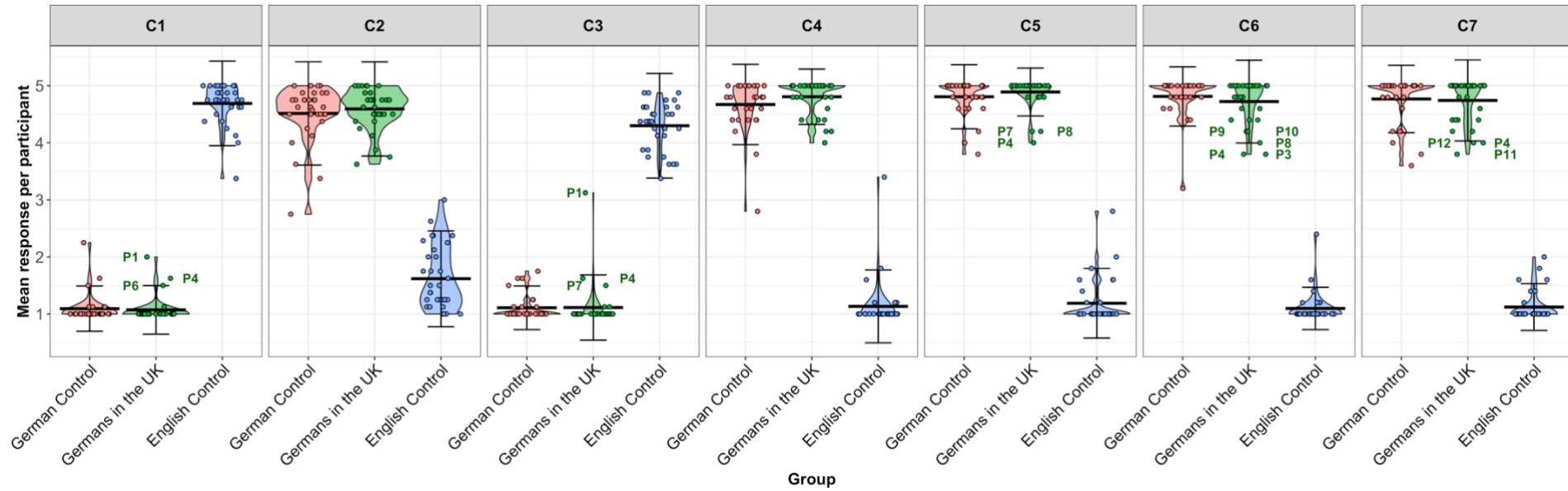


Figure 5.6: Main Clause Verb Position individual variation (L1 Attrition). Bold lines: group mean. Error bars: +/- 1 SD from the mean.

- C1:** S-Adv-V(-O).
- C2:** S-V-Adv(-O).
- C3:** Adv-S-V(-O).
- C4:** Adv-V-S(-O).
- C5:** (temporal) AdvPP-V-S(-O).
- C6:** ('manner') AdvPP-V-S(-O).
- C7:** (locative) AdvPP-V-S(-O).

Three potential attriters are highlighted in Figure 5.6 for Condition 1. Their Likert responses are presented below:

C1		
Participant	Mean	Likert response to each test item (8 items per condition)
P1	2.0	5, 3, 3, 1, 1, 1, 1, 1
P4	1.63	2, 2, 2, 2, 2, 1, 1, 1
P6	1.5	5, 1, 1, 1, 1, 1, 1, 1

P4 clearly maintains the unattrited grammaticality judgment in rating these structures unacceptable in every instance. Their mean score falls outside of the 1 SD range due to them frequently avoiding selecting the lowest possible acceptability rating on the Likert scale for these structures. This indicates that they find these structures slightly more acceptable than the majority of potential attriters. However, as every single test item is still rated unacceptable overall, these results do not suggest that any L1 grammatical restructuring based on the L2 grammar. Recall that P4 has a near identical response pattern for reflexive binding Condition 3 (see 5.5.2.1). Indeed, reviewing their response patterns across the two grammatical properties suggests that they have a strong tendency to avoid the extreme ends of the Likert scale. This suggests their mean score falling outside of the 1 SD range is due to this idiosyncratic response bias rather than due to any L1 grammatical restructuring. P6 likewise rates all but one test item ungrammatical. P1 rates one of the test items acceptable and selects the midpoint for another two, but rates the remaining five test items as unacceptable. Their judgment patterns are therefore clearly very skewed towards unacceptable in line with the unattrited L1 grammar and these ratings cannot be interpreted as evidence of L1–L2 optionality.

No participants are highlighted for Condition 2. For Condition 3, three potential attriters are highlighted and their Likert responses presented below:

C3		
Participant	Mean	Likert response to each test item (8 items per condition)
P1	3.13	5, 5, 5, 4, 3, 1, 1, 1
P4	1.63	2, 2, 2, 2, 2, 1, 1, 1
P7	1.5	5, 1, 1, 1, 1, 1, 1, 1

The results of P4 and P7 on Condition 3 can be interpreted in exactly the same manner as P4 and P6 respectively on Condition 1, as the individual Likert ratings are in fact identical. The response

Chapter 5

patterns of P1 on Condition 3 however, provide a rather robust pattern of L1–L2 optionality in which 4/8 structures are rated acceptable, 3/8 are rated unacceptable, and for 1/8 the midpoint of the Likert scale is chosen. Here there seems to be a clear alternation between the L1 and L2 grammatical options. P1 does not exhibit this pattern of optionality on the other grammatical property tested: reflexive binding (5.5.2.1) nor on filler conditions, thus the optionality on Condition 3 can be more reliably attributed to a change in their underlying grammar as opposed to the participant giving varied responses regardless of the AJT stimuli. Inspection of P1’s (extra)linguistic background data – presented in the table below – reveals them to be an L1 dominant bilingual, though with a higher L2 proficiency score.

C3 Participant	P1
Age	50
Gender	Female
Education Level (mode)	Apprentiship / Professional training
Length of Residence in L2 Country (years)	19
L1 Proficiency (Lextale) (%)	78.5
L2 Proficiency (Lextale) (%)	82.5
L1/L2 Dominance Ratio	4
Partner’s L1	German
German use with Partner (frequency)	Always
English use with Partner (frequency)	Rarely
German use with children (frequency)	Always
English use with children (frequency)	Never
German use in current employment (frequency)	Mostly
English use in current employment	Rarely
Frequency of contact with family and friends in Germany	Regularly
Method of contact with family and friends in country of origin	Audio calls
Frequency of visits to Germany each year	Less than once a year
Number of days in Germany each year (average)	20
Other languages/ dialects	Welsh

No potential attriters are highlighted for Condition 4. The results of Condition 5, 6, and 7 are discussed together as they are sub-conditions of the same structure. The individual Likert responses for each participant are displayed in the following tables:

C5		
Participant	Mean	Likert response to each test item (5 items per condition)
P4	4.0	4, 4, 4, 4, 4
P7	4.2	5, 5, 5, 5, 1
P8	4.2	5, 4, 4, 4, 4

C6		
Participant	Mean	Likert response to each test item (5 items per condition)
P4	3.8	4, 4, 4, 4, 3
P3	3.8	5, 5, 5, 3, 1
P8	4.0	5, 4, 4, 4, 3
P9	4.2	5, 5, 5, 4, 2
P10	4.2	5, 5, 5, 5, 1

C7		
Participant	Mean	Likert response to each test item (5 items per condition)
P4	4.0	4, 4, 4, 4, 4
P11	3.8	5, 5, 4, 4, 1
P12	4.0	5, 5, 5, 3, 2

Every participant maintains the unattrited grammaticality judgement in rating these structures overall acceptable. No participant rates more than 1/5 test items ungrammatical on any condition, however this is in each instance enough to bring the mean score outside the 1 SD range of the controls. In cases where the individual test item is rated unacceptable, it is likely that the participant found the item unacceptable for some reason other than the verb position. P4 and P8 do not rate any test items unacceptable, though frequently give a rating of 4 on the Likert scale and in some cases select the scale midpoint, which is again enough to bring their mean score outside of the 1 SD range. Thus, none of the results on Condition 5, 6, and 7 can be taken as instances of grammatical restructuring.

The L2 acquisition results P1 are displayed in Figure 5.7 below. On Conditions, 1, 3, 5, and 6 we see results which are in each case close to the L2 controls SE range. On Condition 4 and 7 however, we see that although the attriter has essentially acquired the correct grammaticality judgment in rating these structures overall unacceptable in the L2, their mean scores are clearly far from the SE range of the controls and therefore this acquisition is not native-like. The participant's mean score for Condition 2 indicates they find this structure neither acceptable nor unacceptable

Chapter 5

overall. This is confirmed by their responses to the individual test items, which appear to cluster around the midpoint of the Likert scale. For this structure – which is the structure on which they have attrited in their L1 – they appear to have not acquired the correct L2 grammaticality judgement.

Chapter 5

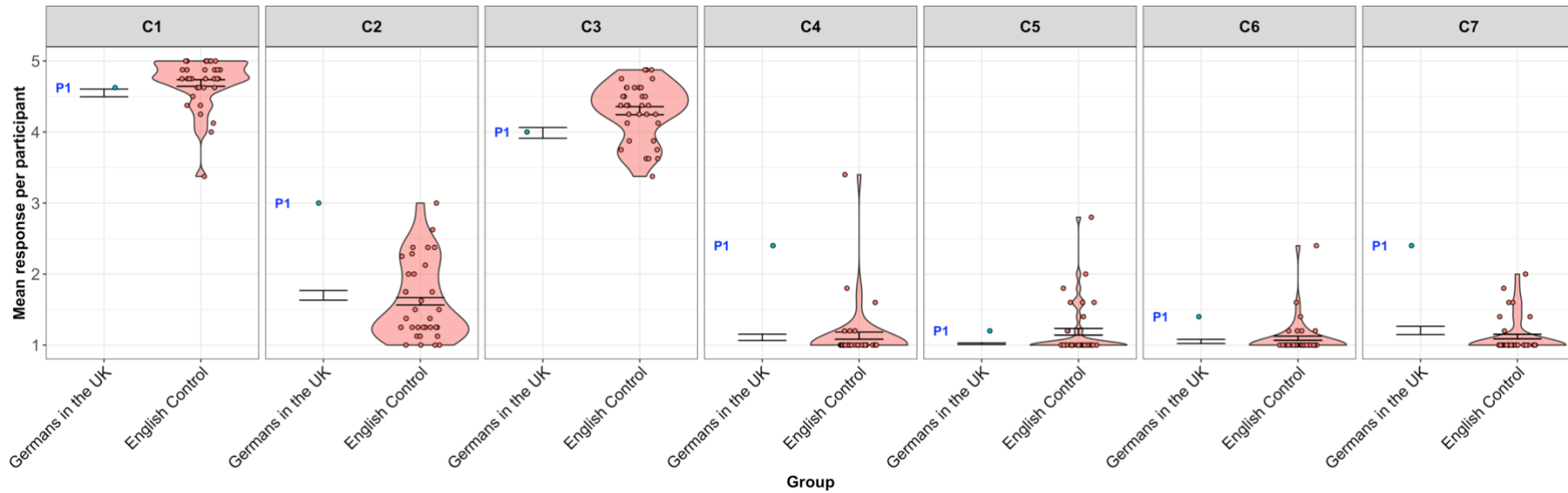


Figure 5.7: L2 Acquisition of Main Clause Verb Position (Individual L1 Attriters only). Error bars: +/- whole group SE.

C1: S-Adv-V(-O).

C2: S-V-Adv(-O).

C3: Adv-S-V(-O).

C4: Adv-V-S(-O).

C5: (temporal) AdvPP-V-S(-O).

C6: ('manner') AdvPP-V-S(-O).

C7: (locative) AdvPP-V-S(-O).

5.5.3 German – Spanish

Finally, we look at the predicative adjective gender agreement and negation results from the German – Spanish group.

5.5.3.1 Predicative Adjective Gender Agreement

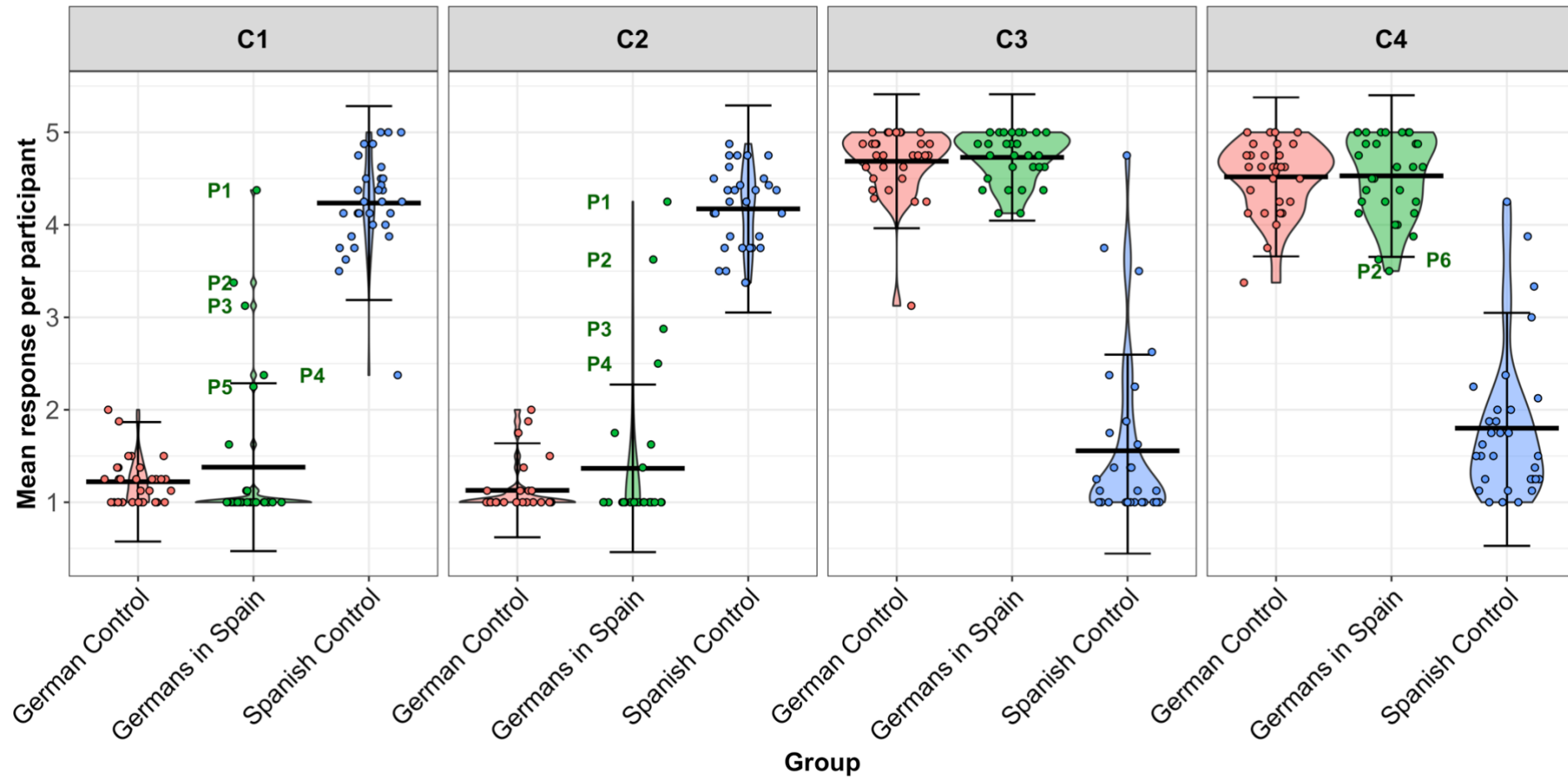


Figure 5.8: Predicative Adjective Gender Agreement individual variation (L1 Attrition). Bold lines: group mean. Error bars: ± 1 SD from the mean.

C1: Feminine noun: gender agreement morphology on adjective.

C2: Masculine noun: gender agreement morphology on adjective.

C3: Feminine noun: no gender agreement morphology on adjective.

C4: Masculine noun: no gender agreement morphology on adjective.

Chapter 5

As Condition 1 and 2 test the same structure but with feminine and masculine nouns respectively, and as four of the potential attriters highlighted in Figure 5.8 for Condition 1 are also highlighted as potential attriters on Condition 2, the results of these two conditions are discussed together. The individual Likert responses by each potential attriter are displayed in the tables below:

C1		
Participant	Mean	Likert response to each test item (8 items per condition)
P1	4.38	5, 5, 5, 4, 4, 4, 4, 4
P2	3.38	5, 4, 4, 4, 3, 3, 2, 2
P3	3.2	4, 4, 4, 3, 3, 3, 2, 2
P4	2.38	4, 3, 3, 2, 2, 2, 2, 1
P5	2.25	3, 3, 3, 2, 2, 2, 2, 1

C2		
Participant	Mean	Likert response to each test item (8 items per condition)
P1	4.25	5, 5, 5, 5, 4, 4, 3, 3
P2	3.63	5, 4, 4, 4, 4, 3, 3, 2
P3	2.88	4, 4, 3, 3, 3, 2, 2, 2
P4	2.5	4, 3, 3, 2, 2, 2, 2, 2

P5 never gives a rating higher than the Likert scale midpoint and P4 does so only for 1/8 test items per condition. Both participants therefore clearly maintain the unattrited grammaticality judgments overall and these patterns cannot be reliably interpreted as L1–L2 optionality or any other pattern of attrition.

P3's results on the other hand, seem to be clustering around the midpoint of the scale on both conditions (3 is the most commonly selected Likert response), suggesting variation of a different nature to L1–L2 optionality. This pattern does not emerge in P3's results on the other grammatical property (negation – see 5.5.3.2) nor on the filler conditions. Thus, this is not a response bias which the participant has regardless of the AJT stimuli but is specific to this property. This is a response pattern which also emerges for other participants on some negation conditions (see 5.5.3.2). This particular response pattern does not neatly conform to either of the two patterns of L1 grammatical restructuring which arise straightforwardly from the Minimalist accounts of cross-linguistic and intra-speaker variation assumed in this thesis i.e., L1–L2 optionality or L2 convergence and which have been found to obtain in previous grammatical attrition studies (see 1.2.3.3 and 2.4 for discussion). This pattern is not explored further in this chapter but discussed in 6.2.1.

Chapter 5

On Condition 1, P1 rates 8/8 test items as acceptable. On Condition 2, they rate 6/8 test items acceptable and give a rating of 3 for 2/8. These structures are thus never rated unacceptable. This is a particularly robust finding as it holds across 16 test items and for both feminine and masculine nouns. Indeed, the mean scores are squarely in line with the L2 means for both conditions and essential in line with their own results on Condition 3 and 4, which are grammatical in German (mean = 4.88 on both conditions). These results therefore provide a clear instance of L2 convergence, i.e., the L2 grammatical options seem to have supplanted the L1 options in the form of consistently and strongly accepting ungrammatical L1 structures based on the acceptability of equivalent L2 structures. This participant does not exhibit patterns of L2 convergence on the other grammatical property tested: negation (though there is possibly attrition in the form of L1–L2 optionality – see 5.5.3.2) nor on the filler conditions. This suggests that this pattern of never rejecting ungrammatical structures is not due to the participant simply clicking through the test items as without paying attention and rating each as acceptable regardless of their grammaticality. P2 rates both conditions as overall acceptable, though with mean scores lower than those of P1. They rate only 3/16 test items (across both conditions) unacceptable. These results are therefore best interpreted as another instance of L2 convergence, though to a slightly lesser extent than P1. Indeed, P2's mean scores are within 1 SD of the mean of the L2 control group, and on Condition 2 their mean score is higher than three of the L2 control participants' means. This participant exhibits no optionality on the negation conditions (see 5.5.3.2), thus these results can be more reliably attributed to a change in the participants underlying grammar rather than them giving varied responses regardless of the test stimuli.⁹⁶

The two attriters have similar (extra)linguistic background data – displayed in the table below – in terms of L1 proficiency, frequency and method of contact with friends and relatives in Germany, and both speak English as an additional L2. Whilst P2 is 50/50 L1–L2 dominant in terms of language usage, P1 is strongly L1 dominant. However, this result is skewed considerably in the participant has no children and is not currently employed, thus German use with partner is the only variable available to calculate this dominance score (see 4.3.1 for details on the calculation).⁹⁷

⁹⁶ P2 does show some optionality on one of the filler conditions: Verb-Subject declarative clauses (see Appendix I for test items), however a number of control participants also exhibit the same pattern. It is perhaps possible that, despite the use contextual sentences and ensuring that the test item audio had the intonation of declarative sentences and also the absence of a question mark in the written test item, some participants may have interpreted these test items as questions – the only instance where Verb-Subject word order is grammatical in German.

⁹⁷ P1's L2 proficiency score appears surprisingly low at first, however this participant informed the researcher via email that they had somewhat misunderstood the Spanish LexTALE instructions and had only clicked 'yes' to a word if they were also sure of the meaning. The task requires only that the word be recognised: it is not necessary to also know the meaning to respond 'yes'.

Chapter 5

C1/C2 Participant	P1	P2
Age	74	62
Gender	Male	Female
Education Level (mode)	Master	Other
Length of Residence in L2 Country (years)	26	40
L1 Proficiency (Lextale) (%)	96.25	95
L2 Proficiency (Lextale) (%)	47.5	98.33
L1/L2 Dominance Ratio	7	1
Partner's L1	German	Spanish
German use with Partner (frequency)	Always	Rarely
Spanish use with Partner (frequency)	Never	Mostly
German use with children (frequency)	N/A	Mostly
Spanish use with children (frequency)	N/A	Rarely
German use in current employment (frequency)	N/A	Often
Spanish use in current employment	N/A	Often
Frequency of contact with family and friends in Germany	Regularly	Regularly
Method of contact with family and friends in country of origin	Email, Audio calls, Video calls, Voice messages	Audio calls, Video calls, Voice messages
Frequency of visits to Germany each year	3-4	1-2
Number of days in Germany each year (average)	30	14
Other languages/ dialects	English	English, French, Plattdeutsc h (German)

For Condition 3 no potential attriters are highlighted. The individual responses for the two participants highlighted as potential attriters on Condition 4 are presented below:

C4		
Participant	Mean	Likert response to each test item (8 items per condition)
P2	3.5	5, 4, 4, 4, 4, 3, 3, 1
P6	3.63	5, 4, 4, 4, 4, 3, 3, 2

Both participants only rate 1/8 items lower than the Likert scale midpoint. They therefore clearly maintain the unattrited grammaticality judgments and these patterns cannot be reliably interpreted as L1–L2 optionality or any other pattern of L1 attrition. It is likely that the one test item rated as unacceptable by each participant was rated so for some reason other than the adjective agreement.

Chapter 5

The L2 results of the two potential attriters, P1 and P2, are displayed in Figure 5.9. P1 has seemingly not acquired the correct grammaticality contrasts in their L2. In fact, they select the same Likert response (5) for every test item for all four conditions. It is not expected that even a beginner learner – which P1 is not – would select the highest acceptability rating for 16/16 Spanish sentences missing all adjectival agreement morphology. On one hand, it seems like the participant has simply clicked through the experimental items without paying sufficient attention and actually considering the acceptability of each item. However, on the other grammatical property tested (negation – see 5.5.3.2) and on filler conditions, this same pattern of results is not seen: though the acquisition of these other properties is likewise not successful, the participant is selecting Likert response options other than 5, indicating that they are in fact paying attention and considering the acceptability of each item as intended (recall that the properties were tested in the same AJT with items presented in a randomised order). It appears then – rather surprisingly – that this participant has erroneously acquired that predicative adjectival morphology is entirely optional in Spanish (they select the ‘I don’t know’ option frequently for the L2 negation test items yet never use that option here, suggesting that they are also fairly certain of these judgments). P2 has likewise not acquired the correct grammaticality contrasts in that all conditions are rated acceptable overall. Interestingly, their individual Likert responses on both the L1 and L2 versions of Condition 1 and 2 – the conditions on which they have attrited and now essentially converge on the L2 – are extremely similar:

- L1 C1 = 3.38 (5, 4, 4, 4, 3, 3, 2, 2), L2 C1= 3.63 (5, 5, 4, 4, 4, 3, 2, 2).
- L1 C2 = 3.63 (5, 4, 4, 4, 4, 3, 3, 2), L2 C2= 3.63 (5, 5, 4, 4, 3, 3, 3, 2).

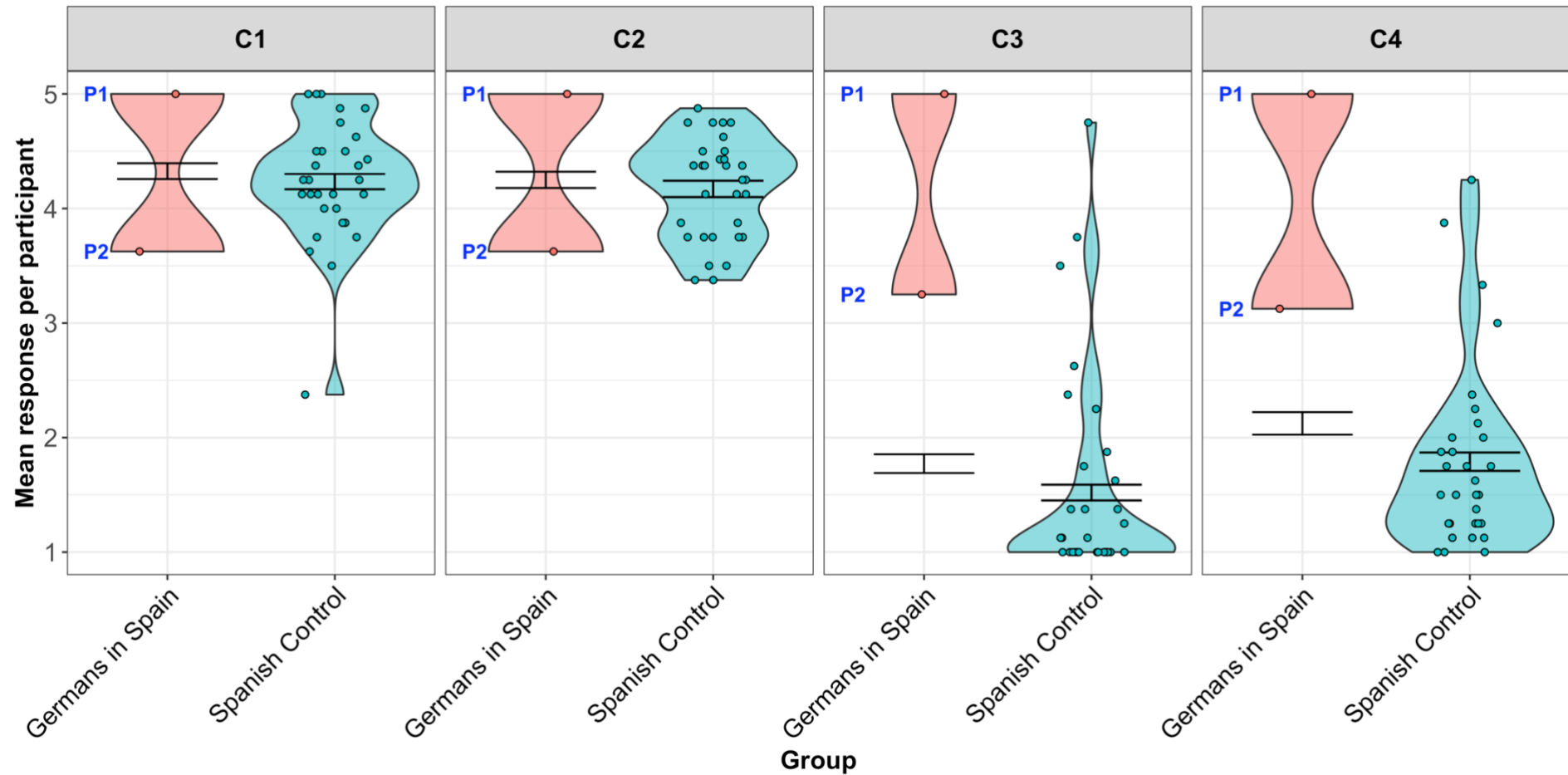


Figure 5.9: L2 Acquisition of Predicative Adjective Gender Agreement (Individual L1 Attriters only). Error bars: +/- whole group SE.

C1: Feminine noun: gender agreement morphology on adjective.

C2: Masculine noun: gender agreement morphology on adjective.

C3: Feminine noun: no gender agreement morphology on adjective.

C4: Masculine noun: no gender agreement morphology on adjective.

5.5.3.2 Negation

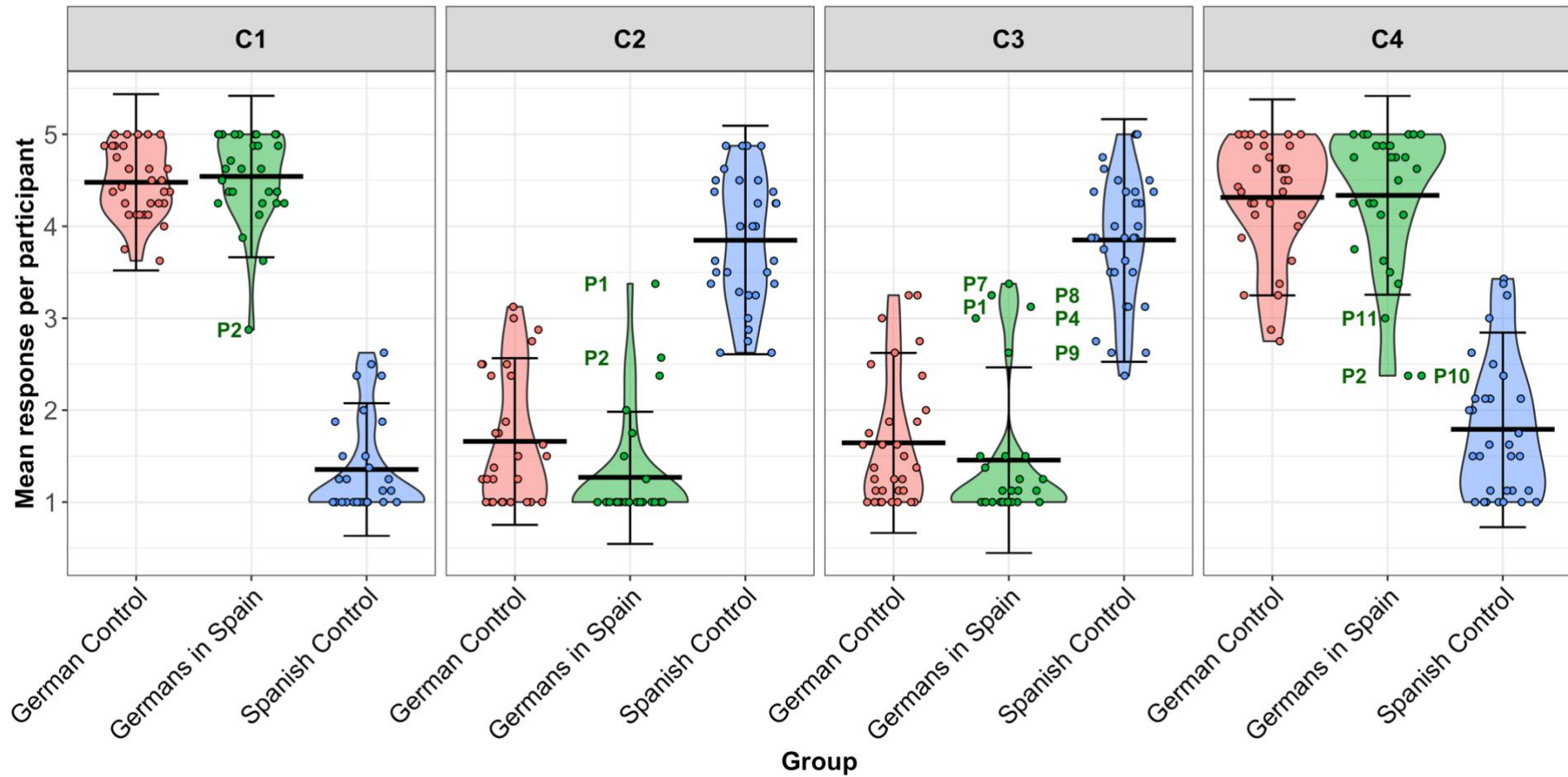


Figure 5.10: Negation individual variation (L1 Attrition). Bold lines: group mean. Error bars: +/- 1 SD from the mean.

C1: Negative Quantifier.

C2: Negative Marker + Negative Quantifier.

C3: Negative Quantifier + Negative Quantifier.

C4: Negative Quantifier + NPI.

Chapter 5

For Condition 1, one participant is highlighted on Figure 5.10 as a potential attriter.

Their responses to the individual test items are presented in the table below:

C1		
Participant	Mean	Likert response to each test item (8 items per condition)
P2	2.89	4, 4, 3, 3, 3, 2, 2, 2

The Likert response pattern is not clearly indicative of L1–L2 optionality or L2 convergence, rather the responses seem more to cluster around the midpoint of the Likert scale. This pattern, noted also in 5.5.1.1 and 5.5.3.1, is not analysed further here but will be discussed in 6.2.1.

The results of the two participants highlighted as potential attriters on Condition 2 are presented below:

C2		
Participant	Mean	Likert response to each test item (8 items per condition)
P1	3.38	5, 4, 4, 4, 3, 3, 2, 2
P2	2.57	4, 3, 3, 2, 2, 2, 2 (+ one 'I don't know' response)

P2 maintains the unattrited grammaticality judgment overall. They rate only 1/8 items over the midpoint, thus these results cannot be reliably interpreted as L1–L2 optionality nor indeed L2 convergence. P1, however, rates this ungrammatical condition as overall acceptable. In terms of the individual Likert responses, 4/8 items are rated as acceptable, 2/8 as unacceptable, and 2/8 are given a midpoint rating. Furthermore, their mean score is well within the 1 SD score of the Spanish controls, and indeed even higher than the mean score of eight of these controls. This pattern can therefore be considered L2 convergence, or at least approaching L2 convergence. P1's (extra)linguistic background information is repeated below from 5.5.3.1.

Chapter 5

C2 Participant	P1
Age	74
Gender	Male
Education Level (mode)	Master
Length of Residence in L2 Country (years)	26
L1 Proficiency (Lextale) (%)	96.25
L2 Proficiency (Lextale) (%)	47.5
L1/L2 Dominance Ratio	7
Partner's L1	German
German use with Partner (frequency)	Always
Spanish use with Partner (frequency)	Never
German use with children (frequency)	N/A
Spanish use with children (frequency)	N/A
German use in current employment (frequency)	N/A
Spanish use in current employment	N/A
Frequency of contact with family and friends in Germany	Regularly
Method of contact with family and friends in country of origin	Email, Audio calls, Video calls, Voice messages
Frequency of visits to Germany each year	3-4
Number of days in Germany each year (average)	30
Other languages/ dialects	English

Five participants are highlighted as potential attriters on Condition 3. Their individual Likert responses are presented in the table below:

C3		
Participant	Mean	Likert response to each test item (8 items per condition)
P1	3.1	4, 4, 4, 4, 3, 3, 2, 1
P7	3.38	5, 5, 5, 5, 3, 2, 1, 1
P8	3.25	5, 5, 4, 3, 3, 3, 2, 1
P4	3.0	5, 4, 3, 3, 3, 2, 2, 2
P9	2.63	4, 4, 4, 3, 3, 1, 1, 1

The mean scores indicate that all participants other than P9 rate this ungrammatical structure as acceptable overall. The mean responses of all participants, including P9, are in fact in line with the mean scores of some Spanish control participants. Despite this, only the response patterns of P1 are suggestive of L2 convergence, or at least are approaching L2 convergence. P1 rates 4/8 items acceptable, 2/8 unacceptable, and 2/8 are given a midpoint rating. P7's responses are perhaps better interpreted as optionality: 4/8 items are rated as acceptable, 3/8 unacceptable, and

Chapter 5

1/8 is given a midpoint rating (though admittedly, the difference between P1's and P7's response patterns is very slight). P9's responses can likewise be interpreted as optionality: 3/8 items acceptable, 3/8 unacceptable, 2/8 midpoint. P8 and P4 both assign the midpoint to 3/8 items. However, whilst P8 rates 3/8 items acceptable and 2/8 unacceptable, P4's responses are the reverse: 2/8 items acceptable, 3/8 unacceptable. These responses are arguably also best interpreted as optionality, though there is a less clear alternation between the available L1 and L2 grammatical options here due to the higher number of items which were given a midpoint rating. These participants exhibit no optionality in their responses to predicative adjective gender agreement (see 5.5.3.1) and the results on the filler conditions are in line with the L1 controls. Thus, the optionality seen for negation can be more reliably attributed to grammatical attrition, rather than these participants giving varied responses regardless of the AJT stimuli. Consideration of their (extra)linguistic background data, presented in the table below, reveals that all participants have an L1 German speaking partner, all have a higher proficiency in their L1, all but one participant is L2 dominant, and all speak English as an additional L2.

Chapter 5

C3 Participant	P1	P7	P8	P4	P9
Age	74	58	71	60	58
Gender	Male	Male	Female	Female	Female
Education Level (mode)	Master	Apprenticeship/ Professional training	Master	High school	Master
Length of Residence in L2 Country (years)	26	19	15	20	32
L1 Proficiency (Lextale) (%)	96.25	85	92.5	87.5	91.25
L2 Proficiency (Lextale) (%)	47.5	58.3	61.6	56.6	83.33
L1/L2 Dominance Ratio	7	4	2.3	7	0.8
Partner's L1	German	German	German	German	German and Spanish
German use with Partner (frequency)	Always	Always	Always	Always	Rarely
Spanish use with Partner (frequency)	Never	Rarely	Sometimes	Never	Mostly
German use with children (frequency)	N/A	Always	Always	Always	Mostly
Spanish use with children (frequency)	N/A	Never	Sometimes	Never	Sometimes
German use in current employment (frequency)	N/A	Mostly	N/A	Always	Regularly
Spanish use in current employment	N/A	Rarely	N/A	Never	Mostly
Frequency of contact with family and friends in Germany	Regularly	Regularly	Regularly	Sometime s	Always
Method of contact with family and friends in country of origin	Email, Audio calls, Video calls, Voice messages	Audio calls, Voice messages	Email, Audio calls, Video calls, Voice messages	Audio calls, Emails, Voice messages	Audio calls, Texts, Video calls, Voice Messages, Letters
Frequency of visits to Germany each year	3-4	Less than once a year	1-2	1-2	1-2
Number of days in Germany each year (average)	30	20	14	10	14
Other languages/ dialects	English	English, Hamburgerisch (German)	English	English	English, French

Three participants are highlighted as potential attriters on Condition 4. Their individual response patterns are presented in the table below:

C4		
Participant	Mean	Likert response to each test item (8 items per condition)
P2	2.38	4, 4, 3, 2, 2, 2, 1, 1
P10	2.38	4, 3, 3, 3, 2, 2, 1, 1
P11	3.0	5, 5, 3, 3, 3, 2, 2, 1

Chapter 5

P2 and P10 rate this grammatical structure ungrammatical overall. P2's results are potentially indicative of L1–L2 optionality. However, considering that only 2/8 items are rated acceptable and 1/8 given a midpoint rating, and that their mean score is well within the 1SD range of the L2 controls – and indeed lower than the mean of six of these controls – their results may be better interpreted as L2 convergence. P10's results are less clear again. Though 4/8 items are rated unacceptable and only 1/8 acceptable, 3/8 are assigned a midpoint rating. This pattern is not obviously optionality or convergence, though their mean score is also well within the 1 SD range of the L2 controls and lower than the mean of six L2 control participants' means. The responses are also not obviously clustering around the midpoint of the scale. These results are therefore arguably best interpreted as approaching L2 convergence. P10 exhibits no optionality for predicative adjective gender agreement or for the filler conditions. P11's mean score is exactly the midpoint of the Likert scale. They rate 2/8 items acceptable, 3/5 unacceptable, and 3/8 are given a midpoint rating. The pattern could be interpreted as some degree of optionality; however, this is not the clearest pattern due to the number of midpoint ratings. P11 exhibits no optionality for predicative adjective gender agreement or for the filler conditions. The participants' (extra)linguistic background data are presented in the table below. P2 and P11 have both have particularly long LoRs, an L1 Spanish speaking partner, and have a higher proficiency in their L2 (unlike P10). Whilst P2 and P10 are balanced L1–L2 dominant in terms of language use, P11 is L1 dominant.

Chapter 5

C4 Participant	P2	P10	P11
Age	62	52	57
Gender	Female	Male	Female
Education Level (mode)	Other	Master	Apprenticeship / Professional training
Length of Residence in L2 Country (years)	40	23	35
L1 Proficiency (Lextale) (%)	95	96.25	86.25
L2 Proficiency (Lextale) (%)	98.33	85	90.83
L1/L2 Dominance Ratio	1	1	0.14
Partner's L1	Spanish	Niether German nor Spanish	Spanish
German use with Partner (frequency)	Rarely	Rarely	Never
Spanish use with Partner (frequency)	Mostly	Often	Always
German use with children (frequency)	Mostly	Mostly	N/A
Spanish use with children (frequency)	Rarely	Sometimes	N/A
German use in current employment (frequency)	Often	Often	N/A
Spanish use in current employment	Often	Often	N/A
Frequency of contact with family and friends in Germany	Regularly	Regularly	Sometimes
Method of contact with family and friends in country of origin	Audio calls, Video calls, Voice messages	Audio calls, Email, Video Calls	Audio calls, Email, Other
Frequency of visits to Germany each year	1-2	3-4	Less than once a year
Number of days in Germany each year (average)	14	5	5
Other languages/ dialects	English, French, Plattdeutsch (German)	English, Catalan	English, Mannheimeri sch (German), Andaluz (Spanish)

Figure 5.11 depicts the L2 acquisition results for the seven potential attriters. Only one participant, P11, has acquired the correct grammaticality contrasts in the L2 for all four conditions, though their mean scores only approach the SE range of the L2 controls on Condition 1 and Condition 2. The results of the remaining seven participants are very varied, both within and across the conditions, indicating that they have not successfully acquired negation in L2 Spanish. Interestingly, for P8, P9, and P10 both the mean scores and individual Likert responses on both the L1 and L2 version of Condition 3 – the condition on which they have attrited – are very similar:

- P8 L1 C3 = 3.25 (5, 5, 4, 3, 3, 3, 2, 1), L2 C3= 2.63 (5, 5, 3, 3, 2, 1, 1, 1).
- P9 L1 C3 = 2.63 (4, 4, 4, 3, 3, 1, 1, 1), L2 C3 = 2.38 (4, 4, 4, 3, 1, 1, 1, 1).
- P10 L1 C4 = 2.38 (4, 3, 3, 3, 2, 2, 1, 1), L2 C4 = 2.0 (3, 3, 2, 2, 2, 2, 1, 1).

Chapter 5

Finally, it should be noted that P1's mean scores are somewhat deceptive here as the participant's most frequent response across all conditions is the 'I don't know' option (24/32 items), with 7/32 items rated 5, and just 1 item – on Condition 3 – rated 1. It appears then they have acquired very little – if anything – of negation in Spanish.

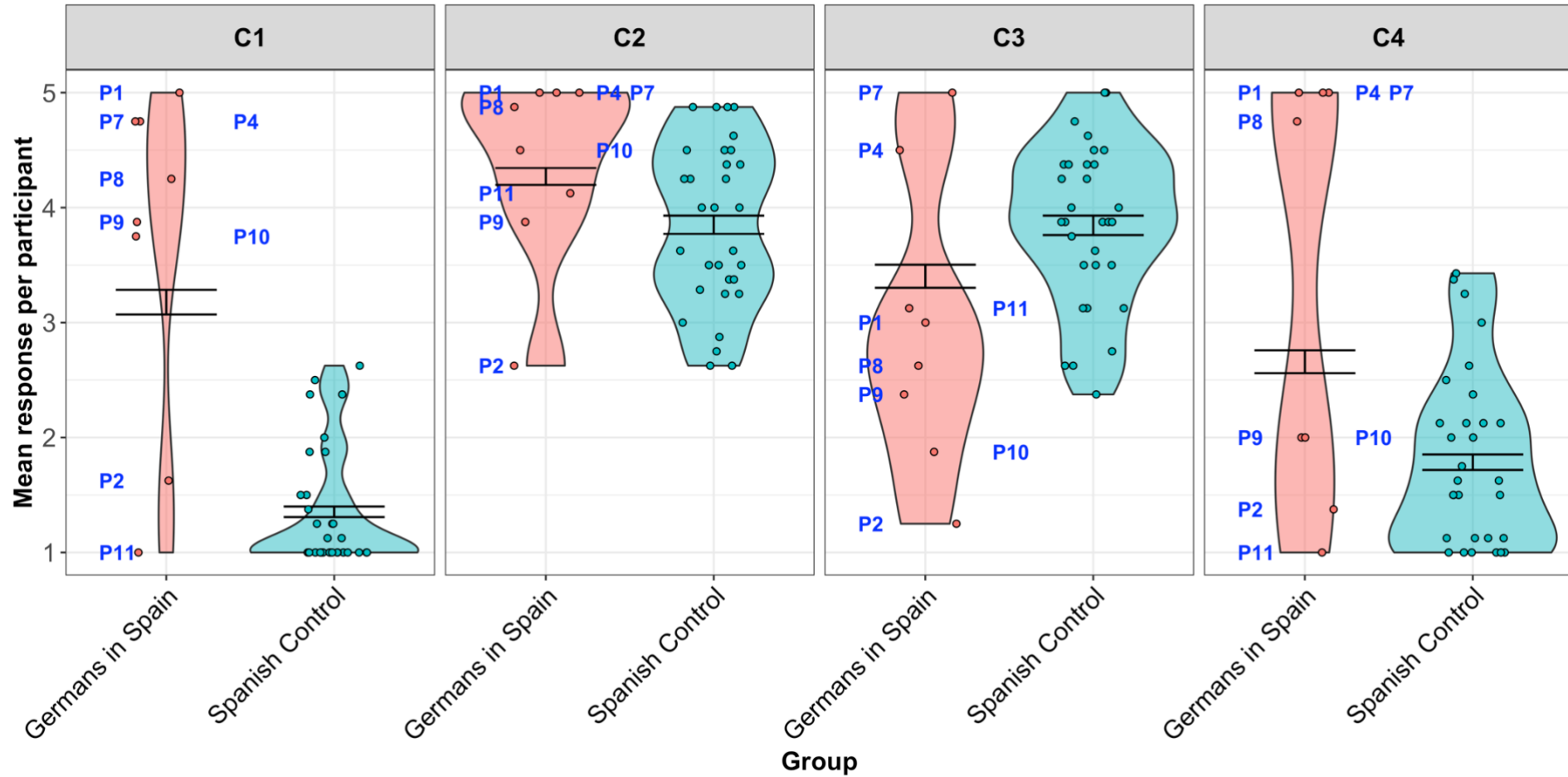


Figure 5.11: L2 Acquisition of Negation (Individual L1 Attriters only). Error bars: +/- whole group SE.

C1: Negative Concord Item.

C2: Negative Marker + Negative Concord Item.

C3: Negative Concord Item + Negative Concord Item.

C4: Negative Concord Item + NPI.

5.6 Summary of results

This study found no attrition at a group level for any of the 22 conditions on which it was expected. In terms of the group-level acquisition results, native-like acquisition is seen for all but five conditions. In each case, non-convergence on the L2 grammar is due to a failure to reject an ungrammatical structure to the same degree as the L2 controls. Of these 5 conditions not acquired to a native-like degree, the correct L2 grammaticality contrasts are acquired for all but 2/5 conditions. Both are negation conditions.

The individual-level attrition and acquisition results are summarised in Table 5.1. There are 16 instances of grammatical attrition across 8 different experimental conditions. In 8 cases this attrition is L2 convergence, and in the other 8 it is L1–L2 optionality. These results are from 11 individual participants. Recall that in 4.5.2, it was reasoned that optionality may obtain in two ways: 1) across conditions i.e., it could be the case that attriters chose the L1 option for one condition, such that their results pattern with the L1 control group, but chose the L2 option for the counterpart condition, such that their results pattern with the L2 controls (recall also that all structures but the German–English reflexive binding structures are in grammatical-ungrammatical pairs based on the L1 and L2 grammatical options for the same structure); 2) optionality may obtain within a single condition in which attriters switch between the L1 and L2 options on different test items for this same structure. Only the results of P1 on both adjective agreement and negation and P2 on adjective agreement indicate optionality across all of these conditions: their results converge on the L2 patterns for the conditions highlighted in Table 5.1 (i.e., for half the conditions for each property), on the remaining conditions for each property, they have not attrited, and therefore their results pattern with the L1 controls. The only other cases of L2 convergence are found on negation condition 4 (P10 and P2). Their results only converge on the L2 for a single condition, and thus they pattern with the L1 on the remaining three conditions. They therefore exhibit optionality across Condition 3 and 4, but not the across all of the negation conditions. No participant converges on the L2 patterns for all conditions.

Chapter 5

Group	Grammatical Property	Attriter	L1 Attrition		L2 Acquisition of equivalent grammatical property
			AJT Condition and (unattrited) L1 grammaticality	Response Pattern	
German – Dutch	Reflexive Binding	P2	C1: grammatical	L1–L2 Optionality (skewed towards ungrammatical).	Successful acquisition of all grammaticality contrasts. Results approach native control SE range for all but one condition (C3), though mean still in line with some individual L2 control means here.
	Grammatical Gender	No Attrition			
German – English	Reflexive Binding	P3	C3: ungrammatical	L1–L2 Optionality (heavily skewed towards ungrammatical).	Successful acquisition of all grammaticality contrasts. Results approach native control SE range for all but one condition (C3), though mean still in line with some individual L2 control means here.
	Main Clause Verb Position	P1	C3: ungrammatical	L1–L2 Optionality.	Successful acquisition of grammaticality contrasts in all but one case (C1 vs. C2). Results within or approaching native control SE range for all conditions but C4 and C7. C4 and C7 means not in line with any individual L2 control means.
German – Spanish	Predicative Adjective Gender Agreement	P1	C1: ungrammatical C2: ungrammatical	L2 Convergence. L2 Convergence.	Unsuccessful acquisition of any grammaticality contrasts (all conditions rated grammatical).
		P2	C1: ungrammatical C2: ungrammatical	L2 Convergence. L2 Convergence.	Unsuccessful acquisition of any grammaticality contrast. Very similar responses on L1 and L2 versions of C1 and C2.
	Negation	P1	C2: ungrammatical C3: ungrammatical	L2 Convergence. L2 Convergence.	Unsuccessful acquisition of any grammaticality contrast.
		P7	C3: ungrammatical	L1–L2 Optionality.	Unsuccessful acquisition of any grammaticality contrast (all conditions rated grammatical).
		P8	C3: ungrammatical	L1–L2 Optionality (though not the clearest response pattern).	Unsuccessful acquisition of grammaticality contrasts. Very similar responses on L1 and L2 version of C3.
		P4	C3: ungrammatical	L1–L2 Optionality (though not the clearest response pattern).	Unsuccessful acquisition of any grammaticality contrast (all conditions rated grammatical).
		P9	C3: ungrammatical	L1–L2 Optionality.	Unsuccessful acquisition of any grammaticality contrast. Very similar responses on L1 and L2 version of C3.
		P2	C4: grammatical	L2 Convergence.	Unsuccessful acquisition of any grammaticality contrast (all conditions rated ungrammatical).
		P10	C4: grammatical	L2 Convergence (though not the clearest response pattern).	Unsuccessful acquisition of any grammaticality contrast. Very similar responses on L1 and L2 version of C4.
		P11	C4: grammatical	L1–L2 Optionality (though not the clearest response pattern).	Successful acquisition of all grammaticality contrasts. Results approach native control SE range for all but two conditions (C3 and C4), though means still in line with some individual L2 control means here.

Table 5.1: Summary of key L1 attrition and L2 acquisition findings from individual attriters.⁹⁸

⁹⁸ Recall that the participant numbers restart for each L1–L2 group, so for example, P1 in the German–Dutch group is not the same as P1 in the German–Spanish group, but P1 listed for the predicative adjective gender agreement and negation in the German–Spanish group is the same participant.

Chapter 6 Discussion and conclusions

6.1 Introduction

The empirical results of this study are first discussed in 6.2 with reference to the three research questions. 6.3 then considers in detail the specific implications of these findings for the AvA model, as well as the additional hypothesis formulated and tested in this thesis regarding the complexity of FR. The relationship between L1 grammatical attrition and L2 acquisition was not addressed specifically by any of the three research questions. Nevertheless, as this relationship is integral to the AvA model, the design of the current study allowed for empirical investigation of this relationship. These findings are discussed in 6.3.3. Section 6.4 proposes some directions for future research in modelling grammatical attrition. Finally, an overall summary and conclusion of the thesis is provided in 6.5.

6.2 Results in relation to the research questions

6.2.1 deals with the first of the three research questions. The second and third research questions, which deal with two distinct yet related aspects of the role of input in grammatical attrition, are considered in 6.2.2.

6.2.1 Divergences from baseline: Manifestations and Feature Reassembly

The first research question is repeated here for clarity:

- 1) Does the L1 German grammar differ from the baseline on any of the morphosyntactic properties in any of the three linguistic contexts? If so, how are these divergences manifested and how can this be accounted for in terms of reassembly of the L1 features?

Analysis of the three experimental groups' results revealed no statistically significant divergences from the L1 control results which can be considered evidence of L2-induced L1 grammatical restructuring at a group level i.e., on none of the 22 experimental conditions where

attrition was predicted do the results of the experimental groups differ significantly from the L1 baseline in the direction of the L2 control results.⁹⁹

Despite no evidence for L2-induced L1 grammatical restructuring at the group level, careful analysis of individual participants' mean scores and, crucially, their individual Likert responses, suggest numerous cases of such attrition for individual participants. 16 individual instances of grammatical attrition (from 11 participants) are found on 8/20 experimental conditions where grammatical attrition was predicted, and across five out of the six grammatical properties tested (the one exception being grammatical gender in the German – Dutch pair – this finding is discussed further in 6.3.2.1).¹⁰⁰

These 16 instances of attrition manifested both as L2 convergence, whereby the L1 grammatical options appeared to have been supplanted by the L2 options such that that an L1 structure is either consistently rated grammatical or ungrammatical in line with the L2 grammar for the equivalent L2 structure, or as optionality, whereby the L2 grammatical options supplement the L1 options and appear to coexist in the L1 grammar such that an L1 structure is consistently rated both grammatical and ungrammatical in line with both the L1 and L2 grammars. There are an equal number of instances of convergence and optionality across the 16 cases of attrition: convergence obtains for 4/4 cases of predicative adjective gender agreement attrition and 4/9 cases of negation attrition, with optionality being found for the remaining 8/16 cases. As was noted in 5.6, only the results of P1 on both adjective agreement and negation and P2 on adjective agreement indicate optionality across all conditions i.e., for each property, their results converge on the L2 patterns for half of the conditions and converge on the L1 for the other half of the conditions. No participant converges on the L2 patterns for all conditions testing the same property. Likewise, no participant exhibits optionality for every condition testing the same property. This finding was anticipated in 4.5.2 where it was suggested that though the same feature assemblies underpin the

⁹⁹ Recall that there is one condition (reflexive binding into a picture NP in the German – English pair) where potential attriters deviate significantly from the L1 baseline at a group level, but not in the direction of the L2. This is a rare, though not wholly unattested, finding. For example, it is found for the proportion of subject interpretations to *wh*-questions tested in Grabitzy, 2014 (see 2.4.1 for more details on this study). This is suggested to be at least partly attributable to the potential difficulty that attriters may have with processing ambiguous morphology in these structures. The same explanation cannot be applied to the reflexive binding results here. Statistical models were ran to investigate the potential effects of *Age, Gender, Education, L1 proficiency and L2 proficiency*, as well as well as to test a potential task effect on the potential attriters' results and to investigate the effect of *Age, Gender, Education, L1 proficiency* on the L1 control results, however none of these effects were found to be significant (see 5.3 for details of this analysis). As all of the L1 controls are also L2 English speakers (this is essentially unavoidable with adult L1 German speakers, especially those with university education – see 4.3.2 and Appendix A for control participant background information) it is plausible that L1 controls with higher L2 use may have judgements more in line with the L2 grammar: in principle they may also show attrition/attrition-like patterns despite no significant residence in the UK. A language usage variable was available only for the potential attriters as this was calculated from the additional background questionnaire which only they completed. However, we can be confident that high L2 usage cannot account for the seemingly more L2-like results L1 control group compared to the potential attriter group as the potential attriter group living in the UK clearly has greater L2 use and exposure overall. An explanation of the results of this structure therefore remains elusive and is left to further experimental and theoretical syntactic research to elucidate.

¹⁰⁰ Recall that for two conditions of reflexive binding in the German–English pair, the degree of individual variation in the L1 baseline was such that it was not possible to ascertain whether any of the potential attriters had undergone grammatical restructuring (see 5.5.2.1). Therefore, whilst group-level attrition can be assessed on 22/26 conditions, individual-level attrition can be assessed on only 20/26.

(un)grammaticality of each condition tested per property (with the exception of reflexive binding in the German–English pair), any differences in the salience, frequency, markedness etc. of the structures tested in the different conditions may mean that attrition is found for some, but not all, of the conditions.

In terms of the FR responsible for the observed L1 restructuring, the view assumed in this thesis is that L2 convergence is the result of the L1 feature assemblies relevant for a particular structure being supplanted by the L2 feature assemblies relevant for the equivalent L2 structure. This results in the relevant L1 PFs being specified with the L2 feature bundles. Optionality obtains when the original L1 feature assemblies are maintained, but the L2 feature assemblies are added to the L1 grammar and assembled onto a second version of the relevant L1 PFs (and/or functional heads). This results in duplicate PFs for a given structure, with one set specified with the L1 and the other with the L2 PFs. The specific FR operations which would result in optionality or convergence for each grammatical structure tested in this thesis are outlined in detail in 4.5.

Where the results indicate convergence or optionality, this attrition appears to have obtained as outlined in 4.5 i.e., there is nothing in the 16 instances of grammatical attrition that suggests L1 FR patterns which contradict the FR predicted in 4.5. Therefore, due to space restrictions and to avoid repetition, the specific FR operations are not discussed in detail for each individual structure again here. Instead, the FR operations argued to be responsible for each distinct instance of attrition observed in this study are summarised in Table 6.1 below.¹⁰¹

¹⁰¹ To be clear, the L1 FR outlined in Table 6.1 accounts for the patterns of attrition for the specific conditions listed therein, but in actuality no individual participant's grammar has been restructured such that there is L2 convergence across all conditions (i.e., the L1 grammatical option is always still available, even if apparently not used for some specific conditions). Overall, then, the L1 grammar of each individual participant is characterised by L1–L2 optionality which manifests as L2 convergence on individual experimental conditions only.

Chapter 6

Group	Grammatical Property	L1 Attrition Observed		L1 Feature Reassembly	
		AJT Condition and Response pattern	Unattrited L1	Attrited L1	
German – Dutch	Reflexive Binding	C1: L1-L2 Optionality.	<i>Sich</i> : [DP [D sich] [NP Ø]]	<i>Sich</i> : [DP [D sich] [NP Ø]] + a second version of <i>sich</i> where: [DP] <i>sich</i>	
	Grammatical Gender	No Attrition			
German – English	Reflexive Binding	C3: L1-L2 Optionality.	<i>Sich</i> : [Var: x/y/z]+ [Reflexive]	<i>Sich</i> : [Var: x/y/z] + a second version of <i>sich</i> specified with [Reflexive] [Var:x/y/z].	
	Main Clause Verb Position	C3: L1-L2 Optionality.	[Clause-type:Decl] on C strong. [uTop] on spec CP strong. [u#fl:present] valued as strong on all verbs	Clause-type:Decl] on C strong + a second version of C where [Clause-type:Decl] on C weak. [uTop] on spec CP strong + a second version of CP where [uTop] on spec CP optionally strong. [u#fl:present] on lexical verbs valued as <i>either</i> strong or weak. (alternation between all three features having L1 and the L2 settings gives rise to L1-L2 optionality).	
German – Spanish	Predicative Adjective	C1: L2 Convergence. C2: L2 Convergence.	[Gen: _] specified on Agr-node.	[Gen: _] specified on <i>a</i> -head. No Agr-node.	
	Gender Agreement				
	Negation	C2: L2 Convergence. C3: L2 Convergence. C4: L2 Convergence.	Negative marker: [iNeg]. N-words (NQs): [iNeg].	Negative marker: [iNeg]. N-words (NICs): [uNeg]. NegP projection which hosts the negative operator bearing [iNeg]. Negative marker: [iNeg].	
		C3: L1-L2 Optionality. C4: L1-L2 Optionality.	No NegP projection.	N-words (NQs): [iNeg] + a second version of the N-word(s) specified with [uNeg]. When N-word(s) specified with [iNeg]: No NegP projection. When N-word(s) specified with [uNeg]: NegP projection which hosts the negative operator bearing [iNeg].	

Table 6.1: L1 Feature Reassembly accounts of observed L1 attrition.

It is worth noting that these patterns of L2 convergence and L1–L2 optionality hold across structures which are both grammatical and ungrammatical in an unattrited L1 grammar i.e., the attrition manifests as both accepting ungrammatical structures as well as rejecting grammatical structures (see Table 5.1 in 5.5 for an overview of individual results). 12/16 cases of attrition are accepting an ungrammatical structure. This pattern of restructuring in which the L1 grammatical options are ‘expanded’ based on contrasting L2 grammatical options is therefore clearly the dominant manifestation of grammatical attrition in this study. Nevertheless, the fact that both patterns are present is further evidence that the attrition found is not the result of some sort of task affect in the form of a ‘yes’ or ‘no’ response bias (recall that attrition was only concluded once such

task effects and response biases had been excluded as potential explanation for each individual participant's results).

No attrition – at the group nor the individual level – was found for grammatical gender; specifically, for gender concord between a determiner and noun. This is in keeping with previous research which has found grammatical gender to be impervious to attrition in adult grammars, and in particular in an L1 German–L2 Dutch context (e.g., Bergman et al, 2015 – see 3.2 for brief discussion on previous studies which have tested the same properties tested in this thesis with L1 German). For the remaining five grammatical properties, at least one instance of attrition was found in each case, though for individual participants rather than at the group level. As noted in 3.2, to the best of my knowledge, negation has not yet been investigated in attrited adult grammars, nor has predicative adjective agreement in L1 German. The results of this study suggest that these properties are vulnerable at least at the individual level. It would be informative to see whether these results are replicated in future research. As also noted in 3.2, previous results regarding the vulnerability of V2 in L1 German are rather mixed, though on the whole any attrition appears rather minimal. The results of this study are therefore very much in line with this. This study likewise finds very minimal attrition of reflexive binding in L1 German–L2 English. To the best of my knowledge, attrition of reflexive binding in L1 German–L2 Dutch has not been investigated previously, however the results of this study clearly suggest that such binding is largely resistant to attrition. The fortitude of reflexive binding found in this study is perhaps somewhat surprising considering the significant group-level attrition of reflexive binding found in L1 Turkish–L2 English by Gürel (2004a etc – see 2.4.2 for details).

The finding of individual but no group-level attrition suggests that grammatical attrition is a particularly individualistic phenomenon that appears to be conditioned by the interaction of a multitude of linguistic and extralinguistic factors which on the whole remain poorly understood to date. In terms of the (extra)linguistic background profiles of the individual attriters, no clear pattern emerges which could explain why attrition is found only for these 11 individual participants and no others.

One further response pattern emerged when inspecting the individual-level results. In a few cases (P3's results on adjective agreement Condition 1 and 2, and P2's results on negation Condition 1, the participants' Likert responses appear to be clustering around the midpoint of the scale. As noted in 5.5.1.1, this particular response pattern does not neatly conform to L2 convergence or L1–L2 optionality – the two patterns of L1 grammatical restructuring which arise straightforwardly from the Minimalist accounts of cross-linguistic and intra-speaker variation assumed in this thesis and which have been found to obtain in previous grammatical attrition studies (see 1.2.3.3 and 2.4 for

discussion). Indeed, it is not immediately clear what manner of L1 FR could give rise to such a pattern of results.

One interpretation of this response pattern would be to assume that L1 grammatical (i.e., representational) restructuring can only take the form of L2 convergence or L1–L2 optionality and to therefore assume that these results – though clearly divergent from the L1 baseline – do not represent a representational change to the L1. In which case, a possible explanation for this pattern would be to assume that these participants simply avoid the extreme ends of the Likert scale when making their judgments. However, this pattern is not found in their results for the remaining experimental conditions or on the filler conditions. This suggests that we are not looking at an idiosyncratic response pattern that obtains regardless of AJT test stimuli, but something specific to these properties and these conditions. Furthermore, these results do not appear to be due to a lack of certainty in their judgments as the Likert scale also includes an ‘I don’t know’ option, which they did not select on these conditions.

Another interpretation is that, as there are only three instances of this response pattern seen in this entire study, it is possible that these are simply anomalous results and thus do not warrant further consideration. It is unclear how frequent such results are in L1 attrition studies as analyses of individual Likert response patterns seldom undertaken and, importantly, as AJTs using Likert scales containing a clear midpoint and as well as a separate ‘I don’t know’ option are rarely employed. As noted in 4.4.3.1, this is a crucial methodological consideration as it allows a differentiation between two distinct types of response: 1) a genuine ‘grey area’ in acceptability and 2) and lack of certainty. Instead, many commonly employed methodologies have response options skewed towards eliciting solely patterns of convergence or optionality e.g., Production tasks, Truth Value Judgement Tasks, and Grammaticality/Acceptability Judgment Tasks with binary response variables/results transformed to binary outcomes. This potentially masks more fine-grained patterns of intra-speaker variation and also the possible shortcomings of theoretical proposals in accounting for these patterns, should these patterns be attested more broadly. Future research would do well to employ – where appropriate – more nuanced gradient response options in order to allow more fine-grained patterns of inter and intra-speaker variation to be revealed. If we assume that these results are not anomalous, a key implication for L1 grammatical attrition research would be that not all divergences from the L1 baseline in the direction of the L2 grammar can be neatly accounted for by the mechanisms of L1 Feature Reassembly.

6.2.2 The role of input similarity in L1 morphosyntactic attrition

Research questions two and three are repeated here for clarity:

- 2) To what extent does the L1–L2 holistic similarity modulate L1 attrition of these morphosyntactic properties?
- 3) To what extent does the structural similarity of the morphosyntactic properties – formalised as the complexity of Feature Reassembly required for the attrition of an L1 structure – modulate attrition of these properties?

Regarding question 2), it is not possible to draw any conclusions regarding the role of L1–L2 holistic similarity based on the group-level results of this study as no group-level attrition is found in any of the three contexts. However, based on the individual results, it seems that holistic similarity does not modulate the likelihood of grammatical attrition: individual instances of attrition are found in all three contexts; however, the fewest instances are found in the most holistically similar L1–L2 pairing (German–Dutch), and by far the greatest number of instances are found in the least holistically similar L1–L2 pairing (German–Spanish). If anything, this pattern suggests an inverse effect to the one predicted, whereby less holistic similarity facilitates attrition. However, the majority of cases of attrition in the German–Spanish case were found for only one of the two properties tested. As the two properties differ in their degree of L1–L2 structural similarity, this finding suggests that holistic similarity cannot be considered in isolation in this experimental design, but that its interaction with structural similarity must be taken into account. The finding that holistic similarity does not play a facilitative role is not wholly surprising based on previous research, which has found grammatical attrition in both holistically very similar and very different L1–L2 language pairs (see 1.2.4.1 for discussion). Nevertheless, a prediction that holistic similarity does play a facilitative role arises straightforwardly from the AvA model’s architecture. The specific implications of these results for the model are discussed in 6.3.1.

Regarding question 3), it is likewise not possible to draw any conclusions regarding the role of L1–L2 structural similarity based on the group-level results of this study, and we must instead look to the individual-level results. Considering the results of the German–Dutch group, one instance of attrition is found for the structurally most similar property whilst no attrition is found for the less similar property. However, in the German–English group, we see one instance of attrition for both properties, and in the German–Spanish group there are considerably more cases of attrition for the

structurally *less* similar property: 9 cases in total, which is just over half of the total number of cases of attrition observed in this study overall.

Structural, i.e., morphosyntactic, similarity is formalised in this thesis as the complexity of FR required for an L1 structure to attrite such that its feature specifications match those of a corresponding L2 structure (see 2.4.6.3.4 for discussion). To this end, a set of criteria was devised to establish the complexity of FR in L1 attrition, and these criteria were applied to the grammatical structures tested (see 2.4.6.3.4.1 for discussion of the criteria and 4.5 for their application to the structures). Assuming that the feature-based syntactic analyses of the structures is correct, there are two immediately apparent possible explanations for the structural similarity results. The first is that FR complexity does indeed modulate the likelihood of grammatical attrition, however, the criteria for establishing FR complexity formulated in this study are incorrect, in which case a different set of criteria should be devised and tested in future research.

The second is that FR complexity simply does not modulate the likelihood of grammatical attrition. If this second explanation is correct, then it is important to highlight that the results of this study nevertheless clearly suggest that what is crucial in determining the likelihood of attrition is not the overall holistic similarity of the L1 and L2, but specific properties of the individual morphosyntactic structures, and it is at the level of the individual morphosyntactic structures that future research should focus. This finding is very much in line with previous research, as – as noted previously – grammatical attrition has been attested in both holistically very similar and also dissimilar L1–L2 combinations. The current study therefore further supports this conclusion with data from a wider range of grammatical structures – many of which had not been studied previously – and also from a greater number of L1–L2 combinations than had been investigated previously. The pertinent question here then, is what specific properties of the individual morphosyntactic structures do modulate the likelihood of grammatical attrition? Assuming for a moment that it is not structural similarity (whether formalised in Minimalist terms as FR tasks or otherwise), it seems entirely possible that it could be another property or properties which operate at the level of individual grammatical structures. However, from the results of this study, it is not immediately clear what aspect(s) of negation would lead to considerably more cases of attrition being found for this property compared to the other five properties. Formulating hypothesis as to what modulates the likelihood of attrition of individual morphosyntactic properties – and empirically testing these hypotheses – is left to future research, which will likely need to investigate a far broader range of grammatical phenomena than have been considered to date.

6.3 Implications for the Attrition via Acquisition Model

6.3.1 and 6.3.2 consider the implications of the empirical findings for the two types of intake which determine the possibility of grammatical attrition within the AvA model, namely Perceptual and Acquisitional Intake. As part of the discussion of Acquisitional Intake, 6.3.2 explores further the manner in which Feature Reassembly operates in mature L1 grammars and discusses the hypothesis regarding the role of FR complexity in grammatical attrition. 6.3.3 examines the nature of the relationship between L2 acquisition and L1 attrition as suggested by the results.

6.3.1 Perceptual Intake

In 2.4.6.3.2, a prediction was derived from the AvA model's architecture whereby attrition is expected to be facilitated in cases where the L2 input is holistically more similar to the L1 (primarily as perceptual encoding of input is argued to be facilitated in such cases). As discussed in 6.2.2, the empirical findings of this study (the individual-level results) indicate that L1–L2 holistic similarity does not in fact appear to have this effect.

Though the prediction that attrition is more likely in cases of greater L1–L2 holistic similarity is plausible based on the architecture of the AvA model and its conceptualisation of Perceptual Intake, when additional factors are taken into account, it is perhaps not as surprising that Perceptual Intake does not play a role in adjudicating between the relative likelihood of attrition in different L1–L2 combinations. Recall that in this experiment participants in all three groups have a minimum of 15 years LoR in the L2 country and are in most cases near-native or native-like speakers (in terms of their L2 proficiency scores) and in many cases L2-dominant (in terms of language usage). Therefore, participants in all groups can likely generate Perceptual Intake for their L2 with equal ease regardless of L1–L2 holistic similarity.

Though this could account for why this specific prediction derived from the role of Perceptual Intake within the AvA model appears not to be borne out in the results of this study, we should perhaps not rule out a potential role for Perceptual Intake in determining the likelihood of attrition across multiple L1–L2 combinations altogether. Perceptual Intake may still play an indirect role via L2 acquisition in that holistic similarity could facilitate more rapid L2 acquisition (see 2.4.6.2.1). If this is the case, and, crucially, assuming a relationship between L2 acquisition and L1 attrition does hold (to be discussed in detail in 6.3.3), it is plausible that attrition may obtain after a shorter time period in more holistically similar L1–L2 pairs as the L2 properties are acquired more quickly and can therefore sooner engender attrition of the equivalent L1 properties (at least for speakers immersed in an L2-speaking environment). This speculation implies there is some sort of threshold at which the 'strength' of the L2 representations is such that they can begin to bear on existing L1 representations, and that this threshold is reached sooner for properties in more holistically similar

L1–L2 pairs. This point moves beyond what is currently explicit in the architecture of the AvA model or discussions in Hicks and Domínguez (2020a, 2020b). As this discussion is very much part of – and integral to – the broader discussion on the relationship between L2 acquisition and L1 and how this relationship is established and formalised by the mechanisms of the AvA model architecture, it is not discussed further here but taken up again in 6.3.3.

6.3.2 Acquisitional Intake and Feature Reassembly

6.3.2.1 The role of Acquisitional Intake and the nature of L1 Feature Reassembly in mature grammars

The AvA model’s conceptualisation and assumptions regarding Acquisition Intake appear to be borne out in the results of this study. Recall that the key prediction derived from the role of Acquisitional Intake within the model is that grammatical attrition should only be possible for an L1 structure which has a corresponding L2 form with divergent behaviour due to differences in the corresponding feature specifications (see 2.4.6.3.1 for discussion). All grammatical properties tested in this study are such properties and are therefore predicted to be vulnerable to attrition. Though no group-level attrition was found, at least one instance of attrition was found for all properties but grammatical gender. Thus, although the attrition found is very limited, it does demonstrate that these *kinds* of properties are in principle vulnerable to restructuring in mature L1 grammars. Furthermore, the conceptualisation of Acquisitional Intake as pertains to L2 acquisition appear to also be essentially correct, as will be discussed in detail in 6.3.3.

As grammatical gender – as tested here – is in principle vulnerable to attrition according to the AvA model, it remains to be explained why not a single instance of attrition was found for this property. A number of plausible explanations can be ruled out. Firstly, in this study grammatical gender was argued to be less likely to attrite than reflexive binding (the other property in the German–Dutch pair) due to a lesser degree of structural overlap between the L1 and L2 for grammatical gender (formalised in terms of the FR operations required for attrition – more on this below). However, as discussed in 6.2.2, the predictions regarding structural similarity are not borne out in the German–English and German–Spanish group. Thus it seems that structural similarity – at least as formalised in this study – does not play a modulating role in grammatical attrition here and thus cannot explain the absence of attrition of grammatical gender. Secondly – as noted in 6.2.1 – previous studies have found grammatical gender to be particularly impervious to change in L1 adult grammars. The most commonly invoked explanations for this include the high frequency and salience of the property. However, V2 and negation – properties where attrition was observed – are arguably equally frequent and even more salient. Finally, there are no clear differences in the background variables of the participants in the German–Dutch group compared to the other two groups, in which at least one case of attrition is found for both properties, that may explain the lack of grammatical

gender attrition (see 4.3.1 for participant background information). The resilience of grammatical gender compared to other morphosyntactic properties therefore remains to be explained.

The L1 restructuring found in this study supports the view that grammatical attrition does not manifest as broad, sweeping changes to the L1, but rather as fine-grained modifications to L1 feature assemblies. As argued in 1.2.2, such nuanced patterns of attrition are easily accommodated under a Minimalist view of the grammar. The AvA model's adoption of this view of the grammar not only allows it to account for these patterns where they are attested, but crucially to also generate predictions as to where (i.e., for which grammatical properties) such attrition will obtain. The modifications to the L1 feature assemblies found in this study appear to be based on the differences between those assemblies and the feature assemblies of the corresponding L2 structures, such that patterns of L2 convergence or L1–L2 optionality emerge. Restructuring of this nature is neatly accounted for in the model in that Acquisitional Intake is conceptualised as what is in effect a list of featural modifications that need to be made to a current grammar in order to update it to match the grammar being parsed from the input (i.e., to match the Perceptual Intake). For L2 acquisition, the L2 grammar is updated to match the L2 intake. However, the model's architecture is such that in attrition contexts, the same Acquisitional Intake used for L2 acquisition can target the feature assemblies of the equivalent L1 structures, resulting in attrition (see 2.4.6.2 for details). Whether L2 convergence or L1–L2 optionality obtains depends on whether the featural modifications to the L1 supplant or supplement the existing L1 feature assemblies.

This much is explicit in the model in its current form. What is not explicit at the moment is exactly how this L1 FR proceeds. In L1 and L2 acquisition it is assumed that feature bundles can be reassembled either in one-fell swoop as a whole unit or one feature at a time. The latter possibility allows for observations of interlanguages converging on the target for some aspects of a grammatical property but not others to be accounted for (see also Slabakova, *in press* for discussion of whether feature bundles can be assembled one feature at a time or also as a whole unit in the context of L3 acquisition). Though not discussed by Hicks and Domínguez (2020a, 2020b) presumably L1 feature bundles could in principle also be reassembled as a single unit or one feature at a time in attrited grammars (there certainly appears nothing to exclude either possibility). However, to the best of my knowledge, there is not clear evidence that (for a structure whose behaviour is determined by multiple features) only some but not all of the relevant L1 features have been reassembled to match the corresponding L2 feature bundle(s).¹⁰² Based on the data available at present, it seems that in grammatical attrition all the relevant features of the L1 lexical items are reassembled simultaneously,

¹⁰² It is of course more straightforward with some properties than others to determine whether only some L1 features have been reassembled at a given time, and the experimental design needs to allow for such patterns to be detected. Indeed, a possible example of one but not all relevant L1 features being reassembled simultaneously in attrition is to be seen in López-Otero, 2022 (see 2.4.6.3.4 for discussion of this study).

i.e., the L2 feature bundle is transferred into the L1 grammar as single unit where it either supplants an existing L1 feature bundle (giving rise to L2 convergence) or is mapped to a copy of the relevant L1 PFs and/or functional heads and co-exists with the original L1 feature bundle (giving rise to L1–L2 optionality), but not feature-by-feature. If this observation is borne out in future research, then it appears to be a key distinction between FR in L1 attrition vs. L_n acquisition, and potentially one which the AvA model would benefit from making explicit in order to generate more precise predictions.

6.3.2.2 The complexity of Feature Reassembly in L1 grammatical attrition

A closely related issue yet to be discussed in the context of the model is the hypothesis tested in this thesis regarding the potential role of FR complexity in attrition. As argued in detail in 2.4.6.3.4, though predictions can be established – based on the role of Acquisitional Intake – regarding which types of L1 grammatical properties potentially vulnerable to attrition within a given L1–L2 combination, in its current form the model cannot make more specific predictions about the relative likelihood of attrition obtaining for two such potentially vulnerable properties within the same L1–L2 pair. This motivated the formulation of the additional hypothesis in this thesis that attrition was more likely in cases where less complex FR is needed for the relevant L1 feature specifications to match the corresponding L2 feature specifications i.e., in cases where there is a greater degree of structural overlap – formalised in Minimalist terms as overlap in morphosyntactic features – between the corresponding L1 and L2 structures. This hypothesis was tested empirically however, as discussed in 6.2.2, the predictions regarding the were not borne out in the individual-level results of this study. It was suggested that this was either as the criteria against which FR complexity was established were incorrect or because FR complexity simply does not play a role in determining the likelihood of grammatical attrition. Therefore, the AvA model is still lacking a way to formulate theoretically tenable and empirically valid predictions regarding the likelihood of attrition obtaining for different ‘candidate’ properties within the same L1–L2 combination.

On this note, it is worth briefly highlighting here that the patterns of attrition found in this study cannot be accounted for by the other theoretical approaches considered in 2.4. It is important to bear in mind that the experimental design was not intended to test these other approaches, however the results are nonetheless informative. Though the lack of group-level attrition for any property tested here – which are all ‘narrow syntax’ properties – appears at first to support the claims of the Interface Hypothesis, the fact that we see attrition of these properties even at an individual level is counter to the IH. More importantly, recall that the IH in its most recent form explicitly denies the possibility of adult L1 grammatical representations being vulnerable to restructuring (see 2.4.1 for details). The patterns of L2 convergence and L1–L2 optionality for core morphosyntactic structures found in this study suggest that such representations are in fact

vulnerable, though such attrition is limited to individual participants only. Likewise, the Subset Model cannot account for these results. Attrition is found for a property where the L1–L2 arguably exists in a subset-superset relationship (reflexive binding in the German–English pair), however such a relationship does not hold for three properties where attrition was found, including for negation, where the greatest number of instances of attrition are attested. For these three properties there are simply contrasting grammatical options in the two languages, but no language has a broader range of options. Attrition was also found for reflexive binding in the German–Dutch pair, which arguably exist in a *superset-subset* relationship for the structures tested. The finding of attrition here is therefore counter the Subset Model’s predictions. Moreover, across multiple properties attrition is attested in the form of rejecting structures which are grammatical in the L1 based on their ungrammaticality in the L2 grammar. This demonstrates that attrition is not only a case of ‘expansion’ of the L1 grammatical options – as predicted by the Subset model – but can also be a restriction of these options under the appropriate L1–L2 contrasts. Finally, the results do appear to support the Bottleneck Hypothesis as applied to attrition as functional morphology is found to be vulnerable to attrition, however the experimental design does not allow a particularly fair or robust investigation of this hypothesis as only one of the five properties (V2 word order) would be predicted largely impervious to attrition, whilst the remaining five would be assumed to be vulnerable.

6.3.3 The relationship between L1 attrition and L2 acquisition

This section analyses the L2 acquisition data and relates it to the L1 attrition findings in order to explore the relationship between L2 acquisition and L1 attrition, as discussed in detail in 2.4.6.3.3. To briefly recapitulate the three key points outlined there: 1) it seems logical that there is a relationship between L2 acquisition and L1 attrition. The assumption here is that acquisition of a given L2 structure is a necessary prerequisite for the attrition of the equivalent L1 structure; 2) this relationship is integral to AvA model in which L1 attrition obtains by means of Acquisitional Intake generated based on perceptual encoding of an L2 structure targeting the feature assemblies of an equivalent L1 structure; 3) if L2 acquisition is indeed a prerequisite for attrition, a pertinent question is what degree of L2 acquisition is necessary for attrition. The limited data from previous studies does not give a clear picture as to whether native-like L2 acquisition is required for attrition or whether successful acquisition is sufficient (see 2.4.6.3.3).

Regarding the final point, L2 acquisition can be considered native-like if the results do not deviate from the control results to a statistically significant degree. However, for acquisition to be deemed successful, in L2 research it is typically considered sufficient to demonstrate correct differentiation between categorical contrasts in grammaticality, interpretations, or usage of certain grammatical elements in the L2, even if the results diverge statistically from the native controls (White, 2003; Slabakova, 2016). In the case of AJT data, acquisition can be considered successful if

the L2 grammar correctly distinguishes between grammatical and ungrammatical versions of the same structure. Therefore, in this discussion, ‘native-like’ acquisition refers to L2 results that are statistically indistinguishable from control results (or for L2 results of individual participants, the results should be within or at least very near to the SE range of the control group), whilst ‘successful’ acquisition refers to acquisition of the L2 grammaticality contrast. For example, to conclude that a participant in the German–Dutch group has acquired reflexive binding with a selected PP object, they would need to have acquired that the Dutch Condition 1 is grammatical *and also* that Condition 2 is ungrammatical. This is the L2 grammaticality contrast relevant to the attrition of either Condition 1 or Condition 2 (or both) on the German version of the task. It is imperative that both relevant L2 conditions are considered, else a participant who has judged all L2 conditions grammatical or all ungrammatical will still *appear* to have the correct grammaticality judgment for half of the individual L2 conditions.¹⁰³

Finally, when analysing the acquisition results, it is important to bear in mind that though L2 acquisition is expected to be a *pre-requisite* to L1 attrition, this is not to say that L2 acquisition *entails* L1 attrition. Thus, whilst lack of L2 acquisition may arguably explain lack of L1 attrition (if such a relationship is empirically established by the results), lack of L1 attrition in cases of successful L2 acquisition is not an unexpected finding.

At a group level we cannot infer anything into the relationship between L2 acquisition and L1 attrition as there simply is no group-level attrition in the first place. Nevertheless, we can assume that the lack of L1 group-level attrition across the board is not due to lack of successful and indeed native-like L2 acquisition across the board as native-like acquisition was found for all but five conditions, and only 2/5 were not acquired successfully (see 5.4 for details).

Analyses of the individual results, however, is far more informative. This study identified 11 participants as exhibiting grammatical attrition on 8/22 conditions where attrition was predicted, giving 16 cases of attrition in total (see Table 5.1 for an overview). For 4/16 instances of attrition there is successful acquisition of the relevant grammaticality contrast for the equivalent L2 structures. There is only one case where the relevant contrast is acquired in the L2 to the degree that the results are approaching the SE range of the native controls (P2 reflexive binding in the German–Dutch group). For 2/3 of the remaining cases the L2 mean scores are still in line with some individual L2 control means. In the final case (P1 in the German–English group’s results), their results for one of the relevant L2 conditions (C3) approach the SE range of the controls, however their mean for the

¹⁰³ As all experimental conditions are in grammatical/ungrammatical pairs within the same language, other than for Reflexive Binding in the German–English AJs. Recall that the L2 ungrammatical structures are ungrammatical in that they use the same structure as the equivalent L1 structure, which is not a possible structure in the L2 (and the L1 ungrammatical structures are likewise ungrammatical as they use the equivalent L2 structure).

other relevant condition (C4) is not in line with the control means, despite them having acquired the correct grammaticality contrast on these two conditions overall. *Thus far*, these results suggest that native-like L2 acquisition is not a necessary pre-requisite of attrition of an equivalent L1 structure but acquisition of the correct L2 grammaticality contrasts is.

However, of the remaining 12 instances where attrition is found, there is no successful acquisition of any of the L2 grammaticality contrasts at all. In 5/12 cases, the attriters in fact appear to have very similar response patterns to the individual AJT test items on both the L1 and the equivalent L2 conditions (all five cases come from the results of the German–Spanish group see 5.5.3.1 and 5.5.3.2 for details). In 2/5 cases (P8 and P9 on negation Condition 3, the response patterns indicate L1–L2 optionality in both the L1 and L2 grammars, such that the results do not converge on either the L1 or L2 control responses. This suggests some degree of L2 acquisition (though this acquisition is not entirely successful as the contrast between the grammatical and ungrammatical version of the structure is not acquired) and, interestingly, that there is bi-directional influence of the two grammars giving rise to the optionality in both languages. This is one way an unexpected finding considering the (extra)linguistic profiles of these participants (particularly P9, who has an LoR of 32 years, is also L2 dominant in terms of usage, and highly proficient in Spanish according to the proficiency measure – see 5.5.3.2 for further information). On the other hand, bi-directional CLI is well documented in acquisition and attrition literature (see Schmid and Köpke, 2017: 641–644 for an overview). To give a morphosyntactic example, Castro, Rothman, and Westergaard (2017) (discussed in 2.4.6.3.3) find bi-directional influence in the overt object pronoun judgements of a group of L1a Brazilian Portuguese speakers residing in Portugal, who are tested in both L1a Brazilian Portuguese and L1b European Portuguese mode, such that their results in both modes pattern with neither the L1a nor L1b controls (*ibid*:11).

For the remaining 3/5 cases where the attriters' response patterns are very similar on the L1 and L2 versions of the same condition, the results appear to converge on the L2 patterns in both languages (German–Spanish group: P2 adjective agreement and P10 negation results). Consequently, they appear to have the correct grammaticality judgment for the single L2 condition corresponding to the L1 condition on which they have attrited, however, comparison of their results on the grammatical and ungrammatical versions of the L2 conditions shows that they have not in fact acquired the relevant grammaticality contrasts (P2 rates both adjective conditions acceptable and P10 rates both negation structures unacceptable). Here then, there appears to be the curious case of L1 attrition in the form of L2 convergence without successful L2 acquisition. However, for each L1 condition on which attrition is found, the L2 results on the corresponding L2 condition do display the correct L2 grammaticality judgement e.g., P10 has attrited on negation L1 Condition 4 (which is grammatical in an unattrited German grammar) and correctly judges L2 Condition 4 ungrammatical. P10 does not have the correct L2 judgement for the counterpart grammatical L2 condition to

Condition 4 – which is Condition 3 – however they have not attrited on the L1 version of Condition 3. The same holds for P2's adjective agreement results.

In a further 5/12 cases of attrition where the relevant L2 grammaticality contrasts are not acquired, the individual L1 and L2 response patterns for those conditions are distinct (German–Spanish group: P1 adjective agreement Condition 1 and 2, P1 negation Condition 4, P7 and P4 Condition 3). However, as with the 3/5 cases discussed in the previous paragraph, the attriters appear to have the correct grammaticality judgment for the single L2 condition corresponding to the L1 condition on which they have attrited (i.e., they rate either both the L2 relevant conditions acceptable, or both unacceptable, hence one of the two conditions appears to have the correct L2 grammaticality judgment, and it is on the L1 version of this condition – but not the L1 condition on which they have the incorrect judgment of the equivalent L2 condition – that they have attrited).

The final 2/12 cases where the relevant L2 grammaticality contrasts are not acquired are P1's (German–Spanish group) results on negation Condition 2 and 3. The results also do not suggest bi-directional influence. Here we can be confident that not only are the relevant L2 grammaticality contrasts not acquired, but also that the participant does not have the correct judgment instantiated in their L2 grammar even for the single L2 condition equivalent to the L1 condition on which they exhibit attrition: as noted in 5.5.3.2, though the mean scores suggest this participant has the correct grammaticality judgment at least for Condition 2, they select the 'I don't know' option for 6/8 items on both Condition 1 and 2. The fact that they respond with 'I don't know' to 24/32 of the negation items in total suggests a near complete lack of L2 acquisition of this property. Though perhaps initially surprising, this finding is not wholly unique in the literature: as discussed in 2.4.6.3.3, Castro, Rothman and Westergaard (2017) find attrition at a group level for an L1a condition for which there is no acquisition of the equivalent L1b structure (to the extent that the bi-dialectals' results of the L1b condition are in fact not statistically distinguishable from the L1a control results).

Overall, in 12/16 cases of attrition inspected here the participant had not acquired the equivalent L2 structure against the benchmark by which successful acquisition is measured L2 acquisition research (i.e., acquisition of the relevant L2 grammaticality contrast). However, in 8/12 of these cases, where attrition was found in the L1, the participants assigned a grammaticality judgment to the single, corresponding L2 condition that was in fact the correct judgement for the L2 grammar and, crucially, this is a judgment which contrasts with the *unattrited* judgment for the corresponding L1 condition.¹⁰⁴ This could suggest that at least some Acquisitional Intake has been generated for this specific L2 structure (in that it seems that a difference between the L1 and L2

¹⁰⁴ 8/12 here as in 2/12 cases there was no evidence of any L2 acquisition and in a further 2/12 cases optionality is found in both the L1 and L2.

grammars has been detected) – even if it has not been successfully used to (fully) update the L2 feature assemblies – and this appears to be sufficient to engender attrition of the corresponding L1 structure in these cases. Indeed, we do not see cases of attrition on an L1 condition where the participants assign the incorrect grammaticality to the equivalent L2 condition (such that both the L1 and L2 conditions are assigned the grammaticality judgment which would be correct for an unattrited L1). In this case arguably no differences between the L1 and L2 grammars are perceived and hence no Acquisitional Intake is generated. The exceptions to this are the 2/12 cases where the same grammar appears to be being used for both the L1 and L2 structures resulting in optionality in both languages. However, as noted previously, the bi-directional influence here also implies some degree of Acquisitional Intake has been generated though the L2 grammar has not been fully updated yet. Finally, there are two cases where we cannot conclude any degree of successful L2 acquisition as the participant's responses demonstrate they have not reliably acquired any grammaticality judgement for the L2 structures at all (as opposed to having acquired the wrong judgments).

Taken together, these findings are somewhat complex to interpret. Nevertheless, they clearly demonstrate that native-like acquisition of an L2 structure is not a prerequisite for L1 attrition of the equivalent structure. Moreover, they suggest that acquisition of the relevant L2 grammaticality contrasts is likewise not a necessary precursor to L1 attrition. What appears to be required, however, is for the contrasting grammaticality of the equivalent L1 and L2 structure to be detected, allowing for – in terms of the AvA model – Acquisitional Intake to be generated for this structure, even if this Acquisitional Intake has not been used to fully and successfully update the L2 grammar.

At first glance, the instances of (individual) L1 attrition apparently obtaining without successful L2 acquisition (as measured by acquisition of the relevant L2 grammaticality contrasts) seems to call into question the clear relationship between acquisition and attrition assumed by the AvA model. It has been suggested above and in 2.4.6.3.3 that the logical assumption is that acquisition of a given L2 structure is a prerequisite to attrition of the equivalent L1 structure. In their commentaries on Hicks and Domínguez (2020a), Westergaard (2020) and – at least implicitly Gürel (2020) – also identify this to be a prediction of the AvA model. However, under a strict reading of Hicks and Domínguez (2020a), it could be argued that the architecture of the model does not in fact make such a prediction.

Here it is essential to consider exactly how Acquisitional Intake is first generated by the inferential component of the model and subsequently targets the L1 feature assemblies. Hicks and Domínguez' (2020a:157) exact wording on the matter is as follows: 'the inferential mechanisms that process the [L2] Perceptual Intake activate not only UG but also the L1 and L2 grammars in their

current state [...] continued processing of L2 input that invokes both UG and the L1 in updating the advanced L2 grammar allows for the possibility that acquired morphosyntactic features of the relevant L2 lexical item ‘update’ the L1 grammar.’¹⁰⁵

Though this is not discussed by the authors, it seems that there are therefore two possible options or ‘routes’ to attrition within the model’s architecture. Firstly, it is possible that the L2 Perceptual Intake (generated from comparing the L2 input against the current L2 grammar-state in the perceptual encoding component and detecting that the existing representations are incomplete/incorrect), is compared in the *inferential* component not against the L2 grammar being acquired, but against the L1 grammar. That this ‘erroneous’ comparison of L2 Perceptual Intake against the L1 grammar is at all possible, is a potential consequence of the fact that all of a speaker’s existing grammars are co-activated within the inferential component (see 2.4.6.2.2 for further discussion). In this case, this Acquisitional Intake presumably targets the feature assemblies of the L1 grammar as this Acquisitional Intake was generated in the first instance by comparing the L2 intake against this L1 grammar within the inferential component. This ‘route’ to attrition is arguably the most plausible and hence is the route described in 2.4.6.2.2 when the AvA model was first explained in detail. The second, alternative route is that the L2 Perceptual Intake is compared to the L2 grammar within the inferential component and that this Acquisitional Intake subsequently targets the L1 feature assemblies. However, in this case it is not clear how or why the generated Acquisitional Intake would then subsequently target the L1 grammar and not always the L2 grammar (recall that Acquisitional Intake is the output of the inferential component and thus the actual updating of the grammar occurs beyond the inferential component).

The crucial point for the broader discussion on the relationship between L2 acquisition and L1 attrition is that under neither route is it actually required that the L2 feature assemblies are first updated to match the L2 Perceptual Intake before the Acquisitional Intake generated for L2 acquisition can target and update the L1 grammar. Hence the architecture does not require L2 acquisition (in terms of acquisition of the relevant L2 feature assemblies) prior to L1 attrition. Assuming the first route described above is the most plausible, seemingly all that is required is that Acquisitional Intake is generated based on an ‘erroneous’ comparison between the L1 grammar and L2 Perceptual Intake i.e., that a discrepancy between the L2 intake and L1 grammar is detected – specifically, a mismatch in the L1–L2 feature assemblies of the specific structure being processed, such that the features of the L1 can be updated by means of the Acquisitional Intake to match those perceived in the L2 Perceptual Intake.

¹⁰⁵ Arguably, the model would benefit from a more precise account of exactly how Acquisitional Intake is generated from L2 input (a point raised by Gürel, 2020: 173). Hicks and Domínguez (2020b) do acknowledge that certain aspects of the model are intentionally underspecified at present and are to be further specified in future work.

In light of this, the AvA model's architecture arguably does account for – and indeed even predict – the L2 acquisition–L1 attrition relationship found in the majority of cases in this study: the results suggest that all that is needed for attrition is that the potential attriters have detected the contrasting grammaticality of the equivalent L1–L2 structures. In terms of the model, it could be argued that participants who attrited previously detected this contrast and generated Acquisitional Intake for this L2 structure by comparing L2 Perceptual Intake against their (at the time unattrited) L1 grammar. This Acquisitional Intake was subsequently used to update the structure in the L1 grammar, leading to the attrition observed. This can account for attrition in the absence of successful acquisition as no updating of the L2 grammar is required.¹⁰⁶

However, the fact that the model appears to be able to account for such results is not without a very considerable drawback. In the route to attrition described above, not only does the model appear to allow the possibility of attrition in the absence of successful L2 acquisition, but in fact the architecture appears to entail that attrition must obtain *prior* to – or at least at the same time as – L2 acquisition: if the speaker is parsing an L2 structure which they have already acquired i.e., if the L2 grammar already contains the correct and complete feature specifications for this structure, then there is no mismatch between the current L2 grammar and that of the L2 structure in the input being processed. There is nothing to acquire in terms of features and thus the Perceptual Intake generated for this structure is not passed on to the inferential component (dotted vertical line on the diagram of the model in Figure 2.2). Consequently, it is not possible to generate Acquisitional Intake for this structure and hence no attrition is possible (similar to how attrition is not possible within this architecture when the L1 and L2 structure have identical feature specifications – see 2.4.6.3.1). It therefore appears that attrition can only obtain *before* the L2 grammatical representations are acquired.

This point appears to be perceived by Westergaard (2020:221), who states that she does not see how the model 'can prevent massive attrition of the L1 to take place already from the initial stages of L2 acquisition.' In fact, it is seemingly at the initial stages that there is the greatest potential for attrition within the model as this is when the L2 representations are most incorrect/incomplete and thus there will be a larger number of structures for which the Perceptual Intake will be fed to the inferential component. This prediction cannot be reconciled with the fact that attrition – certainly grammatical attrition – does not appear to begin from the onset of L2 acquisition. Rather, it appears to obtain only in very specific input conditions where the L2 has replaced the L1 as the speaker's PLD, typically – perhaps exclusively in the case of L2-induced grammatical attrition – in cases of

¹⁰⁶ This is not to say that no L2 knowledge is required at all, as the speaker must still be able to perceptually encode the L2 input and detected a mismatch between the L2 input and their L2 grammar in order to generate PI, which is then passed on to the inferential component.

emigration to an L2-speaking country. Indeed, Gürel (2020), Iverson, (2020), Montrul (2020), and Westergaard (2020) all argue that, in its current form, the model appears to heavily over-predict the occurrence of attrition. To be clear, they appear to agree with model's predictions regarding the types of grammatical structures potentially vulnerable to attrition. Their concern is with the extent to which attrition of these structures is permitted and indeed predicted by the model, and when this attrition is predicted to occur.¹⁰⁷ This is made particularly clear by Iverson (2020:183) who writes, 'without applying some brakes to the mechanisms, it leaves me wondering why we are not all attriting all the time.' His discussion focusses primarily on L1a–L1b contact situations; however, I believe this concern is equally valid for L1–L2 contact situations.

It seems clear then that the model requires some sort of mechanism to restrict the occurrence of attrition further, such that it may not obtain right from the initial stages of L2 acquisition/exposure. Westergaard (2020:211) in fact proposes such a mechanism when she suggests the model 'build in a component that monitors the amount of intake and use for each language and the corresponding strength of the representations in both (or all) languages of the bi- or multilingual.' Though this proposal is not discussed further by Westergaard, her suggestion appears to be predicated on two key assumptions. Firstly, that grammatical representations can have different 'strengths', i.e., representations are not simply present or absent from a grammar, but that they can be instantiated or perhaps 'activated' to different degrees. Plausibly, strong representations are those reinforced by frequent activation through regular usage in production and processing. These representations are more stable, more impervious to influence, and more able to impinge upon other, weaker, representations. Secondly, that it is only when the strength of the L2 grammatical representations reach a certain threshold that they are able to bear on existing L1 representations, culminating in L1 attrition.

Presumably, this strength threshold is only able to be reached in environments where the L2 is the speaker's PLD e.g., after they have emigrated to an L2-speaking country, and possibly also only after a certain period of time in this environment (though, as noted in 2.4.6.3.3, the effect of LoR on attrition, including grammatical attrition, is unclear and poorly understood to date – see Schmid, 2019 for an empirical State of the Art). On this assumption, it can also be argued that this threshold is typically not able to be reached for L2 learners still living in a linguistic environment similar to the one in which they grew up. This would account for the observation that grammatical attrition of the kind discussed and investigated in this thesis is – to the best of my knowledge – not attested among

¹⁰⁷ In contrast to Gürel (2020), Iverson, (2020) and Westergaard (2020), Montrul (2020) questions specifically how the model can account for the disparity in the prevalence and extent of attrition found in Heritage grammars as opposed to attrition which begins in adulthood, and advocates for future work to integrate some sort of mechanism into the model which would enable it to account for this widely acknowledged finding. Though a very valid point, this matter is distinct from the issue of a prediction of attrition occurring from the onset of L2 acquisition/exposure. Due to space and scope restrictions, this matter is not pursued further in this thesis.

such speakers. Continued investigation into the role of LoR and language use and exposure in L1 attrition, as well as further studies investigating attrition amongst speakers in different input environments (including testing the L1s of late-sequential bilinguals residing in their home country) will help inform the precise shape that such a mechanism should take. Particularly informative data would come from longitudinal studies, of which there is a near total absence at present.

Incorporating such a mechanism into the AvA model seems empirically desirable as such a mechanism operating within the existing architecture would allow the model to more completely fulfil its primary goal of accounting for why the language faculty architecture permits grammatical attrition in the first place, yet its occurrence is so highly selective and rarely attested. However, it is not clear that this mechanism can be straightforwardly integrated into the model in its current form. As discussed above, under a strict reading of the model, L1 attrition appears to be possible without initial L2 acquisition. In this case L2 grammatical representations need not be established prior to attrition, and therefore the possibility of attrition obtaining cannot depend on the strength of these representations. It seems then, that such a mechanism cannot be integrated without first, or at least simultaneously, also solving the issue of the model requiring attrition to occur in the absence of – and indeed prior to – L2 acquisition in terms of modification to L2 feature assemblies.

One solution – perhaps the simplest – may be as follows. The assumptions regarding L2 grammatical acquisition are kept the same.¹⁰⁸ In order to prevent the need for attrition to happen prior or at the same time as L2 acquisition, it must be assumed that this L2 intake is not erroneously compared to the L1 grammar within the inferential component, and therefore no Acquisitional Intake based on this L2–L1 comparison is generated *at this point*. This allows L2 acquisition to proceed from the initial stages without the possibility of any attrition *so far*.

At some point during the L2 acquisition process a given structure has been fully acquired in the L2 grammar to the extent that perceptual encoding is complete on all levels and the Perceptual Intake for this structure is therefore no longer passed on to the inferential component. If we assume – as we have done so far in this discussion – that grammatical representations can not only be complete or incomplete but can also have relative strengths, then we can plausibly assume that for a typical speaker living in an L2 country whose PLD is the L2, that prolonged processing of L2 input and continued L2 use will lead their L2 representations to increase in strength over time. Eventually the strength of these representations will reach a certain threshold which is detected by the mechanism responsible for monitoring the strength of representations. Once this threshold is reached, future

¹⁰⁸ L2 input is perceptually encoded to generate L2 Perceptual Intake, if a mismatch between the formal and semantic features present in the L2 intake and those of the L2 grammar is detected, this L2 intake is fed to the inferential component which compares the intake against the current L2 grammar and UG to generate Acquisitional Intake which is then used to update the L2 grammar in the form of featural modifications, such that the L2 grammar matches that of the L2 intake.

input from this same L2 structure will be processed in a different manner than had been the case for L2 acquisition of this same structure.

Specifically, within the *perceptual encoding component*, further L2 input for this structure is now compared to the current L1 grammar state. Assuming that the speaker is able to perceptually encode the L2 input such that Perceptual Intake is generated, a mismatch between the L2 intake and L1 grammar will be detected. This Perceptual Intake will therefore be passed onto the inferential component, which will formulate Acquisitional Intake based on the mismatches between this L2 intake compared to the L1 grammar (comparison to the L1 grammar as this was the grammar used in the comparison which generated this Perceptual Intake initially). This Acquisitional Intake which will then be used to update the representations L1 grammar to match this intake, resulting in attrition.

To be clear, *currently* in the perceptual encoding component L1 input is compared to the L1 grammar state and the L2 input is compared to the L2 grammar state. The mismatched comparison between L2 input and the L1 grammar which ultimately enables attrition occurs further along in the inferential component (where at this point the L2 input is in fact L2 *intake*). I am proposing we could assume that such a mismatched comparison instead occurs earlier in the model's architecture i.e., in the perceptual encoding component. Crucially this mismatched comparison in the perceptual encoding component can only occur after successful L2 acquisition, else the model would not be able to account for the possibility of L2 acquisition at all. Hence L2 acquisition must be allowed to proceed with no mismatched comparisons in either the perceptual encoding or the inferential component. The function of the mechanism which monitors the strength of representations is to ensure that it is only when the strength of the representations instantiated in the L2 grammar reach a certain threshold that the mismatched L2 input–L1 grammar comparison within the perceptual encoding component can occur.¹⁰⁹ This not only prevents massive attrition from obtaining at the initial stages of L2 acquisition/exposure but also ensures that L1 grammatical restructuring of the kind investigated in this thesis can only happen in the contexts where it is attested i.e., for speakers resident in an L2-speaking country where the L2 is their PLD and not for e.g., classroom L2 learners in their home country.

However, this alternative 'route' is certainly not without its own problems. It is perhaps difficult to conceive of why and how the specialised perceptual encoding mechanisms would erroneously encode the L2 input via comparison with the L1 grammar (or at least partially via this

¹⁰⁹ Note that even if we do not incorporate a mechanism which monitors the strength of representations into the model, we would still need to assume that an L2 input-L1 grammar comparison takes place within perceptual encoding (rather than this mismatch comparison only occurring within the inferential component as is currently the case) in order to generate Perceptual Intake which is then passed to the inferential component. As discussed previously, if the L2 input for a given structure is compared to the L2 grammar in the perceptual encoding component at the point where the L2 structure has already been fully acquired, then the Perceptual Intake generated for this structure is not passed on to the inferential component and thus no attrition is possible (this leads to the very issue we are trying to solve here; namely, of L1 attrition being possible only prior to L2 acquisition).

comparison as there are other subcomponents to the perceptual encoding component, see Figure 2.2). The erroneous comparison of L2 intake with the L1 grammar within the inferential component is argued to be possible due to the coactivation and bi-directional influence of all of the speaker's languages within this component. This same explanation could thus feasibly be extended to the perceptual encoding component where all of the speaker's grammars must likewise be activated to allow identification and parsing of the various inputs to which they are exposed.

Perhaps more problematic is how, if, in order for attrition to obtain, the L1 grammar is used as part of the perceptual encoding of the L2 input, enough of the input can in fact be encoded to generate Perceptual Intake. This situation is akin to the initial stages of L2 acquisition where, assuming Full Transfer Full Access, the L2 grammar used as part of perceptual encoding would be a copy of the L1 grammar. As argued in 2.4.6.2.1, it is unlikely at the very initial stages of L2 acquisition that the learner can parse enough of the input to generate Perceptual Intake from which it can be determined whether their current grammar state matches this intake in terms of functional and semantic features. It is only after they can sufficiently encode the input at least on a phonetic and phonological level that the key grammatical features of the input are in principle detectable (with closely related languages this point is reached very quickly or indeed immediately with mutually intelligible languages). However, for speakers living in an L2-speaking country who have already acquired their L2 and whose L2 representations have reached the required strength such that they may engender their L1 representations, they have very advanced perceptual encoding for both languages, and are thus presumably able to utilise parsing procedures from both the L1 and L2 to encode this L2 input. The key point is that the L2 input is compared to the L1 grammar state, and that the perceptual encoding (however exactly this is achieved) is sufficient to detect differences in the grammatical features present in the L2 input and current grammar state (i.e., the L1 for attrition), such that the Perceptual Intake based on this L2 input–L1 grammar comparison is fed to the inferential component.

Finally, it is worth returning once again to the relationship between L2 acquisition and L1 attrition. The results of previous research and the results from the individual-level analysis yield a rather mixed picture as to whether, and if so what degree of, L2 acquisition is a necessary prerequisite to L1 attrition of the equivalent structure (though it seems increasingly clear that native-like acquisition is not required – see earlier in this discussion). Future empirical research is needed to elucidate this matter. If it proves to be the case that L2 acquisition is necessary, then under the reconfiguration of the model outlined above, it could be stipulated that in L2 grammar representations for a certain grammatical structure must fully match those of the L2 input *as well as* the representations reach a certain strength before the L2 input–L1 grammar comparison in the perceptual encoding component can take place. Alternatively, it could be posited that the representations could reach the required strength (simply through prologued L2 exposure and usage

in the L2 environment) even if they are in some way incomplete or inaccurate. This may be a way of accounting for the 8 cases of attrition in this study where the relevant L2 grammaticality contrasts are not acquired, however the speakers still appear to be aware of and have seemingly acquired at least the grammaticality of the single L2 condition equivalent to the L1 condition on which they have attrited. Again, in an L1 environment it may be the case that these L2 representations – whether complete or incomplete – never reach the required strength to allow L1 attrition.

There are likely a number of ways in which the model's architecture could be modified to solve this and integrate such a mechanism. The solution outlined here is arguably the simplest one in that it requires no modifications to the architecture itself. Though not entirely unproblematic, the crucial point is that the new issues it creates are significantly less problematic than the original issue aimed to solve. It is likely that a neater solution may involve more dramatic modifications to the model's architecture which are beyond the space and scope constraints of this thesis. Any such modifications would benefit from, and should be informed by, continued research into the L2 acquisition–L1 attrition relationship in particular.

6.4 Future Directions

In 1.2.4.1 it was highlighted that previous studies have rarely investigated attrition in multiple L1–L2 pairs and directly compared the results, and no study had robustly compared the influence of two or more L2s of different typological proximity on an L1 grammar. Whilst the experimental design of the present study addressed this, future studies with similar experimental designs are required to further investigate the role of L1–L2 holistic similarity in attrition. It was likewise highlighted in 1.2.4.1 that previous studies had investigated a relatively limited set of morphosyntactic properties – a point which this study again addressed. Future studies would do well to investigate broader ranges of properties. In particular, more research which systematically investigates the role of structural similarity at the level of individual morphosyntactic structures is needed to confirm what role this plays in attrition. Specifically, this research could seek to further study whether FR complexity as formulated here, or construed in a different manner, plays a determinate role in attrition outcomes, or whether predictions regarding the likelihood of attrition for specific grammatical structures are better formulated along other parameters.

The relationship between L2 acquisition and L1 attrition is arguably central to furthering our ability to model grammatical attrition (and in particular to the further development of the AvA model – see 6.3.3), however the relationship is clearly still in need of further investigation. Though investigating the attriters' L2 acquisition proved insightful in this study – both in terms of informing the investigation of the AvA model and also in revealing some instances of L1–L2 bi-directional cross-linguistic influence which would have otherwise been missed – the absence of group-level attrition

and the very small number of individual attriters on each property meant that robust statistical modelling of the acquisition–attrition relationship was not possible. In terms of the AvA model in particular, longitudinal studies would be particularly informative in this regard.

This study arguably also serves to demonstrate the potential insights afforded by analysis of individual participants' results and in particular analysis of the response patterns to individual test items. Analysis at this level of detail is not only informative but also necessary with certain experimental methodologies such as AJTs – where averages at a group or individual level can be misleading – to confirm the exact nature of L1 restructuring. Studies which find group-level attrition typically stop there and do not consider individual results. These studies therefore potentially miss out on revealing informative and nuanced data which may further our understanding of attrition. At the same time, it must be acknowledged that determining the type of attrition pattern (whether L2 convergence, L1–L2 optionality or otherwise) from individual Likert responses as in 5.5 is to a degree arbitrary, and there are cases where the patterns are open to alternative interpretations. A further limitation of this study is that due to the unexpected degree of variation in the L1 baseline for two of the reflexive binding conditions tested in the L1 German – L2 English pair, it was not possible to reliably determine attrition for individual participants for these conditions (see 5.5.2.1 for further discussion).

6.5 Summary and conclusions

This thesis sought to investigate the empirical tenability of the Attrition via Acquisition Model (Hicks and Domínguez, 2020a, 2020b). Specifically, it tested the prediction that attrition is facilitated in linguistic environments in which the L2 is holistically more similar to the L1 and that attrition is further facilitated for L1 structures which would need to undergo less complex FR to match the corresponding L2 structure due to greater overlap in the relevant L1–L2 feature specifications. The latter prediction – which is effectively a prediction that structural similarity at the level of individual morphosyntactic structures modulates the likelihood of attrition, though framed in Minimalist terms – is a novel prediction formulated in this thesis in an attempt to further develop the predictive power of the model in its current form.

For the empirical study, three groups of L1 German late-sequential bilingual speakers of either Dutch, English or Spanish were tested. These participants (n=85) have over 15 years of residence, starting in adulthood, in either the Netherlands, UK or Spain. Two grammatical structures, which differ in the relative complexity of FR required for them to attrite, were investigated per language. Grammatical properties were tested by means of bimodal Acceptability Judgement Tasks. Potential attriters completed both an L1 (German) and an L2 version of the relevant AJTs.

The key empirical findings of this thesis can be summarised as follows:

- Cumulative Link mixed effects regression modelling revealed no significant differences between the potential attriter and L1 control groups on any experimental condition.
- Analysis of individual results revealed 16 instances of attrition which manifested as a mix of L2 convergence and L1–L2 optionality. This attrition was found on all grammatical properties other than grammatical gender (in the German–Dutch language pair). The AvA model’s predictions as to the kind properties which may attrite, and how this attrition will manifest in the L1, were therefore largely confirmed.
- The highest number of instances are found for negation (in the German–Spanish comparison) and the second highest number for predicative adjective gender agreement (also in the German–Spanish comparison). For the other three properties on which attrition is found, only one instance is found for each. Therefore, neither L1–L2 holistic similarity nor FR complexity was found to modulate the likelihood of attrition in this study.
- The L2 results of these individual attriters revealed the following:
 - In 4/16 cases the relevant grammaticality contrasts of the L2 structure equivalent to the attrited L1 structure had been acquired.
 - In 5/12 cases where the relevant L2 grammaticality contrasts had not been acquired, the attriters had almost identical Likert responses for the L1 and equivalent L2 structure. In 2/5 of these cases, optionality was found in both the L1 and L2, suggesting bi-directional influence.
 - In a further 2/12 cases, the results indicated no acquisition of the property in the L2 at all.
 - In 8/12 cases where the relevant L2 grammaticality contrasts had not been acquired, the participants still assigned a correct grammaticality judgment to the single L2 condition which is the equivalent of the L1 condition on which they attrited.
- Though rather complex to interpret, on the whole these findings appear to suggest that an L2 structure must be acquired to at least some degree – though crucially not to a native-like degree – in order for it to engender attrition of the equivalent L1 structure.

Though this study has yielded informative findings regarding the kind of grammatical properties potentially vulnerable to attrition at a representational level and the nature of the resultant grammatical changes, the predictions regarding the role of input in modulating attrition were not confirmed. Further research is needed to ascertain whether, and how, models of grammatical attrition should best utilise the role of cross-linguistic similarity – both at the language-level and the level of individual morphosyntactic structures – in accounting for and predicting

Chapter 6

grammatical attrition. The relationship between L2 acquisition and L1 attrition is likewise highlighted as an area requiring further empirical investigation and one which may prove particularly informative for future attempts to model grammatical attrition. Indeed, this thesis proposed some modifications to the AvA model in order to improve its empirical validity in this regard. It has been argued – and is hopefully apparent in this work – that grammatical attrition is a line of enquiry which has the potential to yield significant insights for the broader field of multilingualism. It is hoped that this thesis can serve to inform future research endeavours into both grammatical attrition and multilingualism more generally.

Appendix A Participant exclusion and data quality checks

24 participants were excluded from this study. 11 were excluded for not completing all the tasks required for their particular participant group (Potential Attriters: AJT x2 LexTALE x2, LHQ3.0, and Additional Background Questionnaire. Controls: AJT (at least 1), LexTALE, and LHQ3.0). This study aimed to recruit participants with the linguistic profiles detailed in a) below. These profiles were outlined on the participant information sheets which all participants were required to read before participating in the study. Participants were informed that they could only participate if they fulfilled these criteria and were asked to further confirm this to be the case in an email to the researcher. Upon checking the LHQ3.0 and additional questionnaire (attriters' only) responses, it emerged that some of the participants did not fulfil the criteria in the way intended by the researcher. Consequently, a further 12 participants were excluded on these grounds. 7 of these were excluded from the Spanish control group for being Catalan dominant Spanish-Catalan bilinguals, though 10 Spanish dominant Spanish-Catalan bilinguals were maintained (see 4.3.2 for details). From the remaining participants, one further participant was excluded as their data did not pass the data quality checks for online data collection employed in this study. Participant profile criteria and steps taken to ensure data quality, which were used as the basis for participants exclusion, are detailed below.

a) Linguistic background profiles: justification and exclusion criteria

Potential Attriters were excluded if they did not meet all of the following criteria:

- 1) Native German speaker.
- 2) Only spoke standard German (*Hochdeutsch*) and/or a dialect of German at home growing up and did not attend a bilingual school (i.e., are not childhood bilinguals nor Heritage speakers of any languages).
- 3) Grew up in Germany but now living in either the Netherlands, UK, or Spain.
- 4) 18+ years old when moved to the Netherlands, UK, or Spain.
- 5) Lived in the Netherlands, UK, or Spain for a minimum of 15 years.
- 6) 33-75 years old.
- 7) Are not currently, nor have previously been, a full-time teacher of German as a foreign language.
- 8) Are not currently, nor have previously been, a full-time translator or interpreter of German.

Justification for recruiting participants with the characteristics of 1) and 2) is given in 4.3.1. Regarding 5), the effect of LoR on attrition, in particular on grammatical attrition, is poorly understood and the available data is very mixed (see Schmid, 2019 for an empirical state of the art concerning LoR in attrition with adult migrants). Space restrictions prevent a detailed discussion of this data, however the imposition of a 15 minimum LoR in this study warrants justification. First, it is important to note that to date there is no evidence of a cumulative effect of LoR on attrition, either from comparison of cross-sectional studies with varying LoRs or from the only longitudinal attrition study with a large sample size: de Bot and Clyne (1994). Secondly, researchers very often require a minimum of 10 years LoR for attrition studies. This is particularly the case for those investigating grammatical attrition where it is often assumed that the onset of L1 grammatical changes is later than changes to other linguistic domains. This delimitation however is rather arbitrary. Schmid (2019) summarises that 12 out of 41 studies considered in her review report a significant LoR effect. Importantly, nine of these studies report significant attrition *and* significant LoR. In these nine studies, the minimum LoR is less than 10 years, whilst none of the studies that took 10 years or more as a minimum and found significant attrition also found significant LoR effects. These findings are rather complex to interpret. It could be concluded from this that attrition happens within the first 10 years after which the L1 seems to stabilise again. This is the interpretation that Schmid (2019:291) notes is the current consensus in the field. However, it is also possible that this is the result of a statistical effect: using a longer minimum LoR (10 years+) decreases the range of possible LoRs values for the participant sample (particularly as studies typically take anywhere between 65-70 years old as the maximum age cut off), and this lack of variance makes it less likely that a significant LoR effect will be detected.

The current study does not aim to investigate the role of LoR in attrition but rather the possibility of grammatical attrition obtaining for the given properties in the given language combinations. If the interpretation that attrition does obtain in the first 10 years is correct (or at least in the first 10 years after emigration the L1 is particularly unstable compared to pre-emigration and post this 10-year period), then the current study should avoid participants with a LoR within this range. This way it can be more confidently assumed that there has been ample time in the L2 environment for the L1 – and also L2 – to stabilise and for any L1 attrition to obtain, if it is to do so at all. In this study, a more conservative 15 years was chosen to allow greater confidence in this. Any further variation in LoR within and between the groups of potential attriters is controlled for in the statistical modelling.

Regarding point 6) the lower age limit of 33 is the result of the requirements that participants emigrated at 18+ years old in addition to a minimum 15 years LoR. The imposition of upper age limit in attrition (and multilingualism research more generally) is to avoid a potential confound with the effects of cognitive ageing of linguistic performance. The exact age limit is controversial – and to an extent arbitrary – but typically ranges between 65-75. In attrition studies,

which typically require participants with a very specific linguistic background profile, there is a delicate balance between avoiding such potential confounds and recruiting enough participants to allow for sufficient statistical power and generalisable results. With this in mind, the initial upper age limit for inclusion in this study was set at 70 years old. Ultimately this was revised to 75 as three participants over the age of 70 were included (the eldest of which is 74), all in the German – Spanish group. This is borne in mind when interpreting the results.

As noted in 7) and 8) participants could not be full time German translators/interpreters or teaching of German as a foreign language. The reasoning behind this is that these people typically have a very high degree of L1 metalinguistic awareness (and significantly more so than non-language professionals) and, particularly in the case of language teachers, a core component of their work is identifying grammatical deviations. This may arguably make language professional less likely to exhibit attrition than non-language professionals. Indeed, in Miličević and Kraš (2017), which tests translators on experimental linguistic tasks (as opposed to translation tasks), the authors invoke a high degree of metalinguistic awareness as an explanation for a lack of attrition among trainee translators. Likewise, a number of studies by Lerner (e.g., Lerner, 2021), looking at L1 Spanish speakers with long term residence in Israel, compare language professionals (teachers, translators/interpreters, bilingual journalists) with non-language professions. These studies reveal that the language professionals frequently perform differently to the non-language professionals on a number of L1 comprehension and production tasks in different linguistic domains, including differing patterns of attrition.

In a similar vein, Schmid and Dusseldorp (2010) find a significant relationship between using the L1 in a professional setting and preservation of the L1 (see Schmid, 2019 for a recent review of the role of L1 use in attrition). Though it would be unreasonable to exclude all remaining participants who still use their L1 in a professional setting on these grounds, information about language use in professional settings is collected in this study and controlled for in the statistical analysis. Finally, though not stipulated in the requirement materials or exclusion criteria, an effort was made – as far as was feasible – to avoid recruiting linguistic researchers familiar with the field of L1 attrition and psycholinguistic multilingualism research more generally in case their insider and also metalinguistic awareness might influence their results.

Control participants were excluded if they did not meet all of the following criteria:

- Native speaker of either German, Dutch, English, or Spanish who grew up in Germany, the Netherlands, the UK, or Spain respectively.
- Only spoke either German, Dutch, English, or Spanish (and/or a dialect of one of these languages) at home growing up and did not attend a bilingual school (i.e., are not childhood bilinguals nor Heritage speakers of any languages). The one exception to this

was that seven of the Spanish control participants are childhood bilingual Spanish-Catalan speakers, though they are Spanish dominant (see 4.3.2 for more details).

- 18-75 years old.
- Have not lived for longer than two years outside of the country in which they grew up.

b) Steps to ensure data quality:

1. **Participant profiles** – Making sure the participants are who they say there are in the first place. As this was a remote, online study in which the researcher only had contact with the participants over email it was essential to ensure that the participants did in fact have the profile desired for the study, and, in particular, that they had the correct L1–L2 combination. The LHQ3.0s and additional questionnaire data were thoroughly checked manually to confirm, as far as possible, whether the participants had the appropriate linguistic background and whether there were any conspicuous inconsistencies in their responses. The online experimental software used for this study (*Gorilla*), has function to only allow people to access the online tasks if they are in a certain country. This function was used to ensure, for example, that potential attriters were in their L2 countries at the time of testing. A further component lies in the recruitment procedures. All participants were recruited through contacts of the researcher and in the case of potential attriters also through gatekeepers to communities of expats e.g., expat communities, German cultural organisations, German churches etc. This further helps to ensure that the participants being recruited have the appropriate linguistic profile.
2. **Attention** – Making sure participants are focused throughout tasks:
 - AJT length kept to a minimum (25-30 min average per AJT).
 - Audio input and context sentences for AJTs to keep participants more engaged.
 - Participant reimbursement – all participants were offered reimbursement for their participation.
3. **Response times** – The experimental software used in this study records response times to all experimental items as default. Response times for all AJTs and LexTALEs were therefore available. The total time each participant took to complete each AJT and LexTALE was looked at to see whether any participants took significantly less time than expected to complete a task (less than 15mins for the AJT, less than one minute for the Spanish LexTALE and less than 50s for all other LexTALEs). Such short completion times are possibly indicative of participants simply clicking through the questions to finish as quickly as possible. If a participant completed a task quicker than these times their responses were manually checked (see 4. below for details). For the LexTALEs there was the possibility that the participants would look up words. Therefore, their response times to each item were rank ordered. If any participant took more than 5000ms to respond to an item for 10 items or

more their responses were manually checked to make sure they were distinguishing between words and non-words and not clicking the same response for all items. Finally, the difference in % accuracy between words and non-words was calculated. If there was more than a 70% difference between the word and non-word scores the results were checked manually as again, this is indicative of participants simply clicking through items as quickly as possible. For two participants in the German–Spanish potential attriter group this was found to be the case on the Spanish LexTALE. However, manually checking their results showed that they were not simply clicking the same response each time. Rather, one participant who had a 72% difference was simply not very accurate on this task. The other participant did have a considerably greater % difference, however it emerged that they had only clicked ‘yes’ (i.e., that they thought the word is a real word) if they were also sure of the meaning of the word in Spanish (p.c. via email with that participant). The task does not require the participants to know the meaning of a word to respond ‘yes’, and the instructions did not state that knowledge of word meaning is required for an affirmative response. Despite this misunderstanding, it was decided to keep this participant in the study and bear this point in mind when interpreting their L2 proficiency score.

4. **Inspection of AJT responses** – as noted above, manually checking of a participant’s AJT responses was carried out in cases where the participant completed the AJTs significantly quicker than expected. The researcher checked whether participants were distinguishing between grammatical/ungrammatical items (including filler and practice items). For potential attriters, not making such a distinction could be indicative of attrition, however, for control participants this suggests the participant is not paying attention to the task and simply clicking the same response option to every test item. This procedure revealed that one participant in the German control group had clicked either 4 or 5 to almost every single test item on the AJT, including the fillers and practice items, regardless of grammaticality (this was further confirmed by plotting a histogram of their responses). It was concluded that this participant was not appropriately engaging with the task and their data was therefore removed from analysis.

Appendix B Extended summary of potential attriters' background data*

	L1 German – L2 Dutch (n=25)	L1 German – L2 English (n=31)	L1 German – L2 Spanish (n=30)
Age	53.32 (35-69) (SD 7.81)	51.06 (39-65) (SD 6.41)	56.00 (36-74) (SD 10.20)
Gender	19 Female 4 Male 2 Non-relevant	25 Female 6 Male	17 Female 13 Male
Education Level (mode)	3 Doctorate (<i>Promotion</i>) 16 Master (<i>Master/Diplom</i>) 3 Bachelor (<i>Bachelor</i>) 2 High School Diploma/ A-levels (<i>Fach/Hochschulreife</i>) 1 Other	5 Doctorate (<i>Promotion</i>) 11 Master (<i>Master/Diplom</i>) 6 Bachelor (<i>Bachelor</i>) 6 Apprentiship/ professional training (<i>Lehre/Berufsausbildung</i>) 3 High School Diploma/ A-levels (<i>Fach/Hochschulreife</i>)	5 Doctorate (<i>Promotion</i>) 16 Master (<i>Master/Diplom</i>) 3 Bachelor (<i>Bachelor</i>) 3 Apprentiship/ professional training (<i>Lehre/Berufsausbildung</i>) 2 High School Diploma/ A-levels (<i>Fach/Hochschulreife</i>) 1 Other
Length of Residence in L2 Country (years)	24.64 (16-42) (SD 7.47)	23.79 (15-47) (SD 7.33)	23.77 (15-40) (SD 8.15)
L1 proficiency (LexTALE) (%)	92.40 (57.50-100) (SD 8.67)	92.34 (71.25-100) (SD 5.91)	93.58 (85.00-100) (SD 3.88)
L2 Proficiency (LexTALE) (%)	91.20 (43.75-100) (SD 11.53)	94.11 (58.75-100) (SD 8.64)	81.00 (47.50-99.17) (SD 13.83)
L1-L2 Dominance Ratio	0.87 (0.14-4.0) (0.53)	0.80 (0.14-2.22) (0.91)	1.77 (0.14-7.0) (1.73)
L2 Age of Onset	25.66 (8-38) (SD 7.09)	15.33 (9-42) (SD 8.66)	26.55 (5-52) (SD 9.87)

Appendix B

Self-rated German proficiency before emigration	Listening: 21 Excellent 3 Very good 1 Good	Listening: 26 Excellent 5 Very good	Listening: 22 Excellent 8 Very good
	Speaking: 20 Excellent 3 Very good 2 Good	Speaking: 25 Excellent 6 Very good	Speaking: 20 Excellent 10 Very good
	Reading: 21 Excellent 4 Very good	Reading: 24 Excellent 7 Very good	Reading: 21 Excellent 9 Very good
	Writing: 18 Excellent 6 Very good 1 Good	Writing: 22 Excellent 6 Very good 2 Good 1 Limited	Writing: 19 Excellent 9 Very good 1 Good 1 Limited
Self-rated German proficiency after emigration	Listening: 17 Excellent 4 Very good 4 Good	Listening: 24 Excellent 6 Very good 1 Good	Listening: 21 Excellent 8 Very good 1 Good
	Speaking: 5 Excellent 11 Very good 7 Good 1 Average 1 Limited	Speaking: 11 Excellent 10 Very good 9 Good 1 Average	Speaking: 14 Excellent 14 Very good 2 Good
	Reading: 14 Excellent 7 Very good 4 Good	Reading: 21 Excellent 9 Very good 1 Good	Reading: 21 Excellent 7 Very good 2 Good
	Writing: 6 Excellent 5 Good 11 Very good 3 Average	Writing: 10 Excellent 10 Very good 6 Good 3 Average 2 Limited	Writing: 13 Excellent 12 Very good 4 Good 1 Limited
Partner's first language	11 Dutch 2 German 5 Both (7 no partner)	19 English 7 German 2 Both 2 Another language (1 no partner)	11 German 10 Spanish 6 Both 1 Another language (2 no partner)

Appendix B

Language use with partner (mode frequency)	German: Rarely	German: Rarely/Never	German: Always	
	Dutch: Most of the time	English: Always	Spanish: Always/ most of the time	
	Another language: Never	Another language: Never	Another language: Never	
Language use with children (mode frequency)	German: Sometimes	German: Most of the time	German: Most of the time	
	Dutch: Most of the time	English: Sometimes	Spanish: Sometimes	
	Another language: Never	Another language: Never	Another language: Rarely	
Language use in current employment (mode frequency)	German: Rarely	German: Never	German: Often	
	Dutch: Most of the time	English: Always	Spanish: Most of the time / Often	
	Another language: Rarely	Another language: Never	Another language: Regularly/ Rarely	
Frequency of contact with family and friends in Germany	1 Always	4 Always	3 Always	
	2 Most of the time	1 Most of the time	1 Most of the time	
	3 Often	3 Often	7 Often	
	15 Regularly	16 Regularly	12 Regularly	
	3 Sometimes	4 Sometimes	4 Sometimes	
	1 Rarely	3 Rarely	3 Rarely	
	0 Never	0 Never	0 Never	
Method of contact with family and friends in Germany	38 Audio call	34 Audio call	37 Audio call	
	18 Text/instant message	21 Text/instant message	20 Email	
	17 Video call	21 Video call	19 Video call	
	16 Email	16 Email	18 Voice message	
	8 Voice message	11 Voice message	15 Text/ instant message	
	8 Letters	6 Letters	8 Letters	
	1 Other	0 Other	3 Other	
Frequency of visits to Germany each year	1-2 times a year: 5	Less than once a year: 5	Less than once a year: 5	
	3-4 times a year: 10	1-2 times a year: 18	1-2 times a year: 14	
	5-6 times a year: 3	3-4 times a year: 8	3-4 times a year: 9	
	8-8 times a year: 5		5-6 times a year: 1	
	9 times a year or more: 2		9 times a year or more: 1	
Number of days in Germany each year	6.06 (1-21) (SD 4.58)	9.48 (3-20) (SD 4.03)	12.53 (3-45) (SD 9.05)	
	Other languages/ dialects	25 English	16 French	27 English
		10 French	9 Spanish	12 French
6 Spanish		6 Russian	7 Catalan	
3 Plattdeutsch (German)		5 Bayerisch (German)	3 Plattdeutsch (German)	
2 Bayerisch (German)		3 Italian	2 Dutch	
2 Hessisch (German)		3 Schwäbisch (German)	2 Eifler Platt (German)	
2 Russian		2 Dutch		

Appendix B

1 Afrikaans	2 Sächsisch (German)	2 Hamburgerisch (German)
1 Greek	1 Badisch (German)	2 Schwäbisch (German)
1 Hamburgisch (German)	1 Berlinerisch (German)	1 Allemannisch (German)
1 Kölsch (German)	1 Bonner Platt (German)	1 Andalus (Spanish)
1 Limburgisch (Dutch)	1 Fränkisch (German)	1 Asturiano (Spanish)
1 Norwegian	1 Plattdeutsch (German)	1 Bayerisch (German)
1 Oberlausitzisch (German)	1 Ruhrgebietsdeutsch (German)	1 Belgian French
1 Rheinisch (German)	1 Welsh	1 Español de Canarias (Spanish)
1 Sächsisch (German)	1 West-Country (English)	1 Fränkisch (German)
1 Schwäbisch (German)		1 Japanese
		1 Kurpfälzisch (German)
		1 Mandarin
		1 Mannheimerisch (German)
		1 Schweizerdütsch (German)
		1 Swedish
		1 Valenciano (Catalan)

*Notes:

1. The values for L2 Age of Onset presented in this table should be interpreted only as a very rough estimation of the age at which participants began being exposed to and started learning/using their L2. The Language History Questionnaire (LHQ) 3.0 (Li *et al.*, 2019) used in this study does not contain one single question asking participants when they began learning language X. Rather, it asks three related questions: i) the age at which participants started using language X for listening, speaking, reading, and writing, ii) their total years of using language X (question 7), and iii) the age at which they started to use language X at home, with friends, at school, at work, for language software, and for online games (question 12). The responses of many participants were not consistent between or indeed sometimes within these questions. Furthermore, some participants always answered with years of use rather than age of onset and vice versa, some calculated only from the age at which they emigrated to the L2 country, and some seemed have mixed up the L1-L2 and L2-L3 order/values. For transparency, the L2 Age of Onset values in the table were calculated as follows: the average value of the age at which the participant started using language X for listening, speaking, reading, and writing was calculated for each participant, as these values appeared the most reliable and consistent across the board. Where it was clear that a participant had mixed up the L1-L2 order/values, the values the researcher assumed were intended as the L2 values were used. The values of one participant in the German – Spanish were excluded as they were implausible (greater than the participant's biological age). Additionally, one further participant in this group did not answer this question though they did confirm with the researcher via email that they were not a childhood bilingual of any language. The means, ranges, and standard deviations of the results of this question are presented in the table. In light of this, these values are not used in any further analysis or statistical modelling in this study but are presented here to give a rough estimation. All participants with early ages of L2 exposure were exposed to their L2 through school lessons, with the exception of one participant who was exposed to and spoke to some Spanish at home. This participant confirmed via email that they spoke Spanish at home only very occasionally and they did not learn the language properly until much later. Crucially, none of the participants were childhood bilinguals.
2. Information about other languages and dialects taken from question 7 and question 24 of the LHQ3.0.
3. In giving the estimated number of days spent in Germany each year, some participants provided an estimated range of the number of days rather than an average number. In this case, the median of this range was calculated and used in calculating the means, ranges and standard deviations presented in this column of the table.
4. In the questionnaire there are eight response options for 'method of contact with friends and family in country of origin'. In this table, the options *telephone* and *audio call* are collapsed into one response.

Appendix C Extended summary of control participants' background data*

	L1 German (overall) (n=44)	L1 German (German – Dutch comparison) (n=31)	L1 German (German – English comparison) (n=31)	L1 German (German – Spanish comparison) (n=32)	L1 Dutch (n=30)	L1 English (n=33)	L1 Spanish (n=31)
Age	25.68 (19-52) (SD 6.57)	26.90 (21-52) (SD 7.28)	24.39 (21-52) (SD 5.79)	26.00 (19-52) (SD 7.27)	30.13 (18-67) (SD 14.80)	27.85 (19-52) (SD 9.88)	25.06 (18-57) (SD 10.17)
Gender	29 Female 15 Male	19 Female 12 Male	19 Female 13 Male	22 Female 9 Male	19 Female 10 Male 1 Non-binary	21 Female 12 Male	24 Female 7 Male
Education Level (mode)	4 Master (<i>Master/Diplom</i>) 18 Bachelor (<i>Bachelor</i>) 3 Apprentiship/ professional training (<i>Lehre/ Berufsausbildung</i>) 19 High School Diploma/A-levels (<i>Fach/ Hochschulreife</i>)	2 Master (<i>Master/Diplom</i>) 12 Bachelor (<i>Bachelor</i>) 3 Apprentiship/ professional training (<i>Lehre/ Berufsausbildung</i>) 14 High School Diploma/A-levels (<i>Fach/ Hochschulreife</i>)	2 Master (<i>Master/Diplom</i>) 13 Bachelor (<i>Bachelor</i>) 2 Apprentiship/ professional training (<i>Lehre/ Berufsausbildung</i>) 14 High School Diploma/A-levels (<i>Fach/ Hochschulreife</i>)	4 Master (<i>Master/Diplom</i>) 14 Bachelor (<i>Bachelor</i>) 2 Apprentiship/ professional training (<i>Lehre/ Berufsausbildung</i>) 12 High School Diploma/A-levels (<i>Fach/ Hochschulreife</i>)	2 Doctorate 9 Master 19 Bachelor 1 N/A	5 Doctorate 9 Master 17 Bachelor 1 Other 1 N/A	1 Doctorate (<i>Doctorado</i>) 4 Master (<i>Máster</i>) 22 Bachelor (<i>Licenciatura</i>) 3 High School (<i>Escuela Secundaria</i>) 1 Middle School
L1 Proficiency	90.28 (67.50-100)	89.23 (67.50-100)	90.24 (67.50-98.75)	91.37 (82.50-100)	92.29 (73.75-100)	92.23 (76.25-100)	91.64 (71.67-99.17)

Appendix C

(LexTALE) (%)	(SD 5.46)	(5.68)	(SD 5.92)	(SD 4.28)	(SD 6.35)	(SD 6.51)	(SD 7.28)
Other languages/ dialects	44 English	31 English	31 English	32 English	30 English	21 French	28 English
	25 French	19 French	18 French	18 French	22 German	13 German	12 French
	13 Spanish	7 Spanish	12 Spanish	10 Spanish	21 French	9 Spanish	12 German
	6 Schwäbisch (German)	3 Schwäbisch (German)	6 Schwäbisch (German)	4 Schwäbisch (German)	3 Frisian	2 Italian	10 Catalan (2 Catalán de
	4 Italian	2 Italian	4 Italian	3 Sächsisch (German)	3 Swedish	1 Bengali	Balares, 2
	3 Sächsisch (German)	1 Dutch	2 Portuguese	2 Sächsisch (German)	2 Brabants (Dutch)	1 Hindi	Valenciano)
	2 Portuguese	1 Greek	2 Sächsisch (German)	2 Portuguese	2 Gronings (Dutch)	1 Scots (English)	5 Italian
	2 Plattdeutsch (German)	1 Norwegian	2 Berlinerisch (German)	2 Italian	2 Plattdeutsch (Dutch)	1 Welsh	3 Mandarin
	2 Berlinerisch (German)	1 Russian	1 Danish	2 Plattdeutsch (German)	2 Limburgs (Dutch)		2 Andaluz (Spanish)
	2 Bayrisch (German)	1 Sächsisch (German)	1 Dutch	1 Dutch	2 Spanish		2 Madrileño (Spanish)
	1 Allemanisch (German)	1 Bayrisch (German)	1 Japanese	1 Greek	1 Bordeaux French		2 Asturiano (Spanish)
	1 Allemanisch (German)	1 Allemanisch (German)	1 Machteburjer (German)	1 Japanese	1 Flemish		1 Arabic
	1 Russian	1 Hessisch (German)	1 Machteburjer (German)	1 Norwegian	1 Italian		1 Basque
	1 Rhein Hessisch (German)	1 Hessisch (German)	1 Bayrisch (German)	1 Russian (German)	1 Napolitano (Italian)		1 Gallego
	1 Norwegian	1 Rhein Hessisch (German)	1 Kölsch (German) (German)	1 Machteburjer (German)	1 Ukrainian		1 Greek
	1 Machteburjer (German)	1 Kölsch (German) (German)	1 Plattdeutsch (German)	1 Bayrisch (German)			1 Portuguese
	1 Kölsch (German)	1 Plattdeutsch (German)		1 Berlinerisch (German)			
	1 Japanese			1 Hessisch (German)			
	1 Hessisch (German)			1 Rhein Hessisch (German)			
	1 Greek			1 Kölsch (German)			

1 Dutch

1 Danish

***Notes:**

1. Other languages and dialects calculated from question 7 and question 24 of the LHQ3.0.

Control participant additional information:

Most control participants are late-sequential L2 speakers of additional languages and/or dialects of those languages. Notably, all German and Dutch controls, and 28/31 Spanish controls, report some level of proficiency in English (in most cases a very high level), having started learning English in school, and also report some continued regular use of/exposure to English. Therefore, both the German expats in the UK as well as the German control group both have a high level of English proficiency and some regular exposure to/and use of English. At first sight this might call into question the validity of the German control group as a contrast for the German expats in the UK as it is in principle possible that their L1 German grammars might also be influenced by L2 English. Two points are relevant here: firstly, it is arguably very unlikely that learning an L2 through schooling in the home country, even with frequent exposure and use of this language, would engender representational to L1 morphosyntax as investigated in this study. To the best of my knowledge, there is no evidence of such L2 influence. Secondly, the purpose of the control group is to be representative, as far as possible, of the potential attriters' grammars prior to emigration. All German controls as well as all Germans in the UK started learning English in school. Therefore, it can be assumed that even if L2 English is able to exert some influence on the L1 grammar of the controls, it is likely that this would have also been the case, at least to a relatively similar degree, for the German expats prior to emigration to the UK. Thus, the control group still constitutes a reliable proxy for the German expats L1 grammar prior to emigration. In any case, knowledge of English is essentially unavoidable with L1 German speakers, especially considering the education level of the participants who typically participate in experimental linguistic studies. Consequently, a non-English speaking L1 German group is not attainable, and in this study the L2 dominance measure from the background questionnaire was unfortunately not suitable to use to investigate the potential influence of English further (see 4.3.1).

Regarding the linguistic profile of control participants, there has been considerable debate in the field of multilingualism as to the appropriateness and relative (dis)advantages of utilising monolingual vs. bilingual controls.¹¹⁰ The same issues are applicable to L1 attrition studied here. The primary argument for use of bilingual controls is that it allows for more ecologically valid

¹¹⁰ A related and long-standing debate is whether it is appropriate, valid, and desirable to make direct comparisons between experimental and control groups, and even whether control groups should be included experimental designs (e.g., Bley-Vroman, 1983; Domínguez and Arche, 2021; Rothman *et al.*, 2022). Though space constraints prevent a further consideration of these debates, it is clear that in attrition studies such as this one, where the central line of enquiry is precisely whether an experimental group deviates from a baseline, the inclusion of, and direct comparison to, said baseline is essential. Whilst in longitudinal studies this baseline can be the same experimental participants at an earlier timepoint, in cross-section studies it is necessarily to use a separate group of L1 speakers.

comparisons between the results of the experimental group and baseline, as notably argued for by Rothman and Iverson (2010), among others, in the context of generative SLA. In the context of attrition, Schmid and Köpke, (2017:639), argue that the frequent use of functionally *monolingual* controls in attrition studies is a potential problem. They posit that some of the documented differences between experimental and monolingual controls typically used as evidence for attrition might actually be the result of differences between monolinguals and bilinguals in general (e.g., a result of the additional cognitive demands of bilingualism, such as the need to suppress the language not in use, may influence bilinguals' but not monolinguals' performance on the same task). This is primarily a concern in the domain of processing (see for example, Miller and Rothman, 2019 for discussion in the context of L1 attrition).

As the object of the current investigation is grammatical mental representations, and this is investigated using offline methods, the issue of bilingual vs. monolingual controls is arguably not of such importance as might be case for online attrition studies. In any case, knowledge of L2 English is unavoidable when using L1 German and Dutch speakers, and increasingly unavoidable with L1 Spanish speakers, especially when the educational level of the typical participant is taken into consideration. As discussed above with reference to the L1 German controls, it is not expected that English would influence the offline judgements of these participants for the kind of structures (i.e., morphosyntactic structures) tested in this study, and no suitable L2 dominance measure was available to allow further investigation. Finally, as knowledge of English as a second language, though to varying degrees, is the case for almost all non-L1 English participants in this study, this should not significantly affect the comparability of the results between the groups.

Appendix D Catalan vs. non-Catalan-speaking group

means on negation conditions

Group	Catalan-speaking	Condition	Mean
Germans in Spain (German)	No	GNQ	4.50
Germans in Spain (German)	Yes	GNQ	4.66
Germans in Spain (German)	No	GNNQ	1.33
Germans in Spain (German)	Yes	GNNQ	1.07
Germans in Spain (German)	No	GNQNQ	1.57
Germans in Spain (German)	Yes	GNQNQ	1.09
Germans in Spain (German)	No	GNQPI	4.35
Germans in Spain (German)	Yes	GNQPI	4.29
Germans in Spain (Spanish)	No	SNCI	3.07
Germans in Spain (Spanish)	Yes	SNCI	3.51
Germans in Spain (Spanish)	No	SNNCI	4.24
Germans in Spain (Spanish)	Yes	SNNCI	4.38
Germans in Spain (Spanish)	No	SNCINCI	3.39
Germans in Spain (Spanish)	Yes	SNCINCI	3.45
Germans in Spain (Spanish)	No	SNCIPI	2.62
Germans in Spain (Spanish)	Yes	SNCIPI	2.79
Spanish Control	No	SNCI	1.42
Spanish Control	Yes	SNCI	1.21
Spanish Control	No	SNNCI	3.72
Spanish Control	Yes	SNNCI	4.13
Spanish Control	No	SNCINCI	3.71
Spanish Control	Yes	SNCINCI	4.13
Spanish Control	No	SNCIPI	1.86
Spanish Control	Yes	SNCIPI	1.63

Appendix E LHQ3.0 (Li *et al.*, 2019)

Full pdf. version. For the present study a modular version without questions 17, 25, and 26 of the full version was used. The English version is provided below. The German, Spanish, and Dutch versions are identical other than the German version has 9 rather than 7 options for the education level due to differences in education systems. Online versions of all questionnaires and further information is available at: <https://lhq-blclab.org>.

Appendix E

Language history questionnaire (LHQ). Go to <https://blclab.org/lhq3/> to use the online version and for reference

(1) Participant ID number				(2) Age			
(3) Gender		<input type="checkbox"/> Male	<input type="checkbox"/> Female	<input type="checkbox"/> Non-binary	<input type="checkbox"/> Non-relevant		
(4) Education		<input type="checkbox"/> Graduate school (Doctor)		<input type="checkbox"/> Graduate school (Master)		<input type="checkbox"/> College (Bachelor)	
		<input type="checkbox"/> High school		<input type="checkbox"/> Middle school		<input type="checkbox"/> Elementary school	
(5) Parents' Education	Father	<input type="checkbox"/> Graduate school (Doctor)		<input type="checkbox"/> Graduate school (Master)		<input type="checkbox"/> College (Bachelor)	
		<input type="checkbox"/> High school		<input type="checkbox"/> Middle school		<input type="checkbox"/> Elementary school	
	Mother	<input type="checkbox"/> Graduate school (Doctor)		<input type="checkbox"/> Graduate school (Master)		<input type="checkbox"/> College (Bachelor)	
		<input type="checkbox"/> High school		<input type="checkbox"/> Middle school		<input type="checkbox"/> Elementary school	
(6) Handedness		<input type="checkbox"/> Right-handed		<input type="checkbox"/> Left-handed		<input type="checkbox"/> Ambidextrous	

(7) Indicate your native language(s) and any other languages you have studied or learned, the age at which you started using each language in terms of listening, speaking, reading, and writing, and the total number of years you have spent using each language.

*Notes For "Years of use", you may have learned a language, stopped using it, and then started using it again. Please give the total number of years.

Language	Listening	Speaking	Reading	Writing	Years of use*

(8) Country of origin

(9) Country of residence

(10) If you have lived or traveled in countries other than your country of residence for three months or more, then indicate the name of the country, your length of stay (in Months), the language you used, and the frequency of your use of the language for each country.

* You may have been to the country on multiple occasions, each for a different length of time. Add all the trips together

	Never	Rarely	Sometimes	Regularly	Often	Usually	Always
	1	2	3	4	5	6	7

Country	Length of stay (in Months)*	Language	Frequency of use
			<input type="checkbox"/> 1, <input type="checkbox"/> 2, <input type="checkbox"/> 3, <input type="checkbox"/> 4, <input type="checkbox"/> 5, <input type="checkbox"/> 6, <input type="checkbox"/> 7.
			<input type="checkbox"/> 1, <input type="checkbox"/> 2, <input type="checkbox"/> 3, <input type="checkbox"/> 4, <input type="checkbox"/> 5, <input type="checkbox"/> 6, <input type="checkbox"/> 7.
			<input type="checkbox"/> 1, <input type="checkbox"/> 2, <input type="checkbox"/> 3, <input type="checkbox"/> 4, <input type="checkbox"/> 5, <input type="checkbox"/> 6, <input type="checkbox"/> 7.
			<input type="checkbox"/> 1, <input type="checkbox"/> 2, <input type="checkbox"/> 3, <input type="checkbox"/> 4, <input type="checkbox"/> 5, <input type="checkbox"/> 6, <input type="checkbox"/> 7.

(11) Indicate the way you learned or acquired your non-native language(s). Check one or more boxes that apply.

* e.g., immigrating to another country where the dominant language is different from your native language so you learn this language through immersion in the language environment.

Non-native Language	Immersion*	Classroom instruction	Self-learning
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix E

(12) Indicate the age at which you started using each of the languages you have studied or learned in the following environments (Including native language).

Language	At home	With friends	At school	At work	Language software	Online games

(13) Indicate the language used by your teachers for instruction at each educational level. If the instructional language switched during any educational level, then also indicate the "Switched to" language. If you had a bilingual education at any educational level, then simply check the box under "Both Languages".

Environment	Language	(Switched to)	Both Language
Elementary school			<input type="checkbox"/>
Middle school			<input type="checkbox"/>
High school			<input type="checkbox"/>
College (Bachelor)			<input type="checkbox"/>
Graduate school (Master)			<input type="checkbox"/>
Graduate school (Doctor)			<input type="checkbox"/>

(14) Rate your language learning skill. In other words, how good do you feel you are at learning new languages, relative to your friends or other people you know?

Very poor	Poor	Limited	Average	Good	Very good	Excellent
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

(15) Rate your current ability in terms of listening, speaking, reading, and writing in each of the languages you have studied or learned (including the native language).

Very poor	Poor	Limited	Average	Good	Very good	Excellent
1	2	3	4	5	6	7

Language	Listening	Speaking	Reading	Writing

(16) Rate the strength of your foreign accent for each of the languages you have studied or learned.

None	Very weak	Weak	Moderate	Strong	Very strong	Extreme
1	2	3	4	5	6	7

Language	Accent
	<input type="checkbox"/> 1, <input type="checkbox"/> 2, <input type="checkbox"/> 3, <input type="checkbox"/> 4, <input type="checkbox"/> 5, <input type="checkbox"/> 6, <input type="checkbox"/> 7.
	<input type="checkbox"/> 1, <input type="checkbox"/> 2, <input type="checkbox"/> 3, <input type="checkbox"/> 4, <input type="checkbox"/> 5, <input type="checkbox"/> 6, <input type="checkbox"/> 7.
	<input type="checkbox"/> 1, <input type="checkbox"/> 2, <input type="checkbox"/> 3, <input type="checkbox"/> 4, <input type="checkbox"/> 5, <input type="checkbox"/> 6, <input type="checkbox"/> 7.
	<input type="checkbox"/> 1, <input type="checkbox"/> 2, <input type="checkbox"/> 3, <input type="checkbox"/> 4, <input type="checkbox"/> 5, <input type="checkbox"/> 6, <input type="checkbox"/> 7.

(17) If you have taken any standardized language proficiency tests (e.g., TOEFL, IELTS, TOEIC, etc.), then indicate the name of the test, the language assessed, and the score you received for each. If you do not remember the exact score, then indicate an "Approximate score" instead.

Test	Year taken	Language	Score	Approximate score

Appendix E

(18) Estimate how many hours per day you spend engaged in the following activities in each of the languages you have studied or learned (including the native language).

Language	Watching television	Listening to radio	Reading for fun	Reading for school/work	Using social media and Internet	Writing for school/work

(19) Estimate how many hours per day you spend speaking with the following groups of people in each of the languages you have studied or learned (including the native language).

Note *Include significant others in this category if you did not include them as family members (e.g., married partners)
 **Include anyone in the work environment in this category (e.g., if you are a teacher, include students as co-workers).

Language	Family members	Friends*	Classmates	Others (co-workers**, roommates, etc.)

(20) If you use mixed language in daily life, please indicate the languages that you mix and estimate the frequency of mixing in normal conversation with the following groups of people.

Note *Include significant others in this category if you did not include them as family members (e.g., married partners)
 **Include anyone in the work environment in this category (e.g., if you are a teacher, include students as co-workers).

	None 1	Very weak 2	Weak 3	Moderate 4	Strong 5	Very strong 6	Extreme 7

(21) In which language do you communicate best or feel most comfortable in terms of listening, speaking, reading, and writing in each of the following environments? You may be selecting the same language for all or some of the fields below.

	Listening	Speaking	Reading	Writing
At Home				
At school				
At work				
With friends				

Appendix E

(22) How often do you use each of the languages you have studied or learned for the following activities? (including the native language)

Note*This includes shouting, cursing, showing affection, etc.
 **This includes counting, calculating tips, etc.
 ***This includes telephone numbers, ID numbers, etc.

		Never	Rarely	Sometimes	Regularly	Often	Usually	Always
		1	2	3	4	5	6	7
Language	Thinking	Talking to yourself	Expressing emotion*	Dreaming	Arithmetic**	Remembering numbers***	Praying	

(23) What percentage of your friends speaks each of the languages you have studied or learned? (including the native language)

Language	Percentage
	%
	%
	%
	%

(24) Which cultures/languages do you identify with more strongly? Rate the strength of your connection in the following categories for each culture/language.

		Very poor	Poor	Limited	Average	Good	Very good	Excellent
		1	2	3	4	5	6	7
Culture/Language	Way of life	Food	Music	Art	Cities/Towns	Sports teams		

(25) Use the comment box below to indicate any additional answers to any of the questions above that you feel better describe your language background or usage.

(26) Use the comment box below to provide any other information about your language background or usage.

(27) Do you also speak/use any dialects of the languages you know? Please indicate the name(s) of the dialect and the degree you use them.

Appendix F Additional Background questionnaire

Pdf. Version. Online version included branching depending on participants answers to certain questions. Scales designed to be in line with LH3.0. N.B: This questionnaire was administered to the potential attriters only.

Fragebogen 2

Hier gibt es noch einige Fragen zu Ihrem Sprachhintergrund und Ihrer Sprachverwendung. Bitte beantworten Sie alle Fragen.

* Required

1. Bitte geben Sie Ihre Teilnehmernummer an. *

2. Wie lange leben Sie schon in dem Land Ihres derzeitigen Wohnsitzes? (Jahre)

*

3. Bitte geben Sie Ihren derzeitigen Beschäftigungsstatus an. *

- Berufstätig
- Pensioniert
- Arbeitslos
- Ich war nie berufstätig

Appendix F

4. Bitte schätzen Sie, wie viele Jahre Sie schon in diesem Beruf tätig sind. *

5. Bitte schätzen Sie, wie oft Sie jede Sprache in diesem Beruf verwenden. *

	Nie	Selten	Manchmal	Regelmäßig	Oft	Meistens	Immer
Deutsch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Sprache des Landes meines derzeitigen Wohnsitzes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eine andere Sprache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Hatten Sie einen vorherigen Beruf? *

- Ja
 Nein

Appendix F

7. Bitte schätzen Sie, wie viele Jahre Sie in diesem Beruf tätig waren. *

8. Bitte schätzen Sie, wie oft Sie jede Sprache in diesem Beruf verwendet haben. *

	Nie	Selten	Manchmal	Regelmäßig	Oft	Meistens	Immer
Deutsch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Sprache des Landes meines derzeitigen Wohnsitzes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eine andere Sprache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Hatten Sie noch einen vorherigen Beruf? *

- Ja
- Nein

Appendix F

10. Bitte schätzen Sie, wie viele Jahre Sie in diesem Beruf tätig waren. *

11. Bitte schätzen Sie, wie oft Sie jede Sprache in diesem Beruf verwendet haben. *

	Nie	Selten	Manchmal	Regelmäßig	Oft	Meistens	Immer
Deutsch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Sprache des Landes meines derzeitigen Wohnsitzes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eine andere Sprache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Hatten Sie noch einen vorherigen Beruf? *

- Ja
 Nein

13. Bitte schätzen Sie, wie viele Jahre Sie in diesem Beruf tätig waren. *

14. Bitte schätzen Sie, wie oft Sie jede Sprache in diesem Beruf verwendet haben. *

	Nie	Selten	Manchmal	Regelmäßig	Oft	Meistens	Immer
Deutsch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Sprache des Landes meines derzeitigen Wohnsitzes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eine andere Sprache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix F

15. Seitdem Sie ausgewandert sind, wie oft im Durchschnitt sind Sie in Ihr Herkunftsland zurückgekommen? *

- Nie
- Weniger als ein Mal im Jahr
- 1-2 Mal im Jahr
- 3-4 Mal im Jahr
- 5-6 Mal im Jahr
- 7-8 Mal im Jahr
- 9 Mal oder mehr im Jahr

16. Bitte schätzen Sie die Durchschnittsdauer (Tage) dieser Aufenthalte *

17. Wie würden Sie Ihre Deutschfähigkeiten in diesen Bereichen vor Ihrer Emigration einstufen? *

	Sehr schlecht	Begrenzt	Durchschnittlich	Gut	Sehr Gut	Ausgezeichnet
Hören	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sprechen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lesen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schreiben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Wie würden Sie Ihre derzeitigen Deutschfähigkeiten in diesen Bereichen einstufen? *

	Sehr schlecht	Begrenzt	Durchschnittlich	Gut	Sehr Gut	Ausgezeichnet
Hören	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sprechen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lesen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schreiben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix F

19. Welche Sprache spricht Ihr Partner oder Ihre Partnerin als Muttersprache? *

- Deutsch
- Die Sprache des Landes meines derzeitigen Wohnsitzes
- Beides
- Eine andere Sprache
- Ich bin single

Appendix F

20. Welche Sprache(n) sprechen Sie mit Ihrem Partner oder Ihrer Partnerin und wie oft? *

	Nie	Selten	Manchmal	Regelmäßig	Oft	Meistens	Immer
Deutsch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Sprache des Landes meines derzeitigen Wohnsitzes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eine andere Sprache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. Haben Sie Kinder? *

- Ja
 Nein

22. Welche Sprache(n) sprechen Sie mit Ihren Kindern und wie oft? *

	Nie	Selten	Manchmal	Regelmäßig	Oft	Meistens	Immer
Deutsch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Sprache des Landes meines derzeitigen Wohnsitzes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eine andere Sprache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

23. Wie oft haben Sie Kontakt mit Verwandten und Freunden in Ihrem Herkunftsland? *

- Nie
 Selten
 Manchmal
 Regelmäßig
 Oft
 Meistens
 Immer

Appendix F

24. Wie halten Sie Kontakt mit Verwandten und Freunden in Ihrem Herkunftsland? *

- Telefon
- E-mail
- SMS/Nachrichten
- Videoanrufe
- Sprachanrufe
- Sprachnachrichten
- Briefe
- Andere

Appendix G LexTALE instructions (English version)

(As appeared on experimental software)

This task consists of about 60 trials, in each of which you will see a string of letters. Your task is to decide whether this is an existing English word or not. If you think it is an existing English word, click "yes", and if you think it is not an existing English word, click "no". British English spelling is used throughout.

If you are sure that the word exists, even though you don't know its exact meaning, you may still respond "yes". But if you are not sure if it is an existing word, you should respond "no".

Please do not use a dictionary or look up any words.

If you have any questions, please contact Lewis Baker (lmb3g14@soton.ac.uk) before continuing. (You can exit the task now and log back into this page again later).

If everything is clear, you can now start the task by clicking 'Continue' below.

Continue

Appendix H AJT instructions (English version)

(As appeared on experimental software)

In this experiment we want to see how acceptable you find certain sentence forms.

There are around 100 trials.

Please complete this experiment in a quiet place where you can hear your computer audio clearly.

In each trial you will first read a short context sentence/sentences to set the scene. Each context sentence ends with the words "You say: ". Read the sentence then click on the 'Play' button below it to hear a sentence that follows the context. Once the clip has finished, this same sentence will appear written on the screen followed by a 6-point rating scale: **1, 2, 3, 4, 5, ?**

Each of these numbers corresponds to a judgement as shown below:

- 1.** It sounds very unnatural. I would never say it like this. This is not a possible sentence for me
 - 2.** It sounds unnatural. I would probably not say it like this
 - 3.** It doesn't sound that natural. But I could possibly still say it like this
 - 4.** It sounds quite natural. I could probably say it like this
 - 5.** It sounds very natural. I could definitely say it like this
- ? I don't know whether I would say it like this or not. I am really not sure

Please note meaning of '?' on the scale.

Continue

We are interested in whether you could say this sentence (i.e., whether it is a possible English sentence for you). Do not take into account whether you think the sentence is true or not, or whether it is exactly what you would say in that context.

For each trial, only the scale **1, 2, 3, 4, 5, ?** will appear– please click on one of these numbers or **'?'**. If you need a reminder of what these numbers mean, you can click the drop-down list at the bottom of the screen to see the full descriptions (you do not need to select a number from the drop-down menu, this is only here to remind you of the descriptions if needed. Your response is recorded from the number scale alone).

You can play the audio clip once more if needed. These clips are recorded by an English speaker from the north of England. Don't worry if the accent is not the same as yours; the clips are only there to help you consider how acceptable you find the sentences. Do not take the accent into account when making your judgements.

Once you have made your judgement, click 'Continue'.

First there are 6 practice trials.

Please click 'Continue' to begin.

Continue

Appendix I Full list of AJT items

*=ungrammatical

I.1 AJT1: Reflexive Binding and Grammatical Gender (German)

Reflexive Binding	Item no.	Context Sentence(s)	Test Sentence:
Condition 1: Transitive, non-grooming, non-inherently reflexive verb with <i>Sich</i>	1	Ihr seid auf einer Party. Annette fragt, was Markus in der Ecke mit seinem Handy macht. Du sagst:	Er fotografiert sich.
	2	Du findest Lena sehr arrogant. Du sagst:	Lena liebt sich.
	3	Anna fragt dich, warum Kurt draußen vor der Kamera steht. Du sagst:	Er filmt sich.
	4	Dein Hund steht vor einem Spiegel. Er ist von seiner Spiegelung fasziniert. Du sagst:	Er erkennt sich.
	5	Du sagst Anna, warum du glaubst, dass Max sehr arrogant ist. Du sagst:	Max findet sich toll.
	6	Deine Freundin ist eine sehr begabte Künstlerin. Du schaust ihre Selbstporträts an. Du sagst:	Sie zeichnet sich sehr gut.

Appendix I

	7	Du findest, dass die Politikerin eine sehr gute Leistung in der Debatte erbracht hat. Du sagst:	Sie hat sich sehr gut verteidigt.
	8	Dein Kollege fragt dich, was du von dem letzten Kandidaten hältst.	Er hat sich sehr gut präsentiert.
Condition 2: Transitive, non-grooming, non-inherently reflexive verb with <i>Sich selbst</i>	1	Du und Jonas warten auf Anna, da ihr zusammen auf eine Party geht. Jonas fragt, warum sie immer noch in ihrem Zimmer und noch nicht bereit ist. Du sagst:	Sie fotografiert sich selbst.
	2	Ana fragt, warum du Leo eingebildet findest. Du sagst:	Er liebt sich selbst.
	3	Hans fragt warum, dass Lisa vor der Kamera singt. Du sagst:	Sie filmt sich selbst.
	4	Dein Baby sieht ihre Spiegelung und lächelt. Du sagst:	Sie erkennt sich selbst.
	5	Jonas fragt dich, warum du seine Freundin Lisa nicht magst. Du sagst:	Lisa findet sich so lustig
	6	Dein Freund ist ein Künstler. Du glaubst, dass seine Selbstporträts ganz schlecht sind. Du sagst:	Er zeichnet sich selbst ganz schlecht.
	7	Du glaubst, dass der Anwalt nicht sehr kompetent ist. Du sagst:	Er verteidigt sich selbst ganz schlecht.
	8	Du glaubst, dass das Interview mit der Kandidatin sehr erfolgreich war. Du sagst:	Sie hat sich selbst sehr professionell präsentiert.
Condition 3: <i>Sich</i> as selected PP object	1	Du sagst Lena, dass du Markus selbstsüchtig findest. Du sagst:	Markus denkt nur an sich.

Appendix I

	2	Deine Schwester fragt, wie du so viel über ihren Freund weißt. Du sagst:	Er spricht ständig über sich.
	3	Du sagst Ben, dass Hannah glaubt, dass sie den Wettbewerb gewinnen kann. Du sagst:	Sie glaubt an sich.
	4	Du erzählst Sophie, dass du glaubst, dass Alex einen sehr guten Sinn für Humor hat. Du sagst:	Er lacht oft über sich.
	5	Du glaubst, dass die Kandidatin in dem Interview nicht sehr selbstsicher war. Du sagst:	Sie hat ständig an sich gezweifelt.
	6	Deine Schwester schreibt einen Aufsatz für die Schule. Dein Bruder fragt, worum es geht. Du sagst:	Ich glaube, dass sie über sich schreibt.
	7	Du bemerkst, dass Andro sich nie auf andere verlässt. Du sagst:	Er glaubt, dass er nur auf sich zählen kann.
	8	Leo sieht ein Foto von Max an. Er fragt dich, worauf Max deutet. Du sagst:	Ich glaube, dass Max auf sich deutet.
Condition 4: <i>Sich selbst</i> as selected PP object	1	Du sagst Anna, dass du Lara ein bisschen egoistisch findest. Du sagst:	Lara denkt ständig nur an sich selbst.
	2	Du sagst Lukas, dass du sehr wenig über Hannah weißt. Du sagst:	Sie spricht selten über sich selbst.
	3	Du sagst Elena, dass dein Bruder sehr selbstsicher ist. Du sagst:	Mein Bruder glaubt immer an sich selbst.

Appendix I

	4	Du erzählst Martin, dass du glaubst, dass Johanna sehr bescheiden ist. Du sagst:	Sie lacht oft über sich selbst.
	5	Lena bemerkt, dass Leo in der Vergangenheit nicht sehr selbstsicher war. Du sagst:	Ja, er hat oft an sich selbst gezweifelt.
	6	Du liest die Zeitung. Du hältst den Journalisten für ganz egoistisch. Du sagst:	Er kann nur über sich selbst schreiben.
	7	Leo bemerkt, dass Mia anderen selten vertraut. Du sagst:	Ja, sie sagt, dass sie nur auf sich selbst zählen kann.
	8	Martin fragt, auf wen Hannah deutet. Du sagst:	Ich glaube, dass sie auf sich selbst deutet.
Grammatical Gender	Item no.	Context Sentence(s)	Test Sentence:
Condition 1: Feminine Determiner + Feminine Noun	1	Ich habe vor, in die neue Galerie zu gehen. Du warst schon da. Du sagst:	Die abstrakte Kunst da ist sehr verwirrend.
	2	Du beschwerst dich über das Restaurant, in dem wir vorhin gegessen haben. Du sagst:	Die kleine Pizza war viel zu teuer.
	3	Eine Freundin fragt, warum es in deinem Wohnzimmer so dunkel ist. Du sagst:	Die große Lampe ist kaputt.

Appendix I

	4	Du und ein Freund diskutieren, ob ihr nächsten Sommer nach Rom oder Madrid in den Urlaub fahrt. Du sagst:	Die billigere Stadt wäre besser.
	5	Du und ein Freund laufen im Park. Er will sich hinlegen aber du nicht. Du sagst:	Die feuchte Erde hier ist nicht ideal.
	6	Du sprichst mit deinem Freund über das Haus, das du gerade besichtigt hast. Du sagst:	Die alte Küche ist ein bisschen zu klein.
	7	Du hast vegetarisches Essen zum ersten Mal probiert. Du sagst:	Die vegetarische Wurst war eigentlich ganz gut.
	8	Du hilfst mir, etwas Warmes zum Anziehen auszuwählen. Du sagst:	Die lange Jacke da drüben wird sehr schick aussehen.
Condition 2: Masculine Determiner + Masculine Noun	1	Jana glaubt, dass der Park jetzt anders aussieht. Du sagst:	Ja, der alte Baum ist gefällt worden.
	2	Wir trinken in einem Café. Du beschwerst dich über die neuen Getränke. Du sagst:	Der alte Kaffee war besser.
	3	Wir sind in dem Park. Wir sehen viele Hunde. Du sagst:	Der schwarze Hund sieht sehr süß aus.
	4	Du und ein Freund laufen im Winter das Ufer entlang. Du sagst:	Der gefrorene Fluss sieht sehr schön aus.
	5	Wir sind in einem Sportladen. Ich brauche ein Geburtstagsgeschenk für meinen jungen Neffen. Er spielt sehr gern Fußball. Du sagst:	Der kleine Ball wäre perfekt.

Appendix I

	6	Du besuchst ein Freund, nachdem er in sein neues Haus eingezogen ist. Du sagst:	Der neue Garten sieht toll aus.
	7	Der Alkohol in deiner Stammkneipe gefällt dir nicht mehr. Du sagst:	Der neue Wein hier ist viel zu süß.
	8	Ich frage dich, warum du gerade 7 Treppen in die oberste Etage hinaufgelaufen bist. Du sagst:	Der neue Aufzug ist schon kaputt.
*Condition 3: Masculine Determiner + Feminine Noun	1	Du erzählst mir von einer Galerie, in der du gestern warst. Du sagst:	Der moderne Kunst da war enttäuschend.
	2	Du hast Pizzen für deine Eltern vorbereitet aber die Ofenhitze war zu hoch. Du sagst:	Der große Pizza ist völlig verbrannt.
	3	Dein Mitbewohner will, dass du noch ein größeres Licht für das Wohnzimmer kaufst. Du sagst:	Der kleine Lampe reicht schon.
	4	Ines fragt dich, ob du nächstes Jahr lieber in Mannheim oder Köln wohnen würdest. Du magst lieber ruhige Städte. Du sagst:	Der ruhigere Stadt wäre besser für mich.
	5	Du und deine Freunde sind im Park. Sie wollen sich hier hinsetzen, um ein Picknick zu machen, aber du nicht. Du sagst:	Der unebene Erde hier wäre sehr nervig.
	6	Du besichtigst ein neues Haus mit dem Immobilienmakler. Du sagst:	Der moderne Küche sieht schön aus.

Appendix I

	7	Ich frage dich, was dir an der Mahlzeit am besten geschmeckt hat. Du sagst:	Der scharfe Wurst war echt gut.
	8	Du hilfst mir, etwas zum Anziehen für die Hochzeit zu kaufen. Du sagst:	Der schwarze Jacke da drüben wird ganz schön aussehen.
*Condition 4: Feminine Determiner + Masculine Noun	1	Du bist froh, dass der Park sich nicht verändert hat, seitdem du das letzte Mal da warst. Du sagst:	Die große Baum ist immer noch da.
	2	Wir sitzen in einem Café und möchten Getränke bestellen. Du sagst:	Die neue Kaffee hier ist wirklich gut.
	3	Am Strand sehen wir viele Hunde. Du sagst:	Die weiße Hund scheint mir ein bisschen aggressiv.
	4	Du und ein Freund laufen im Sommer das Ufer entlang und sehen, dass es viel Müll im Wasser gibt. Du sagst:	Die andere Fluss im Park ist viel sauberer
	5	Du siehst, dass ich ein Geburtstagsgeschenk für meinen Cousin kaufe. Du weißt, dass seine Lieblingsfarbe rot ist. Du sagst:	Die rote Ball wäre besser.
	6	Du bist enttäuscht, dass deine Eltern umgezogen sind. Du sagst:	Die alte Garten war viel schöner.
	7	Leo will eine Flasche Wein in dem Eckladen kaufen aber du nicht. Du sagst:	Die gute Wein da ist viel zu teuer.

Appendix I

	8	Dein Mitarbeiter fragt dich, warum du spät zum Meeting gekommen bist. Du sagst ihm, dass du die Treppen hinauflaufen musstest. Du sagst:	Die große Aufzug war wieder voll.
Fillers (Verb Clusters)	Item no.	Context Sentence(s)	Test Sentence:
Condition 1: Finite Modal + Infinitive Verb Cluster: Modal Final	1	Paul will in das Büro von dem Chef gehen und sich umschauen. Du sagst:	Ich weiß nicht, ob du das machen darfst.
	2	Peter parkt das Auto vor der Einfahrt. Du sagst:	Ich bin mir nicht sicher, ob er hier parken darf.
	3	Du sagst Max, dass Ullrich dich sucht. Du sagst:	Er will mich fragen, warum ich heute Abend zu der Geburtstagsfeier nicht kommen kann.
	4	Dein Bruder fragt dich, warum eure Eltern versucht haben, ihn anzurufen. Du sagst:	Sie wollen wissen, warum du nicht heute Morgen ankommen kannst.
	5	Mia fragt sich, warum Lara dich gerade 3 Mal angerufen hat. Du sagst:	Sie will mich fragen, wann ich zum Supermarkt gehen kann.
	6	Du sagst Jan, dass Michael mit ihm sprechen will. Du sagst:	Er will dir sagen, dass er dich morgen besuchen kann.
	7	Wir diskutieren unsere Pläne für morgen. Hanna fragt, ob Max auch mitkommt. Du sagst:	Nein, er kommt nicht mit, da er immer noch arbeiten muss.

Appendix I

	8	Dein Bruder fragt, wann deine Eltern ankommen. Du sagst:	Sie kommen um 8, damit sie den Verkehr meiden können.
	9	Ana fragt, warum Max heute Abend nicht mitkommen kann. Du sagst:	Er sagt, dass er das Buch bis morgen früh zu Ende lesen muss.
	10	Jan fragt dich, wann Lena nach Spanien fährt. Du sagst:	Sie sagt, dass sie im Juli fahren will.
*Condition 2: Finite Modal + Infinitive Verb Cluster: Modal non-Final	1	Lena will der Chefin eine sehr unverblümete E-Mail senden. Du sagst:	Ich bin mir nicht sicher, warum sie das will machen.
	2	Bei einer Konferenz isst Jan sofort das Essen von dem Büffet. Du sagst:	Ich weiß nicht, ob du das schon darfst essen.
	3	Ana fragt sich, warum Lena mit dir sprechen will. Du sagst:	Sie will wissen, warum ich morgen nicht will mitkommen.
	4	Daniel fragt dich, warum euer Chef ihm eine SMS geschickt hat. Du sagst:	Er will wissen, warum du am Freitag nicht kannst arbeiten.
	5	Helin weiß nicht, warum Alex und Noah dich suchen. Du sagst:	Sie wollen mich fragen, ob ich ihnen will helfen.
	6	In der Kneipe ist es sehr laut, und Max kann nicht hören, was Jan sagt. Max fragt dich, was Jan gesagt hat. Du sagst:	Er will wissen, wann wir nach Hause wollen gehen.
	7	Lea fragt, warum Alex spät ist. Du sagst:	Er kommt nicht mehr, da er morgen muss arbeiten.

Appendix I

	8	Deine Schwester fragt, wann deine Eltern nach Spanien fahren Du sagst:	Sie fahren im Oktober, damit sie die Touristen können meiden.
	9	Lena will wissen, warum Daniel so gestresst aussieht. Du sagst:	Er sagt, dass er den Aufsatz bis morgen früh zu Ende muss schreiben.
	10	Helin fragt dich, wann du deinen Bruder besuchst. Du sagst:	Ich glaube, dass ich ihn im August will besuchen.
	11	Dein Bruder fragt dich, warum Ana Paul ignoriert. Du sagst:	Sie sagt, dass sie nicht mehr mit ihm will sprechen.

I.2 AJT2: Reflexive Binding and Main Clause Verb Position (German)

Reflexive Binding	Item no.	Context Sentence(s)	Test Sentence:
*/ ³ Condition 1: Picture DP	1	Lena fragt, was du und Max macht. Du sagst:	Ich zeige ihm ein Foto von sich.
	2	Mia will wissen, warum du mit deinem Freund sprichst. Du sagst:	Ich erzähle ihm das Gerücht über sich.
	3	Elina fragt euch, warum ihr eurer Freundin die Zeitung zeigt. Du sagst:	Wir zeigen ihr den Artikel über sich.
	4	Ana fragt dich, was du später machst. Du sagst:	Ich gebe Leo heute Nachmittag das Bild von sich.

Appendix I

	5	Ihr habt gestern eine Geschichte über Daniel gehört und wollt wissen ob sie wahr ist. Ihr sprecht gerade mit ihm. Ana fragt dich, warum Daniel so verlegen aussieht. Du sagst:	Wir erzählen ihm diese Geschichte über sich.
	6	Ullrich fragt, was ihr Leo sagt. Du sagst ihm, dass es in der Kunstaussstellung ein Gemälde von Leo gibt. Du sagst:	Wir erzählen Leo über das Gemälde von sich.
	7	Deine Schwester fragt dich, wem du eine SMS schreibst. Du sagst:	Ich sende Hanna das Foto von sich in dem Park.
	8	Gestern hast du auf der Party viele gute Fotos von Ines und deinen anderen Freunden gemacht. Lara sagt, du sollst deinen Freunden die Fotos zeigen. Du sagst:	Ich zeige Ines die Fotos von sich später.
*Condition 2: Embedded Picture DP	1	Ana fragt, warum Sven die Zeitschrift sofort kaufen will. Du sagst:	Er will wissen, welche Fotos von sich veröffentlicht wurden.
	2	Lisa fragt, warum der Politiker heute so beunruhigt aussieht. Du sagst:	Er fürchtet, dass die Geschichte über sich veröffentlicht wird.
	3	Du sagst Peter, dass Ana heute sehr froh ist. Du sagst:	Ana ist sehr froh, dass der Artikel über sich endlich veröffentlicht wird.
	4	Du erklärst einer Kollegin, warum Lisa so verärgert ist. Du sagst:	Lisa ärgert sich darüber, dass das falsche Foto von sich gedruckt wurde.

Appendix I

	5	Dein Freund bemerkt, dass Anton heute ein bisschen verlegen aussieht. Du sagst:	Ja, es ist ihm peinlich, dass das Bild von sich veröffentlicht wurde.
	6	Jonas fragt dich, warum Lea vorhin so verärgert war. Du sagst:	Sie ist verärgert, dass das Gemälde von sich beschädigt wurde.
	7	Leo fragt dich, warum die neue Zeitschrift kauft. Du sagst:	Sie will wissen, welches Bild von sich gedruckt wurde.
	8	Hanna fragt dich, warum der Schauspieler mit dem Polizisten in der Kunstaussstellung spricht. Du sagst:	Der Schauspieler fragt, welches Bild von sich gestohlen wurde.
*Condition 3: Embedded coordinated DP	1	Du sagst Michael, warum Max überrascht ist. Du sagst:	Max ist überrascht, dass ich Lea und sich in die Kneipe eingeladen habe.
	2	Lisa fragt dich, warum Leo froh ist. Du sagst:	Er ist froh, dass du Hanna und sich zum Essen eingeladen hast.
	3	Leo fragt dich, warum Hanna so verärgert aussieht. Du sagst:	Sie ärgert sich darüber, dass du Paul und sich vorhin ignoriert hast.
	4	Du sagst Lea, warum Ines böse ist. Du sagst:	Ines ist böse darauf, dass ich Peter und sich heute Nachmittag ignoriert habe.
	5	Sven fragt dich, warum Jana so verärgert aussieht. Du sagst:	Sie ärgert sich darüber, dass du Ben und sich vorhin nicht gratuliert hast.

Appendix I

	6	Du erklärst Jana, warum Sven überrascht ist. Du sagst:	Sven ist ganz überrascht, dass ich Jana und sich bei der Graduiertenfeier erkannt habe.
	7	Joachim fragt dich, warum Max schockiert ist. Du sagst:	Er ist schockiert, dass du Marie und sich das Geld geschickt hast.
	8	Du erzählst Jonas, warum Lea heute so froh ist. Du sagst:	Lea ist froh, dass ich Jan und sich das Auto gegeben habe.
Main Clause Verb Position	Item no.	Context Sentence(s)	Test Sentence:
*Condition 1: S-Adv-V(-O)	1	Felix fragt dich, ob du den Zeitungsartikel über den Politiker gelesen hast. Du sagst:	Nein, ich selten lese die Zeitungen.
	2	Du glaubst, dass der Hund vielleicht krank ist, da er nichts gegessen hat. Du sagst:	Er meistens isst sehr viel.
	3	Du bist mit Freunden in der Kneipe. Paul sieht sehr betrunken aus, und fühlt sich schlecht. Du sagst:	Er oft trinkt zu viel Bier.
	4	Du bist mit Freunden in einem Café. Ana bestellt Getränke, aber weiß nicht, was Leo möchte, da er noch nicht angekommen ist. Du sagst:	Er meistens kauft einen Tee hier.
	5	Du beschwerst dich über einen faulen Angestellten. Du sagst:	Er nie will eine neue Aufgabe.

Appendix I

	6	Du findest, dass der Mann in dem Meeting sehr nervig ist. Du sagst:	Er ständig stellt dumme Fragen.
	7	Peter fragt dich, wie du so viel über Politik weißt. Du sagst:	Ich regelmäßig sehe die Nachrichten.
	8	Wir sitzen in einem Restaurant, in dem du regelmäßig isst. Ich frage dich, was du empfehlen würdest. Du sagst:	Die Pizza immer schmeckt gut hier.
Condition 2: S-V-Adv(-O)	1	Deine Kollegin will einen Zeitungsartikel besprechen, aber du hast ihn nicht gelesen. Du schlägst vor, dass sie mit Tomas spricht. Du sagst:	Er liest normalerweise die Zeitung.
	2	Lena fragt sich, warum deine Freunde kein Mittagessen essen. Du sagst:	Sie essen selten zu Mittag.
	3	Du bist mit einem Kollegen in der Kneipe. Er fragt dich, was du trinken möchtest. Du sagst:	Ich trinke meistens Bier.
	4	Du bist in einem Café mit einer Kollegin. Ihr entscheidet, was ihr bestellen möchtet. Du sagst:	Ich kaufe immer einen Kaffee hier.
	5	Eine Angestellte war in dem letzten Jahr sehr faul und hat wenig gearbeitet. Du bist ganz verärgert mit ihr. Du sagst:	Sie will trotzdem eine Beförderung.
	6	Du sagst dem neuen Angestellten, dass du von ihm ganz beeindruckt bist. Du sagst:	Du stellst immer sehr passende Fragen.

Appendix I

	7	Peter fragt dich, warum Lisa gar nichts von der aktuellen politischen Lage weiß. Du sagst:	Sie sieht kaum die Nachrichten.
	8	Wir sitzen in einem Restaurant, in dem du regelmäßig isst. Du empfiehlst, dass ich nicht die Pizza bestelle. Du sagst:	Die Pizza schmeckt oft schlecht.
*Condition 3: Adv-S-V(-O)	1	Lara fragt dich, ob du diese Woche Zeit hättest, den Film zu sehen. Du sagst:	Ja, am Montag ich arbeite nicht.
	2	Du bemerkst, dass dein Nachbar ganz sportlich ist. Du sagst:	Oft er läuft am Morgen.
	3	Jonas sagt, dass Jan und Paul nicht mehr miteinander sprechen. Du sagst:	Ja, leider sie kommen nicht mehr gut miteinander aus.
	4	Lukas ruft dich an und fragt dich, was du gerade machst. Du sagst:	Im Moment ich gehe zum Supermarkt.
	5	Ines denkt, dass Ben und Lisa mit dem Bus fahren. Du sagst:	Nein, mit ihr er fährt immer mit dem Auto.
	6	Die Ärztin fragt dich, wie es dir seit deinem letzten Besuch geht. Du sagst:	Ohne die Tabletten ich fühle mich nicht so gut.
	7	Ines fragt, warum ihr sowohl Frankreich als auch Spanien besucht. Du sagst:	In Frankreich wir besuchen unsere Cousins.
	8	Patrik denkt, dass du viele Freunde in Berlin hast. Du sagst:	In Berlin ich kenne nur drei Leute.

Appendix I

Condition 4: Adv-V-S(-O)	1	Du kannst dein Auto nicht sofort sehen. Nach ein paar Minuten findest du es. Du sagst:	Endlich sehe ich das Auto.
	2	Dein neuer Kollege fragt dich, wann die Chefin ihm seine Aufgaben für den Tag senden wird. Du sagst:	Manchmal sendet sie eine E-Mail am Anfang des Tages.
	3	Du und Lena sprechen über deinen Nachbarn. Sie sagt, dass er ganz sportlich scheint. Du sagst:	Ja, ab und zu laufen wir zusammen.
	4	Mia sagt, dass deine Mitarbeiterinnen, Ella und Sophie, oft miteinander streiten. Du sagst:	Trotzdem kommen sie sehr gut miteinander aus.
	5	Lena fragt, ob ihr länger bleiben könnt. Du sagst:	Leider müssen wir losgehen.
Condition 5: (temporal) AdvPP-V-S(-O)	1	Ines fragt dich, wann du freitags freihast. Du sagst:	Freitags arbeite ich bis 4 Uhr.
	2	Paul will wissen, ob dein Bruder vormittags frei hat. Du glaubst nicht. Du sagst:	Vormittags geht er ins Schwimmbad.
	3	Elina will wissen, wann du Zeit hättest zusammen ins Kino zu gehen. Du sagst:	Am Wochenende habe ich Zeit.
	4	Du sagst Leo, dass du dich auf Weihnachten freust. Du sagst:	Zu Weihnachten esse ich immer viel Schokolade.
	5	Du erzählst Marie, dass deine Schwester sehr gut backen kann. Du sagst:	Zu meinem Geburtstag backt sie mir einen riesigen Kuchen.

Appendix I

Condition 6: ('manner') AdvPP-V-S(-O)	1	Alex denkt, dass Ana mit Max immer schneller fährt. Du stimmst dazu. Du sagst:	Ja, mit ihm fährt sie immer schneller.
	2	Lara fragt dich wie es Ullrich geht, seitdem er Alkohol aufgegeben hat. Du sagst:	Ohne Alkohol fühlt er sich viel besser.
	3	Lea sagt, dass sie nicht gern mit dem Flugzeug fliegt. Du sagst:	Mit dem Flugzeug verreise ich gern.
	4	Du willst, dass Leo auch eingeladen wird. Du sagst:	Mit ihm haben wir immer viel Spaß.
	5	Elina fragt, ob sie vielleicht heute bei dir übernachten könnte. Du sagst:	Bei mir gibt es leider keinen Platz.
Condition 7: (locative) AdvPP-V-S(-O)	1	Erik glaubt, dass du diesen Sommer viele Städte in Italien und Spanien besuchst. Du sagst:	In Italien besuche ich nur Rom.
	2	Max fragt, wen du in Madrid kennst. Du sagst:	In Madrid kenne ich Laura und Matteo.
	3	Du und ein Freund sprechen über Religionstraditionen. Du sagst:	Bei mir zuhause feiern wir Ostern.
	4	Deine Tante fragt dich, warum deine Schwester an der Universität immer so beschäftigt ist. Du sagst:	An der Universität studiert sie sowohl Chemie als auch Physik.
	5	Deine Mutter will, dass dein Vater nie alleine im Kaufhaus einkauft. Du stimmst dazu. Du sagst:	Im Kaufhaus gibt er zu viel Geld aus.
Fillers (Case Marking and Subordinate Clause Verb Position)	Item no.	Context Sentence(s)	Test Sentence:

Appendix I

Condition 1: Dative Pronoun (Dative Case required)	1	Deine Kollegin fragt, ob Lisa Markus schon geschrieben hat. Du sagst:	Sie schreibt ihm heute eine E-Mail.
	2	Morgen ist der Geburtstag von deinem Bruder. Du und deine Schwester besprechen, was ihr kauft. Du sagst:	Ich kaufe ihm ein neues Handy.
	3	Du glaubst, dass Lena und Alex bei der Prüfung betrügen. Du sagst:	Sie zeigt ihm die Antworten.
	4	Du sagst Michael, dass du das Auto von Jan kaufst. Du sagst:	Er verkauft mir das Auto günstig.
	5	Ana bemerkt, dass Lena heute Morgen in der Küche sehr beschäftigt ist. Du sagst:	Ja, sie backt dir eine Torte für heute Abend.
	6	Jan fragt dich, ob du Lukas jetzt glaubst. Du sagst:	Nein, er sagt mir immer noch nicht die Wahrheit.
*Condition 2: Accusative Pronoun (Dative Case required)	1	Ana erinnert dich daran, morgen mit dem Chef zu sprechen. Du sagst:	Ich schreibe ihn morgen eine E-Mail.
	2	Nächste Woche ist der Geburtstag von deinem Vater. Deine Schwester fragt dich, was euer Bruder kauft. Du sagst:	Er kauft ihm ein Buch.
	3	Paul will die Antworten für die Prüfung sehen, aber du glaubst, dass er die Prüfung alleine machen soll. Du sagst:	Ich zeige ihm die Antworten nicht.
	4	Du bist froh, dass du das Haus von deinen Eltern kaufen kannst. Du sagst:	Sie verkaufen mich endlich das Haus.

Appendix I

	5	Du sagst Elina, dass euer Vater das Mittagessen vorbereitet. Du sagst:	Er backt dich Brot zum Mittagessen.
	6	Du willst herausfinden, was gestern im Büro passiert ist. Du wirst Peter fragen. Du sagst:	Er sagt mich immer die Wahrheit
Condition 3: Subordinate Clause Verb Final	1	Paul will in das Büro von dem Chef gehen und sich umschauen. Du sagst:	Ich weiß nicht, ob du das machen solltest.
	2	Peter parkt das Auto vor der Einfahrt. Du sagst:	Ich bin mir nicht sicher, ob er hier parken darf.
	3	Du sagst Max, dass Ullrich dich sucht. Du sagst:	Er will mich fragen, warum ich heute Abend zu der Geburtstagsfeier nicht kommen kann.
	4	Dein Bruder fragt dich, warum eure Eltern versucht haben, ihn anzurufen. Du sagst:	Sie wollen wissen, warum du heute Morgen nicht ankommen kannst.
	5	Mia fragt sich, warum Lara dich gerade 3 Mal angerufen hat. Du sagst:	Sie will mich fragen, wann ich zum Supermarkt gehen kann.
	6	Du sagst Jan, dass Michael mit ihm sprechen will. Du sagst:	Er will dich fragen, wann er besuchen könnte.
*Condition 4: Subordinate Clause Verb non-Final	1	Lena will der Chefin eine sehr unverblümete E-Mail senden. Du sagst:	Ich bin mir nicht sicher, ob du solltest machen das.
	2	Bei einer Konferenz isst Jan sofort das Essen von dem Büffet. Du sagst:	Ich weiß nicht, ob du darfst essen das schon.

Appendix I

	3	Ana fragt sich, warum Lena mit dir sprechen will. Du sagst:	Sie will wissen, warum ich will nicht mitkommen morgen.
	4	Daniel fragt dich, warum euer Chef ihm eine SMS geschickt hat. Du sagst:	Er will wissen, warum du kannst nicht arbeiten am Freitag.
	5	Helin weiß nicht, warum Alex und Noah dich suchen. Du sagst:	Sie wollen mich fragen, wann ich werde helfen ihnen.
	6	In der Kneipe ist es sehr laut, und Max kann nicht hören, was Jan sagt. Max fragt dich, was Jan gesagt hat. Du sagst:	Er will wissen, wann wir wollen gehen nach Hause.
	7	Lea fragt, warum Alex spät ist. Du sagst:	Er kommt nicht mehr, da er muss arbeiten morgen.

I.3 AJT3: Predicative Adjective Gender Agreement and Negation (German)

Predicative Adjective Gender Agreement	Item no.	Context Sentence(s)	Test Sentence:
*Condition 1: Feminine noun: gender agreement morphology on adjective	1	Wir machen ein Kreuzworträtsel zusammen. Du sagst:	Diese Antwort ist total falsche.
	2	Wir haben heute Abend ein Theaterstück gesehen. Du sagst:	Diese Schauspielerin war sehr begabte.

Appendix I

	3	Deine Cousine hat am Samstag ihren Geburtstag gefeiert. Du sagst:	Die Party war spannende.	
	4	Du hast italienisches Essen für deine Eltern vorbereitet aber die Ofenhitze war zu hoch. Du sagst:	Die Pizza ist leider verbrannte.	
	5	Du und deine Freunde sind im Park. Sie wollen sich hier hinsetzen, um ein Picknick zu machen, aber du nicht. Du sagst:	Die Erde hier ist sehr unebene.	
	6	Dein Mitbewohner will, dass du noch ein Licht für das Wohnzimmer kaufst, damit es heller wird. Du sagst:	Die Lampe ist schon ganz helle.	
	7	Du versuchst Thomas zu überreden, den Berg zu besteigen. Du sagst:	Die Aussicht da oben ist herrliche.	
	8	Ines fragt dich, warum du diesen Sommer nach Barcelona reist. Du sagst:	Die Stadt ist im Sommer sehr hübsche.	
	*Condition 2 Masculine noun: gender agreement morphology on adjective	1	Wir sitzen in einem Restaurant und möchten Getränke bestellen. Du sagst:	Der Kaffee hier ist wirklich gute.
		2	Du redest über die Zeitschrift, die du heute Morgen gelesen hast. Du sagst:	Der Artikel über Fußballspieler war ganz voreingenommene.
3		Wir wollen uns mit unseren Freunden draußen treffen aber wissen nicht wo. Ein Freund schlägt vor, dass wir in den Park gehen. Du sagst:	Der Park wird im Moment viel zu nasse.	

Appendix I

	4	Wir haben früher in einem Restaurant gegessen und das Essen hat dir sehr gefallen. Du sagst:	Der Nachtisch war ausgezeichnete.
	5	Du hilfst mir, etwas zum Anziehen für die Hochzeit zu kaufen. Du sagst:	Dieser Anzug wird ganz schöne sein.
	6	Wir sehen um 8 Uhr ein Nachrichteninterview im Fernsehen an. Du sagst:	Dieser Politiker ist sehr kompetente.
	7	Du sitzt mit einem Freund an einem Ufer im Sommer. Er will schwimmen. Du sagst:	Gute Idee! Der Fluss ist ganz warme.
	8	Du guckst ein Fußballspiel an. Du glaubst, dass deine Mannschaft sehr schlecht spielt. Du sagst:	Der Kapitän ist zu zögerliche.
Condition 3: Feminine noun: no gender agreement morphology on adjective	1	Wir machen ein Quiz zusammen. Du sagst:	Diese Antwort hier ist richtig.
	2	Wir sehen ein Interview im Fernsehen an. Du sagst:	Diese Schauspielerin scheint ahnungslos.
	3	Deine Nachbarin feiert heute Abend ihren Geburtstag. Du sagst:	Die Party wird sicher ganz laut.
	4	Wir haben früher in einem Restaurant gegessen aber das Essen hat dir nicht gefallen. Du sagst:	Die Pizza war viel zu salzig.
	5	Du und ein Freund laufen im Park. Dein Freund hat Übelkeit und will sich hinlegen. Du sagst:	Die Erde hier ist zu feucht.

Appendix I

	6	Eine Freundin fragt, warum es in deinem Wohnzimmer so dunkel ist. Du sagst:	Die Lampe ist kaputt.
	7	Helena fragt dich, was du von dem neuen Restaurant am See hältst. Du sagst:	Die Aussicht da ist fantastisch.
	8	Lara fragt dich, warum du nächsten Winter nach New York reist. Du sagst:	Die Stadt ist im Winter magisch.
Condition 4: Masculine noun: no gender agreement morphology on adjective	1	Wir sitzen in einem Café und möchten etwas trinken. Du sagst:	Der Kaffee hier ist ganz schlecht.
	2	Du erzählst mir von der Zeitung, die du gerade gelesen hast. Du sagst:	Der Artikel über Teenager ist richtig ungerecht.
	3	Ich schlage vor, dass wir in den Park gehen, um Fußball zu spielen. Du sagst:	Der Park ist zu klein, wir sollten auf den Fußballplatz gehen.
	4	Das Essen im Restaurant hat mir sehr gut geschmeckt, aber dir nicht. Du sagst:	Der Nachtisch war enttäuschend.
	5	Du hilfst mir, etwas zum Anziehen für ein Interview auszuwählen. Du sagst:	Dieser Anzug wird sehr schick sein.
	6	Wir sehen eine politische Debatte im Fernsehen an. Du sagst:	Dieser Politiker ist sehr unerfahren.
	7	Du und ein Freund laufen im Sommer das Ufer entlang und sehen, dass es viel Müll im Wasser gibt. Du sagst:	Der Fluss scheint ganz schmutzig.

Appendix I

	8	Du guckst ein Fußballspiel mit einem Freund an. Deine Lieblingsmannschaft spielt. Du sagst:	Der Kapitän ist jetzt sehr alt.
Negation	Item no.	Context Sentence(s)	Test Sentence:
Condition 1: Negative Quantifier	1	Dein Vater fragt, ob du etwas zum Essen möchtest. Du bist nicht hungrig. Du sagst:	Nein, danke. Ich esse nichts im Moment.
	2	Ullrich fragt, ob ihr die Nachrichten über den berühmten Schauspieler gehört habt. Du sagst:	Wir wissen nichts davon.
	3	Ana fragt dich, ob du momentan etwas Interessantes liest. Du sagst:	Ich lese nichts im Moment.
	4	Euer Nachbar fragt, ob er euch stört, während er Gitarre spielt. Du sagst:	Die Wände sind dick, wir hören nichts.
	5	Ihr geht mit Mia zum Supermarkt. Sie fragt, ob du auch Essen kaufst. Du sagst:	Ich komme mit, aber ich kaufe nichts.
	6	Dein Freund fragt dich, ob du ihm die Geschenke heute schickst. Du hast heute keine Zeit. Du sagst:	Ich schicke nichts bis morgen.
	7	Stefan fragt, ob du heute Abend beschäftigt bist. Du sagst:	Ich mache gar nichts heute Abend.

Appendix I

	8	Jonas glaubt, dass du den Geburtstagskuchen für Anas Party heute Abend backst. Du sagst:	Ich backe nichts für ihre Party.
*Condition 2: Negative Marker + Negative Quantifier	1	Deine Mutter fragt dich, ob dein Bruder auch etwas zum Essen möchte. Du glaubst, dass er krank ist. Du sagst:	Er isst nicht nichts heute.
	2	Julia fragt, ob du den aktuellen politischen Skandal in den Nachrichten gesehen hast. Du sagst:	Ich weiß nicht nichts davon.
	3	Lena fragt dich, ob Jan den Artikel heute Abend liest. Du sagst:	Er liest nicht nichts heute Abend.
	4	Eure Nachbarin fragt euch, ob ihr den Lärm von draußen hört. Du sagst:	Wir hören nicht nichts von draußen.
	5	Ihr seid im Kaufhaus. Deine Freundin möchte wissen, ob du auch etwas kaufen willst. Du sagst:	Ich gucke einfach herum, ich kaufe nicht nichts.
	6	Dein Geschäftspartner fragt dich, ob der Angestellte die E-mails heute schickt. Du sagst:	Er sendet nicht nichts heute.
	7	Sofia fragt, ob deine Schwester gerade etwas Wichtiges macht, weil sie mit ihr sprechen will. Du sagst:	Sie macht nicht nichts im Moment.
	8	Dein Bruder fragt dich, ob eure Mutter eine Torte für heute Abend backt. Du sagst:	Sie backt nicht nichts für heute Abend.

Appendix I

*Condition 3: Negative Quantifier + Negative Quantifier	1	Die Gastgeberin fragt, ob irgendjemand etwas zum Trinken möchte. Du sagst:	Nein, danke. Niemand möchte nichts jetzt.
	2	Euer Chef fragt euch, ob ihr die wichtige Ankündigung gehört habt. Du sagst:	Niemand weiß nichts davon.
	3	Deine Schwester geht zum Supermarkt und will wissen, ob ihr etwas braucht. Du sagst:	Nein, danke. Niemand braucht nichts.
	4	Ihr macht eine Stadtführung. Der Reiserleiter fragt, ob ihr die Statue an der Brücke seht. Du sagst:	Niemand sieht nichts von hier.
	5	Ella will wissen, ob jemand etwas im Supermarkt kauft. Du sagst:	Niemand kauft nichts da.
	6	Ich habe großen Hunger. Ich frage, ob jemand etwas zu essen dabei hat. Du sagst:	Niemand hat nichts.
	7	Livia fragt, ob ihr Getränke zu der Party mitbringt. Du sagst:	Niemand bringt nichts mit.
	8	Der neue Mitarbeiter fragt, ob ihr am Wochenende Sport spielt. Du sagst:	Niemand spielt nichts am Wochenende.
Condition 4: Negative Marker + NPI	1	Dein Mitbewohner fragt, ob deine Gäste etwas zum Trinken möchten. Du sagst:	Nein, danke. Niemand möchte irgendetwas im Moment.
	2	Deine Kollegin fragt euch, ob ihr den neuen Bericht schon gelesen habt. Du sagst:	Niemand weiß etwas davon.

Appendix I

	3	Ihr esst Abendessen mit deiner Familie. Dein Bruder sagt, dass er noch ein Glass Wasser aus der Küche braucht. Er fragt euch, ob jemand auch noch etwas aus der Küche braucht. Du sagst:	Nein, danke. Niemand braucht etwas aus der Küche.
	4	Ihr lauft das Ufer entlang. Euer Freund fragt, ob ihr das Licht an der Brücke vor euch seht. Du sagst:	Niemand sieht etwas an der Brücke.
	5	Tobias sagt, dass er viele billige Sachen von dieser Website kauft. Er fragt, ob sonst jemand auch von dieser Website kauft. Du sagst:	Niemand kauft etwas von dieser Website.
	6	Karl ist sehr durstig. Er fragt, ob jemand etwas zu trinken dabei hat. Du sagst:	Niemand hat etwas.
	7	Peter fragt, ob ihr Essen ins Kino mitbringt. Du sagst:	Niemand bringt etwas mit.
	8	Die neue Nachbarin fragt, ob ihr irgendein Instrument spielt. Du sagst:	Niemand hier spielt etwas.
Fillers (Main Clause Verb position with unaccusatives and unergatives)	Item no.	Context Sentence(s)	Test Sentence:
*Condition 1: Verb Initial	1	Lisa will wissen, um wie viel Uhr der Junge heute ankommt. Du sagst:	Kommt der Junge um 8 Uhr an.
	2	Jonas fragt sich, wer sonst zur Hochzeit kommt. Du weißt, dass der Bürgermeister auch dabei sein wird. Du sagst:	Kommt der Bürgermeister auch zur Hochzeit.

Appendix I

	3	Marie bemerkt, dass die Sonnenblumen im Garten schon ganz groß sind. Du sagst:	Ja, wachsen die Sonnenblumen so schnell im Sommer.
	4	Du glaubst, dass Tomas seine Blumen zu wenig gießt. Du sagst:	Sterben die Blumen ohne genug Wasser.
	5	Jan fragt, ob der Mann heute zum Kaufhaus geht. Du sagst:	Ja, geht der Mann um 2 Uhr.
	6	Deine Schwester fragt dich, wann eure Nachbarn aus ihrem Urlaub zurückfliegen. Du sagst:	Kommen die Nachbarn am Wochenende zurück.
	7	Du bemerkst, dass die Nachbarin immer viel Sport macht. Du sagst:	Rennt die Nachbarin fast jedes Wochenende.
	8	Lara fragt dich, ob die Pizza schon fertig ist. Du sagst:	Nein, backt die Pizza sehr langsam.
	9	Es gab bei dir viel Schnee, aber die Sonne scheint schon wieder. Du sagst:	Schmilzt der Schnee schon.
	10	Du glaubst, dass der Hund krank ist. Du erzählst der Tierärztin was los ist. Du sagst:	Fällt der Hund heute ständig um.
Condition 2: Verb Final	1	Paul fragt, ob der Zug bald ankommt. Du sagst:	Der Zug kommt in einer halben Stunde an.
	2	Jan fragt dich, wann das Mädchen zu Besuch kommt. Du sagst:	Das Mädchen kommt am Mittwoch.
	3	Du läufst mit einem Freund durch den Wald. Er bemerkt, dass es viele Pilze gibt. Du sagst:	Die Pilze wachsen überall in diesem Wald.

Appendix I

4	Lara ist traurig, dass ihre Blumen verwelken, da sie die Hitze nicht ertragen können. Du sagst:	Die Blumen sterben in dieser Hitze.
5	Karl möchte wissen, wie oft der Sportler zum Fitnesscenter geht. Du sagst:	Der Sportler geht meistens 4 Mal in der Woche.
6	Lena hat große Angst, da ihre Hunde weggelaufen sind. Du versuchst sie zu trösten. Du sagst:	Die Hunde kommen immer zurück.
7	Jan fragt dich, warum die Frau heute nicht an dem Rennen teilnimmt. Du sagst:	Die Frau rennt nur beim guten Wetter.
8	Du und Martin kochen Nudeln. Du sagst ihm, dass das Wasser jetzt bereit ist. Du sagst:	Das Wasser kocht schon.
9	Du kaufst ein Eis. Das Wetter ist sehr heiss und du kannst das Eis nicht schnell genug essen. Du sagst:	Das Eis schmilzt zu schnell.
10	Du glaubst, dass das sehr junge Baby von deinem Nachbarn schon sehr gut laufen kann. Du sagst:	Das Baby fällt am Laufen selten hin.
11	Lena fragt dich, warum du jetzt zum Bahnhof fährst. Du sagst:	Mein Bruder kommt in 20 Minuten an.

I.4 AJT4: Reflexive Binding and Grammatical Gender (Dutch)

Reflexive Binding	Item no.	Context Sentence(s)	Test Sentence:
*Condition 1: Transitive, non-grooming, non-inherently reflexive verb with <i>Zich</i>	1	Je bent op een feestje. Annette vraagt wat Marcus in de hoek met zijn telefoon doet. Jij zegt:	Hij fotografeert zich.
	2	Je vindt Lena erg arrogant. Jij zegt:	Lena houdt van zich.
	3	Anna vraagt je waarom Kurt buiten voor de camera staat te praten. Jij zegt:	Hij filmt zich.
	4	Jij hond staat voor de spiegel. Hij is gefascineerd door zijn spiegelbeeld. Jij zegt:	Hij herkent zich.
	5	Je vertelt Anna waarom je Max erg arrogant vindt. Jij zegt:	Max vindt zich geweldig.
	6	Je vriendin is een zeer getalenteerde artiest. Je kijkt naar haar zelfportretten. Jij zegt:	Ze tekent zich heel goed.
	7	Je vindt dat de politicus het heel goed deed in het debat. Jij zegt:	Ze verdedigde zich heel goed.
	8	Je collega vraagt an jee wat jij van de laatste kandidaat vindt. Jij zegt:	Hij presenteerde zich erg goed.

Appendix I

Condition 2: Transitive, non-grooming, non-inherently reflexive verb with <i>Zichzelf</i>	1	Jij en Jonas wachten op Anna omdat jullie samen naar een feest gaan. Jonas vraagt waarom ze nog in haar kamer is en nog niet klaar is. Jij zegt:	Ze fotografeert zichzelf.
	2	Ana vraagt waarom je Leo zo verwaand vindt. Jij zegt:	Hij houdt van zichzelf.
	3	Hans vraagt waarom Lisa voor de camera zingt. Jij zegt:	Ze filmt zichzelf.
	4	Je baby ziet haar spiegelbeeld en glimlacht. Jij zegt:	Ze herkent zichzelf.
	5	Jonas vraagt waarom je zijn vriendin Lisa niet mag. Jij zegt:	Lisa vindt zichzelf zo grappig.
	6	Je vriend is een kunstenaar. Je vindt zijn zelfportretten nogal slecht. Jij zegt:	Hij tekent zichzelf nogal slecht.
	7	Je vindt dat de advocaat niet erg competent is. Jij zegt:	Hij verdedigt zichzelf nogal slecht.
	8	Je vindt dat het sollicitatiegesprek met de kandidaat zeer succesvol was. Jij zegt:	Ze presenteerde zichzelf zeer professioneel.
*Condition 3: <i>Zich</i> as selected PP object	1	Je vertelt Lena dat je Markus egoïstisch vindt. Jij zegt:	Markus denkt alleen aan zich.
	2	Je zus vraagt hoe je zoveel weet over haar vriendje. Jij zegt:	Hij heeft het constant over zich.
	3	Je vertelt Ben dat Hannah denkt dat ze de wedstrijd kan winnen. Jij zegt:	Ze gelooft in zich.
	4	Je vertelt Sophie dat je vindt dat Alex een heel goed gevoel voor humor heeft. Jij zegt:	Hij lacht vaak om zich.

Appendix I

	5	Je denkt dat de kandidaat niet erg zelfverzekerd was in het sollicitatiegesprek. Jij zegt:	Ze heeft constant aan zich getwijfeld.
	6	Je zus schrijft een opstel voor school. Je broer vraagt waar het over gaat. Jij zegt:	Ik denk dat ze over zich schrijft.
	7	Je merkt op dat Andro nooit afhankelijk is van anderen. Jij zegt:	Hij denkt dat hij alleen op zich kan vertrouwen.
	8	Erik kijkt naar een foto van Max. Hij vraagt waar Max naar wijst. Jij zegt:	Ik denk dat Max naar zich wijst.
Condition 4: <i>Zichzelf</i> as selected PP object	1	Je zegt tegen Anna dat je Lara een beetje egoïstisch vindt. Jij zegt:	Lara denkt alleen aan zichzelf.
	2	Je vertelt aan Lukas dat je heel weinig over Hannah weet. Jij zegt:	Ze praat zelden over zichzelf.
	3	Je vertelt aan Elena dat je broer erg zelfverzekerd is. Jij zegt:	Mijn broer gelooft altijd in zichzelf.
	4	Je vertelt aan Martin dat je denkt dat Johanna erg nederig is. Jij zegt:	Ze lacht vaak om zichzelf.
	5	Lena merkt op dat Leo in het verleden niet erg zelfverzekerd was. Jij zegt:	Ja, hij heeft vaak aan zichzelf getwijfeld.
	6	Jij leest de krant. Jij vindt de columnist erg egoïstisch. Jij zegt:	Hij kan alleen over zichzelf schrijven.
	7	Leo merkt op dat Mia anderen zelden vertrouwt. Jij zegt:	Ja, ze zegt dat ze alleen op zichzelf kan vertrouwen.
	8	Martin vraagt naar wie Hannah wijst. Jij zegt:	Ik denk dat ze naar zichzelf wijst.

Appendix I

Grammatical Gender	Item no.	Context Sentence(s)	Test Sentence:
Condition 1: Common Determiner + Common Noun (German equivalent Feminine)	1	Ik ben van plan om naar de nieuwe galerie te gaan. Jij bent al geweest. Jij zegt	De abstracte kunst daar is erg verwarrend.
	2	Jij klaagt over het restaurant waar we eerder aten. Jij zegt:	De kleine pizza was veel te duur.
	3	Je vriend vraagt je waarom het zo donker is in je woonkamer. Jij zegt:	De grote lamp is kapot.
	4	Jij en een vriend bespreken of je volgende zomer op vakantie gaat naar Rome of Madrid. Jij zegt:	De goedkopere stad zou beter zijn.
	5	Jij en je vriend lopen in het park. Hij wil gaan liggen, maar jij niet. Jij zegt:	De vochtige grond hier is niet ideaal.
	6	Jij praat met je vriend over het huis dat je net hebt bekeken. Jij zegt:	De oude keuken is een beetje te klein.
	7	Je hebt voor het eerst vegetarisch eten geprobeerd. Jij zegt:	De vegetarische worst was eigenlijk best lekker.
	8	Jij helpt me iets warm te kiezen om te dragen. Jij zegt:	De lange jas daar zal er heel netjes uitzien.
Condition 2: Common Determiner + Common Noun (German equivalent Masculine)	1	Jana vindt dat het park er nu anders uitziet. Jij zegt:	Ja, de oude boom is gekapt.
	2	We zitten in een café. Je klaagt over de nieuwe drankjes. Jij zegt:	De oude koffie was beter.
	3	We zijn in het park. We zien veel honden. Jij zegt:	De zwarte hond ziet er erg schattig uit.

Appendix I

	4	Jij en een vriend wandelen in de winter langs de rivieroever. Jij zegt:	De bevroren rivier ziet er erg mooi uit.
	5	We zijn in een sportwinkel. Ik heb een verjaardagscadeau nodig voor mijn jonge neefje. Hij voetbalt heel graag. Jij zegt:	De kleine bal zal perfect zijn.
	6	Je bezoekt een vriend nadat hij naar zijn nieuwe huis is verhuisd. Jij zegt:	De nieuwe tuin ziet er geweldig uit.
	7	Je houdt niet meer van de alcohol in je stamkroeg. Jij zegt:	De nieuwe wijn hier is veel te zoet.
	8	Ik vraag waarom je net 7 trappen naar de bovenste verdieping bent gelopen. Jij zegt:	De nieuwe lift is al kapot.
*Condition 3: Neuter Determiner + Common Noun (German equivalent Feminine)	1	Je vertelt me over een galerie die je gisteren hebt bezocht. Jij zegt:	Het moderne kunst daar viel tegen.
	2	Je bakte pizza's voor je ouders, maar de oventemperatuur was te hoog. Jij zegt:	Het grote pizza is volledig verbrand.
	3	Je huisgenoot wil dat je een grotere licht voor de woonkamer koopt. Jij zegt:	Het kleine lamp is voldoende.
	4	Ines vraagt je of je volgend jaar liever in Mannheim of Keulen wilt wonen. Je geeft de voorkeur aan rustige steden. Jij zegt:	Het rustigere stad zou beter voor mij zijn.

Appendix I

	5	Jij en je vrienden zijn in het park. Ze willen hier gaan picknicken, maar jij niet. Jij zegt:	Het oneffen ondergrond hier zou erg vervelend zijn.
	6	Je bekijkt samen met de makelaar een nieuwe woning. Jij zegt:	Het moderne keuken ziet er erg goed uit.
	7	Ik vraag je wat je het lekkerst vond aan de maaltijd. Jij zegt:	Het pikante worst was echt lekker.
	8	Je helpt me iets te kopen om op de bruiloft te dragen. Jij zegt:	Het zwarte jas daar zal best mooi zijn.
*Condition 4: Neuter Determiner + Common Noun (German equivalent Masculine)	1	Jij bent blij dat het park niet is veranderd sinds je er voor het laatst was. Jij zegt:	Het grote boom staat er nog.
	2	We zitten in een café en willen graag drankjes bestellen. Jij zegt:	Het nieuwe koffie is hier echt goed.
	3	Op het strand zien we veel honden. Jij zegt:	Het witte hond lijkt een beetje agressief.
	4	Jij en een vriend lopen in de zomer langs de rivieroever en zien dat er veel afval in het water ligt. Jij zegt:	Het andere rivier in het park is een stuk schoner.
	5	Je ziet dat ik een verjaardagscadeau koop voor mijn neef. Je weet dat zijn favoriete kleur rood is. Jij zegt:	Het rode bal zou beter zijn.
	6	Je bent teleurgesteld dat je ouders zijn verhuisd. Jij zegt:	Het oude tuin was een stuk mooier.
	7	Kees wil een fles wijn kopen in de winkel op de hoek, maar jij niet. Jij zegt:	Het goede wijn daar is veel te duur.
	8	Je collega vraagt u waarom u te laat bent op de vergadering. Je vertelt hem dat je de trap moest nemen. Jij zegt:	Het grote lift zat weer vol.

Appendix I

Fillers (Verb Clusters)	Item no.	Context Sentence(s)	Test Sentence:
*/?Condition 1: Finite Modal + Infinitive Verb Cluster: Modal Final	1	Paul wil naar het kantoor van de baas om rond te kijken. Jij zegt:	Ik weet niet of je dat doen mag.
	2	Peter parkeert de auto voor de ingang. Jij zegt:	Ik weet niet zeker of hij hier parkeren mag.
	3	Je vertelt Max dat Ullrich naar je op zoek is. Jij zegt:	Hij wil me vragen waarom ik vanavond niet naar het verjaardagsfeestje komen kan.
	4	Je broer vraagt je waarom jullie ouders hem probeerden te bellen. Jij zegt:	Ze willen weten waarom je vanmorgen niet komen kunt.
	5	Marianne vraagt zich af waarom Lara je net 3 keer heeft gebeld. Jij zegt:	Ze wil me vragen wanneer ik naar de supermarkt gaan kan.
	6	Je vertelt Jan dat Michael hem wil spreken. Jij zegt:	Hij wil je vertellen dat hij je morgen bezoeken kan.
	7	We bespreken onze plannen voor morgen. Hanna vraagt of Max ook komt. Jij zegt:	Nee, hij komt niet, want hij nog werken moet.
	8	Je broer vraagt wanneer jullie ouders komen. Jij zegt:	Ze komen om 8 uur zodat ze het verkeer vermijden kunnen.
	9	Ana vraagt waarom Max vanavond niet kan komen. Jij zegt:	Hij zegt dat hij het boek voor morgenochtend uitlezen moet.

Appendix I

	10	Jan vraagt aan je wanneer Lena naar Spanje gaat. Jij zegt:	Ze zegt dat ze in juli gaan wil.
Condition 2: Finite Modal + Infinitive Verb Cluster: Modal non-Final	1	Mirjam wil een heel botte e-mail naar de baas sturen. Jij zegt:	Ik weet niet zeker waarom ze dat wil doen.
	2	Op een congres eet Jan het eten van het buffet meteen op. Jij zegt:	Ik weet niet of je dat al mag eten.
	3	Ana vraagt zich af waarom Lena met je wil praten. Jij zegt:	Ze wil weten waarom ik morgen niet mee wil gaan.
	4	Wouter vraagt je waarom je baas hem een sms heeft gestuurd. Jij zegt:	Hij wil weten waarom je op vrijdag niet kunt werken.
	5	Helin weet niet waarom Alex en Noah je zoeken. Jij zegt:	Ze willen me vragen of ik ze wil helpen.
	6	Het is erg luid in de kroeg en Max kan niet horen wat Jan zegt. Hij vraagt wat Jan zei. Jij zegt:	Hij wil weten wanneer we naar huis willen gaan.
	7	Lea vraagt waarom Alex laat is. Jij zegt:	Hij komt niet meer omdat hij morgen moet werken.
	8	Je zus vraagt wanneer jullie ouders naar Spanje gaan. Jij zegt:	Ze gaan in oktober zodat ze de toeristen kunnen vermijden.
	9	Lena wil weten waarom Daniel er zo gestrest uitziet. Jij zegt:	Hij zegt dat hij het essay morgenochtend af moet hebben.
	10	Anneke vraagt je wanneer je je broer wilt bezoeken. Jij zegt:	Ik denk dat ik hem in augustus wil bezoeken.

Appendix I

	11	Je broer vraagt je waarom Ana Paul negeert. Jij zegt:	Ze zegt dat ze hem niet meer wil spreken.
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I.5 AJT5: Reflexive Binding and Main Clause Verb Position (English)

Reflexive Binding	Item no.	Context Sentence(s)	Test Sentence:
Condition 1: Picture DP	1	Laura asks what you and Max are doing. You say:	I am showing him a photo of himself.
	2	Amelia wants to know why you are speaking to your friend. You say:	I'm telling him the rumour about himself.
	3	Elina asks you why you are all showing your friend the newspaper. You say:	We are showing her the article about herself.
	4	Anna asks what you are doing later. You say:	I am giving Mathew the picture of himself this afternoon.
	5	You all heard a story about Daniel yesterday and want to know if it's true. You are speaking to him now. Anna asks you why Daniel looks so embarrassed. You say:	We are telling him that story about himself.
	6	James asks what you are saying to Luke. You tell him there is a painting of Luke in the art exhibition. You say:	We are telling Luke about the painting of himself.

Appendix I

	7	Your sister asks you who you are texting. You say:	I am sending Hannah the photo of herself in the park.
	8	Yesterday at the party you took lots of good photos of Charlotte and your other friends. Lilly says you should show your friends the photos. You say:	I am showing Charlotte the photos of herself later.
Condition 2: Embedded Picture DP	1	Anna asks why Chris wants to buy the magazine immediately. You say:	He wants to know which photos of himself were published.
	2	Lisa asks why the politician looks so worried today. You say:	He is worried that the story about himself will be published.
	3	You are telling Peter that Anna is very happy today. You say:	Anna is very happy that the article about herself is finally being published.
	4	You are explaining to a colleague why Emily is so annoyed. You say:	Emily is annoyed that the wrong photo of herself was printed.
	5	Your friend notices that Anton looks a bit embarrassed today. You say:	Yes, he is embarrassed that the photo of himself was published.
	6	James asks you why Ellie looked so annoyed earlier. You say:	She is annoyed that the painting of herself has been vandalised.
	7	Luke asks you why Julie is buying the new magazine. You say:	She wants to know which picture of herself has been printed.

Appendix I

	8	Hannah asks you why the actor is speaking to the policeman in the art gallery. You say:	The actor is asking which picture of himself has been stolen.
Condition 3: Embedded coordinated DP	1	You are telling Michael why Max is surprised. You say:	Max is surprised that I invited Amy and himself to the pub.
	2	Amy asks you why Tom is happy. You say:	He is happy that you invited Hannah and himself to dinner.
	3	Sophie asks you why Hannah looks so annoyed. You say:	She is annoyed that you ignored Paul and herself earlier.
	4	You are telling Ava why Sophie is angry. You say:	Sophie is angry that I ignored Peter and herself this afternoon.
	5	Stephen asks you why Lily looks so annoyed. You say:	She is annoyed that you didn't congratulate Ben and herself earlier.
	6	You are explaining to Freya why Andrew is surprised. You say:	Andrew is quite surprised that I recognised Eleanor and himself at the graduation ceremony.
	7	John asks you why Max is shocked. You say:	He is shocked that you sent Marie and himself the money.
	8	You are telling Tom why Lea is so happy today. You say:	Lea is happy that I gave Sam and herself the car.

Appendix I

Main Clause Verb Position	Item no.	Context Sentence(s)	Test Sentence:
Condition 1: S-Adv-V(-O)	1	Finley asks you if you have read the newspaper article about the politician. You say:	No, I rarely read the newspapers.
	2	You think that the dog might be ill as he hasn't eaten anything. You say:	He usually eats a lot.
	3	You are in the pub with friends. Paul looks very drunk and doesn't feel well. You say:	He often drinks too much beer.
	4	You are in a cafe with friends. Amy is ordering drinks but doesn't know what Luke would like as he hasn't arrived yet. You say:	He usually buys a tea here.
	5	You are complaining about a lazy employee. You say:	He never wants a new task.
	6	You find the man in the meeting very annoying. You say:	He constantly asks silly questions.
	7	Phillip asks you how you know so much about politics. You say:	I regularly watch the news.
	8	We are sitting in a restaurant that you eat at regularly. I ask you what you would recommend. You say:	The pizza always tastes good here.
*Condition 2: S-V-Adv(-O)	1	Your colleague wants to discuss a newspaper article but you haven't read it. You suggest that she speaks with Toby. You say:	He reads normally the newspaper.
	2	Lucy asks why your friends are not eating lunch. You say:	They eat rarely lunch.

Appendix I

	3	You are in a bar with a colleague. He asks you what you would like to drink. You say:	I drink usually beer.
	4	You are in a café with a colleague. You are deciding what you want to order. You say:	I buy always a coffee here.
	5	An employee was very lazy this last year and they did very little work. You are quite annoyed by her. You say:	She wants nevertheless a promotion.
	6	You tell the new employee you are quite impressed by him. You say:	You ask always very pertinent questions.
	7	Phillip asks you why Sophie knows nothing about the current political situation. You say:	She watches hardly the news.
	8	We are sitting in a restaurant that you eat at regularly. You recommend that I don't order the pizza. You say:	The pizza tastes often bad.
Condition 3: Adv-S-V(-O)	1	Laura asks you if you have time this week to watch the film. You say:	Yes, on Monday I'm not working.
	2	You notice that your neighbour is quite sporty. You say:	He often runs in the morning.
	3	Joe says that Jess and John don't speak anymore. You say:	Yes, unfortunately, they don't get on well with each other anymore.
	4	Harry calls you and asks what you are doing now. You say:	At the moment I am going to the supermarket.

Appendix I

	5	Imogen thinks that Ben and Sophie are travelling by bus. You say:	No, with her he always travels by car.
	6	The doctor asks you how you have been since your last visit. You say:	Without the tablets I don't feel so good.
	7	Imogen asks why you are visiting France as well as Spain. You say:	In France we are visiting our cousins.
	8	Adam thinks that you have a lot of friends in Berlin. You say:	In Berlin I only know three people.
*Condition 4: Adv-V-S(-O)	1	You can't see your car straight away. After few minutes you spot it. You say:	Finally, see I the car.
	2	Your new colleague asks you when the boss will tell him his tasks for the day. You say:	Sometimes sends she an email at the beginning of the day.
	3	You and Lena are discussing your neighbour. She says that he seems quite sporty. You say:	Yes, occasionally run we together.
	4	Mia says that your colleagues, Ella and Sophie, are often arguing with one another. You say:	Nevertheless, get they on very well together.
	5	Amy asks if you could stay longer. You say:	Unfortunately, have we to go.
*Condition 5: (temporal) AdvPP-V-S(-O)	1	Georgia asks you when you finish work on Fridays. You say:	On Fridays work I until 4 o'clock.
	2	Mike wants to know if your brother is free in the mornings. You don't think so. You say:	In the mornings goes he to the swimming pool.

Appendix I

	3	Ellie wants to know when in the week you would have time to go to the cinema. You say:	On the weekend have I time.
	4	You tell Joe that you are looking forward to Christmas. You say:	At Christmas eat I always lots of chocolate.
	5	You are telling Megan that your sister can bake very well. You say:	For my birthday bakes she me a huge cake.
*Condition 6: ('manner') AdvPP-V-S(-O)	1	Alex thinks that Anya drives quicker with Morgan. You agree. You say:	Yes, with him drives she always quicker.
	2	Laura asks how Toby is since he gave up alcohol. You say:	Without alcohol feels he a lot better.
	3	Lucy says she doesn't like to travel by plane. You say:	By plane, like I to travel.
	4	You want Luke to be invited too. You say:	With him have we always a lot of fun.
	5	Elin asks if she could perhaps stay at your place tonight. You say:	At my place is there no room, sadly.
*Condition 7: (locative) AdvPP-V-S(-O)	1	Edward thinks that you are visiting lots of cities in Italy and Spain this summer. You say:	In Italy am I visiting only Rome.
	2	Morgan asks who you know in Madrid. You say:	In Madrid know I Laura and Matteo.
	3	You and a friend are discussing religious traditions. You say:	At my house celebrate we Easter.
	4	Your aunt asks you why your sister always has so many lectures. You say:	At university studies she both Chemistry and Physics.

Appendix I

	5	Your mother never wants your father to shop alone in the department store. You agree. You say:	In the department store spends he too much money.
Fillers (Case Marking and Subordinate Clause Verb Position)	Item no.	Context Sentence(s)	Test Sentence:
Condition 1: Dative Pronoun (Dative Case required)	1	Your colleague asks if Lisa has already written to Mark. You say:	She is writing him an email today.
	2	Tomorrow is your brother's birthday. You and your sister are discussing what you are buying. You say:	I am buying him a new phone.
	3	You think that Lucy and Alex are cheating in the exam. You say:	She is showing him the answers.
	4	You tell Michael that you are buying the car from Jessica. You say:	He is selling me the car at a good price.
	5	Amy notices that Lena is very busy in the kitchen this morning. You say:	Yes, she is baking you a cake for this evening.
	6	Megan asks you if you believe Luke now. You say:	No, he is still not telling me the truth.
Condition 2: Dative Pronoun (Dative Case required)	1	Amy reminds you to speak with the boss tomorrow. You say:	I am writing him an email tomorrow.
	2	Next week it is your father's birthday. Your sister asks what your brother is buying. You say:	He is buying him a book.
	3	Paul wants to see the answers for the exam, but you think he should do it alone. You say:	I am not showing him the answers.

Appendix I

	4	You are happy that you can buy the house from your parents. You say:	They are finally selling me the house.
	5	You tell Ellie that your father is already preparing lunch. You say:	He is baking you bread for lunch.
	6	You want to find out what happened in the office yesterday. You are going to ask Phillip. You say:	He always tells me the truth.
*Condition 3: Subordinate Clause Verb Final	1	Paul wants to go into the boss's office and have a look around. You say:	I don't know whether you that do should.
	2	Phillip parks the car in the main street. You say:	I am not sure if he here park can.
	3	You tell Morgan that Jake is looking for you. You say:	He wants to ask me why I to the birthday party this evening not come can.
	4	Your brother asks you why your parents tried to call him. You say:	They want to know why you this morning arrive can't.
	5	Mia wonders why Laura just called you 3 times. You say:	She wants to ask me when I to the supermarket go can.
	6	You tell Jessica that Michael wants to speak with him You say:	He wants to ask you when he visit could.
Condition 4: Subordinate Clause Verb non-Final	1	Lucy wants to send a very blunt email to the boss. You say:	I'm not sure if you should do that.
	2	At a conference, Jane eats the food from the buffet straight away. You say:	I don't know if you're allowed to eat that already.

Appendix I

	3	Amy wonders why Lucy wants to talk to you. You say:	She wants to know why I don't want to come tomorrow.
	4	Daniel asks you why your boss sent him a text. You say:	He wants to know why you can't work on Friday.
	5	Helen doesn't know why Alex and Noah are looking for you. You say:	They want to ask me when I am going to help them.
	6	It is very loud in the pub and Morgan can't hear what John is saying. He asks you what John said. You say:	He wants to know when we want to go home
	7	Charlotte asks why Alex is late. You say:	He's not coming anymore as he has to work tomorrow.

I.6 AJT6: Predicative Adjective Gender Agreement and Negation (Spanish)

Predicative Adjective Gender Agreement	Item no.	Context Sentence(s)	Test Sentence:
Condition 1: Feminine noun: gender agreement morphology on adjective	1	Estamos haciendo un crucigrama juntos. Tú dices:	Esta respuesta es completamente incorrecta.
	2	Esta noche hemos visto una obra de teatro. Tú dices:	Esa actriz fue extraordinaria.
	3	Tu prima celebró su fiesta de cumpleaños el sábado. Tú dices:	La fiesta fue emocionante.

Appendix I

	4	Preparaste comida italiana para tus padres, pero la temperatura del horno estaba demasiado alta. Tú dices:	Desafortunadamente, la pizza está quemada.
	5	Tú y tus amigos estáis en el parque. Quieren sentarse aquí para tener un picnic, pero tú no. Tú dices:	El terreno está muy desnivelado aquí.
	6	Tu compañero de piso quiere que compres otra bombilla para la sala de estar para que sea más brillante. Tú dices:	La lámpara ya es bastante brillante.
	7	Estás intentando convencer a Andrés de que suba a la cima del monte. Tú dices:	La vista allí es maravillosa.
	8	Sara te pregunta por qué vas a Barcelona este verano. Tú dices:	La ciudad es muy bonita en verano.
Condition 2: Masculine noun: gender agreement morphology on adjective	1	Estamos sentados en un restaurante y nos gustaría pedir bebidas. Tú dices:	El café aquí es muy bueno.
	2	Estás hablando de la revista que leíste esta mañana. Tú dices:	El artículo sobre los futbolistas era bastante partidista.
	3	Queremos reunirnos con nuestros amigos fuera, pero no sabemos dónde. Un amigo sugiere que vayamos al parque. Tú dices:	El parque estará demasiado mojado en este momento.
	4	Antes estuvimos comiendo en un restaurante y te gustó mucho la comida. Tú dices:	El postre fue excelente.

Appendix I

	5	Me estás ayudando a comprar ropa para la boda. Tú dices:	Este traje será muy bonito.
	6	Estamos viendo una entrevista en el informativo de las ocho. Tú dices:	Ese político es muy competente.
	7	Estás sentado en la orilla de un río con un amigo en verano. Quiere nadar. Tú dices:	¡buena idea! El río estará bastante caliente.
	8	Estás viendo un partido de fútbol. Piensas que tu equipo está jugando muy mal. Tú dices:	El capitán es demasiado tímido.
*Condition 3: Feminine noun: no gender agreement morphology on adjective	1	Estamos haciendo un test juntos. Tú dices:	Esta respuesta aquí es correct.
	2	Vemos una entrevista en la televisión. Tú dices:	Esa actriz parece despistad.
	3	Tu vecina celebra su cumpleaños esta noche. Tú dices:	Sin duda la fiesta será bastante animad.
	4	Antes estuvimos comiendo en un restaurante, pero no te gustó la comida. Tú dices:	La pizza estaba demasiado salad.
	5	Tú y tu amigo estáis caminando por el parque. Tu amigo se siente mal y quiere tumbarse. Tú dices:	La tierra está demasiado húmed aquí.
	6	Una amiga te pregunta por qué hay muy poca luz en tu salón. Tú dices:	La lámpara está rot.
	7	Helena te pregunta qué piensas del nuevo restaurante en el lago. Tú dices:	La vista allí es fantástic.

Appendix I

	8	Lara te pregunta por qué vas a ir a Nueva York el próximo invierno. Tú dices:	La ciudad es mágic en invierno.
*Condition 4: Masculine noun: no gender agreement morphology on adjective	1	Estamos sentados en un café y nos gustaría algo de beber. Tú dices:	El café aquí está bastante mal.
	2	Me estás hablando del periódico que acabas de leer. Tú dices:	El artículo sobre los adolescentes es muy injust.
	3	Sugiero que vayamos al parque a jugar al fútbol. Tú dices:	El parque es demasiado pequeño, deberíamos ir al campo de fútbol.
	4	Me gustó mucho la comida del restaurante, pero a ti no. Tú dices:	El postre fue decepcionant.
	5	Me estás ayudando a elegir algo que ponerme para una entrevista. Tú dices:	Este traje será muy elegant.
	6	Vemos un debate político en la tele. Tú dices:	Ese político es muy inexpert.
	7	Tú y tu amigo estáis caminando por la orilla del río en verano y veis que hay mucha basura en el agua. Tú dices:	El río parece bastante suci.
	8	Estás viendo un partido de fútbol con un amigo. Está jugando tu equipo favorito. Tú dices:	El capitán ahora es muy viej.
Negation	Item no.		

Appendix I

*Condition 1: Negative Concord Item	1	Tu padre te pregunta si quieres comer algo. No tienes hambre. Tú dices:	No, gracias. Como nada en este momento.
	2	Miguel os pregunta si habéis escuchado las noticias sobre el famoso actor. Tú dices:	Sabemos nada al respecto.
	3	Ana te pregunta si lees algo interesante en este momento. Tú dices:	Leo nada en este momento.
	4	Tu vecino te pregunta si te molesta mientras toca la guitarra. Tú dices:	Las paredes son gruesas, oímos nada.
	5	Vas al supermercado con Elena. Ella te pregunta si también compras comida. Tú dices:	Te acompaño, pero compro nada.
	6	Tu amigo te pregunta si vas a enviar los regalos hoy. Hoy no tienes tiempo. Tú dices:	Envío nada hasta mañana.
	7	Fernando pregunta si estás ocupado esta noche. Tú dices:	Hago nada en absoluto esta noche.
	8	Esteban cree que haces el pastel de cumpleaños para la fiesta de Ana esta noche. Tú dices:	Prepara nada para su fiesta.
Condition 2: Negative Marker + Negative Concord Item	1	Tu madre te pregunta si a tu hermano también le gustaría algo de comer. Crees que está enfermo. Tú dices:	Hoy no come nada.

Appendix I

	2	Julia te pregunta si has visto el escándalo político actual en las noticias. Tú dices:	No sé nada al respecto.
	3	Laura te pregunta si Jan lee el artículo esta noche. Tú dices:	No lee nada esta noche.
	4	Tu vecino te pregunta si escuchas ruido de afuera. Tú dices:	No oímos nada de afuera.
	5	Estás en el centro comercial. A tu amigo le gustaría saber si tú también quieres comprar algo. Tú dices:	Solo estoy mirando, no estoy comprando nada.
	6	Tu socio comercial te pregunta si el empleado está enviando los correos electrónicos hoy. Tú dices:	No envía nada hoy.
	7	Ana te pregunta si tu hermana hace algo importante en este momento porque quiere hablar con ella. Tú dices:	Ella no está haciendo nada en este momento.
	8	Tu hermano te pregunta si tu madre prepara un pastel para esta noche. Tú dices:	No prepara nada para esta noche.
	Condition 3: Negative Concord Item + Negative Concord Item	1	El anfitrión pregunta si alguien quiere algo de beber. Tú dices:
2		Tu jefe os pregunta si habéis oído el anuncio importante. Tú dices:	Nadie sabe nada al respecto.
3		Tu hermana va al supermercado y quiere saber si necesitáis algo. Tú dices:	No, gracias. Nadie necesita nada.

Appendix I

	4	Estás haciendo un recorrido por la ciudad. El guía turístico os pregunta si veis la estatua en el puente. Tú dices:	Nadie ve nada desde aquí.
	5	Valeria quiere saber si alguien está comprando algo en el supermercado. Tú dices:	Nadie compra nada allí.
	6	Tengo mucha hambre. Pregunto si alguien tiene algo para comer. Tú dices:	Nadie tiene nada.
	7	Sofia pregunta si traéis bebidas a la fiesta. Tú dices:	Nadie trae nada.
	8	El nuevo colega os pregunta si practicáis deporte el fin de semana. Tú dices:	Nadie juega a nada durante el fin de semana.
*Condition 4: Negative Marker + NPI	1	Tu compañero de piso pregunta si a tus invitados les gustaría beber algo. Tú dices:	No, gracias. Nadie quiere algo en este momento.
	2	Tu colega os pregunta si ya habéis leído el nuevo informe. Tú dices:	Nadie sabe algo al respecto.
	3	Estás cenando con tu familia. Tu hermano dice que necesita otro vaso de agua de la cocina. Os pregunta si alguien también necesita algo más de la cocina. Tú dices:	No gracias. Nadie necesita algo de la cocina.
	4	Estás caminando por la orilla del río. Tu amigo os pregunta si veis la luz en el puente de enfrente. Tú dices:	Nadie ve algo en el puente.

Appendix I

	5	Juan dice que compra muchas cosas baratas en este sitio web. Pregunta si alguien más también compra en este sitio web. Tú dices:	Nadie compra algo en ese sitio web.
	6	Mateo tiene mucha sed. Pregunta si alguien tiene algo de beber. Tú dices:	Nadie tiene algo.
	7	Samuel pregunta si vais a llevar comida al cine. Tú dices:	Nadie trae algo.
	8	El nuevo vecino os pregunta si tocáis algún tipo de instrumento. Tú dices:	Nadie aquí toca algo.
Fillers (Main Clause Verb position with unaccusatives and unergatives)	Item no.		
Condition 1: Verb Initial	1	Mariana quiere saber cuándo llega el chico hoy. Tú dices:	Llega el chico a las 8.
	2	Antonio se pregunta quién más asistirá a la boda. Sabes que también viene el alcalde. Tú dices:	Vendrá el alcalde a la boda también.
	3	María se da cuenta de que los girasoles del jardín ya están bastante grandes. Tú dices.	Sí, crecen los girasoles muy rápidamente en verano.
	4	Crees que Martín no riega sus plantas lo suficiente. Tú dices:	Mueren las flores sin suficiente agua.
	5	Juan te pregunta si el hombre va a ir al centro comercial hoy. Tú dices:	Sí, va a ir el hombre a las 2 en punto.

Appendix I

	6	Tu hermana te pregunta cuándo volverán los vecinos de sus vacaciones. Tú dices:	Regresarán los vecinos el fin de semana.
	7	Te das cuenta de que la vecina siempre hace mucho deporte. Tú dices:	Corre la vecina casi todos los fines de semana.
	8	Lara te pregunta si la pizza ya está lista. Tú dices:	No, se hace la pizza muy lentamente.
	9	Hubo mucha nieve donde vives, pero el sol ya está brillando de nuevo. Tú dices:	Ya se está derritiendo la nieve.
	10	Crees que el perro está enfermo. Le estás diciendo al veterinario lo que pasa. Tú dices:	Se está cayendo el perro hoy mucho.
Condition 2: Verb Final	1	Paula pregunta si el tren llegará pronto. Tú dices:	El tren llega en una hora y media.
	2	Juan te pregunta cuándo la chica vendrá a hacerte una visita. Tú dices:	La chica vendrá el miércoles.
	3	Estás caminando por el bosque con un amigo. Se da cuenta de que hay muchos hongos. Tú dices:	Los hongos crecen en todas partes en este bosque.
	4	Laura está triste porque sus flores se están marchitando ya que no pueden soportar el calor. Tú dices:	Las flores se están muriendo con este calor.
	5	A Diego le gustaría saber con qué frecuencia el atleta va al gimnasio. Tú dices:	El atleta va como máximo 4 veces a la semana.

Appendix I

	6	Lucia está muy preocupada porque sus perros se han escapado. Intentas consolarla. Tú dices:	Los perros siempre vuelven.
	7	Alejandro te pregunta por qué la mujer no participa hoy en la carrera. Tú dices:	La mujer solo corre cuando hace buen tiempo.
	8	Tú y Martín estáis cocinando pasta. Le dices que el agua ya está lista. Tú dices:	El agua ya está hirviendo.
	9	Compras un helado. Hace mucho calor y no puedes comer el helado lo suficientemente rápido. Tú dices:	El helado se derrite demasiado rápido.
	10	Piensas que el crío de tus vecinos ya puede andar muy bien. Tú dices:	Rara vez el bebé se cae cuando anda.
	11	Lena te pregunta por qué te vas ahora a la estación de tren. Tú dices:	Mi hermano llega en 20 minutos.

Appendix J Ethics approval

Approval of initial ERGO application:

Submission ID: 62835
Submission Title: PhD ERGO
Submitter Name: Lewis Baker

Your submission has now been approved by the Faculty Ethics Committee. You can begin your research unless you are still awaiting any other reviews or conditions of your approval.

Comments:

-

[Click here to view the submission](#)

Tid: 23011_Email_to_submitter__Approval_from_Faculty_Ethics_committee__cat_B__C_ Id: 360496

lmb3g14@soton.ac.uk coordinator

Approval of amendment to recruitment and data collection procedures:

Submission ID: 62835.A1

Submission Title: The Role of Linguistic Input in L1 Attrition ERGO
(Amendment 1)

Submitter Name: Lewis Baker

Your submission has now been approved by the Faculty Ethics Committee. You can begin your research unless you are still awaiting any other reviews or conditions of your approval.

Comments:

-

[Click here to view the submission](#)

Tid: 23011_Email_to_submitter__Approval_from_Faculty_Ethics_committee__cat_B__C__Id: 464417

lmb3g14@soton.ac.uk coordinator

Appendix K Inferential statistics: Cumulative Link mixed effects models

Model 1: German – Dutch L1 Attrition

Response ~ Group*Condition + (1 | Participant) + (1 + Group | Item)

Condition names:

Reflexive Binding	
OPSPPSICH	<i>Sich</i> as selected PP object.
OPSPPSICHSELBST	<i>Sich selbst</i> as selected PP object.
TNGNRSICH	Transitive, non-grooming, non-inherently reflexive verb with <i>sich</i> .
TNGNRSICHSELBST	Transitive, non-grooming, non-inherently reflexive verb with <i>sich selbst</i> .
Grammatical Gender	
MATCHAF	Feminine Determiner + Feminine Noun.
MATCHAM	Masculine Determiner + Masculine Noun.
MISMATCHAF	Masculine Determiner + Feminine Noun.
MISMATCHAM	Feminine Determiner + Masculine Noun.

Fixed effects	log odds (logit)	Std. Error	z value	p value
(Intercept)	-0.18	0.19	-0.99	0.32
Condition MATCHAF	2.66	0.30	8.94	<.001*
Condition MATCHAM	2.96	0.30	9.92	<.001*
Condition MISMATCHAF	-6.80	0.35	-19.28	<.001*
Condition MISMATCHAM	-6.47	0.34	-18.86	<.001*
Condition OPSPPSICH	1.90	0.28	6.68	<.001*
Condition OPSPPSICHSELBST	2.47	0.29	8.52	<.001*
Condition TNGNRSICH	1.91	0.29	6.71	<.001*
Group German Control AJT1: Condition MATCHAF	0.46	0.14	3.19	<.01*
Group German Control AJT1: Condition MATCHAM	0.20	0.15	-1.31	0.19
Group German Control AJT1: Condition MISMATCHAF	0.13	0.20	0.65	0.51
Group German Control AJT1: Condition MISMATCHAM	0.46	0.19	2.47	<.05*
Group German Control AJT1: Condition OPSPPSICH	0.27	0.12	2.21	<.05*
Group German Control AJT1: Condition OPSPPSICHSELBST	0.00	0.14	-0.02	0.98
Group German Control AJT1: Condition TNGNRSICH	0.07	0.13	0.52	0.60

Number of observations: 3576; Random Intercepts: Participant (56, Var: 1.73, SD: 1.31) Item (64, Var: 0.82, SD: 0.91); Random Slopes: Group (German Control/ Germans in the NLS)/ Item (Var: 0.11, SD: 0.33); Confidence Level used: 0.95

Pairwise comparisons:

Contrast (German Control vs Germans in the NLS)	Estimate	SE	df	z ratio	p value
OPSPPSICH	0.18	0.44	Inf.	0.41	1.00
OPSPPSICHSELBST	-0.37	0.46	Inf.	-0.82	1.00
TNGNRSICH	0.50	0.44	Inf.	-1.13	1.00
TNGNRSICHSELBST	-0.64	0.43	Inf.	-1.48	0.98
MATCHAF	1.29	0.47	Inf.	-2.73	0.31
MATCHAM	0.76	0.48	Inf.	-1.58	0.97
MISMATCHAF	0.10	0.56	Inf.	-0.19	1.00
MISMATCHAM	0.55	0.53	Inf.	1.04	1.00

Confidence Level used: 0.95

Model 2: German – English L1 Attrition

Response ~ Group*Condition + (1 | Participant) + (1 + Group | Item)

Condition names:

Reflexive Binding

PNPREF	Picture DP.
EPNREF	Embedded Picture DP.
ACBCNPREF	Embedded Coordinated DP.

Main Clause Word

Order

SAdvPV	S-Adv-V(-O).
SVAdvP	S-V-Adv(-O).
AdvPSV	Adv-S-V(-O).
AdvPVS	Adv-V-S(-O).
AdvPTPPVS	(temporal) AdvPP-V-S(-O).
AdvPMPPVS	('manner') AdvPP-V-S(-O).
AdvPPPPVS	(locative) AdvPP-V-S(-O).

Fixed effects	log odds (logit)	Std. Error	z value	p value
(Intercept)	0.11	0.12	0.88	0.38
Condition ACBCNPREF	-4.19	0.26	-16.41	<.001*
Condition AdvPMPPVS	3.58	0.31	11.72	<.001*
Condition AdvPPPPVS	3.46	0.30	11.49	<.001*
Condition AdvPSV	-5.00	0.28	-17.59	<.001*
Condition AdvPTPPVS	4.01	0.32	12.60	<.001*
Condition AdvPVS	3.37	0.30	11.22	<.001*
Condition EPNREF	-2.06	0.23	-8.95	<.001*
Condition PNPREF	-0.70	0.22	-3.14	<.01*
Condition SAdvPV	-5.26	0.30	-17.80	<.001*
Group German Control AJT2: Condition ACBCNPREF	-0.27	0.14	-1.92	0.05
Group German Control AJT2: Condition AdvPMPPVS	0.04	0.16	0.26	0.79

Appendix K

Group German Control AJT2: Condition AdvPPPPVS	-0.08	0.16	-0.52	0.60
Group German Control AJT2: Condition AdvPSV	0.13	0.18	0.70	0.48
Group German Control AJT2: Condition AdvPTPPVS	-0.36	0.18	-1.98	<.05*
Group German Control AJT2: Condition AdvPVS	-0.34	0.15	-2.23	<.05*
Group German Control AJT2: Condition EPNREF	0.38	0.10	3.83	0.00
Group German Control AJT2: Condition PNPREF	0.56	0.09	5.92	0.00
Group German Control AJT2: Condition SAdvPV	0.17	0.20	0.88	0.38

Number of observations: 4200; Random Intercepts: Participant (62, Var: 0.78, SD: 0.89) Item (68, Var: 0.37, SD: 0.61); Random Slopes: Group (German Control/ Germans in the UK)/ Item (Var: 0.01, SD: 0.12); Confidence Level used: 0.95

Pairwise comparisons:

Contrast (German Control vs Germans in the UK)	Estimate	SE	df	z ratio	p value
PNPREF	1.33	0.29	Inf.	4.64	<.001*
EPNREF	0.97	0.29	Inf.	3.32	0.10
ACBCNPREF	-0.32	0.37	Inf.	-0.87	1.00
SAdvPV	0.57	0.48	Inf.	1.17	1.00
SVAdvP	-0.25	0.32	Inf.	-0.77	1.00
AdvPSV	0.47	0.45	Inf.	1.05	1.00
AdvPVS	-0.46	0.39	Inf.	-1.17	1.00
AdvPTPPVS	-0.50	0.45	Inf.	-1.11	1.00
AdvPMPPVS	0.30	0.41	Inf.	0.74	1.00
AdvPPPPVS	0.06	0.40	Inf.	0.14	1.00

Confidence Level used: 0.95

Model 3: German – Spanish L1 Attrition

Response ~ Age_cent*Group*Condition + (1 | Participant) + (1 + Age_cent*Group | Item)

Condition names:

Predicative Adjective Agreement	
PAGMDF	Feminine noun: no gender agreement morphology on adjective.
PAGMDM	Masculine noun: no gender agreement morphology on adjective.
PANGMDF	Feminine noun: gender agreement morphology on adjective.
PANGMDM	Masculine noun: gender agreement morphology on adjective.
Negation	
NQ	Negative Quantifier.
NNQ	Negative Marker + Negative Quantifier.
NQNQ	Negative Quantifier + Negative Quantifier.

Appendix K

NQPI		Negative Quantifier + NPI.			
Fixed effects	log odds (logit)	Std. Error	z value	p value	
(Intercept)	0.03	0.02	1.64	0.10	
Group German Control AJT3	0.71	0.29	2.49	<.05*	
Condition NNQ	-3.71	0.49	-7.54	<.001*	
Condition NQ	3.66	0.43	8.59	<.001*	
Condition NQNQ	-2.29	0.43	-5.36	<.001*	
Condition NQPI	3.03	0.41	7.35	<.001*	
Condition PAGMDF	-4.20	0.50	-8.44	<.001*	
Condition PAGMDM	-4.33	0.50	-8.62	<.001*	
Condition PANGMDF	4.00	0.44	9.12	<.001*	
Age_cent: Group German Control AJT3	-0.05	0.02	-2.77	<.01*	
Age_cent: Condition NNQ	-0.02	0.02	-1.35	0.18	
Age_cent: Condition NQ	-0.02	0.01	-1.55	0.12	
Age_cent: Condition NQNQ	0.02	0.01	1.25	0.21	
Age_cent: Condition NQPI	-0.01	0.01	-0.93	0.35	
Age_cent: Condition PAGMDF	0.03	0.02	1.75	0.08	
Age_cent: Condition PAGMDM	0.04	0.02	1.95	0.05	
Age_cent: Condition PANGMDF	-0.02	0.01	-1.09	0.28	
Group German Control AJT3: Condition NNQ	0.72	0.35	2.09	<.05*	
Group German Control AJT3: Condition NQ	-0.66	0.23	-2.84	<.01*	
Group German Control AJT3: Condition NQNQ	0.55	0.25	2.24	<.05*	
Group German Control AJT3: Condition NQPI	-0.41	0.21	-1.95	0.05	
Group German Control AJT3: Condition PAGMDF	0.44	0.35	1.27	0.21	
Group German Control AJT3: Condition PAGMDM	0.24	0.36	0.67	0.50	
Group German Control AJT3: Condition PANGMDF	-0.52	0.25	-2.11	<.05*	
Age_cent: Group German Control AJT3: Condition NNQ	-0.06	0.02	-3.35	<.001*	
Age_cent :Group German Control AJT3: Condition NQ	0.03	0.01	2.37	<.05*	
Age_cent: Group German Control AJT3: Condition NQNQ	0.02	0.01	1.22	0.22	
Age_cent: Group German Control AJT3: Condition NQPI	0.03	0.01	1.95	0.05	
Age_cent: Group German Control AJT3: Condition PAGMDF	-0.03	0.02	-1.84	0.07	
Age_cent: Group German Control AJT3: Condition PAGMDM	-0.02	0.02	-1.13	0.26	
Age_cent: Group German Control AJT3: Condition PANGMDF	0.01	0.02	0.90	0.37	

Number of observations: 3897; Random Intercepts: Participant (62, Var: 1.07, SD: 1.04) Item (64, Var: 1.26, SD: 1.12); Random Slopes: Group (German Control / Germans in Spain)/ Item (Var: 0.08, SD:

0.28); Age_cent/ Item (Var: 0.00, SD: 0.01); Age_cent:Group (German Control/ Germans in Spain)/ Item (Var: 0.00, SD: 0.03); Confidence Level used: 0.95

Pairwise comparisons:

Contrast (German Control vs Germans in Spain)*	Estimate	SE	df	z ratio	p value
PAGMDF	1.74	0.94	Inf.	1.84	0.90
PAGMDM	1.42	0.97	Inf.	1.47	0.99
PANGMDF	0.16	0.75	Inf.	0.21	1.00
PANGMDM	0.55	0.73	Inf.	0.76	1.00
NQ	0.02	0.73	Inf.	0.03	1.00
NNQ	2.13	0.93	Inf.	2.29	0.63
NQNQ	2.31	0.74	Inf.	3.12	0.12
NQPI	0.45	0.70	Inf.	0.64	1.00

*Controlling for Age_cent 3.43. Confidence Level used: 0.95

Model 4: German – Dutch L2 Acquisition

Response ~ Group*Condition + (1 | Participant) + (1 + Group | Item)

Condition names:

German – Dutch Reflexive Binding	
OPSPZICH	<i>Zich</i> as selected PP object.
OPSPZICHZELF	<i>Zichzelf</i> as selected PP object.
TNGNRZICH	Transitive, non-grooming, non-inherently reflexive verb with <i>zich</i> .
TNGNRZICHZELF	Transitive, non-grooming, non-inherently reflexive verb with <i>zichzelf</i> .
Grammatical Gender	
MATCHAC(F)	Common Determiner + Common Noun (German cognate Feminine).
MATCHAC(M)	Common Determiner + Common Noun (German cognate Masculine).
MISMATCHAC(F)	Neuter Determiner + Common Noun (German cognate Feminine).
MISMATCHAC(M)	Neuter Determiner + Common Noun (German cognate Masculine).

Fixed effects	log odds (logit)	Std. Error	z value	p value
(Intercept)	0.44	0.17	2.64	<.01*
Condition OPSPZICH	-2.33	0.30	-7.72	<.001*
Condition OPSPZICHZELF	3.51	0.31	11.23	<.001*
Condition TNGNRZICH	-0.97	0.30	-3.28	<.01*
Condition TNGNRZICHZELF	2.98	0.31	9.73	<.001*
Condition MATCHAC(F)	2.81	0.31	9.13	<.001*
Condition MATCHAC(M)	3.21	0.31	10.38	<.001*
Condition MISMATCHAC(F)	-4.43	0.34	-12.93	<.001*

Appendix K

Group Germans in the NLS: Condition OPSPZICH	0.73	0.15	4.97	<.001*
Group Germans in the NLS: Condition OPSPZICHZELF	0.64	0.16	-3.92	<.001*
Group Germans in the NLS: Condition TNGNRZICH	0.31	0.14	2.27	<.05*
Group Germans in the NLS: Condition TNGNRZICHZELF	-0.57	0.15	-3.73	<.001*
Group Germans in the NLS: Condition MATCHAC(F)	-0.49	0.15	-3.20	<.01*
Group Germans in the NLS: Condition MATCHAC(M)	-0.42	0.16	-2.67	<.01*
Group Germans in the NLS: Condition MISMATCHAC(F)	0.57	0.21	2.75	<.01*

Number of observations: 3495; Random Intercepts: Participant (55, Var: 1.32, SD: 1.15) Item (64, Var: 0.41, SD: 0.64); Random Slopes: Group (Dutch Control/ Germans in the NLS)/ Item (Var: 0.31, SD: 0.56); Confidence Level used: 0.95

Pairwise comparisons:

Contrast (Dutch Control vs Germans in the NLS)	Estimate	SE	df	z ratio	p value
OPSPZICH	2.34	0.44	Inf.	5.36	<.001*
OPSPZICHZELF	0.39	0.46	Inf.	-0.84	1.00
TNGNRZICH	1.51	0.42	Inf.	3.59	<.05*
TNGNRZICHZELF	0.25	0.44	Inf.	-0.56	1.00
MATCHAC(F)	-0.09	0.45	Inf.	-0.21	1.00
MATCHAC(M)	0.06	0.45	Inf.	0.12	1.00
MISMATCHAC(F)	2.02	0.55	Inf.	3.67	<.05*
MISMATCHAC(M)	1.89	0.58	Inf.	3.25	0.09
Grammaticality Contrasts (Dutch Controls)					
TNGNRZICH vs. TNGNRZICHZELF	-4.83	0.59	Inf.	-8.21	<.001*
OPSPZICH vs. OPSPZICHZELF	-7.20	0.62	Inf.	11.71	<.001*
MATCHAC(F) vs. MISMATCHAC(F)	8.30	0.68	Inf.	12.12	<.001*
MATCHAC(M) vs. MISMATCHAC(M)	7.00	0.63	Inf.	11.16	<.001*
Grammaticality Contrasts (Germans in the NLS)					
TNGNRZICH vs. TNGNRZICHZELF	-3.07	0.40	Inf.	-7.76	<.001*

Appendix K

OPSPPZICH vs. OPSPPZICHZELF	-4.48	0.41	Inf.	-10.93	<.001*
MATCHAC(F) vs. MISMATCHAC(F)	6.18	0.44	Inf.	13.99	<.001*
MATCHAC(M) vs. MISMATCHAC(M)	7.06	0.46	Inf.	15.24	<.001*

Confidence Level used: 0.95

Model 5: German – English L2 Acquisition

Response ~ Group*Condition + (1 | Participant) + (1 + Group | Item)

Condition names:**Reflexive Binding**

PNPREF	Picture DP.
EPNREF	Embedded Picture DP.
ACBCNPREF	Embedded Coordinated DP.

Main Clause Word**Order**

SAdvPV	S-Adv-V(-O).
SVAdvP	S-V-Adv(-O).
AdvPSV	Adv-S-V(-O).
AdvPVS	Adv-V-S(-O).
AdvPTPPVS	(temporal) AdvPP-V-S(-O).
AdvPMPPVS	('manner') AdvPP-V-S(-O).
AdvPPPPVS	(locative) AdvPP-V-S(-O).

Fixed effects	log odds (logit)	Std. Error	z value	p value
(Intercept)	0.27	0.14	1.98	<.05*
Condition ACBCNPREF	1.90	0.22	8.70	<.001*
Condition AdvPMPPVS	-4.23	0.36	-11.82	<.001*
Condition AdvPPPPVS	-3.46	0.31	-11.06	<.001*
Condition AdvPSV	3.66	0.23	16.14	<.001*
Condition AdvPTPPVS	-4.22	0.39	-10.94	<.001*
Condition AdvPVS	-4.09	0.34	-11.95	<.001*
Condition EPNREF	3.54	0.22	15.79	<.001*
Condition PNPREF	3.00	0.22	13.53	<.001*
Condition SAdvPV	5.13	0.24	21.27	<.001*
Group English Control: Condition ACBCNPREF	-0.41	0.10	-3.96	<.001*
Group English Control: Condition AdvPMPPVS	0.31	0.26	1.19	0.23
Group English Control: Condition AdvPPPPVS	-0.21	0.20	-1.06	0.29
Group English Control: Condition AdvPSV	0.01	0.11	0.07	0.94
Group English Control: Condition AdvPTPPVS	0.92	0.30	3.06	<.01*
Group English Control: Condition AdvPVS	-0.06	0.24	-0.26	0.79
Group English Control: Condition EPNREF	-0.15	0.11	-1.44	0.15
Group English Control: Condition PNPREF	-0.11	0.11	-1.00	0.32
Group English Control: Condition SAdvPV	-0.05	0.13	-0.36	0.72

Appendix K

Number of observations: 4341; Random Intercepts: Participant (64, Var: 1.00, SD: 1.00) Item (68, Var: 0.33, SD: 0.57); Random Slopes: Group (English Control/ Germans in the UK)/ Item (Var: 0.07, SD: 0.27); Confidence Level used: 0.95

Pairwise comparisons:

Contrast (English Control vs Germans in the UK)	Estimate	SE	df	z ratio	p value
PNPREF	0.34	0.32	Inf.	1.07	1.00
EPNREF	0.24	0.32	Inf.	0.76	1.00
ACBCNPREF	-0.26	0.31	Inf.	-0.85	1.00
SAdvPV	0.46	0.36	Inf.	1.28	1.00
SVAdvP	0.05	0.33	Inf.	0.15	1.00
AdvPSV	0.57	0.33	Inf.	1.74	0.97
AdvPVS	0.42	0.58	Inf.	0.73	1.00
AdvPTPPVS	2.39	0.70	Inf.	3.39	0.08
AdvPMPPVS	1.17	0.62	Inf.	1.88	0.94
AdvPPPPVS	0.13	0.49	Inf.	0.26	1.00

Confidence Level used: 0.95

Model 6: German – Spanish L2 Acquisition

Response ~ Group*Condition + (1 | Participant) + (1 + Group | Item)

Condition names:

Predicative Adjective

Agreement

PAGMDF Feminine noun: no gender agreement morphology on adjective.

PAGMDM Masculine noun: no gender agreement morphology on adjective.

PANGMDF Feminine noun: gender agreement morphology on adjective.

PANGMDM Masculine noun: gender agreement morphology on adjective.

Negation

NCI Negative Concord Item

NNCI Negative Marker + Negative Concord Item

NCINCI Negative Concord Item + Negative Concord Item

NCIPI Negative Concord Item + Negative Polarity Item

Fixed effects	log odds (logit)	Std. Error	z value	p value
(Intercept)	0.46	0.14	3.27	<.01*
Condition PAGMDF	2.11	0.27	7.95	<.001*
Condition PAGMDM	2.04	0.27	7.71	<.001*
Condition PANGMDF	-2.47	0.27	-9.21	<.001*
Condition PANGMDM	-1.95	0.27	-7.32	<.001*
Condition NCI	-1.35	0.27	-5.08	<.001*
Condition NCINCI	1.02	0.26	3.89	<.001*
Condition NCIPI	-1.14	0.26	-4.37	<.001*
Group Germans in Spain: Condition PAGMDF	-0.21	0.10	-2.18	0.03

Appendix K

Group Germans in Spain: Condition PAGMDM	-0.28	0.10	-2.92	<.01*
Group Germans in Spain: Condition PANGMDF	-0.18	0.10	-1.80	0.07
Group Germans in Spain: Condition PANGMDM	-0.13	0.10	-1.35	0.18
Group Germans in Spain: Condition NCI	1.21	0.10	12.04	<.001*
Group Germans in Spain: Condition NCINCI	-0.71	0.09	-7.80	<.001*
Group Germans in Spain Condition NCIPI	0.27	0.09	3.09	<.01*

Number of observations: 3802; Random Intercepts: Participant (61, Var: 1.10, SD: 1.05) Item (64, Var: 0.51, SD: 0.71); Random Slopes: Group (Spanish Control/ Germans in Spain)/ Item (Var: 0.03, SD: 0.18); Confidence Level used: 0.95

Pairwise comparisons:

Contrast (Spanish Control vs Germans in Spain)	Estimate	SE	df	z ratio	p value
PAGMDF	0.50	0.34	Inf.	1.48	0.98
PAGMDM	0.36	0.34	Inf.	1.07	1.00
PANGMDF	0.55	0.35	Inf.	1.56	0.97
PANGMDM	0.65	0.34	Inf.	1.89	0.88
NCI	3.33	0.35	Inf.	9.60	<.001*
NCCI	0.99	0.34	Inf.	2.95	0.19
NCINCI	-0.51	0.33	Inf.	-1.53	0.98
NCIPI	1.46	0.33	Inf.	4.44	<.001*
Grammaticality Contrasts (Spanish Controls)					
NCI vs. NCCI	-4.25	0.45	Inf.	-9.50	<.001*
NCINCI vs. NCIPI	3.14	0.44	Inf.	7.21	<.001*
Grammaticality Contrasts (Germans in Spain)					
NCI vs. NCCI	-1.91	0.40	Inf.	-4.74	<.001*
NCINCI vs. NCIPI	1.18	0.40	Inf.	2.95	0.19

Confidence Level used: 0.95

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