UNIVERSITY OF SOUTHAMPTON

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Modern Languages

Exploring the role of previously acquired languages in third language (L3) acquisition: a feature-based approach

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ABSTRACT

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THE ROLE OF PREVIOUSLY ACQUIRD LANGUAGES IN THIRD (L3) ACQUISITION: A FEATURE-BASED APPROACH

By Maria Clements

This thesis explores the role of previously acquired languages in third language (L3) acquisition, providing evidence that L3 transfer is determined by the underlying structural similarities and differences between previously acquired languages and the target L3. The analysis proposes a 'feature-based' approach to L3 transfer studies, highlighting the importance of linguistic features and the way in which they are assembled in different languages.

I examine the acquisition of null and overt arguments by L1 English-L2 Spanish-L3 Chinese learners [+SP], conducting a comparative analysis with a group of L1 English-L2 non-null subject language-L3 Chinese learners [-SP]. The three languages of the [+SP] participants are not typologically related, but the L1 and L2 have similarities related to subject pronouns in the L3. Null subjects are allowed in Spanish and Chinese (although there are syntactic differences) and overt subjects behave in a similar way in English and Chinese. Therefore, transfer can occur from the L1 or L2. A Written Production Task (WPT) and a Pronoun Interpretation Task (PIT) test the use and interpretation of arguments, and a Language Relations Questionnaire (LRQ) explores the learners' perceptions of the relatedness between languages.

The results show transfer from L1 English (overt pronouns) and L2 Spanish (null subjects), indicating that L3 transfer can occur from either the L1/L2, depending on the property being acquired (i.e. it is selective). Furthermore, the data shows that the [+SP] group outperform the [-SP] group with null subjects, indicating that reassembling features associated with null subjects is straightforward despite syntactic differences between the languages. In addition, learners' perceptions of language relatedness do not play an important role for typologically unrelated languages. Therefore, the study concludes that future L3 transfer studies can make more specific predictions regarding the source of transfer if linguistic features are taken into account.

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DECLARATION OF AUTHORSHIP

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

'The role of previously acquired languages in third language (L3) acquisition: a feature-based approach'.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
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.

Signed: .....

Date: .....

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Definitions and Abbreviations

A-bound	pronoun can be bound in argument position
A'-bound	pronoun is restricted to a non-argument position
Adv	adverb
A/Agr	agreement
AgrSP	subject agreement phrase
Aux	auxiliary
CAH	Contrastive Analysis Hypothesis
CEM	Cumulative Enhancement Model
C-I	conceptual-intentional system
CL	clitic
CLI	cross-linguistic influence
CP	complementiser phrase
D	definiteness
DELE	Diplomas of Spanish as a Foreign Language
DP	determiner phrase
e	empty category
EPP	Extended Projection Principle
FRH	Feature Reassembly Hypothesis
FTFA	Full Transfer/Full Access hypothesis
HSK	Hanyu Shuiping Kaoshi
I-A	intermediate-advanced
I/Infl	inflection
IP	inflectional Phrase
L1	first language
L2	second language
L3	third language
L3A	third language acquisition
L_n	subsequent language acquisition
LF	Logical Form
LPM	Linguistic Proximity Model
LRQ	Language Relations Questionnaire
LS	learners with L2 Spanish
LX	learners with no L2 Spanish
MP	Minimalist Program
NO	null object
NP	noun phrase
NS	null subject
NSL	null subject language
NSP	Null Subject Parameter
OO	overt object
OPC	Overt Pronoun Constraint
OS	overt subject
PAST	past tense marker
PF	Phonetic Form
PIT	Pronoun Interpretation Task
P&P	Principles and Parameters

pro	empty category which marks a null subject in a finite clause
PRO	empty category which marks a null subject in a non-finite clause
QNP	quantified noun phrase
QNS	quantified noun phrase and embedded null subject
QNO	quantified noun phrase and embedded null object
QOO	quantified noun phrase and embedded overt object
QOS	quantified noun phrase and embedded overt subject
RNO	referential noun phrase and embedded null object
RNP	referential noun phrase
RNS	referential noun phrase and embedded null subject
ROO	referential noun phrase and embedded overt object
ROS	referential noun phrase and embedded overt subject
SLA	Second Language Acquisition
SM	The Scalpel Model
S-M	sensori-motor system
Spec	specifier
Subj	subject
T	tense
TC	topic chain
TL	target language
TP	tense phrase
TPM	Typological Primacy Model
u	uninterpretable feature
UG	Universal Grammar
V	verb
V2	verb second
VP	verb phrase
WPT	Written Production Task
Ø	null marker
[+SP]	L1 English-L2 Spanish-L3 Chinese learners
[-SP]	L1 English-L2 non-null subject language-L3 Chinese learners

Chapter 1: Introduction

1.1 Introduction to the study

This thesis aims to investigate the acquisition of a third language (L3), focusing on the influence of previously acquired languages (i.e. transfer). L3 learners are defined as having already acquired at least one non-native language (L2) following successful acquisition of their native language (L1) and therefore, have at least two languages from which they can transfer. Crucially, this knowledge of more than one non-native language is precisely what sets this field of language acquisition apart from others and has resulted in an increased interest in L3 transfer studies in the last decade or so (e.g. Bardel & Falk, 2007; Flynn et al., 2004; Rothman, 2010, 2011, 2013, 2015).

The main aim of the study is to contribute towards current discussions regarding the role of previously acquired languages in L3 acquisition, by examining i) the source of transfer (either the L1 or the L2) and ii) the conditions which determine the source of transfer. In other words, I explore the factors which cause language learners to transfer their linguistic knowledge from previously acquired languages. In order to examine these issues, I consider the role of the underlying structural similarities and differences between the previously acquired languages (i.e. the background languages) and the target language (TL). In this case, structural similarity is defined by the linguistic features (phonological, formal and semantic) that make up all lexical items (Chomsky, 1995, 1998, 2000, 2004, 2007) and takes into account that L3 learners are required to remap features from the way they are assembled in the L1/L2 into new configurations in the L3 (in line with Lardiere, 2000, 2009). Therefore, this study proposes a 'feature-based' approach for L3 transfer. These key notions will be expanded in more detail in the following sections.

1.2 Rationale

The significance of the study is demonstrated by outlining the current status of the field of L3 acquisition (see Chapter 2 for more detail). There are currently a number of proposals to account for the interaction between previously acquired languages and the TL. There are L1-only proposals which predict that the L1 is dominant (Hermas, 2010; Na

Ranong & Leung, 2009) as well as L2-only proposals in which the L2 has a privileged status and blocks L1 influence (Bardel & Falk, 2007; Falk & Bardel, 2010, 2011). Furthermore, there are four models which argue that any previously acquired language can influence the grammar of an L3 learner. This is outlined by the Cumulative Enhancement Model (CEM) (Flynn et al., 2004) which argues that transfer is facilitative or otherwise remains neutral. In addition, the Typological Primacy Model (TPM) (Rothman 2010, 2011, 2013, 2015) argues that either the whole L1 or L2 will be transferred in the initial stages of L3 acquisition (i.e. Full Transfer). This is based on the (real or perceived) typological similarity between the background languages and the TL, predicting that L3 learners will transfer from the language which is more similar to the L3. The Linguistic Proximity Model (LPM) (Mykhaylyk et al., 2015; Westergaard et al., 2016) builds on the claims made by the TPM but argues that the source of transfer is determined by the similarity between specific linguistic properties, rather than the languages as a whole. Finally, the Scalpel Model (SM) (Slabakova, 2016) supports transfer from either the L1 or the L2, but questions full transfer from one language and predicts that transfer may take place on a property-by-property basis. Alongside these proposals, researchers have observed a number of key factors that are likely to influence the source of transfer (e.g. age, proficiency, metalinguistic knowledge).

Whilst these proposals have greatly improved current understandings of L3 acquisition, there are some remaining issues that are yet to be resolved. For example, there is no definitive agreement on the predicted source of transfer. Furthermore, this summary demonstrates that current discussions are increasingly concerned with the conditions which trigger transfer from a particular background language, with an emphasis on the suggestion that language learners are more likely to transfer from a background language if it is more 'similar' to the TL. There are a number of different accounts of 'similarity'; for example, this is understood as the 'perceived similarity' by the learners (e.g. Hammarberg, 2009; Kellerman, 1977; Ringbom, 1987), 'typological similarity' of the languages as a whole (Rothman, 2011) or the underlying 'structural similarity' (e.g. De Angelis, 2007; Montrul et al., 2011; Mykhaylyk, et al., 2015; Rothman, 2013, 2015; Slabakova, 2016; Westergaard et al., 2016). Furthermore, studies claim to have provided evidence of transfer between Germanic languages (Bardel & Falk, 2007; Williams & Hammarberg, 1998) as well as Romance languages (Montrul et al., 2011; Rothman & Cabrelli Amaro,

2010). However, the definition of the terms outlined above is somewhat unclear, as well as the implications for languages which are typologically unrelated.

This investigation aims to address these key issues in an attempt to account for the observations made in L3 studies. The study focuses on the notion that the source of L3 transfer is determined by the structural similarities and differences between background languages and the TL, proposing that we can make more precise predictions regarding these structural similarities by considering the role of linguistic features, i.e. the way in which features are assembled, or configured in different languages. To explain this further, the following section outlines the theoretical background that is assumed in the project which highlights why the role of features may be important in exploring L3 transfer.

1.3 Theoretical background

Throughout the investigation, I reference 'generative grammar' as the underlying framework and more specifically, I assume the latest version of this linguistic theory, the Minimalist Program (MP) (Chomsky 1995, 1998, 2000, 2004, 2007). Generative grammar was initially outlined by Chomsky (1957) and describes language in terms of a set of rules that allow us to generate an infinite number of sentences in a given language. One of the basic tenets of this theory is that knowledge of language is subconscious and language use is possible due to a 'computational system' that is able to compute (deal with) the structure patterns of languages (i.e. phrase structure rules) as well as operations to manipulate these phrase structures.

Crucially, generative grammar postulates that we are able to acquire language due to a biologically innate Universal Grammar (UG), which captures the notion of the implicit competence of language learners. The biologically innate nature of UG is supported by observations regarding the way in which children acquire their L1, which has been shown to occur uniformly and at a very similar rate across all children. Furthermore, ultimate attainment of language by L1 child learners goes above and beyond the linguistic input to which they are exposed (i.e. the logical problem of language acquisition or the poverty of the stimulus) (Chomsky, 1986). In the generative tradition, it is widely accepted that L1 acquisition is UG-constrained and that L1 grammars are based on UG from the beginning.

In this view, children acquire their L1 through access to various possible linguistic principles as well as L1 input which allows them to determine language-specific properties.

The aim of the current study is to examine the acquisition of a specific morphosyntactic property by L3 learners and currently, the most detailed account of the structure of language and linguistic variation is based on generative linguistics. This highlights that the generative tradition is the most appropriate framework for the current study. In the following sections, I will outline the development of generative grammar and the implications for language acquisition, focusing on the progress of the theoretical framework from the 'Principles and Parameters' account to the emergence of the 'Minimalist Program'.

1.3.1 Principles and Parameters

Before the emergence of the Minimalist Program, the 'Principles and Parameters' (P&P) framework (Chomsky, 1981, 1986) marked significant progress for generative approaches to language acquisition. P&P theory distinguishes between principles (present in all languages) and parameters (which vary between languages). There are a number of important principles instantiated in P&P theory, for example the Subjacency Principle which explains the contexts in which wh-movement occurs and Binding Theory which governs the potential relationships between (pro)nominal elements and antecedents (i.e. anaphoric relations). On the other hand, parameters are thought to represent a set of 'switches' that may be set to one value or another (i.e. +/-) during acquisition. It is thought that language learners have access to UG but must also choose the appropriate value of the parameter [+/-] according to information in the input. For example, the Null Subject Parameter (NSP) is a well-known case in which learners must determine whether a language is [+null subject] or [-null subject], depending on whether or not subject pronouns can be phonetically null in finite clauses. To summarise, principles are thought to be innate constraints that are built into UG and do not need to be learnt, whilst parameters are the differences between languages that are encoded within UG and identified by language learners through input, which triggers the selection of a particular parametric setting.

1.3.2 Minimalism

The Minimalist Program (MP) (Chomsky, 1995, 1998, 2005, 2007) emerged from P&P theory with a reductionist view of the language faculty and language acquisition, aiming to provide a much more basic account that relies only on what is strictly necessary for ultimate attainment. In this view, the language faculty is reduced to a computational system, where a syntactic component (narrow syntax) derives structures and maps them onto two subsystems, i) the sensori-motor sub-system (S-M) which is responsible for speech perception and production and ii) the conceptual-intentional sub-system (C-I) responsible for intentions and conceptual knowledge. The syntactic derivation reaches C-I or S-M via two levels of representation, Logical Form (LF) and Phonetic Form (PF) respectively. The LF and PF interfaces ensure that linguistic expressions are optimally designed, in that derivations must satisfy PF and LF requirements in order to converge.

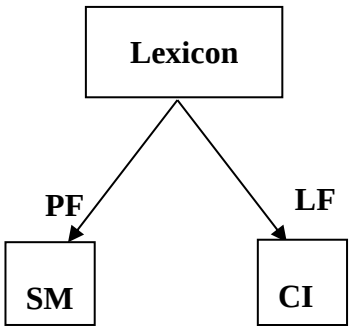


Figure 1: The (inverted) T- (or Y-) Model (Chomsky, 1995, 1998)

Crucially for this study, the role of features is significant in the MP. Grammatical features are located within the lexicon and must be acquired by all language learners. Within this view, features are grouped together in specific combinations and are assembled onto functional categories of lexical items. Functional categories (e.g. Determiner, Complementiser) are thought to be a collection of features, e.g. [+/-wh], [+/-past], or [+/-definite] that are combined in language-specific ways on Infl(ection). Importantly, there are two types of features; interpretable features, otherwise known as phi-features of nouns (person, number, gender) and uninterpretable features which are involved in syntactic derivation.

According to the MP, phrase structure is built via a number of computational operations, in particular, Numeration, Merge and Move. Numeration selects a subgroup of items associated with certain features from the lexicon, Merge takes the items and puts them

into phrases and Move takes an element of the phrase, raises it and merges it with another element in order to 'check' its features. In this view, uninterpretable features must be checked by other elements which bear the same feature and are consequently removed from the derivation. These operations all follow the general principle of Economy which requires that the least complex computation is always selected. In more recent versions of Minimalism (Chomsky, 2001), features must be 'valued', rather than checked. Uninterpretable features lack value and therefore must be valued by a corresponding interpretable feature, through the operation Agree. Finally, once the syntactic structure is complete it is sent to PF to receive a phonetic representation and LF which maps the syntactic structure onto a semantic representation. The syntactic derivation must contain interpretable features only, so that phonetic and sematic interpretations can be applied. As a result, uninterpretable features must be removed (i.e. deleted) from the derivation via checking or valuation. The following section considers the implications of the emergence of the MP for language acquisition and the way in which we view linguistic variation.

1.3.3 Linguistic variation and language acquisition

The view of parameters and the variation between languages have shifted and simplified in line with the MP. Originally, broad 'macro-parameters' were presented in which the possibilities available from UG are set one way or another, meaning that languages only have two options for each linguistic property, for example [+null subject] or [-null subject]. This does not take into account any possible variation to this rule, for example, not all languages can be said to be strictly head-initial or head-final in all cases. As a result, parameters could be the cumulative result of several micro-parameters. As summarised in Gallego (2011: 531), Borer (1984) explored the issue of where (in UG) parameters are located, proposing that parameters are located in the lexicon. This is further developed by Baker (2008), building on observations made by others (Borer, 1984, Chomsky, 1995) that the differences between languages should be considered as micro-parameters, meaning that parametric variation is attributed to differences in features, i.e. functional heads, in the lexicon. Baker proposes the Borer-Chomsky Conjecture, arguing that there are both macro- and micro-parameters. For example, a single macro-parameter distinguishes polysynthetic languages such as Mohawk from other languages, whilst variation between polysynthetic languages is accounted for by micro-parameters.

If we consider the NSP as a more specific example, this means that the cluster of properties originally related to the NSP do not form a macro-parameter but that a number of micro-parameters are involved. In this view, inflectional richness (morphological) will determine whether or not a language allows null subjects which is not a yes/no or +/- setting (macro-parameter), but a scale which determines the possibility of null subjects. The point in the scale at which a language allows null subjects is thought to be a micro-parameter, providing an account for languages such as Chinese which do allow null subjects even though such languages have no inflection to identify them (Camacho, 2013). The main point to note is that the view of linguistic variation has developed from parameters, to the features on functional categories in the lexicon. In this view, linguistic variation depends on how features are assembled onto lexical items in different languages. This variation must somehow be detectable from the linguistic input, through word order, lexical properties or morphological forms.

In terms of language acquisition, the task of an L1 learner is to determine from input which categories and features of UG are present in the language being acquired and to disregard the rest. Similarly, the task of the L2 learner is to acquire parametric values (categories and features) of the L2 being acquired. However, there are additional complexities involved, such as influence from the L1. This is captured by the Feature Reassembly Hypothesis (FRH) (Lardiere, 2000, 2009). According to the FRH, the crucial task for the L2 learner is to figure out how to reassemble features from the way they are represented in the L1 into new configurations in the L2. The learners need to assemble the right combinations of features onto the appropriate corresponding lexical items in the L2. In this view, it is logical to propose that if there are fewer differences between the features of the L1 and the L2, the language acquisition task will be more straightforward. To illustrate this, Hwang and Lardiere (2013) explore L1 English-L2 Korean learners acquiring the plural marker *–tul* (building on Lardiere, 2009), showing that the features related to the intrinsic plural (which are more similar to English) are more easily acquired than the extrinsic plural features which require significantly more feature reconfiguration. The important point here is the proposal that features and the way in which they are configured in the L1 and subsequent languages is thought to be vital for non-native acquisition. The FRH is able to make specific predictions for L2 acquisition and has been directly tested in L2 studies (e.g. Arche, Domínguez & Myles, 2011) finding that successful

acquisition is closely related to whether or not features need to be reassembled in line with the target grammar. Despite the observations that features are central to non-native acquisition, FRH predictions have not as yet been directly explored in L3 acquisition. [1] This highlights the contribution of this study and demonstrates why a feature-based approach is essential.

1.4 The current study

It has become increasingly evident that L3 acquisition research is able to provide an incomparable insight into the extent to which previously acquired languages facilitate or complicate subsequent language learning. Traditionally, all adult non-native acquisition was treated under the term 'second language acquisition' (SLA). However, whilst we know that in L2 acquisition learners have one potential source of transfer (the L1) available to them, we should expect the task to be even more complicated in the subsequent acquisition of additional languages (i.e. L3 acquisition). L3 learners have already acquired (at least) two languages which are subject to interact and influence each other to varying degrees and could be possible sources of transfer. Therefore, this process is set apart from L1 or L2 acquisition and investigated separately (Rothman & Cabrelli Amaro, 2010). This highlights that L3 acquisition research makes an essential contribution to our understandings of generative language acquisition and language variation.

As the current literature demonstrates, the role of 'similarity' is clearly significant for L3 acquisition; however, there does not seem to be an adequate definition, even though understanding this term is essential to fully understanding transfer in L3 acquisition. Therefore, this study aims to further investigate the 'source of transfer' and the role of 'similarity', but with an alternative, 'feature-based' approach. This approach predicts that the source of L3 transfer is determined by the structural similarities and differences between background languages and the TL, which are accounted for through linguistic features and the way in which they are assembled, or configured. This approach can provide an explanation of the role of structural similarity that incorporates what we know from the (generative) Minimalist theoretical framework about the importance of linguistic

[1] Although there are some studies, such as Slabakova (2012), in which the FRH is applied to L3 data collected in other studies.

features and the way in which they are configured in different languages. This extends the notion of feature reassembly to L3 acquisition and aims to provide a universal way of predicting L3 transfer. The following section outlines the study in more detail and provides a brief account of the linguistic properties investigated.

1.5 Experimental design

In order to examine these issues, I investigate the acquisition of null and overt arguments (i.e. subject and object pronouns) in L3 Chinese by two groups of learners:

i) L1 English-L2 Spanish-L3 Chinese [+SP]
ii) L1 English-L2 non-null subject language-L3 Chinese [-SP]

The [+SP] group is the predominant focus for the analysis, whilst the [-SP] group serves to provide a comparative analysis. These groups will be compared to a Chinese native control group and the [+SP] group will also be compared with a Spanish native control group (se Chapter 4 for more detail). The experimental design of the current study is an ideal context to explore the role of features in explaining the source of transfer in L3 acquisition; in other words, the language combination and language property are significant and have been purposefully selected. English, Spanish and Chinese are typologically unrelated languages which makes it difficult to predict the source of transfer according to a simple typological distinction. An analysis based on structural similarities (defined by linguistic features and how they are assembled in each language) solves this problem, allowing for precise predictions regarding the role of transfer. For the [+SP] group, both the L1 (English) and L2 (Spanish) have relevant features associated with the interpretation of null and overt arguments in L3 Chinese. As a result, the source of transfer could be the L1 or L2. Firstly, I will outline the similarities and differences between Spanish and Chinese in terms of the features associated with null subjects. Secondly, I will outline the similarities and differences between English and Chinese in terms of the use of overt pronouns.

Firstly, both Spanish and Chinese allow null subjects in finite clauses. Spanish is a Romance language that has been classified as a 'typical' null subject language in which a null element (*pro*) has a [uD] feature, moves from [Spec, VP] to [Spec, IP] to value uninterpretable features and is deleted at PF (1) (Sheehan, 2006). Furthermore, null

objects are not generally possible (1). Chinese is a Sino-Tibetan, topic-prominent language that allows empty categories (null subjects and null objects) as long as their reference can be recovered in context, by either an overt or null topic phrase (2). Chinese has no agreement morphology, no [uD] feature and it has been proposed that Chinese null elements move from [Spec, VP] to [Spec, CP] for syntactic licensing (Huang, 1984; Zhao, 2008). Finally, English is a Germanic language which does not allow null subjects (3) or null objects (3) in the same contexts as Chinese and Spanish; English has poor agreement morphology and no [uD] feature to licensed null elements (see Chapter 3 for more detail regarding these properties).

(1) Spanish

a. Juan/*pro* bebe agua
John /Ø drinks water
'John/*pro* drinks water'

b. Juan le/**pro* vio
John CL/*Ø saw
'John saw him/*pro*'

(2) Chinese

Q: Zhangsan kanjian Lisi le ma?
Zhangsan see Lisi PAST yet
'Did Zhangsan see Lisi?

a. Ta/*e* kanjian ta le
He/*e* see him PAST
'He/*e* saw him'

b. Ta kanjian ta/*e* le
He see him/*e* PAST
'He saw him/*e*'

(3) English

a. John/**pro* likes him

b. He likes him/**pro*

These examples highlight that the significant similarity between Chinese and Spanish is that both languages allow null subjects in finite clauses; however, the syntactic mechanisms that allow null subjects are different in each language. This suggests that whilst the L3 learners may transfer their knowledge of null subjects from L2 Spanish, the task for the L3 learners will involve 'unlearning' that the [uD] feature must be present for null subjects and learning that null elements move to [Spec, CP] in Chinese which may be

problematic. For the purpose of this study, I have proposed the following feature specifications for each language: [VAR(IABLE):__] in English, [VAR: *pro*] in Spanish and [VAR: empty category] in Chinese to represent these key differences and demonstrate the acquisition task for L3 Chinese learners (see section 3.4 for more detail).

Secondly, the similarity between English and Chinese is the behaviour of embedded overt pronouns. The Overt Pronoun Constraint (OPC) (Montalbetti, 1984) reports that overt subject pronouns in an embedded clause can only have a referential antecedent and cannot have a quantified antecedent, as outlined in (4) for Spanish. The acquisition of the OPC has been used in previous studies as an indication that null subjects have been acquired. Therefore, it is interesting that recent claims argue that the OPC does not apply to Chinese (Zhao, 2009, 2012) (5). Since the OPC also does not apply to English overt pronouns (6), this provides a similarity between the behaviour of overt pronouns in English and Chinese and predicts that transfer of overt pronouns will take place from L1 English.

(4) Spanish

a. Nadie$_i$ cree que él$_{*i/j}$ es inteligente
Nobody thinks that he is intelligent
'Nobody$_i$ believes that he$_{*i/j}$ is intelligent'

b. Nadie$_i$ cree que *pro*$_{i/j}$ es inteligente
Nobody believes that is intelligent
'Nobody$_i$ believes that *pro*$_{i/j}$ is intelligent'
[Montalbetti, 1984: 93]

(5) Chinese

Meigeren$_i$ dou shuo ta$_{i/j}$/e$_{i/j}$ mingtian yao lai.
Everyone all say he/e tomorrow want come
'Everyone says that he/*e* wants to come tomorrow.'
[Zhao, 2012: 175]

(6) English

Everyone$_i$ believes that he$_{i/j}$ is the most intelligent.

In summary, it is problematic to predict the source of transfer for L1 English-L2 Spanish-L3 Chinese speakers by making a general typological distinction. However, if we consider the role of structural similarities, i.e. the role of features and the way in which they are configured in each language, we can make predictions regarding the source of transfer for typologically unrelated languages. The investigation predicts that the source of transfer

for the L3 learners in the experiment is ultimately guided by linguistic features, which can provide a more detailed account of the structural similarities and differences between null and overt arguments in English, Spanish and Chinese.

1.6 Research Questions

The study aims to contribute to current discussions regarding the role of previously acquired languages in L3 acquisition. In order to address this question, I will examine i) the source of L3 transfer and ii) how this relates to the similarities and differences between specific features in the background languages and the target language. This can be formalised as the following:

1. What is the source of transfer for the L1 English-L2 Spanish-L3 Chinese learners?

2. To what extent does the similarity between features in each language determine the source of transfer; is there evidence of feature reassembly in the acquisition of null subjects in L3 Chinese?

1.7 Outline

The remainder of this document is as follows. Chapter 2 discusses the current status of the field of L3 acquisition and the nature of linguistic transfer. Firstly, some of the key concepts and terminology that are used throughout the thesis are clarified, including an overview of some of the key definitions of cross-linguistic transfer and an outline of the generative view of transfer. I will then present an account of transfer in L2 acquisition and the development from L2 transfer studies to L3 transfer studies. This is followed by a detailed account of the current L3 transfer models, summarising what has been learnt from this previous research. Importantly, the Chapter then addresses the remaining gaps that have been identified from the literature review, discussing the issue of what is meant by 'structural similarity' and the potential role of features in L3 transfer studies. This review of relevant literature serves to highlight the significance of the current study, indicating that structural similarities between languages are a deterministic factor in L3 acquisition.

In Chapter 3, I will present the linguistic properties that are explored in the study. I provide an overview of null and overt arguments from a generative perspective and identify the key characteristics of the use and interpretation of null and overt arguments in English, Spanish and Chinese. There is a detailed account of null and overt arguments, highlighting the fundamental differences and similarities. In addition, the Chapter also reviews some of the key L2 acquisition studies that explore the acquisition of Chinese and Spanish by English learners, revealing important predictions for the current study. Finally, I will highlight the hypotheses that have emerged from the analysis outlined in Chapter 2 and Chapter 3.

The methodology is presented in Chapter 4, starting with a rationale for the chosen experimental method. I will provide a detailed account of the learner groups and the background tests that were carried out, followed by an outline of the control groups. The tasks completed by the participants will be presented, including the background tests that gathered a linguistic profile of the learners as well as the main experimental tasks. Within the Chapter, I will provide examples of the test items and details regarding the way in which the tasks were implemented.

Chapter 5 presents the results of the data collection. The data from each main experimental task will be reported and discussed; the Written Production Task (WPT) tests the use of null and overt arguments, the Pronoun Interpretation Task (PIT) tests the interpretation of null and overt arguments and the Language Relations Questionnaire (LRQ) provides an insight into the role of the learners' perceptions in L3 acquisition. Finally, Chapter 6 will serve to summarise the main findings and highlight the conclusions of the study. This is followed by an evaluation of the study and some key points for future research.

Chapter 2: Linguistic transfer and L3 acquisition

The goal of this Chapter is to provide a detailed account of linguistic transfer in L3 acquisition, outlining the current status of the field and highlighting the significance of the current study. Firstly, I will provide a summary of the main terminology that will be used throughout the study, including definitions of cross-linguistic transfer and the generative perspective of transfer. I will then discuss previous research in the field of L2 acquisition which provides an essential starting point for examining transfer in L3 acquisition. This is followed by a review of the important development of transfer studies from L2 acquisition to L3 acquisition. I then provide a detailed overview of the current proposals for transfer in L3 acquisition. Consequently, this leads to identifying some key remaining issues in current discussions, in particular, the use of the terms 'structural' and 'typological' similarity' and the potential role of features in our definition of structural similarity.

2.1 Terminology

2.1.1 L3 acquisition and interlanguage

Since L3 acquisition is a relatively new field, I start with a crucial explanation of some of the key terms used throughout this paper. Firstly, the term 'L3 acquisition', denoted as 'L3' or 'L_n' in the literature, refers to the language acquisition process by learners who have already acquired at least one foreign language. In some straightforward cases, the L3 may be the third language acquired in sequence; for example, an L1 English speaker who has acquired French (L2) and is currently acquiring Spanish (L3). However, determining the linguistic background of some multilingual learners can be more complex. For example, there are simultaneous bilinguals who are exposed to two languages during childhood who may find it difficult to identify or separate their L1 and L2. There are some cases where non-native languages are learnt at the same time at school and there is no clear L2 and L3. In addition, it could be argued that if a learner has already acquired two non-native languages, subsequent acquisition should be regarded as L4 acquisition which could well be different to L3 acquisition. This complexity highlights the importance for researchers to be aware of all previous linguistic knowledge when conducting an L3 study,

since any prior linguistic knowledge in the mind has the potential to interact in some way. Taking these issues into account, Hammarberg (2001, 2009) suggests that the term 'L3 acquisition' can be used to mark the language which the multilingual learner is currently using or acquiring, regardless of the chronological status of the language (i.e. L3, L4, or L5). For example, if an L1 English speaker has previously acquired French and Spanish (successively or simultaneously) and is currently learning Italian, the L3 of the multilingual learner can be considered to be Italian. The current study adopts this viewpoint of 'L3'. [2]

The term 'interlanguage grammar' is also used in this analysis. Generally, it refers to a non-native grammar, meaning the intermediate language or grammar that language learners create during the acquisition of an additional language, constrained by the principles and parameters of UG (White, 2003). It is assumed that all linguistic systems in a speaker's mind are likely to be interacting and competing in the production of an additional interlanguage (in this case, the L3) (De Angelis & Selinker, 2001). This potential influence of one interlanguage on another is an important concept for this L3 study, highlighting the significance of examining the interlanguage of L3 learners to establish the interactions between the background languages and the target language.

2.1.2 Cross-linguistic transfer

The interaction or influence of previously acquired languages in the acquisition of a subsequent language is generally referred to as 'transfer' or 'cross-linguistic transfer' but other terms such as 'cross-linguistic influence' (CLI) are also widely used by researchers. As a result, it is important at this stage to consider the differences between these terms and state their use in this study. According to De Angelis and Selinker (2001), 'cross-linguistic influence' tends to be used as a super-ordinate term which encompasses instances of native language transfer, interlanguage transfer and reverse transfer from an interlanguage to a native language. Generally, 'transfer' refers to target language (TL) performance which can be reasonably linked to previous linguistic knowledge. In L3 acquisition, this is complicated by the knowledge and experience of more than one

[2] The linguistic profile of the participants will be provided in detail in Chapter 4, taking into account possible influences from all background languages.

previously acquired language which are all potential sources of transfer. Overall, definitions of the terms 'transfer' and 'cross-linguistic influence' do not differ significantly and tend to describe the influence of either the native language or a non-native language on the acquisition of the TL. Therefore, the terms will be used interchangeably in the current study to account generally for the transfer of elements between linguistic systems. This is based on the following definition; "transfer is the influence resulting from the similarities and differences between the target language and any other language that has been previously (and perhaps imperfectly) acquired" (Odlin, 1989: 27). Whilst this definition accounts for transfer in a general way, the current study adopts a generative view of the term transfer which is much more nuanced and takes into account specific grammatical features of previously acquired languages and how they are assembled in different languages. This view is expanded in the following section.

2.1.3 Generative view of transfer

Firstly, prior to generative accounts of linguistic transfer, some behaviourist theories made important observations regarding the acquisition of non-native languages. There are early studies which link language transfer to the Contrastive Analysis Hypothesis (CAH) (Lado, 1957) which attempts to explain why some areas of a target language are more problematic to acquire than others, based on the notion of L1 interference. Within behaviourist theories such as the CAH, any errors made in L2 acquisition can be attributed to the differences between the L1 and L2. It is argued that any properties which are similar to the native language can be learned with little difficulty, whilst the degree of difficulty increases for properties which are more different from the native language. However, in the 1970s, research provided evidence that some L2 errors are not caused by transfer alone, showing similar types of errors by learners of different L1s. Since the CAH links the source of difficulty in L2 acquisition to the learners' L1 only, it is not able to account for the variability seen in L2 studies in the most effective way (Ellis, 1994: 308). Although the CAH has been noted as too simplistic and restrictive, the notion of linguistic transfer has remained a central part of SLA discussions.

Cross-linguistic investigations became based on empirical evidence during the development of Chomsky's theory of language acquisition (first introduced in Chomsky, 1957), which questioned previous behaviourist approaches and altered the way linguistic

transfer was analysed. Consequently, studies began to adopt Chomsky's theory of 'generative grammar' according to which "sentences are generated by a subconscious set of procedures" (Carnie, 2007: 5).

In Chapter 1, I outlined the generative Minimalist view of grammatical features in which the language faculty contains formal features which are grouped together in language-specific combinations and then assembled onto functional categories of lexical items (Chomsky, 1998). In this view, linguistic variation depends on how features are assembled onto lexical items in different languages and the task of the language learner is to distinguish the specific configurations of features. Therefore, morphosyntactic transfer involves the transfer of the appropriate feature specifications of a word class which would need to be reconfigured onto lexical items in the target language. As an example, consider the acquisition of nominal phi-features (person, number and gender) in L3 Portuguese by L1 English-L2 Spanish or L1 Spanish-L2 English speakers. In Romance languages, grammatical number and gender are encoded on nominals and the gender feature must be in morphological agreement with other constituents of the DP (i.e. articles or adjectives). This accounts for aspects such as word order as well as the possibility of ellipsis (i.e. absence of the overt pronoun). On the other hand, English lacks gender features and does not allow noun ellipsis. For the learners outlined above, transfer of Spanish at the initial stages would involve transfer of the set of nominal phi-features within the DP and configuring the features onto lexical items in L3 Portuguese. This would be confirmed by early knowledge of morphology and syntax for grammatical gender features in L3 Portuguese (evidenced in Iverson, 2010) (example from Rothman, 2013: 4). This demonstrates the way in which transfer is regarded in this study.[3] Under a generative, minimalist perspective, cross-linguistic transfer between languages should take into account the way in which features are assembled in different languages and involves the transfer of features from one interlanguage to another. Although this study focuses on the nature of transfer in L3 acquisition, in the following section I will start by exploring existing theories and evidence of cross-linguistic transfer in the domain of L2 acquisition, which provides a valuable starting point for investigations in L3 acquisition.

[3] Note that the outcome of this scenario and others outlined in studies which support feature transfer may also be predicted by other models, e.g. CAH accounts. Feature-based accounts differ in that they offer more detail regarding the specific role of features, which are thought to be essential in generative grammar.

2.2 Transfer in L2 acquisition

2.2.1 L2 transfer studies

This section provides an overview of some of the key generative research studies conducted within L2 acquisition in terms of what constitutes the L2 initial state and the extent of L1 influence (see White, 2003 for a more detailed summary). In L2 acquisition studies, the term 'initial state' accounts for the (unconscious) knowledge that the L2 learner starts with before any L2 input is introduced. In the generative view, we have already seen that L1 grammars are thought to be UG-constrained; although there is no resounding agreement in terms of UG-accessibility in L2 acquisition, it is widely accepted that we should expect some level of UG-access, since L2 learners have been shown to acquire properties that were not present in their linguistic input (i.e. the 'poverty-of-the-stimulus'). In addition, there are many proposals that claim that L1 properties are implicated in the initial-state of L2 acquisition, although they disagree in terms of whether the whole L1 grammar is involved. These proposals are outlined as follows.

Firstly, there are 'no transfer' proposals which argue that the L1 grammar is not involved at all in the L2 initial state and that learners only have access to UG. For example, the 'Full Access Hypothesis' (Epstein et al., 1996) argues that UG constrains the interlanguage grammar at all stages of the acquisition process and therefore, rejects any transfer from the L1. There are two 'partial transfer' proposals which advocate some transfer from the L1. The 'Minimal Tress Hypothesis' (Vainikka & Young-Scholten, 1996) proposes that the L2 initial state is partly based on the L1 grammar, but crucially claims that there is a lack of functional categories at the L2 initial state. The 'Valueless Trees Hypothesis' (Eubank, 1993) argues that L1 lexical and functional categories are present in the L2 initial state, but the L1 feature values are not transferred. As a result, features are valueless in the L2 initial state. Finally, the 'Full Transfer/Full Access' (FTFA) hypothesis (Schwartz & Sprouse, 1996) argues that the L2 initial state is the L1 grammar, meaning that the starting point for L2 learners is the 'steady-state' grammar of their L1. Schwartz and Sprouse propose that L2 learners also have full access to UG and can therefore access properties not instantiated in the L1 in order to alter representations in line with what they learn from L2 input. Although there has been no definitive conclusion to this debate, the accuracy of

'no transfer' and 'partial transfer' proposals have been questioned, whilst FTFA has received more support to account for transfer in L2 acquisition (White, 2003).

2.2.2 Feature Reassembly Hypothesis (FRH)

Further to these accounts, the Feature Reassembly Hypothesis (FRH) (Lardiere, 2000; 2009) builds on the notion of Full Transfer/Full Access in the initial stages of L2 acquisition but focuses on the role of linguistic features and their configuration in the language acquisition process, specifically in L2 acquisition. The FRH starts with the generative view of L1 acquisition, in which children have access to the universal inventory of features (i.e. UG) and their task is to select the appropriate subset of features deployed in their native language and disregard other features that are not present in that particular language. This notion is extended to L2 acquisition, taking into account the additional complexity that learners have two competing sets of features to compute. The FRH assumes FTFA (Schwartz & Sprouse, 1996), meaning that the L2 initial state is the L1 end-state grammar and supports the Minimalist view that cross-linguistic variation is determined by syntactic features and the different ways in which they are assembled on lexical items.

According to the FRH, L2 learners initially look for morpholexical equivalents of L1 lexical items in the target language, possibly on the basis of semantic meaning or grammatical function (Lardiere, 2009: 191). If any correspondences are identified, the L2 form is 'mapped' onto the L1 feature set for that particular item. The task for L2 learners is then to 'reassemble' the features, adding or deleting features as required. The reassembly process may be slow and difficult for the learners, since features may need to be remapped onto quite different lexical items or there may be influence from the L1 grammar that impairs reassembly. The greatest difficulty for L2 learners is thought to be assembling the right combinations of features onto the right lexical items for each language.

In order to illustrate the main principles of the FRH, Hwang and Lardiere (2013) explore the acquisition of the features and restrictions of 'intrinsic' and 'extrinsic' plural marking in L2 Korean, by L1 English learners. Both types of plural marker in Korean are marked by the morphological suffix *-tul*; however, they have distinct uses. In summary, "the intrinsic plural denotes multiple nominal referents (as in English), whereas the extrinsic plural

'pluralizes' entire predicates by distributing them over the individual members in the denotation of a (necessarily referentially plural) c-commanding subject" (which differs from English) (Hwang & Lardiere, 2013: 59). In terms of features, Korean intrinsic plural marking requires the features shown in (7) whilst plural-marking in English is much less complex, see (8).

(7) Korean intrinsic plural features:
[n] = noun
[group] = plural
[individuation] = classifier [+human] or [-human]
[specific]
[q] = quantity [q-rel] (relative) e.g. non-numerical quantifier (many, some)
or [q-abs] (absolute) e.g. numerical quantifier (three)

(8) English intrinsic plural features:
[n]
[group]

As a result, the task for the L1 English-L2 Korean learners is to acquire the additional features required for Korean intrinsic plural marking. In terms of Korean extrinsic plural marking, the authors outline the requirement for an interpretable distributive feature [distr] as well as an uninterpretable plural feature [*u*-pl] (9). The nearest equivalent in English is likely to be *each (of the)*, which requires the same features as in Korean but has very different syntactic properties. The task for the L1 English-L2 Korean learners is to realise that the [distr] and [*u*-pl] features of a very different morpholexical item in their native language must be recruited for reassembly onto the plural marker in Korean.

(9) Extrinsic plural features in Korean:
[distr]
[*u*-pl]

The study explores whether or not the L2 learners assume early on that plural marking in Korean occurs in the same contexts and uses the same features as English plural marking (in line with Full Transfer from L1 English). In addition, the study examines at which point (assessed by different proficiency levels) the learners begin to reassemble the features specifically associated with L2 Korean plural marking (i.e. the extrinsic plural marking). The learners (low-intermediate, high-intermediate, low-advanced, advanced) completed five tasks; i) an elicitation task (testing intrinsic *–tul*), ii) acceptability judgement task

(testing intrinsic –*tul*), iii) preference task (testing extrinsic –*tul*), iv) truth value judgement task (testing both types) and v) multiple-choice translation task (testing both types).

The results for the intrinsic plural show that the features were not acquired by the lowest proficiency group whilst there was no significant difference between the other learner groups and the native speakers. This shows that only the low-intermediate learners found the intrinsic plural problematic. The extrinsic plural proved more complex to acquire, although the advanced group were target-like in the multiple-choice translations which shows that the features can be acquired with an increased proficiency level. The data suggest that the features associated with the intrinsic plural were acquired more easily than those associated with the extrinsic plural. The authors attribute their findings to feature reassembly; the intrinsic plural is more similar to English plural marking whilst acquisition of the extrinsic plural-marking involves recruitment of a distributive feature from a completely different lexical item in English.

The FRH has largely received support from the findings of other studies, although it has received some criticism. For example, White (2009) challenges the predictive power of the hypothesis, questioning whether or not it is possible to predict that some L1-L2 combinations are easier or harder because of the sort of reassembly that is involved. Arche, Domínguez and Myles (2011) test the predictive power and the validity of the FRH by examining the acquisition of the imperfect tense by L1 English-L2 Spanish learners at beginner, intermediate and advanced levels of learning. In Spanish, there are three types of imperfect (continuous, habitual and *pro*gressive) which are expressed using the same morphological inflections, whilst the perfect tense is marked by different morphological inflections. In contrast, English uses the past tense to express the continuous meaning and uses periphrasis (i.e. the use of function and content words rather than inflections) to express habitual and progressive meanings; furthermore, English uses the same form to mark imperfective and perfective events. The only meaning that requires remapping for the L1 English speakers is the continuous meaning; the learners need to learn that the same past form cannot be used to express both the perfect and imperfect (continuous) in Spanish. According to the authors, if there is no feature reassembly involved and the only task for the learners is to select aspectual features, there will be no differences in the acquisition of the three imperfect meanings. The learners completed a context matching task in which they rated the appropriateness of a pair of (perfect/imperfect) sentences.

The results show that the continuous meaning was problematic for all of the L2 learners, including the advanced group, which the authors attribute to the remapping of features involved. This strengthens the claims of the FRH and shows that it is possible to make predictions about how feature assembly is likely to affect L2 acquisition.

Gil and Marsden (2013) also directly apply the FRH to existing L2 data which provides further support for the FRH. The study focuses on the quantifier 'any' in English and the equivalents in Chinese, Korean and Japanese which take the form of wh-existentials. The aim was to test the FRH prediction that learners will map the target existential quantifiers in the L2 input onto feature sets in their L1, reassembling features to make better matches with the target. The paper breaks the FRH into two clearly defined stages which are regarded as separate processes. Step one is 'mapping' and involves the learners making initial associations between lexical items in the L2 input and the closest morpholexical equivalent in the L1. Step two is 'feature reassembly' and marks the point at which the L1-based feature set is modified (if prompted by the input). The paper explores the findings from four existing studies that examine the acquisition of existential quantifiers: i) L1 English-L2 Korean learners in (Choi, 2009), ii) L1 English or L1 Japanese-L2 Chinese learners (Yuan, 2010), iii) L1 Chinese-L2 English learners (Gil et al., 2011) and iv) L1 Korean-L2 English learners (Gil & Marsden, 2010).

In English, the quantifier *any* is restricted to contexts that do not correspond to an event and is grammatical in conditional and interrogative settings; the authors summarise this restriction by claiming that *any* bears an uninterpretable non-veridical feature, [uNV]. In Chinese, existential quantifiers take the form of wh-expressions and are also sensitive to certain restrictions. For example, Chinese *renhe* has the same distributional restrictions as English 'any' and has the same feature specifications, i.e. [uNV]. In Korean and Japanese, wh-words are also used to form existential quantifiers, but neither have any distributional restrictions (i.e. no [uNV] feature). The authors make precise predictions based on the mapping and feature reassembly for each language combination; for example, it is predicted that for L1 Chinese-L2 English learners there is no feature reassembly required, since *any* can be mapped to the Chinese equivalent. The results support these predictions, showing a hierarchy of difficulty in completing the mapping and reassembly stages for each L1-L2 combination based on the morphological paradigm for mapping. The results

show support for the FRH as well as highlight the benefits of focusing on the specific process of mapping and then reassembling features in L2 acquisition.

In summary, L2 studies have explored the availability of UG and the influence of the L1; this provides a number of proposals in terms of the L2 initial state and development and in particular, the FTFA is widely accepted. In addition, the FRH has received support from other studies, to account for the role of features in L2 acquisition. Although there are no definitive conclusions, the models outlined form a crucial starting point for many L3 researchers. The development of these proposals from an L2 acquisition context to an L3 acquisition context is reviewed in the next section.

2.3 Moving from L2 to L3 acquisition

Traditionally, all adult non-native acquisition was treated under the term second language acquisition (SLA). However, using an all-encompassing term is problematic when we consider that L2 learners only have one potential source of transfer (the L1) whilst L3 learners have multiple sources of transfer, hence setting L3 acquisition apart from L1 or L2 acquisition (Rothman & Cabrelli Amaro, 2010). Aside from a few early exceptions (e.g. Ringbom, 1987; Stedje, 1977; Vildomec, 1963) the study of L3 acquisition as a separate field of research has developed in the last decade. It has become increasingly evident that L3 acquisition research offers a unique perspective into language acquisition in general. In particular, since knowledge already present at the L3 initial state can reasonably be attributed to access to UG or influence from the L1/L2 grammar, L3 acquisition allows valuable insights into what has been previously acquired by a learner during their prior language acquisition experience, i.e. during their L2 acquisition (Leung, 2005; Iverson, 2010).

Some studies have applied L2 theories directly to L3 learners. For example, Leung (2006) explores some of the different generative SLA accounts of transfer outlined in the previous section (Full Transfer/Full Access, Schwartz & Sprouse, 1996; Minimal Trees Hypothesis, Vainikka & Young-Scholten, 1996; and Valueless Features Hypothesis, Eubank, 1993). In addition, the study aimed to explore which of the previously acquired grammars is transferred in the acquisition of an L3. The study investigates two groups of beginner learners, L1 Vietnamese-L2 French and L1 Cantonese-L2 English-L3 French. The status of

past tense, agreement features and properties related to feature strength of Tense are explored during four written experimental tasks. The results show that the L1 or prior language effects can be seen for both groups which support Full Transfer. As a result, the Minimal Trees or the Valueless Features hypotheses are not supported. However, the author notes that there is some variability in the learners that questions the full transfer of a previously acquired interlanguage into the L3 initial state. Crucially, this shows that L3 acquisition is not simply another case of L2 acquisition and has supported the division of these areas of research (e.g. Leung 2005, 2006, 2007).

In terms of UG-access, García Mayo and Rothman (2012) point out that current models of the L3 initial state tend to reject proposals of inaccessibility or partial access to UG. In general, L3 studies suggest that the full range of UG features is available to multilingual adults, which means that L3 learners have more grammatical options available to them, which could either be facilitative or non-facilitative. For example, Gutierrez-Mangado and García Mayo (2008) explore the acquisition of long distance wh-questions by Basque-Spanish bilinguals learning L3 English. In Basque, Spanish and English wh-questions are formed by moving the wh-phrase to the left periphery. The results show that the L3 learners produced partial wh-movement and wh-copying questions in their oral productions, both of which are absent from their background languages (Basque and Spanish) and their target language (English). The authors suggest that the presence of non-native questions found in the L3 grammar stem from UG, which must still be directly available in L3 acquisition. Furthermore, it is predicted that once new L2 morphosyntactic properties are acquired by successful L2 learners, they are available for initial state transfer in L3A. In general, it is noted that most of the current generative transfer models are based on the notion of Full Transfer/Full Access (Schwartz & Sprouse, 1996).

Slabakova (2012) applies some of the key L2 theories to three L3 acquisition data-sets in order to test their applicability and accuracy in an L3 context. The study explores the predictions made by the Feature Reassembly Hypothesis, the Interface Hypothesis, the Bottleneck Hypothesis and the Interpretability Hypothesis. The results show that the Interface Hypothesis and the Interpretability Hypothesis could not account for the findings of the L3 studies (Chin, 2008 and Foote, 2009). On the other hand, the Feature Reassembly Hypothesis and the Bottleneck Hypothesis could have predicted the L3 results. However, none of the L2 theories could account for the results of the study

carried out by Montrul, Días and Santos (2011). Overall, the author argues that some L2 theories can be applied to L3 data whilst others cannot. Slabakova states that there are other deterministic factors in the source of L3 transfer, mainly the difficulty of the property being acquired and its frequency in the input. Crucially, Slabakova does not support the notion of Full Transfer to the L3 initial state, claiming that it is significant parts of the grammar, rather than the whole grammar, that is transferred in a modular way (see Section 2.5.6 for more detail).

2.3.1 Factors affecting L3 acquisition

An important outcome of previous acquisition research is the identification of factors which may affect L3 acquisition. For example, Klein (1995) was one of the first studies to compare and contrast L2 and L3 acquisition, finding a number of influential factors that constrain linguistic transfer. The study explores the acquisition of lexical and syntactic properties in a group of L3 learners and a group of monolingual learners of English as an L2. An interesting finding is that the L3 learners outperformed the L2 learners significantly. Klein argues that there are several factors, such as attitude to learning, cognitive skills, heightened metalinguistic skills and enhanced lexical knowledge of the L3 learners which are advantageous in triggering the setting of UG parameters. These factors are in line with observations in previous SLA cross-linguistic debates (Kellerman, 1995: 126) and further demonstrate the need to investigate L3 acquisition separately from L2 acquisition.

Cenoz (2001) argues that the age of acquisition is also an important factor, in that younger learners may be negatively affected by reduced cognitive and metalinguistic development, compared to older learners who may advance more quickly in the initial stages of acquisition. Williams and Hammarberg (1998) suggest that the 'recency' of use of background languages and the dominant status of the L2 may influence the source of L3 transfer (see Section 2.4.2 for more detail). In addition, the proficiency level of the learners is thought to be a deterministic factor (also Cenoz, 2003). The participants in the study (Williams & Hammarberg, 1998) showed transfer from their L2 German in which they were the most proficient, leading to the suggestion that the proficiency level of a prior language may be a key factor in selecting the source of transfer. Jaensch (2008) explored the acquisition of articles in L3 German by learners with L1 Japanese and L2 English, finding a positive effect of L2 and L3 proficiency on the learners' performance. In

the investigation of L3 German adjectival inflection, Jaensch (2011) controlled for the proficiency level of the learners' L2 English and L3 German. The study found no significant effect of L2 proficiency but as expected, the more proficient the learners were in L3 German, the more target-like their use of adjectival inflection.

It is widely accepted that cross-linguistic transfer is more likely to take place in the initial stages of language acquisition, when knowledge and exposure to the target language is low (De Angelis, 2007; Rast, 2010). As a result of these influential factors, it is important to consider the individual linguistic history of any participants, since it has been suggested that knowledge of other L2s may affect the source of transfer for L3 acquisition (Odlin & Jarvis, 2004: 125). This section has outlined the key developments in moving from L2 acquisition to L3 acquisition transfer studies and highlighted some of the likely influential factors affecting L3 acquisition. The following section presents the main L3 transfer models and their proposals.

2.4 L3 transfer models

In the development of the field of L3 acquisition, one of the main debates has been the source of transfer for L3 learners. This has led to a number of proposals regarding the role of the previously acquired languages in L3 acquisition. In summary, there are four logical possibilities regarding L3 transfer:

- No transfer
- L1-only transfer
- L2-only transfer
- Transfer from either the L1 or the L2

An account based on 'no transfer' would predict that the initial state of all adult language learners is the same, irrespective of previous linguistic knowledge (see Håkansson et al., 2002). The growing body of evidence which demonstrates influence from prior languages discredits this claim and it is widely accepted that some transfer will obtain in L3 acquisition following L3 input. The remainder of the models discussed here aim to account for this interaction between previously acquired languages and the target L3.

2.4.1 L1-only transfer

L1-only proposals argue that the learners' L1 will be dominant and the most likely source of transfer in L3 acquisition. Na Ranong and Leung (2009) explore the acquisition of null objects in L3 Chinese by L1 Thai-L2 English learners. Null objects are possible in Chinese and Thai, but not in English. The study finds significant influence from L1 Thai on the acquisition of null objects in L3 Chinese, taken to indicate dominant L1 transfer. The authors also discuss the interaction of 'typological similarity' in the study, stating that the learners transferred from their L1 Thai due to the structural similarities with Chinese. Hermas (2010) tested the acquisition of verb movement by L1 Arabic-L2 French-L3 English speakers as well as L1 French and L1 English speakers. Verb movement is absent in English but present in French and Arabic. The results show that the L3 learners do not perform in line with the L1 French speakers or the L1 English speakers; this is taken to show that the L3 initial state was exclusively influenced by L1 Arabic. The author concludes that the L1 has a privileged status for the source of transfer; although this is not always facilitative (i.e. it is not helpful). Although it seems logical to expect some level of L1 influence, there is no reason to believe that this will be observed in every case of multilingual acquisition. As a result, this proposal has not received substantial support.

2.4.2 L2-only transfer

L2-only proposals similarly predict dominant transfer from one background language, but in this case the learners' L2 is predicted to have a particularly important role in L3 acquisition. There is evidence from lexical studies (e.g. Cenoz, 2003; Hammarberg, 2001) as well as syntactic studies (e.g. Bardel & Falk, 2007; Jaensch, 2011; Leung, 2005) to support the notion that the L2 is the most likely source of linguistic transfer. Williams and Hammarberg (1998) argue that L3 learners favour the L2 as the source of transfer in an attempt to avoid using their L1 which might cause them to sound more 'foreign', regardless of the relatedness between the languages. The study explored the L3 acquisition process of one of the investigators (Sarah Williams) who was learning L3 Swedish. The results reported a strong influence from L2 German which superseded any possible transfer from L1 English. The authors propose that this is because L1 English received the 'instrumental' role, primarily having a metalinguistic function and remaining separate from the L3. On the other hand, the L2 has been assigned the 'default supplier'

role which has been activated in parallel to the L3 and is used in the majority of lexical construction attempts. In line with this, De Angelis (2005) suggests that there are two factors that may determine a 'system shift' in which a lexical item transfers from one linguistic system to another. The first factor is 'perception of correctness' which accounts for the learners' resistance to using linguistic knowledge from their L1 due to the perception that L1 lexical items are too distant from the target L3. This is likely to interact with the second factor, 'association of foreignness', by which learners are thought to assign a 'foreign' status to all non-native languages which are then grouped together separately from the L1.

Proposals for dominant L2 transfer are formalised by the 'L2 Status Factor' hypothesis (Bardel & Falk, 2007; Falk & Bardel, 2010; Falk & Bardel, 2011). Bardel and Falk (2007) investigate the acquisition of placement of negation by learners of L3 Swedish and L3 Dutch. In Swedish and Dutch, sentence negation is affected by the presence of the verb-second (V2) rule, in which finite verbs occupy the second position in a main clause and the sentence-initial position can be a subject or non-subject. For negation, finite verbs raise to CP, whilst negation remains in its original position, above the VP. The learners were divided into two groups who had differing previous experience with a V2 language. One group had the combination L1-V2 and L2-non-V2 and the second group had the combination L1-non-V2 and L2-V2.

The study found that properties of the L2 transferred into the L3 initial state for both groups. The authors conclude that the L2 acts like a filter, making the L1 inaccessible to the L3 learner. The notion here is that L2 transfer is not only possible, but it is privileged at the L3 initial state due to a higher level of cognitive similarity between the L2 and the L3. This is thought to outrank other features such as language relatedness. It is argued that there are significant similarities between L2 and L3 acquisition which encourage L2 dominance over the L1, such as age of onset, outcome, learning situation (i.e. natural/informal or classroom), metalinguistic knowledge, learning strategies which are present in L2 but not in L1 and awareness of the language learning process (Falk & Bardel, 2010: 192). However, there are a low number of participants in the study with a variety of background languages which could affect the reliability of the results. Furthermore, the learners provided a self-evaluation of their L2 proficiency, rather than completing a controlled proficiency test. Nevertheless, the study makes strong claims about the

dominance of a learners' L2 in transfer and has been supported by other syntactic studies (e.g. Falk & Bardel, 2011; Leung, 2006).

2.4.3 The Cumulative Enhancement Model

Flynn, Vinnitskaya and Foley (2004) were amongst the first researchers to advance the claim that L3 research can further our understandings of linguistic transfer, since there is more than one possible source of transfer. Flynn et al., (2004) propose the Cumulative Enhancement Model (CEM) after exploring the production of restrictive relative clauses in L1 Kazakh-L2 Russian-L3 English speakers. The study argues that a learners' experience in their L1 or L2 can be used in L3 acquisition, suggesting that language acquisition is cumulative (i.e. any background language can enhance language acquisition or remain neutral). In this view, transfer can take place from the L1 or the L2; however, it is not clear what factors determine the selection of the source of transfer. Furthermore, there is no mention of the possible effect of negative transfer in the study, assuming only facilitative transfer. However, it seems likely that language learners will experience negative transfer of some kind which has been shown in other studies (e.g. Chin, 2008).

2.4.4 The Typological Primacy Model

The 'Typological Primacy Model' (TPM) (Rothman, 2010, 2011, 2013, 2015) advocates potential transfer from either the L1 or the L2 (similarly to the CEM), but also takes into account that transfer might be negative (which is not supported by the CEM) and outlines the importance of the typological similarity between the background languages and the target L3. An important study for the emergence of the TPM is the investigation carried out by Rothman and Cabrelli Amaro (2010) which aimed to test the claims made by the L2 Status Factor and the CEM. The study explored the acquisition of the Null Subject Parameter by a group of L3 French learners and a group of L3 Italian learners; both groups had L1 English and L2 Spanish. The results show transfer from L2 Spanish for both groups, which is in line with the predictions of the L2 Status Factor. However, in their conclusions the authors also propose a modified version of the CEM, arguing that the learners' perception of the similarity between languages (i.e. psychotypology) is a crucial factor in the transfer of morphosyntactic features. This would mean that either the L1 or L2 could be responsible for transfer, decided by actual or perceived typology.

Following the observations made by Rothman and Cabrelli Amaro (2010), Rothman (2011) compares the adjectival interpretation of L1 Italian-L2 English-L3 Spanish speakers and L1-English-L2 Spanish-L3 Brazilian Portuguese (BP) speakers. In English, the only available position for adjectives is pre-nominal whilst in Italian, Spanish and BP most adjectives can appear both pre- and post-nominally. The results show that both experimental groups performed in a similar way, producing similar numbers of correct interpretations for pre-posed and post-posed adjectives. L3 Spanish is typologically more similar to L1 Italian for one group and L3 Brazilian Portuguese is more similar to L2 Spanish for the other; since there are no statistically significant differences between the groups and the data shows that L2 English does not affect the performance of the L3 learners, the results seem to support the notion that typology is an integral factor in L3 syntactic transfer. In early versions of the TPM, the role of perceived similarity or 'psychotypology' is also emphasised.

According to this model, after a brief access to both the L1 and L2 at the initial state of L3 acquisition, one of the previously acquired systems is transferred as early as possible (based on FTFA of Schwartz & Sprouse, 1996). In order to avoid redundancy and lessen the cognitive burden, property-by-property transfer is not supported as it is thought that this would be a slow and gradual process. Rothman does not support the notion that psychotypological assessment is conscious and instead, the model relies on the following linguistic cues from input which are used by the learner to make the assessment of similarity: *Lexicon >Phonological/Phonotactic cues >Functional Morphology >Syntactic Structure.* Not all of these cues are equally accessible or usable at the same time and therefore, the list is hierarchical and the language combinations ultimately determine the source of transfer. The TPM claims that the language with the most detectable or usable cross-over (at the highest levels of the hierarchy and the earliest in the process) will be selected for full transfer. [4]

Montrul, Dias and Santos (2011) show support for the TPM in their study of L3 acquisition of Brazilian Portuguese (BP) by L1 English-L2 Spanish and L1 Spanish-L2 English learners. The study assesses the L3 learners' knowledge of object clitic expression in BP, which is

[4] It has been noted that the name of this model is misleading, since the latest versions do not focus on 'typology' but rather on structural proximity at different language levels.

present but different in Spanish and not present in English. The findings show that the acquisition of object expression was not particularly difficult for the two groups of L3 learners. However, there were some transfer effects that the authors attribute to Spanish as an L1 and an L2, since the errors were very similar for both groups. The study concludes that typological similarity between the background languages and the target L3 is important.

2.4.5 The Linguistic Proximity Model

The Linguistic Proximity Model (LPM) (Mykhaylyk et al., 2015; Westergaard et al., 2016) presents an alternative analysis of L3 transfer, which focuses on the linguistic property being acquired. The study investigates transfer effects in light of the predictions made by the CEM and TPM in particular, claiming that transfer can indeed occur from either the L1 or the L2. However, the model also postulates that it may be non-facilitative and does not completely depend on typological similarity. The LPM claims that "transfer in L*n* acquisition occurs when a particular linguistic property receives supporting input from the involved languages, regardless of the order of acquisition (L1 or L2) or general typological grouping." (Mykhaylyk et al., 2015: 8).

Westergaard, Mitrofanova, Mykhaylyk and Rodina (2016) (also Mykhaylyk et al., 2015) investigate the acquisition of word-order in L3 English by L1-L2 Norwegian-Russian bilinguals, as well as monolingual L1 Russian speakers and monolingual L1 Norwegian speakers. The study explores the role of previously acquired languages that are both typologically distant (to each other) but both have similarities with L3 English. Whilst Norwegian and English are both Germanic languages and can be said to be typologically related, Russian is a Slavic language and therefore, typologically unrelated to English and Norwegian. However, Norwegian and Russian both have similarities with English in the domain of word-order. The similarity between Norwegian and English is the word order of questions which both allow Subject-Auxiliary inversion (Aux-Subj), whilst Russian does not (Subj-Aux). The similarity between Russian and English is that they both feature an Adverb-Verb (Adv-V) word order in declarative clauses, whilst Norwegian is a V2 language which requires a finite verb in the second position in declaratives. The participants completed a Grammaticality Judgement Task which tested the acquisition of the two word order constructions, i.e. questions with auxiliaries and declaratives with adverbs.

The results for the Aux-Subj condition are similar across the participant groups; however, for the Adv-V condition the Norwegian-Russian bilinguals and the L1 Russian group performed significantly better than the L1 Norwegian group. The authors take this to show that prior knowledge of Russian for the Norwegian-Russian bilinguals was facilitative, despite the fact that Russian is typologically distant from L3 English and a minority language for the learners.

The LPM builds on some of the positive aspects of the TPM, for example, the notion that certain similarities between the background languages and the target language are crucial. However, the authors of the LPM highlight some issues with the predictions made by the TPM and aim to address these problems in the new model. Firstly, it is highlighted that the selection of languages used in TPM studies to argue for the model are biased. For example, many studies that support the TPM explore the acquisition of English and two Romance languages; in this case, two of the learners' languages are clearly closely related whilst the other is not which inevitably provides an ideal context to argue for the influential role of typological grouping. Secondly, transfer at the 'initial state' only (as discussed in the TPM) is questioned. According to the TPM, the source of transfer is determined by a hierarchy of cues which presumably means that transfer cannot obtain prior to exposure to the language and indicates that there must be a certain amount of learning for transfer to be triggered. However, it is not clear whether or not the initial state is a fixed time period, or whether it is determined by a certain level of exposure or a certain level of proficiency.

Finally, the authors question the notion of complete transfer of the whole grammar of only one of the languages which is postulated by the TPM for economic reasons. It is highlighted that there is a lack of evidence in L3 acquisition to support the claim that it is more economical to transfer at one time only rather than in smaller steps. Furthermore, it seems uneconomical that the L3 initial state should be the same as either the L1 or L2 steady state, rather than transferring only when there is evidence from the input to suggest that transfer is relevant. The authors suggest that wholesale (i.e. full) transfer of one background language could be more demanding than a partial transfer approach, since the learners may be subjected to a huge amount of unlearning or reconfiguring of irrelevant properties. Furthermore, a wholesale approach assumes that learners ignore linguistic knowledge from the other background language(s) that may be beneficial to the

learning process, which could be rather uneconomical. As a result, rather than focusing on typology, the LPM claims that the important similarity is that of abstract linguistic properties which triggers transfer from previously acquired languages in L3 acquisition. The authors claim to further develop the TPM, specifying the scope of the model to language properties rather than general similarity between the languages. The LPM predicts different learning patterns for different linguistic situations and crucially, predicts that there may be cross-linguistic influence from both of the previously acquired languages. In this view, L3 learners should be able to benefit from any previously acquired language; however, they may also experience non-facilitative (i.e. negative) transfer from either language.

2.4.6 The Scalpel Model

The Scalpel Model (SM) (Slabakova, 2016) is another recent proposal which aims to provide a more nuanced account of L3 transfer, building on some important claims made in previous models whilst challenging some of the assumptions made. The SM does not support L1-only or L2-only models, based on the notion that neither the L1 nor the L2 should have a privileged status for L3 transfer. This view is based on accounts of multilingualism which argue that the starting point for L3 learners is a combination of the L1 plus L2 grammar, rather than three separate monolingual grammars (e.g. Amaral & Roeper, 2014; Grosjean, 1989). The SM claims that this combination (i.e. L1+L2) acts like a scalpel to extract relevant options of the L1 and L2 parameter values required for the acquisition of the target L3. As a result, the SM supports the claim that transfer occurs from either the L1 or the L2 which has been made by other models (CEM, TPM, and LPM). Slabakova also states that the precision of the scalpel may be affected by other factors such as complexity, processing, misleading input and the frequency of the property in the target L3.

The SM challenges the TPM claim that transfer is wholesale from one background language. Similarly to the LPM (Mykhaylyk et al., 2015; Westergaard et al., 2016), Slabakova argues that there is no evidence that full transfer reduces the cognitive burden for L3 learners, highlighting the fact that full transfer involves supressing knowledge from other background languages. Disregarding knowledge from some background languages may be more difficult for the learner at subsequent stages of acquisition, particularly if

the other language(s) have relevant features which were not initially identified. As a result, one of the main predictions made by the SM is that transfer occurs on a property-by-property basis.

The SM also challenges the CEM claim that L3 transfer is only facilitative or remains neutral, using evidence from a study conducted by Slabakova and García Mayo (2015). This study examined the acquisition of English left dislocation constructions by L1 Basque-L2 Spanish-L3 English learners and L1 Spanish-L2 Basque-L3 English learners. In the domain of topicalization, English is more similar to Basque than it is to Spanish. However, the results of the study suggested that both groups of learners transferred from Spanish, regardless of whether Spanish was the L1 or the L2 and despite the fact that this is not facilitative for learning English. The authors conclude that the findings provide evidence of negative transfer in L3 acquisition. In response, the SM predicts that L3 transfer is not always facilitative and in some cases, manifests itself as negative influence in the target L3.

2.4.7 Summary of L3 transfer models

Table 1 summarises the current L3 transfer models and their predictions. L1-only accounts restrict the dominance of background languages to the L1 which is not supported by evidence of L2 transfer, whilst the L2 Status Factor cannot explain the evidence that has shown transfer from the L1 for other language combinations. The CEM does predict transfer from the L1/L2 but only allows for facilitative transfer. The TPM also accounts for L1/L2 transfer as well as the possibility of negative (i.e. non-facilitative) transfer but only predicts full transfer from one background language which is dependent on the typological similarity between the background languages and the target language. The LPM builds on the claims made by the TPM but refines the view of the conditions for L3 transfer to argue that we should focus on the abstract linguistic property being acquired, rather than the similarity of the languages as a whole. Finally, the SM is very similar to the LPM but aims to further refine our understandings of L3 transfer, presenting a model which supports L1/L2 transfer as well as partial transfer from either the L1/L2 based on the notion that previous linguistic experience acts as a scalpel to extract relevant properties for L3 acquisition.

Model	Source of transfer	Full/Partial?	Facilitative?	Predictions
L1 transfer Na Ranong & Leung (2009)	L1 only	Full	Facilitative/non-facilitative	L1 dominant
L2 Status Factor Bardel & Falk (2007)	L2 only	Full	Facilitative/non-facilitative	L2 is dominant and blocks L1transfer
Cumulative Enhancement Model (CEM) Flynn et al., (2004)	L1 or L2	Partial	Facilitative only	Transfer is either facilitative or remains neutral
Typological Primacy Model (TPM) Rothman (2010, 2011, 2013, 2015)	L1 or L2	Full	Facilitative/non-facilitative	Typological similarity is dominant
Linguistic Proximity Model (LPM) (Mykhaylyk et al., 2015; Westergaard., 2016)	L1 or L2	Partial	Facilitative/non-facilitative	Transfer is determined by the linguistic properties being acquired
Scalpel Model (SM) (Slabakova, 2016)	L1 or L2	Partial	Facilitative/non-facilitative	Transfer is determined by the linguistic properties being acquired [5]

Table 1: Summary of current L3 transfer models

This summary highlights some of the limitations of certain models as well as the way in which more recent proposals have attempted to provide a more extensive account which can explain the findings of L3 studies.

2.5 Remaining issues

The previous section has provided an extensive overview of the current L3 models and the most up-to-date predictions regarding the source of L3 transfer and the conditions which may influence cross-linguistic transfer. However, some aspects of L3 transfer have not been clarified which highlights the significance of the current study. Whilst it is clear

[5] The summary of the predictions made for the LPM and SM are the same in Table 1, to highlight that the models make the same main claim regarding L3 transfer. The SM differs only in that the model proposes that we should use the analogy of a scalpel to account for the transfer of certain properties.

from current research that the 'similarities' and 'differences' between background languages and the target L3 play an important role in the source of L3 transfer, it remains unclear how this should be measured or defined within a generative, Minimalist framework. Consequently, this study highlights the role of linguistic features (the source of linguistic variation) in defining structural similarities between languages which could allow for more precise predictions regarding the source of transfer. In the following section, I will outline some of the issues surrounding the use and definition of the terms 'structural similarity' and 'typological similarity, followed by a more detailed account of how features may be crucial for L3 transfer debates.

2.5.1 'Structural' vs. 'Typological' similarity

As shown by the overview of previous studies, some researchers focus on the role of 'typological' similarity whilst others discuss 'structural' similarity. As it stands, it is not always clear how these terms are being used in L3 transfer studies nor how an explanation of the 'relatedness' between languages can have a universal application to different language combinations. This section explores the use of these terms in order to clarify this issue.

Kellerman (1977) outlines 'cross-linguistic similarity' as that which the learner 'perceives' to be similar or different between the TL and their L1 (i.e. psychotypology). If there are formal cross-linguistic similarities across 'related' languages, one-to-one relationships between items can be established which facilitates comprehension. If similarities are not perceived by the learner and there are considerable cultural differences, the learning task is more complex and cross-linguistic transfer is not naturally established. However, this term is problematic as it is not clear what criteria should be used to determine similarity and furthermore, it unavoidably incorporates the issue of individual learner variation (Ringbom, 2007: 8). Hammarberg (2009) also argues that similarity is subjective and depends on how the learner perceives similarities and differences between languages. In cases in which the cross-linguistic similarity is clear and easy to perceive, learners are more likely to activate the background language that is closer to the TL. However, when language distance is less clear, it is not obvious how learners will perceive linguistic similarity.

The importance of perceptions is also supported by others, for example, by Rast (2010) who explores the initial state for L3 learners of Polish, who have L1 French and a variety of L2s. The findings show that the learners with L2 Russian were the most successful in Polish negation when compared to other participants with L2 English. The author attributes this result to the typological similarity between Russian and Polish. Furthermore, Rast argues that what the learners perceive to be similar between the languages overrides typological relatedness, especially at the earliest stages of acquisition and ultimately, this perception determines what the learner can perceive, parse, produce and comprehend. The importance of learners' perceptions has been reported frequently in L3 acquisition studies and in some cases, could clearly have some sort of effect on the way that learners deal with their competing background languages at the initial stages of L3 acquisition. However, the role of perceptions is less clear if there is no obvious relatedness between the prior languages and the target language, which suggests that there must be more to the explanation.

According to Ringbom (2007), if a learner sets out to acquire a language that is closely related to their L1, prior linguistic knowledge can be very useful. However, if the L1 and the target L3 are not closely related, prior linguistic knowledge is much less relevant for the learner. Ringbom further states that language learners are only concerned with 'language proximity' (i.e. similarities) but do not care about language distance (i.e. differences) in order to facilitate the learning task. Ringbom (2007) argues that there is no clear division between difference and similarity, outlining a possible continuum of similarity. Firstly, 'similarity relations' can be established if items in the TL are perceived as formally and/or functionally similar to items in the L1 (or another previously acquired language). The second type of relation is 'contrast relations', where the learner perceives significant differences between items in the TL and the L1, whilst they share an underlying similarity. Finally, the zero relation refers to cases where the differences between the TL and the L1 mean that the learner does not notice any features that the languages may potentially have in common. This continuum attempts to account for what it means to make use of any 'similarities' between languages and suggests that relatedness is perhaps more than the relationship between the languages as a whole.

According to De Angelis (2007), the term 'similarity' is used to refer to a similarity between components of two or more languages, without suggesting a genetic

relationship. De Angelis points out that there is evidence that learners use knowledge of more distant languages, even in cases where they have acquired a language that is typologically closer to the target language. This shows that researchers should not assume that relatedness will necessarily provoke cross-linguistic transfer. As a result, there is a need to further investigate this phenomenon in multilingual learners. De Angelis argues that 'relatedness' and 'formal similarity' must be distinguished from each other, as they are not necessarily interchangeable terms. Learners may be influenced by how they perceive the closeness of the overall languages or the similarity between particular elements of the languages they have acquired and the target language. This highlights the question of whether it is overall similarity or similarity between certain components of languages that determine the source of transfer in L3 acquisition.

In the predictions made by the TPM, Rothman (2010, 2011, 2013, and 2015) claims that L3 transfer is constrained by the (real or perceived) typological similarity between the background language grammars and the target language grammar. Rothman (2013) argues that 'structural similarity' is the cross-linguistic overlap of linguistic properties at the mental representation level. In this view, the typological similarity between languages is determined by the hierarchy outlined earlier (Lexicon; Phonological/Phonotatic Cues; Functional Morphology; Syntactic Structure). Crucially, the TPM predicts that typological similarity established by the learner using this hierarchy, prevails over actual structural similarity in terms of individual properties. This is supported by the findings of Özçelik (2013) who claims to demonstrate evidence of overall typological transfer, rather than property level structural transfer. The study tested Uzbek-Russian bilinguals learning Turkish as their L3. Uzbek and Turkish are Turkic languages (typologically related) whilst Russian is Slavic (typologically unrelated). The investigation tested the acquisition of quantificational scope which works in the same way in Russian and Turkish, even though they are typologically unrelated. The results suggest that the L3 learners transfer properties of Uzbek, even though Uzbek works in a different way to Turkish. This shows that the Uzbek-Russian bilinguals transfer from the other Turkic language which is overall more typologically similar to the target L3, rather than the language which is more structurally similar which supports the claims made by the TPM.

The issue regarding the definitions of 'typological' and 'structural' similarity is also explored by Santos (2014), challenging the assumption that is commonly made that

learners' perceptions of structural similarity correspond with the typological relationship between languages that has been defined by linguists. The study examined the acquisition of L3 Brazilian Portuguese (BP) by L1 English-L2 Spanish and L1 Spanish-L2 English learners, completing a grammaticality judgement task, acceptability judgement task, oral picture description task and perception of language distance task. The results show that both groups of L3 learners acquired the relevant properties of BP but also accepted ungrammatical structures. Both learner groups showed transfer from English and Spanish in the data and showed positive and negative effects of cross-linguistic transfer, indicating that transfer can take place from either the L1 or the L2. Therefore, Santos concludes that perceived similarity (psychotypology) is not a main factor in determining cross-linguistic transfer and we must consider other factors such as the learners' proficiency and order of acquisition.

Furthermore, Santos (2014) explores what it means for two languages to be considered 'similar' to each other, highlighting the importance of making a clear distinction between perceived similarity and actual similarity that can be determined by linguistic analysis. Santos outlines two ways to measure typological proximity; firstly, by establishing the 'genetic relatedness' between languages according to their language family (i.e. Germanic, Romance, Slavic) and secondly, by specific structural similarities such as linguistic parameters (i.e. null subject languages, head-initial languages). Importantly, Santos highlights that two languages that are not genetically related to each other may be considered to be similar to each other based on structural considerations, arguing that typological proximity between languages does not imply a genetic relation and vice versa. Crucially, Santos highlights the importance of exploring L3 acquisition of languages which share structural properties but do not belong to the same language family, which is highly relevant for the current study.

As discussed earlier, the Linguistic Proximity Model (LPM) (Mykhaylyk et al., 2015; Westergaard et al., 2016) aims to extend the scope of the predictions made by the TPM and refines the conditions for L3 transfer. The model predicts that L3 transfer occurs when there is evidence of a linguistic property of the L3 in the previously acquired languages. In this view, the similarity between linguistic properties does not depend on the order of acquisition or the general typological relationship across the three languages and is more important than perceived similarity. Similarly, the Scalpel Model (SM)

(Slabakova, 2016) supports the notion that actual structural considerations override psychotypology in L3 acquisition. However, the exact nature of these structural considerations remains unclear which highlights the need for a more detailed account of L3 transfer.

In summary, the general agreement among researchers is that the similarities and differences between the background languages and the target language are important for L3 acquisition. Furthermore, 'typological similarity' and 'structural similarity' should not be used interchangeably; 'typological similarity' denotes the relatedness between languages as a whole and tends to take into account the role of learners' perceptions in this assessment, whilst 'structural similarity' is used to refer to the actual, linguistic differences between the structures of the languages. In this dissertation, I focus on the role of structural similarity in L3 acquisition, aiming to provide a more refined account of how this should be defined. As demonstrated by this overview of definitions, there is currently no account or model that defines 'structural similarity' through the use of linguistic features. As we have seen earlier in this Chapter, generative grammar accounts support the notion that variation between languages is determined by features and the way in which they are configured, or assembled in lexical items, in a language-specific way. As a result, the current study attempts to provide an account of L3 transfer in which the structural similarity of the languages determines the source of transfer, rather than the typological similarity of the languages as a whole. In addition, this account focuses on the role of linguistic features in our view of structural similarity. The following section outlines some of the observations and findings from other studies which highlight the importance of features for L3 transfer.

2.5.2 The role of features in L3 acquisition

As discussed earlier in this Chapter, there have been a number of proposals regarding transfer in L2 acquisition studies which have helped researchers in their investigations of transfer in L3 acquisition. In the current study, I am interested in the potential role of linguistic features in L3 transfer, proposing that our definition of 'structural similarity' in the source of transfer debate should take into account the way in which features are assembled in background languages and the target language in L3 acquisition. Therefore, I return to the claims made by the Feature Reassembly Hypothesis (FRH) (Lardiere, 2000;

2009). The FRH does not make predictions beyond L2 acquisition, although this does not necessarily mean that the fundamental principles cannot be applied to L3 acquisition. In this section, I outline the findings of Slabakova (2012) which presents a group of studies that did not necessarily set out to test the FRH predictions in L3 acquisition, but nonetheless make important observations that the FRH could be advantageous in explaining L3 behaviour.

Slabakova (2012) examines the data found in three L3 acquisition studies (Chin, 2008; Foote, 2009 and Montrul et al., 2011) to test a number of L2 theories. The aim of this analysis is to explore current L3 acquisition issues but from an L2 acquisition perspective, establishing whether or not any prominent L2 proposals can explain the results of L3 studies and whether or not the L3 data supports any of the L2 proposals. The four hypotheses applied to the L3 studies are the Feature Reassembly Hypothesis, the Interface Hypothesis, the Bottleneck Hypothesis and the Interpretability Hypothesis; I will focus here on the FRH. The results of the study indicate that the FRH could be very helpful in explaining some of the L3 behaviour observed in the studies. I will outline each study to demonstrate this in more detail.

Chin (2008) investigates the acquisition of aspectual meanings by L1 Chinese-L2 English-L3 Spanish speakers, focusing on the semantic interpretation of aspectual markings on states, accomplishments and achievements in each language. There is an important contrast between the preterit (one-time completed event) and imperfect (unfinished event, either habitual or continuous) tense in Spanish that has been well-documented. In English, the past simple is used for the preterit equivalent in Spanish and the past progressive is used for the imperfect equivalent; however, in each case there is a different meaning. Therefore, there is a form-to-meaning mismatch between English and Spanish aspectual meanings. The addition of Chinese in the language combination further complicates the matter. In Chinese, the perfective marker *le* can be used with all lexical classes, the progressive marker *zai* is unavailable with states and the durative marker *zhe* is only available with states. The L3 group were tested alongside an L1 English–L2 Spanish group and a Chinese control group. The results show that the L2 group were not accurate with states, which marks the main mismatch between English and Spanish. The L3 group were not accurate with any of the contrasts that were tested, since there are form-to-meaning mismatches in all lexical classes between Chinese (L1) and Spanish (L3). Slabakova

highlights that the FRH can explain these findings, in that the more reassembly of features required, the more difficult it is to acquire semantic contrasts.

Similarly, Foote (2009) focuses on the similarities and differences in the aspectual tense domain of Romance languages and English. The study examines native speakers of English learning Romance languages as their L2 and L3 (French, Spanish and Italian) and native Romance speakers learning English as their L2 and another Romance language as their L3 (i.e. English–Romance–Romance; Romance–English–Romance). There was also an L1 English–L2 Romance group and control groups. The acceptance (on a scale of +2 to -2) of the three lexical classes (states, accomplishments and achievements) was tested with perfective and imperfective aspect marking. The results show that the L1 English–L2 Romance group were the least 'target-like' in the acceptability ratings across the contrasts. Since the other groups have previous experience of learning a Romance language and are more target-like, this indicates that there is a significant advantage of having previously acquired a Romance language when acquiring another Romance language, regardless of whether it is the L1 or the L2. Slabakova (2012) points out that in the acquisition of aspectual semantics there is no reassembly of features among Romance languages, but rather mapping new morphemes onto existing ones. Therefore, the results can be explained by the FRH.

Finally, Slabakova (2012) presents data from one part of a study conducted by Montrul, Días and Santos (2011) which cannot be explained by the FRH. The study examines the acquisition of clitic placement in Brazilian Portuguese (BP) by two learner groups; L1 English-L2 Spanish-L3 BP and L1 Spanish-L2 English-L3 BP. Whilst English does not have clitics, Spanish and BP use clitics in various contexts but there are some important differences (i.e. clitic climbing is seen in Spanish but not BP). The results for both learner groups are very similar and indicate transfer from Spanish in both cases. For example, both learner groups accepted clitic climbing (which is seen in Spanish but not English or BP) and did not differ significantly from each other. Although transfer from Spanish is seen for both groups, this is not necessarily helpful for the learners, since Spanish clitic placement differs from BP in many cases. The authors conclude that this suggests that the perceived typology (the learners' perceptions of the similarities between the languages) is a deterministic factor in the source of transfer. Slabakova (2012) highlights that the properties being acquired involve a similar amount of feature reassembly in the L3 and do

not differ significantly in terms of inflectional morphology; however, they were acquired at different rates which does not comply with FRH predictions. Therefore, the FRH cannot account for the L3 behaviour observed in the study. Alternatively, Slabakova suggests that the frequency of the property in L3 input is likely to be important and should be considered as an influential factor.

Overall, the examination of L3 data in Slabakova (2012) reveals that none of the L2 theories that were tested can fully account for learners' behaviour. However, the analysis crucially highlights that there may be some merit in applying the predictions of the FRH to L3 acquisition experiments. As a result, although the FRH has not yet been directly examined in any L3 study, there is growing evidence that suggests that the main tenets of the model could help to provide a more detailed linguistic account of some of the patterns noted in L3 acquisition studies.

According to the FRH, L2 learners search for the closest (morpholexical) equivalent of an L2 property in their existing L2 feature set; if an equivalent is found, the target property is mapped onto the L1 feature set and then any reassembling that may be required (indicated by L2 input) takes place. Slabakova (2012) suggests that an extension of the FRH model would likely predict that the difficulties presented by feature reassembly will be intensified in L3 acquisition, since there are three sets of features to be taken into account. Based on the main claims of the FRH, I propose that it is logical to assume the following:

- L3 learners search both their L1 and L2 for morpholexical equivalents of a property.
- If a morpholexical equivalent is found in the L1/L2, L3 features are mapped onto the L1/L2 feature subset and if required, features are re-assembled onto relevant L3 lexical items.

This section shows that it may be beneficial to utilise the FRH claims in an L3 setting, to provide a more detailed account of L3 transfer, especially the conditions that determine L3 transfer. One of the main benefits of applying the FRH to L3 acquisition is moving away from relying on the role of typology when discussing or predicting the source of L3 transfer. Whilst typological similarity may motivate transfer between certain languages with obvious structural similarities (i.e. Spanish and Italian), it is not clear how this is able to account for transfer between languages with few or no structural similarities. In

contrast, a feature-based approach to L3 transfer utilises what we know about cross-linguistic variation, i.e. differences in how formal linguistic features are represented on lexical items in each language. As a result, this offers a 'linguistic' explanation for L3 behaviour, in that transfer from the L1 or L2 depends on the specific linguistic feature being acquired in the target language, which background language has the closest equivalent and finally, the amount of mapping and reassembling of that feature is required. Furthermore, this approach can make more precise predictions for transfer across various language combinations.

2.6 Summary

This Chapter has provided a thorough account of linguistic transfer in L3 acquisition, outlining the current status of L3 transfer models and highlighting the significance of the current study. The study adopts a generative view of transfer in which features are thought to be responsible for language variation. The main debates of L2 acquisition studies focus on the availability of UG and the influence of the L1, as well as the role of features (i.e. the FRH). These L2 studies formed a fundamental basis for L3 studies which are able to further our understandings of the language acquisition process. The summary of current L3 transfer models reveals that the main debates have been focused on i) the source of transfer (i.e. L1, L2 or L1/L2) as well as ii) the conditions which determine the source of transfer.

From this literature review, it is apparent that the role of 'similarity' is thought to be particularly influential in L3 acquisition, although there seems to be a lack of clarity regarding what this entails exactly. This has culminated in the discussion of the importance of features in L3 acquisition which has been highlighted throughout the Chapter. From the start, it is clear that within the generative view, the role of features and their assembly onto functional categories is significant for language acquisition. The importance of features in L2 acquisition is demonstrated by the Feature Reassembly Hypothesis which outlines the task of the L2 learner in figuring out how L1 features are assembled in the L2, which may require reconfiguration or remapping onto the new lexical items. Although the FRH did not make any predictions for subsequent non-native acquisition, the last section of this Chapter brings to our attention the emerging view that features are likely to play a crucial role in L3 acquisition, especially in discussions of

typology, or similarity. Chapter 3 will examine the features associated with null and overt arguments in English, Spanish and Chinese.

Chapter 3: Null and overt arguments in English, Spanish and Chinese

3.1 Introduction

The current study examines the role of previously acquired languages in L3 acquisition, focusing on the effect of structural similarity between previously acquired languages and the target language (TL). The previous Chapter outlined the current L3 models which make predictions regarding the source of transfer (L1 only, L2 only or L1/L2) as well as the conditions which determine the source of transfer. This highlighted that the 'typological' or 'structural' relationship between the background languages and the TL is thought to be crucial, which raises the question of what it means for languages to be 'typologically' or 'structurally' similar to each other. In response, this study argues for a more detailed analysis which is based on the specific property being acquired, and more specifically, the role of feature reassembly (i.e. FRH). In this Chapter, I outline the language combination and linguistic properties that will be examined, providing a detailed account of the three typologically unrelated languages at the centre of the study, which crucially, have some structural similarities (as well as many notable differences).

The study examines the acquisition of the features associated with null and overt arguments (i.e. null subjects/objects, overt subjects/objects) in L3 Chinese, by learners with L1 English and L2 Spanish. In summary, these languages are typologically unrelated to each other, although there are some key structural similarities. Firstly, there is an important similarity between Chinese and Spanish in that they both allow null subjects in finite clauses. Null subjects in languages such as Spanish are typically analysed as cases of '*pro*-drop', in which the content of null subjects is recovered by rich agreement morphology and *pro* moves from VP to IP. However, Chinese does not have any agreement morphology and null elements are identified by a preceding topic. It is thought that Chinese null elements should not be analysed as *pro*, but rather as cases of 'topic-drop' in which the null element moves from VP to CP. Therefore, there are also key syntactic differences in the features associated with null subjects.

In terms of the interpretative behaviour of subjects and objects, there are mostly similarities between Spanish and Chinese. For example, embedded null subjects can have two interpretations in Chinese and Spanish; i) co-reference with the main clause subject or ii) disjoint reference with a topic in discourse. However, in Spanish there is a restriction on embedded overt subjects in that they cannot have a co-referential interpretation if the antecedent is quantified (i.e. somebody, anyone). This restriction does not apply to English or Chinese.

This briefly demonstrates the main similarities and differences between the use and interpretation of null and overt arguments in these languages and highlights why the language combination and language property were chosen for this study. Firstly, the languages are typologically unrelated which means it is difficult to predict the source of transfer according to a general 'typological distinction'. In addition, neither the L1 nor the L2 are typologically related to the L3 in the specific domain of null subject use; English is a non-null subject language, Spanish is a *pro*-drop language and Chinese is a topic-drop language. This provides an ideal context to highlight the role of specific structural similarities and linguistic features to predict the source of transfer. Secondly, the study requires a language combination in which both the L1 and the L2 have relevant features for the acquisition of the L3, which allows potential transfer from either the L1 or the L2. On the other hand, there are also key differences which reduce the bias towards a particular background language. These factors will be explained in more detail in the remainder of this Chapter, highlighting that the notion of typological or structural 'similarity' is more complex than a 'null subject' vs. 'non-null subject' language distinction.

This Chapter presents a detailed overview of null and overt arguments in English, Spanish and Chinese. Firstly, I present the theoretical background of null subjects and the various analyses of null elements in each language. This is followed by an account of the interpretation of embedded null and overt arguments in each language. The main similarities and differences between the use and interpretation of null and overt arguments in English, Spanish and Chinese will be summarised, followed by an overview of some of the key previous L2 studies that help to form predictions for the acquisition of these properties in L3 Chinese. Finally, I will outline the main hypotheses of the current study which emerge from the analysis presented in Chapter 2 and Chapter 3.

3.2 Null arguments: theoretical background

3.2.1 Empty Categories and Binding Theory

As outlined in Chapter 1, the Principles and Parameters (P&P) framework (Chomsky, 1981, 1986) of generative grammar is based on the notion that languages consist of sets of principles which are present in all languages, as well as parameters which vary between languages. Such parameters are thought to account for the cross-linguistic variation that is evident between languages. An important principle to present here is 'Binding Theory', in which Chomsky outlines a typology of noun phrases (NP) which accounts for the potential relationships between (pro)nominal elements and antecedents (i.e. anaphoric relations). Within this framework, null elements are referred to as 'empty categories', of which there are four different types: *pro,* PRO, variable and NP-trace (examples from Huang, 2000: 17):

(10) a) ***pro*** [anaphor, +pronominal]
e.g. Carreras sabe que *pro* es estimado por Domingo.
Carreras knows that is esteemed by Domingo.
'Carreras knows that (he) is respected by Domingo'.

b) **PRO** [+anaphor, +pronominal]
e.g. John promised PRO to compose a light orchestral work for his father.

c) **variable/wh-trace** [-anaphor, -pronominal]
e.g. Who did Brahms admire *t.*

d) **NP-trace** [+anaphor, -pronominal]
e.g. The giant panda seems *t* to live exclusively on bamboo shoots.

Each null element is distinguished by two abstract features, anaphor and pronominal. An anaphor is a representation of the features of an NP which are referentially dependent and must be bound within a suitable syntactic domain, whilst a pronominal may be referentially dependent but must be free within such a syntactic domain. English allows the empty category PRO, whilst *pro* is not possible in finite clauses. Traditional analyses have discussed null subjects in languages such as Spanish as instances of *pro,* whilst in Chinese null subjects are analysed as *pro* and null objects are analysed as variables. However, it is not clear whether or not Chinese null subjects should be analysed as *pro,* which will be discussed further in Section 3.2.6. This provides an essential starting point

for the theoretical background of null elements; in the following sections, I will present more recent analyses.

3.2.2 *Pro*-drop parameter

The *pro*-drop parameter, or the Null Subject Parameter (NSP), is one of the most studied cases of the P&P paradigm (e.g. Chomsky, 1981; Rizzi, 1986), providing an account for the observation that some languages require an obligatory overt subject (i.e. English, French) whilst it is optional in other languages (i.e. Spanish, Italian, Chinese). Under a traditional view of the NSP, the possibility of null subjects has been linked to a cluster of properties summarized in (11) (Chomsky, 1981).

(11) i) **Missing subjects**

a. Salimos.

b. Nosotros salimos.
'(We) left'
(Spanish)

ii) **Free inversion in simple clauses**

a. Marta habló.

b. Habló Marta.
'Marta spoke'
(Spanish)

iii) **Long wh-movement of subjects**

L'uomo che mi domando chi abbia visto.
The-man that CL wonder who has seen
'The man who I wonder who has seen'
(Italian)

iv) **Empty resumptive pronouns in embedded clauses**

Este es la mujer que me pregunto [quién cree [que no venga]].
This is the woman who CL wonder who thinks that not come
'This is the woman that I wonder who believes might not come'
(Spanish)

v) **Violation of the that-trace filter**

a. ¿Quién piensas que vendrá?
Who think that will come
'Who do you think will come?'

b. *¿Quién piensas vendrá?
Who think will come
'Who do you think will come?'
(Spanish)

There are two important factors that are thought to contribute to the parametric variation of null subjects; licensing and identification. Whilst licensing deals with how null subjects are formally allowed and involves the verbal features of a given language, identification relates to how the referential content (i.e. phi-features) of null subjects are recovered and involves the nominal features of a given language (Huang, 2000: 60). Jaeggli and Hyams (1988) argue that null subjects can only be realised if they can be identified through syntax. They propose two ways of identifying a null subject in a given language: i) identification by a governing category which contains T(ense) and A(greement) features and ii) identification by the closest identifier. According to research, (Chomsky, 1981; Rizzi, 1982, 1986) null subjects are possible in *pro*-drop languages because the Agr feature in Infl(ection) governs the empty category; *pro* is licensed by 'head-government' and identified by rich agreement specifications. In this view, null subjects should only be possible in a language with rich inflectional morphology, particularly in its verbal agreement. For example, the rich inflectional morphology of languages such as Italian and Spanish are able to recover the agreement features of the dropped argument(s), whilst inflectionally weaker languages such as English and French do not allow null arguments and require an overt subject in tensed clauses.

Whilst it is clear from the literature that null subjects have been strongly linked to agreement and rich inflection in null subject languages (e.g. Chomsky, 1981; Rizzi, 1982, 1986; Taraldsen, 1978), providing a definition of rich agreement is not necessarily straightforward. In response, Jaeggli and Safir (1989) use the richness of the morphological paradigm to define the richness of agreement, predicting that only morphologically uniform languages can have null subjects. The authors point out that all of the forms in Japanese are derived (morphemes do not encode person and number), all forms in Chinese are underived (no inflectional morphology) and Spanish (and Italian) uniformly encodes grammatical person and number. The level of uniformity displayed in these languages is thought to reflect the possibility of null subjects. On the other hand, languages such as English and French have some derived and some underived forms and these mixed languages do not allow null subjects in main clauses. However, whilst this appears to provide an explanation, this has not been supported for other languages such as German and Icelandic, which have only derived forms but neither allows null subjects

(Sheehan, 2006: 15). Furthermore, this does not explain why only morphologically uniform languages should allow null subjects.

From a syntactic point of view, the possibility of an empty subject in a finite clause is explained by the Extended Projection Principle (EPP) (Chomsky, 1986). The EPP is a universal principle that requires the subject position, [Spec, IP], in all languages to be filled in order for a sentence to converge. The EPP suggests that clauses never completely lack a subject, but rather a subject is syntactically present but not overtly realised. In that case, clauses with an overt or covert argument may have similar underlying representations. A covert subject is represented as '*pro'* to mark a pronoun that is phonologically empty and can be placed accordingly in the position where an overt subject would usually appear to demonstrate the co-occurrence of overt and null arguments in some languages.

In 'typical' null subject languages such as Spanish, subjects can move to the [Spec, IP] position (12); furthermore, the subject [Spec, IP] position can be filled by other elements, for example, an expletive subject (12) or the subject can remain in [Spec, VP] position in post-verbal structures (12) (see Camacho, 2013 for a recent review).

(12) a. él/*pro* bebe agua
He/*pro* drinks water
*'*He/she drinks water'

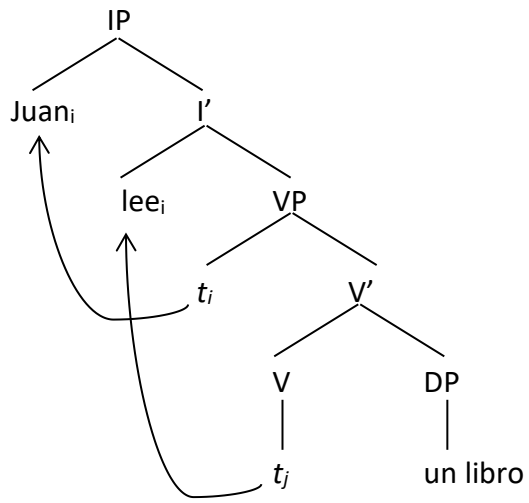
b. *pro* llueve
raining
'It's raining'

c. *pro* bebe agua Juan
drinks water John
'John drinks water'

It is widely accepted that in languages such as Spanish, the subject undergoes V-to-I movement (Suñer, 1994); the subject moves from [Spec, VP] to the specifier of IP/VP, in order to satisfy the EPP (13).

(13) *Juan lee un libro*

'John reads a book'



However, there is not always agreement amongst researchers regarding the position to which a subject moves within IP. In earlier research, Rizzi (1986) claims that *pro* is underspecified for Agr (person and number) features and therefore, is able to receive the phi feature values of Infl. Rizzi also argues that nominative case assignment triggers the movement of null and overt subjects to [Spec, IP] as a syntactic requirement. According to Chomsky (1995), preverbal subjects have two possible positions; i) [Spec, TP] where nominative case is checked or valued or ii) [Spec, AgrSP] where agreement features are satisfied. Therefore, the licensing of a null subject relies on the availability of the agreement features in either Agr or T (Chomsky, 1995, 2001). Since there is a lack of consensus, for the analysis in this study, I will assume the movement of preverbal subjects to the [Spec, IP] position.

3.2.3 Null subjects in the Minimalist Program

A reanalysis of the EPP by Chomsky (1995) within the Minimalist Program explains the fulfilment of the EPP by a strong D(definiteness) feature on T, which needs to be satisfied by another element which has the same D feature (i.e. a nominal acting as the subject). The movement of the DP subject to the [Spec, IP] position is argued to occur in order to satisfy the D feature. Chomsky (1995) proposes that uninterpretable features probe for a goal that bears the same interpretable features. The uninterpretable features then have an agree relation with the goal and are valued and deleted.

More recent research suggests that the D feature on T is in fact an uninterpretable [uD] feature (Roberts, 2004; Sheehan, 2006). In terms of Romance languages, Sheehan (2006) argues that *pro* is a full pronoun (like an overt subject) which is specified for interpretable phi-features. In this view, agreement morphology on Infl is uninterpretable and the features of *pro* value the uninterpretable features of Agr; the uninterpretable features are valued by the subject and are then deleted before LF but are present at PF as agreement. This would mean that the EPP is satisfied by movement of either an overt or a null pronoun to [Spec, IP], proposing that null and overt pronouns have the same uninterpretable features. This analysis has many advantages, for example, limiting parametric variation to the properties of a functional head, i.e. the [uD] feature on Infl. Furthermore, this analysis accounts for the deletion of *pro* in the EPP position, which must occur to satisfy economy principles, i.e. to avoid duplication of features. This is possible since T contains the required [uD] feature which is in an agreement relation with the features of the (overt or null) pronoun. This analysis also argues that other pronouns which can satisfy the EPP (i.e. expletives) are deleted at PF in the same way, accounting for the fact that other D-bearing elements can satisfy the EPP in null subject languages. In Sheehan's analysis, languages which do not allow null subjects in finite clauses such as English do not have a [uD] feature and therefore, have no means to value the appropriate features of a null element in a finite clause. Therefore, the main difference between preverbal subjects in a null subject language such as Spanish and English is the feature specification of I (i.e. the presence or absence of [uD]) and whether or not the subject is required to be phonetically realised.

In the current study, I assume the analysis outlined by Sheehan (2006) for *pro*-drop in traditional null subject languages. This analysis promotes a view of null subjects as a feature-based phenomenon which is crucial for the aims of this investigation. In the following sections, I will outline the possibility and the syntactic licensing of null elements in English, Spanish and Chinese.

3.2.4 English

English is a Germanic language which does not allow a null element in the subject position of a finite clause (14) or the object position of a transitive verb (15). In English, a finite clause is ungrammatical with a null subject and prefers an overt structure.

(14) a. He speaks
b. **e* speaks

(15) a. John saw him
b. John saw **e*

(16) a. John wants [you to stay]
b. John wants [PRO to stay]

(17) a. It is raining
b. * is raining

As shown by (16), English does allow null subjects in a non-finite clause. Since the null element is thought to have similar properties to the overt version, it is represented as PRO. The antecedent (or controller) of PRO is 'John' in the preceding clause. However, the presence of this type of empty category does not qualify English as a null subject language since null subjects are not possible in finite clauses. Syntactically, English requires the subject position of a finite clause to be filled at all times to satisfy the EPP. As a result, English sometimes requires 'expletive' subjects to fill the subject position of a sentence, even though they do not have any semantic content as shown in (17). English is classified as a non-null subject language which does not have a [D] feature. Furthermore, there is no V-to-I movement that is evident in languages such as Spanish; therefore, the verb remains in VP. The weak morphology in English would not be sufficient to identify a null subject and there are no proposals for any other mechanism to recover the content of a missing subject pronoun in a finite clause.

3.2.5 Spanish *pro*-drop

Spanish is a Romance language which licenses null subjects in finite clauses, as well as displaying the cluster of properties summarised at the start of Section 3.2.2. It is an example of a standard 'null subject language' (NSL) which allows either an overt or null element in the subject position of a finite clause (18) but like English, does not allow a null element in the object position of a transitive verb (19).

(18) Él/*pro* bebe agua
He drinks water
'He/*pro* drinks water'

(19) a. Juan le vio
John CL saw
John saw him'

b. Juan *_pro_* vio
'John saw _pro_'

In morphologically rich languages such as Spanish, the use of null subjects is considered to be the 'default' option in some cases and overt pronouns are primarily used to contrast between referents, to change the topic or for emphasis. It is widely accepted that Spanish identifies, or recovers the content of null subjects from its rich morphology, represented as Agr. In terms of licensing null subjects, this follows the analysis presented at the beginning of Section 3.2.3 for 'standard' NSLs. As a reminder, it is thought that Spanish *pro* has a similar underlying structure to overt pronouns and although phonetically null, has a syntactic purpose (Sheehan, 2006). The null subject is able to move to [Spec, IP] to satisfy the EPP conditions of clauses due to the fact that *pro* is a full pronoun with agreement features which value the uninterpretable features on Infl and can therefore be deleted at PF. As a result, the [uD] feature on Infl is valued by the equivalent [D] feature on the null or overt pronoun.

It is worth noting that there are some exceptions where Spanish appears to allow null objects, although these are restricted to a generic use with inanimate objects (Campos, 1986). Spanish null objects are restricted in terms of definiteness, i.e. definite objects (specific or non-specific) cannot be dropped (20). On the other hand, indefinite, non-specific objects must be dropped (21) (examples from Cuza, Pérez-Leroux & Sánchez, 2013: 95).

(20) a. ¿Compraste la revista?
You-bought the magazine
'Did you buy the magazine?

b. Sí, la (*Ø) compré.
Yes, it I-bought
'Yes, I bought it'

(21) a. ¿Compraste café?
You-bought coffee
'Did you buy coffee?'

b. Sí, compré (Ø).
Yes, I-bought
'Yes, I bought (it)'

However, the null objects that feature in the pronoun interpretation task used in the present study will be definite objects and therefore, it is assumed that these should not be allowed by native speakers of Spanish. Null objects in Spanish clearly have restrictions, but not in Chinese, which we will see in the following section.

3.2.6 Chinese topic-drop

Chinese is a Sino-Tibetan language that has no inflectional morphology and is often classified as a topic-prominent language in which the topic of a clause plays a particularly important role in its formation. This contrasts with languages such as English which are subject-prominent, given that the subject of a clause is indispensable. Chinese null arguments have been referred to as 'discourse *pro* drop' or 'radical *pro* drop' (Neeleman & Szendrői, 2007: 672) since any pronominal element can be omitted and they are allowed more freely than in other languages such as Italian and Spanish. Chinese allows an overt or null element in both the subject position of a finite clause (22) and the object position of a transitive verb (22)[6] which sets it apart from other languages such as English and Spanish (examples from Huang, 1984: 533).

(22) Q: Zhangsan kanjian Lisi le ma?
Zhangsan see Lisi PAST yet
'Did Zhangsan see Lisi?

a. **Overt subject, overt object**
ta kanjian ta le
He see him PAST
'He saw him'

b. **Null subject, overt object**
e kanjian ta le
see him PAST
'(He) saw him'

[6] In these examples '*e*' refers to 'empty category' and represents the position of the null element.

c. **Overt subject, null object**
ta kanjian *e* le
He see PAST
'He saw (him)'

d. **Null subject, null object**
e kanjian *e* le
see PAST
'(He) saw (him)'

e. **Embedded null subject, null object**
Zhangsan shuo [*e* kanjian *e* le]
Zhangsan say [see PAST]
Zhangsan said that (he) saw (him)'

Whilst we may classify Chinese as a 'null subject language', there has been some debate regarding whether or not Chinese should be considered a '*pro*-drop' language. As we have seen, the '*pro*-drop' analysis predicts that rich agreement systems are both sufficient and necessary to license *pro* in traditional NSLs; however, this does not apply to all languages. For example, German encodes person and number agreement to a greater extent than Portuguese, but German does not allow null subjects whilst Portuguese does (Huang, 2000: 57). Furthermore, an agreement-based theory incorrectly predicts that languages such as Chinese and Japanese should not allow argument-drop. In other words, the criteria for a *pro*-drop language under the NSP cannot account for the subject- and object-drop in Chinese which lacks an agreement system that can recover the content of null arguments and therefore, has no Agr in Infl for syntactic licensing. In response to the fact that null arguments are clearly not recovered by morphology, Huang (1984) proposes an alternative explanation for Chinese null subjects, based on the theory of control:

(23) 'Generalised Control Rule' (GCR): an empty pronominal is controlled in its control domain (if it has one)

The GCR proposes that 'control' determines the use of null subjects. In languages such as Spanish, the null subject is 'controlled' by Agr within the domain that contains Agr but in languages such as Chinese, Agr is absent so the clause containing the null subject cannot be the control domain. If there is no control domain, a null subject can be identified by the closest c-commanding antecedent in a preceding clause, or it can be arbitrarily interpreted or pragmatically controlled. However, there is evidence that this analysis based on control does not hold for all sentences containing null arguments in Chinese. For

example, in (24) (from Li, 2007: 81) the null object in the embedded clause would be expected to refer to the subject of the embedded clause (Lisi) which is the nearest c-commanding nominal. However, the null object is co-indexed with the topic of the main clause (this book).

(24) Zhe-ben shu_i, [[Lisi kan e_i] zui heshi]
This book Lisi read most appropriate
'This book, for Lisi to read [it] is most appropriate'

In terms of identification, in the traditional view null subjects in 'standard' NSLs such as Spanish are thought to depend on verbal inflectional morphology to recover the content. However, Chinese has no verbal inflectional morphology and empty categories are thought to be identified by a null sentence topic, [null topic]. This means that the content (i.e. the referent) of an empty category is identified by the topic of which it refers in the preceding sentence, since there are no clues in the morphology. Topic-identified null arguments are possible because of the rule 'Topic NP deletion' which states that the topic of the sentence can be deleted, under identity with a topic in a preceding sentence. The result is the presence of 'topic chains' in Chinese, which are defined as "a chain of clauses sharing a single topic" (Li, 2004: 26) and are seen as a basic syntactic unit in Chinese. For example, in (25)(25) the topic (China) is overtly introduced at the start of the chain and thereafter is not phonetically realised as a subject or object but the content is understood in context (Huang, 1984: 549).

(25) [Zhongguo, difang hen da] [*e* renkou hen duo] [*e* tudi hen
China place very big population very many land very
feiwo.] [*e* qihou ye hen hao] [*e* women dou hen xihuan]
fertile climate too very good we all very like
'(As for) China, (its) land area is very large. (Its) population is very big. (Its) land is very fertile. (Its) climate is also very good. We all like (it).'

Huang (1984) claims that the syntactic status of null subjects and null objects is not the same and outlines two types of null elements in Chinese, i) *pro* (an empty category that can be A-bound) and ii) variable (NP-trace that is A'-bound). Both are allowed in the embedded subject (or object) position but have different antecedents. This is demonstrated by the following example (26)(26).

(26) a. Lisi$_i$ says that $e_{i/j}$/he$_{i/j}$ likes Zhangsan.

b. Lisi$_i$ says that Zhangsan likes $e_{*i/j}$/him$_{i/j}$.

In (26), the embedded null subject in the subordinate clause can refer to either the main clause subject (argued to be an instance of *pro*) or a subject outside of the sentence (a syntactic variable), shown by the indices. In (26), an embedded overt object refers to the matrix subject or discourse entity; however, an embedded null object can only be licensed to a discourse entity (i.e. null objects cannot be bound by a matrix argument). This is in line with Chomsky (1981) and Principle C of Binding Theory which states that a variable cannot be co-referential with a c-commanding nominal in argument position, i.e. it cannot be A-bound. Instead, Huang (1984) analyses null objects as a variable, bound by a null topic in a higher clause. Huangs' (1984) theory of Chinese null arguments assumes that i) *pro* is only possible as the subject of an embedded clause, bound by the matrix clause argument and that ii) all other arguments are [null topic] or a variable. This moves away from the original agreement-based argument and provides an alternative analysis for null elements in Chinese.

In terms of syntactic licensing, recall the proposal that in Romance NSLs with rich morphological agreement, null subjects move to [Spec, IP] to satisfy the EPP conditions of clauses, which is possible because *pro* is a full pronoun with agreement features which value the [uD] feature on Infl and can therefore be deleted at PF (Roberts, 2007, 2010; Sheehan, 2006). On the other hand, languages such as English which do not allow null subjects in finite clauses do not have a [uD] feature and lack rich morphology; therefore, this type of licensing has been linked to rich agreement. However, as Zhao (2012) points out, Roberts' proposal cannot be directly applied to Chinese null subjects since this would assume that Chinese T has a [uD] feature, which does not correlate with the proposal that this feature is present in languages with rich verbal inflection (Zhao, 2012: 172). Chinese lacks both subject and object agreement morphology and neither the T nor v has a [uD] feature; therefore, pronominal features cannot be included in those of T or v. Clearly, an alternative analysis is required that takes into account that Chinese null arguments are not straightforward cases of *pro* (Zhao, 2009: 78).

Zhao (2008, 2009, 2012, 2014) outlines an alternative explanation of how Chinese null elements are syntactically licensed. Firstly, Zhao (2009) marks the two different types of null argument that have been observed in previous studies as the 'syntactic deletion type'

and the 'discourse deletion type'. The syntactic deletion type refers to an embedded null subject whose reference is the matrix subject (i.e. the equivalent of *pro* in Romance languages). Since Chinese null subjects cannot be deleted at PF as a defective goal of T, Zhao introduces the notion that null subjects are the result of the deletion of the bare reflexive *ziji* ('self') as the defective goal of the matrix subject. *Ziji* is assumed to be unspecified for phi-features (person, number, gender) and base-generated at [Spec, vP]; it is a N(ominal)-head with unvalued phi-features which can move from one head to another during syntactic derivation. The unvalued phi-features of *ziji* trigger movement upwards to head-adjoin to C of the embedded clause.

The assumption here is that the embedded C probes *ziji* at the [Spec, vP] position of the embedded clause, valuing its unvalued case feature as nominative. This is justified by applying the analysis outlined in Chomsky (1995) that phase heads (i.e. C or v) have phi-features. In languages such as English, phi-features are transmitted from C to T, however in this case, Chinese C of the embedded clause probes *ziji* at [Spec, vP] of the embedded clause. The unvalued features of *ziji* cause it to move up and head-adjoin to the embedded C, which is still accessible to the matrix vP according to the Phase-Impenetrability Condition (PIC) (Chomsky, 2001). The matrix subject at [Spec vP] probes *ziji* and values its unvalued agreement features. As a result, at PF *ziji* has the same phi-features as the matrix subject, i.e. both have a nominative case feature. *Ziji* has a nominal feature, denoted as [N] feature, whilst the matrix subject has an [N] feature and a [D] feature. Since *ziji* can be deleted, a null subject can be derived.

Since a Chinese embedded null subject can also refer to a discourse entity, Zhao discusses a second type of embedded null subject, the discourse deletion type (the embedded argument refers to an entity in the discourse). If the discourse takes the form of a question, the embedded null subject can refer to a discourse prominent referent (i.e. another person mentioned in the question), but this is not possible for the *ziji* type of null subject. This second type of embedded null subject is represented by the Topic NP Deletion Rule: the embedded subject moves from [Spec CP] position of the embedded clause until it reaches the [Spec CP] position of the matrix clause. All of the lower copies are supressed which gives rise to a 'topic chain' in which the topic of the sentence is deleted (Zhao, 2009: 80). In summary, an embedded null subject can be either Øziji or Øtopic but an embedded null object can only be discourse deletion, Øtopic.

This is the most recent account of the syntactic licensing of Chinese null subjects; however, it has not been corroborated with further research yet. There are some similarities between Zhao's account and Huangs' previous account, in that there seems to be two different types of null element in Chinese, depending on whether the embedded null element refers to the main clause subject or a referent in the discourse. In line with Zhao, it seems logical to assume that Chinese null elements are not instances of *pro* in the traditional sense, since there is no inflectional morphology to support the type of identification and licensing that has been suggested for Romance-type null subjects. Furthermore, it is possible that the features associated with null subjects are assembled differently in *pro*-drop and topic-drop languages; i.e. in [Spec, IP] in Spanish and in [Spec, CP] in Chinese as suggested by Zhao. For the current study, the most important point is that the syntactic structure of null subjects in Chinese and Spanish must be inherently different in some way.

3.3 Interpretations of null and overt arguments in embedded clauses

In the previous sections, we have seen that English is a non-null subject language and although Chinese and Spanish both allow null subjects, there are some crucial differences in the way in which they are identified and licensed. Another interesting characteristic of subject and object pronouns that will be explored in this study is the anaphoric relationship between an embedded pronoun and an antecedent in a preceding clause. Other studies have shown that it has proven insightful to not only explore the use of null and overt arguments, but also the interpretative behaviour of language learners (e.g. Rothman, 2009; Kanno, 1997; Zhao, 2008). Interpretative behaviour refers to the preferred antecedent of an embedded null or overt element, either the main clause subject (i.e. the co-referential reading) or someone else in discourse (i.e. the disjoint reading). In some cases, either of these antecedents is possible (i.e. the ambiguous reading). The interpretative behaviour of arguments in English is straightforward; however, there are some key differences in Chinese and Spanish depending on the type of antecedent (referential or quantified) in Spanish, and the type of embedded argument (null objects) in Chinese. In the following sections, I will outline the interpretative behaviour of embedded null and overt arguments when the antecedent is referential, followed by the interpretative behaviour of embedded null and overt arguments when

the antecedent is quantified in order to highlight the similarities and differences between the languages.

3.3.1 Embedded null and overt arguments with a referential antecedent

Firstly, in English an embedded overt subject or object with a referential antecedent can refer to the main clause subject (i.e. the co-referential reading) or someone else in discourse (i.e. the disjoint reading). For example, in example (27) if the embedded overt subject 'he' has the co-referential reading it means that 'John himself' forgot his books, whilst if it has the disjoint reading it means that 'someone else that is not John' forgot his books. In example (27), if the embedded overt object has a co-referential reading it has the meaning that 'David did not see John'; however, if it has the disjoint reading, it means that 'David did not see someone else who is not John'. English does not license or identify null subjects or null objects in finite clauses and therefore, there are no referential properties to consider.

(27) a. $John_i$ said that $he_{i/j}$ forgot his books.

b. $John_i$ says that David did not see $him_{i/j}$.

In Chinese, an embedded overt subject (28) or null subject (28), or an embedded overt object (28) can have either a co-referential reading with the main clause subject or a disjoint reading with a referent outside of the discourse. However, as mentioned in the previous section an embedded null object cannot have a co-referential reading and must only refer to someone else in discourse. For example, in (28) the embedded object cannot refer to 'John' and must refer to 'David' in the preceding sentence.

(28) a. John shuo ta qu guo lundun
John say he have been London
'$John_i$ says $he_{i/j}$ has been to London'

b. John shuo qu guo lundun
John say have been London
'$John_i$ says *($e_{i/j}$)* has been to London'

c. Peter shuo Bill ren chu le ta.
Peter say Bill recognize PAST him
'$Peter_i$ says Bill recognizes $him_{i/j}$'

d. Q: some friends want to know who likes $David_j$…
A. John shuo Peter xi huan.

John say Peter like
'John said that Peter likes (him$_{*i/j}$).

Finally, in Spanish an embedded overt (29) or null subject (29) or an embedded overt object (29) can refer to a referential antecedent in the main clause (co-referential reading) or someone else in discourse (disjoint reading). However, embedded null objects are not possible in Spanish (29).

(29) a. Juan$_i$ cree que él$_{i/j}$ es inteligente
John believes that he is intelligent
'John believes that he$_{i/j}$ is intelligent'

b. Juan$_i$ cree que *pro*$_{i/j}$ es inteligente
John believes that is intelligent
'John believes that *pro*$_{i/j}$ is intelligent'

c. Juan cree que David le conoce.
John believes that David CL knows
'John$_i$ believes that David knows him$_{i/j}$'

d. *Juan cree que David (*e*) conoce.
John believes that David knows
'John$_i$ believes that David knows (*e* $_{*i/*j}$)'

These examples demonstrate that the interpretations for embedded null and overt arguments are mostly straightforward in all three languages and can have a co-referential or disjoint reading. However, it is important to note that in Chinese embedded null objects cannot have a co-referential reading.

3.3.2 Embedded null and overt subjects with a quantified antecedent

In this section I will present the interpretative behaviour of embedded arguments with a quantified antecedent in the main clause. It has been observed that in some languages (e.g. Spanish), there is a binding restriction on overt subjects which blocks their licensing with a quantified noun phrase (which does not apply to null subjects). This has been captured by the Overt Pronoun Constraint (OPC) (Montalbetti, 1984) which describes this asymmetry in the interpretation of embedded null and overt pronouns. According to the OPC, there is a restriction on the interpretation of embedded overt subjects which can refer to a referential noun phrase (RNP) in the main clause but cannot refer to a quantified noun phrase (QNP) in the main clause. In other words, an overt subject cannot receive a bound variable interpretation, but null elements can refer to any type of main

clause subject or to a referent outside of the clause (i.e. in discourse). In referential contexts both a null and an overt pronoun can refer to the subject antecedent, whereas in quantified contexts only a null subject can be bound to the subject. As a result, null and overt pronouns do not have the same interpretation and distribution, depending on their position in the sentence.

In Spanish, the OPC has been widely observed, preventing a bound variable interpretation for embedded overt subjects. An embedded overt subject cannot refer to a QNP/wh-element in the main clause, i.e. it cannot receive a bound variable interpretation. In (30) the embedded null subject (*pro*) is ambiguous in its interpretation and could reasonably refer to the matrix clause subject *nadie* (the co-referential reading) or an unspecified referent outside of the sentence (the disjoint reading), whilst the embedded overt subject *él* in (30) cannot refer to the matrix clause subject (the co-referential reading).

(30) a. Nadie$_i$ cree que él$_{*i/j}$ es inteligente
Nobody believes that he is intelligent
'Nobody$_i$ believes that he$_{*i/j}$ is intelligent'

b. Nadie$_i$ cree que *pro*$_{i/j}$ es inteligente
Nobody believes that is intelligent
'Nobody$_i$ believes that *pro*$_{i/j}$ is intelligent'

The constraints on embedded overt subjects have been observed for Japanese (Kanno, 1997) and Spanish (Pérez-Leroux & Glass, 1997, 1999; Rothman, 2009). Furthermore, successful acquisition of this property is often assumed to indicate that the NSP has been reset and null subjects have been acquired (Rothman, 2009: 955).

There is a lack of evidence in the literature regarding the OPC in Chinese, although it has been observed and tested in Japanese (Kanno, 1997). Recent evidence suggests that the OPC does not apply to Chinese (Zhao, 2008, 2012), despite the presence of null subjects. In particular, Zhao (2012) states that the Chinese pronoun *ta* (he/she) in an embedded clause can refer to a quantified expression in the subject position of the main clause.[7] In

[7] The results of the experimental tasks will be able to contribute towards the discussion regarding whether or not the OPC applies to Chinese.

(31) (from Zhao, 2012:175) we see that the embedded subject *ta* can refer to *everyone* or *someone in the discourse*.

(31) Meigeren$_i$ dou shuo *ta*$_{i/j}$ mingtian yao lai.
everyone all say he tomorrow want come
'Everyone$_i$ says that *he*$_{i/j}$ wants to come tomorrow.'

In English, there are no constraints that prevent the co-referential, disjoint or ambiguous readings for an embedded overt subject with a quantified antecedent; an embedded subject pronoun is not restricted by OPC constraints, as shown by (32), which demonstrate that 'he' can refer to a referential matrix subject (32) or a quantified matrix subject (32), (as well as someone else in the discourse).

(32) a. John$_i$ thinks that he$_{i/j}$ is smart.
b. Everyone$_i$ thinks that he$_{i/j}$ is smart.

These examples show that English allows the bound variable reading for embedded overt subjects.

3.4 Summary of the key differences and similarities (English, Spanish and Chinese)

The above analysis outlines a number of key similarities and differences between English and Spanish, compared with Chinese that may prove crucial for the L3 learners of this study. Firstly, general typological distinctions highlight that the three languages are not related to each other. English is a Germanic language, Spanish is a Romance language and Chinese is a Sino-Tibetan language. In terms of null subjects, English is classed as a non-null subject language (i.e. subject-drop is not possible) and has a weak morphological paradigm. Spanish is an example of a typical null subject language (i.e. *pro*-drop) and has a rich morphological paradigm. In contrast, Chinese also allows null subjects (topic-drop) but has no inflectional morphology. In terms of null objects, neither English nor Spanish allow object-drop, whilst Chinese does. The main similarity between English and Chinese is that embedded overt subjects are not restricted by the OPC and therefore, allow embedded overt pronouns to refer to a quantified noun phrase in the preceding clause. This demonstrates that despite no formal typological relations between the three languages, there is a structural similarity between Spanish and Chinese (null subjects) and

a structural similarity between English and Chinese (no binding restrictions on overt subjects).

Rather than relying on broader typological distinctions, this investigation is able to discuss 'similarity' or 'relatedness' in terms of the features associated with null subjects. Table 2 summarises the features associated with null subjects in each language, showing that Spanish and Chinese null arguments must be identified and licensed by a different mechanism.

Identification and licensing of null subjects	**English**	**Spanish**	**Chinese**
Identified	No	Yes via [AGR]	Yes via topic
Licensed	No	Yes -*pro* [uD] feature	Yes - [Øziji] or [Øtopic] No [uD] feature

Table 2: Summary of the features associated with null subjects in English, Spanish and Chinese

The leading explanation for Spanish-type null subjects is that *pro* is identified, or recovered, by the inflectional morphology of verbs and licensed by the presence of a [uD] feature which causes movement to [Spec, IP] to value its uninterpretable features; as a result, *pro* can be deleted at PF. On the other hand, Chinese completely lacks agreement and therefore, null subjects are controlled by an antecedent in the dominant clause. The leading syntactic explanation for Chinese is that null subjects cannot have a [uD] feature, since there is a complete lack of inflectional morphology. If an embedded null element refers to the matrix subject, it is analysed as the bare reflexive *ziji* which has unvalued phi-features and triggers movement to [Spec, CP] of the embedded clause to be valued and consequently deleted at PF [Øziji]. The second type of null argument that refers to a discourse entity is perhaps more straightforward; the null subject is [Øtopic] which moves from [Spec, CP] of the embedded clause to [Spec, CP] of the matrix clause. The deletion of lower copies induces a topic chain.

3.4.1 Proposal for a feature-based acquisition task

For the current study, the important factor is that Spanish and Chinese both have null arguments but there are significant differences in their licensing and identification. Currently, there is a lack of syntactic analysis for Chinese null subjects and therefore, it is

not straightforward to provide a feature-based acquisition task for Chinese learners. Nonetheless, I put forward the following proposal for the purpose of this thesis in order to discuss the acquisition task in more concrete terms. The proposal is based on one of the feature-sets outlined in Domínguez, Hicks and Song (2012) for the acquisition of Korean reflexives by L1 English speakers. The authors propose a feature-based account of the L2 acquisition of binding properties in which cross-linguistic differences are discussed in terms of anaphoric feature specifications and their role in syntactic operations. The analysis attributes difficulties in acquiring certain binding properties to problems reanalysing the features associated with reflexives in the target language; this focus on feature reassembly makes it an appropriate account for the basis of the current proposal. In summary, the features responsible for syntactic binding are manipulated in the syntactic component of the grammar and are semantically interpretable, represented as logical variables at LF; therefore, the relevant features are termed [VAR(IABLE)] and are identified by their feature value (i.e. x, y, z). In English, since anaphors are referentially dependent the [VAR] feature is absent when the anaphor enters the syntactic derivation; as a result, [VAR:] is unvalued. In Korean, reflexives are analysed as bound variables which are restricted to binding by a topic, rather than a subject, summarised as [VAR: topic]. Although the analysis presented by Domínguez, Hicks and Song (2012) is put forward for the binding of reflexives, it can be adapted for the analysis of licensing null subjects in the current study. In this case, I use the [VAR] feature to outline the possible feature specifications for licensing null subjects in English, Spanish and Chinese.

In English, null subjects are not possible in finite clauses and therefore, I assume that the [VAR] feature is unvalued when it enters the syntactic derivation; [VAR:] in much the same way as the above analysis. In Spanish, null subjects are thought to be syntactic equivalents of overt pronouns but are not phonetically realised, represented as *pro* in syntactic derivations (see previous section for more detail). Therefore, one way to summarise the feature specifications responsible for Spanish null subjects is [VAR: *pro*]. In Chinese, the exact feature specifications for null subjects is unclear; Zhao's analysis suggests that null subjects could be summarised as [Øziji] or [Øtopic], however, this analysis has not been corroborated. In the literature, null elements in Chinese are consistently referred to as 'empty category', in an attempt to highlight the fact that null subjects are not just straightforward instances of *pro* as in null subject languages such as

Spanish and most likely involve a different syntactic analysis. Therefore, the feature specification for null subjects can be summarised as [VAR: empty category] in Chinese.

English	Spanish	Chinese
[VAR:]	[VAR: *pro*]	[VAR: empty category]

Table 3: Summary of the feature-sets in English, Spanish and Chinese

Although this has not been attested, the above proposal provides a basis to outline the acquisition task for learners of Chinese, which is essential for the current study. Firstly, the task for L1 English learners acquiring Chinese (English → Chinese) involves learning the null subject feature set as a new property, i.e. mapping the unspecified [VAR] feature from English to [VAR: empty category] in Chinese. On the other hand, the task for Spanish learners of Chinese (Spanish → Chinese) is to reconfigure the [VAR: *pro*] feature to [VAR: empty category] in Chinese via feature reassembly. This feature-based account of null subjects is crucial for the current study, highlighting that although null subjects are possible in both Spanish and Chinese, the acquisition task is not necessarily straightforward. This analysis will be referred to throughout the remainder of the thesis.

3.5 Previous studies

This section provides an outline of some of the key studies that have explored the acquisition of Spanish and Chinese by English learners, discussing their findings and the insight this provides for the current study. Whilst there is a distinct lack of L3 studies which explore English, Spanish and Chinese, there are a number of relevant L2 studies. Firstly, there are studies which have explored whether or not L1 speakers of a language which allows null arguments (e.g. Spanish, Chinese) are able to 'unlearn' the setting from their native language when acquiring an L2 which does not allow null arguments (e.g. English). Toribio, Roebuck and Lantolf (1992) show that L1 speakers of Chinese, Japanese and Korean are significantly better at identifying that null subjects are not possible in English than L1 speakers of Romance languages (i.e. Spanish and Italian). Toribio et al. attribute this finding to the perceived differences between their L1 and L2 (i.e. Kellerman's psychotypology), given that English and Asian languages have more salient typological differences and therefore, learners pay more attention to the input.

Similarly, another study explored the acquisition of English by speakers of Spanish and Chinese, following observations that null subjects are possible in these languages despite different syntactic mechanisms (i.e. Spanish null subjects are *pro* whereas Chinese null subjects can be *pro* or a null topic licensed by a topic chain) (Roebuck et al., 1999). The authors issued an elicited imitation task, which shows that the L1 Chinese speakers outperformed the L1 Spanish speakers in disallowing null subjects in English. The results also show that this can be overcome with proficiency, since Spanish speakers at more advanced levels are able to identify that null subjects are not allowed in English. These studies show that L1 Chinese speakers find it easier than L2 Spanish speakers to learn that null subjects are not possible in English.

Next, I consider what we know from existing L2 acquisition studies that explore the acquisition of null subjects in L2 Spanish and L2 Chinese, by L1 English learners. This will provide an insight into how well L1 learners of a non-null subject language are able to acquire the features associated with null subjects which is particularly relevant for the current study. The situation is much more complex in the current study, as this process in then followed by the acquisition of another null subject language. However, this is an important step in forming predictions for the acquisition of null subjects in L3 Chinese. In terms of L1 English learners, the acquisition of null and overt subjects has been widely explored in L2 studies, finding that null pronouns are quickly and easily acquired by L2 learners of Spanish (Liceras, 1988; Phinney, 1987). There have been claims that learners do not find null subjects particularly difficult to acquire whilst overt subjects are problematic (e.g. Sorace & Filiaci, 2006). However, this asymmetry has been challenged in more recent research, for example, Clements and Domínguez (2016) who find that L1 English-L2 Spanish learners at advanced levels do not find the acquisition of overt pronouns significantly more difficult than null subjects. Furthermore, studies show that L1 English-L2 Spanish speakers are able to acquire syntactic properties of subject pronouns easily, but find it more difficult to integrate syntax with pragmatics (i.e. the behaviour and distribution of pronouns) (e.g. Pladevall Ballester, 2013). Overall, previous research shows that null subjects are quite straightforward to acquire for L1 English learners.

As noted by Zhao (2009, 2012), there are relatively few studies which have investigated the L2 acquisition of Chinese null arguments. Yuan (1993) is the notable exception, who studied L1 English learners of L2 Chinese, finding that learners accept both null subject

and null objects from an early stage of acquisition. However, the study explored whether or not the participants knew that null arguments are allowed and did not explore whether or not the learners were able to use and interpret null arguments correctly, at different stages of acquisition. In response, Zhao (2012) investigated the L2 acquisition of Chinese by L1 English speakers to establish if the learners are able to acquire the correct interpretations of null subjects in Chinese, at high-intermediate and advanced levels of learning. The participants completed a Picture Verification Task which shows that L2 learners are able to acquire the interpretations of the overt pronoun 'ta' and the null subject (Øziji) by the high-intermediate level of proficiency. The results show an asymmetry in the disjoint readings, in that Øtopic was acquired earlier for elements in the embedded null object position than in the embedded subject position. However, this is overcome with proficiency as the advanced L2 learners have acquired the interpretation of Øtopic in both positions. The findings support Yuan (1993), showing that the L2 learners allow Chinese null arguments to appear in embedded argument positions from an early stage onwards. These data indicate that L1 English learners do not find it particularly difficult to acquire null subjects and null objects in L2 Chinese.

The interpretation of null and overt embedded subjects has been explored in Spanish (Pérez-Leroux & Glass, 1999; Rothman, 2009) and Japanese (Kanno, 1997), focusing on the acquisition of the Overt Pronoun Constraint (OPC). Kanno (1997) tested the accessibility of the OPC principle in L2 Japanese by L1 English speakers, finding that the learners were able to successfully reject QNPs as an antecedent for overt pronouns, with no significant differences between the learners and the control group. These findings are supported by Pérez-Leroux and Glass (1999) which tested the knowledge of the OPC in L2 Spanish, finding that the L1 English learners are able to acquire knowledge of OPC restrictions early on. Rothman (2009) also explores the L2 acquisition of Spanish null and overt subjects by L1 English speakers, finding that advanced learners were completely native-like. From these studies, it seems as though the OPC remains accessible in L2 acquisition of a NSL. Zhao (2008, 2012) states that the OPC does not apply to Chinese based on evidence that the bound variable interpretation is not blocked; therefore, it is assumed that L1 English learners will not have difficulties in L2 Chinese.

If we compare the results of the L1 English-L2 Spanish and L1 English-L2 Chinese studies, there is a recurring pattern that indicates that neither null nor overt subjects are

particularly difficult to acquire for L1 English learners (although the pragmatic constraints of Spanish subjects seem to present more challenges than for Chinese subjects at advanced levels). These previous studies serve to provide the basis of my predictions for the L3 Chinese learners in this study, who have L1 English and L2 Spanish. Since null subjects are not identified or licensed in English, the task for the learner acquiring one NSL is quite straightforward and does not involve significant remapping or reconfiguration of features. However, the L3 learners have already acquired one NSL and are now acquiring a second NSL with an important structural difference; there is a different syntactic licensing mechanism at work in Spanish and Chinese. This means that the learners will need to learn that null subjects are allowed due to topic-drop in Chinese rather than *pro*-drop in Spanish. Furthermore, even though the OPC does not apply to English it is thought to be available through UG which leads to target-like competence with overt subject pronouns in Spanish. The learner group with L2 Spanish are presumed to have acquired the OPC conditions in the acquisition of their L2 Spanish. However, this knowledge is no longer required for L3 Chinese, even though it is classed as a NSL. As a result, the L3 Chinese learners with L2 Spanish must learn that null subjects are allowed, but OPC conditions are not relevant. I will outline the hypotheses in more detail in the following section.

3.6 Hypotheses

The aim of the present study is to investigate the importance of structural similarity between the previously learnt languages and the target language; furthermore, I propose that structural similarity may be defined by specific linguistic features. Recall the research questions as outlined in Chapter 1:

1. What is the source of transfer for the L1 English-L2 Spanish-L3 Chinese learners?

2. To what extent does the similarity between features in each language determine the source of transfer; is there evidence of feature reassembly in the acquisition of null subjects in L3 Chinese?

Question 1 aims to establish from which background language (L1 or L2) transfer takes place, for null and overt arguments in L3 Chinese. Question 2 focuses on the acquisition of null subjects and whether or not there is evidence of feature reassembly. This tests the

hypothesis that the role of feature reassembly or reconfiguration is influential on L3 acquisition, in that the task of the L3 learner is to reconfigure the feature(s) from their L1 or L2 onto appropriate lexical items in the L3. The language combination in this study is particularly interesting because we need to look past obvious typological relatedness and focus on the underlying structures associated with the use of null and overt arguments. Spanish and Chinese both allow null subjects but the licensing and identification in each language is fundamentally different. Furthermore, there is an important difference in the referential properties of overt subjects in these languages, in that an embedded overt subject cannot be co-referential with a quantified main clause subject in Spanish but this is possible in Chinese and English. As a result, transfer could take place from the L1 or the L2 of the L3 learners. The two main hypotheses are presented below, outlining the type of evidence that is anticipated to corroborate either prediction. The L1 English-L2 Spanish-L3 Chinese learners are referred to as the [+SP] group, whilst the group with no previous experience of Spanish is referred to as the [-SP] group (see Chapter 4 for more detail on the learner groups).

H1: English is the source of transfer

- **Null subjects:** since null subjects are not possible in English, I do not expect any direct evidence of transfer from English. However, if the two learner groups perform similarly to each other this could indicate that the [+SP] have not transferred from Spanish and are learning null subjects as a new property. Feature reassembly accounts predict that if the L3 feature does not exist in the L1 or L2, i.e. [VAR:] in English, there should be no considerable difficulties for the learner, as their task is to acquire a completely new feature with no competing sets of rules.
- **Overt subjects:** both learner groups perform similarly to each other.
- **Null objects:** the learner groups perform similarly in the interpretation of null objects. Since English does not allow null objects, they are learnt as a new property and there is no feature reassembly involved. However, there may be more difficulties at the beginner level which improves with proficiency.

H2: Spanish is the source of transfer

- **Null subjects:** the [+SP] beginner group will outperform the [-SP] beginner group, showing an advantage of having previous knowledge of null subjects. However,

the task for the [+SP] group is not straightforward; learners need to reassemble the [VAR: *pro*] feature in Spanish to the [VAR: empty category] feature in Chinese. Therefore, the I-A group may show more difficulties with null subjects, due to the feature reassembly involved at later stages.

- **Overt subjects:** the two learner groups perform differently to each other, i.e. their interpretations are not the same: the two groups transfer from different background languages.
- **Null objects:** the two learner groups perform differently and the [+SP] beginners may be more target-like than the [-SP] beginners. However, transfer from Spanish is ultimately non-facilitative and would be marked by rejection of null object sentences.

The two main hypotheses are that transfer could take place from either L1 English or L2 Spanish for the [+SP] learners. Crucially, the hypotheses have also been divided into the different properties being acquired and therefore, it is possible that either learner group could transfer from a different background language for different properties. If this is the case, the data could provide evidence of partial transfer which occurs from the L1 and the L2, rather than full transfer from only one background language. The main evidence for feature reassembly is anticipated to be shown by the acquisition of null subjects by the two learner groups; if the two groups perform similarly (and are target-like at early stages) this could show that feature reassembly is not difficult, whilst a difference in the performance could indicate that the [+SP] learners have transferred from L2 Spanish and need to reconfigure the relevant features.

3.7 Summary

In this Chapter I have outlined the use and interpretation of null and overt arguments in English, Spanish and Chinese in order to clarify the similarities and differences that have been observed. Firstly, I have provided an overview of the theoretical background of null elements and the progression of these analyses from Government and Binding Theory to the Minimalist Program. In the most recent analyses, we know that English does not allow a null subject or a null object in a finite clause. In Spanish, null subjects are analysed as a typical instance of '*pro*-drop' and null objects are only allowed in generic, inanimate contexts. Finally, Chinese allows null objects (under identification with a sentence topic)

and also allows null subjects. However, it has been argued that we should be careful in referring to Chinese null subjects as *pro,* since Chinese does not have the inflectional morphology necessary to identify or license null subjects in the same way as languages such as Spanish. Another important difference is the licensing of null subjects in [Spec, IP] in Spanish, but in [Spec, CP] in Chinese. For the purpose of this study, I have outlined possible feature specifications in each language: English [VAR:], Spanish [VAR: *pro*] and Chinese [VAR: empty category] that represent the differences in syntactic licensing and highlight the feature reassembly task for Spanish learners of Chinese. This highlights the main similarity between Spanish and Chinese (i.e. the possibility of null subjects) as well as a key difference (i.e. their syntactic licensing).

As well as exploring the use of null and overt arguments, this Chapter also outlined the value of considering the interpretation of embedded null and overt arguments, and their reference to a referential or quantified antecedent in the preceding clause. It is within this context that we see a key similarity between English and Chinese; an embedded overt subject can refer to a quantified antecedent with no binding restrictions, whilst this is blocked in Spanish.

This detailed account of the structural similarities and differences between English, Spanish and Chinese is crucial in making predictions in terms of L3 transfer. The study investigates L1 English-L2 Spanish-L3 Chinese learners, as well as L1 English-L2 non-null subject language-L3 Chinese learners in their use and interpretation of null and overt arguments. In terms of the hypotheses, it is predicted that transfer may take place from either the L1 or L2, for which the learners cannot rely on typological similarity. Therefore, the study investigates the role of these structural similarities in determining the source of transfer, proposing that structural similarity can be accounted for by the presence or absence of relevant features (e.g. the [uD] feature). The following Chapter outlines the experimental design in more detail.

Chapter 4: Methodology

4.1 Rationale

The study investigates the source of transfer in L3 acquisition, exploring the role of structural similarities and differences between previously acquired languages and the target L3. I predict that any transfer observed between languages in L3 acquisition can be attributed to the configuration of relevant features in the L1 and L2, as well as how much restructuring is required on lexical items in the L3.

As outlined in the previous Chapter, these issues are explored by examining the acquisition of null and overt arguments in L3 Chinese by L1 English-L2 Spanish-L3 Chinese learners, referred to as the [+SP] group. This language combination and linguistic property provide an ideal setting to explore the importance of features in L3 acquisition since both the L1 and L2 have similarities and differences in the use and interpretation of null and overt arguments. The behaviour of the [+SP] group will be compared with the behaviour of another learner group, who have no knowledge of Spanish, referred to as the [-SP] group. This provides an insight into whether or not the similarities and differences in Spanish and Chinese affect the source of transfer in L3 acquisition. In addition, there are two control groups in the study; a Chinese control group which shows the extent to which both learner groups are target-like in Chinese with null and overt arguments, and a Spanish control group which can be compared with the [+SP] learner group to establish whether or not there has been transfer from Spanish.

In this Chapter, I present the experimental design and outline the tasks that were completed by the participants in detail. The tasks were administered online through the 'iSurvey'[8] website. Each task was explained clearly and included example test items where possible (in the native language of the participant); the participants had no strict time limit but could not return to previous pages to change their answers. Firstly, the learner participants completed two background tests which aimed to ensure that the learners were suitable to take part in the final testing. The learner groups completed a background

[8] iSurvey is a survey generation and research tool for distributing online questionnaires, hosted by the University of Southampton; it is free to use for any member of the University.

questionnaire to provide a profile of their previous linguistic experience, for example, how many languages they have acquired and to what level of proficiency. The [-SP] and [+SP] learners both completed a Chinese proficiency test from which the learners were divided into proficiency groups. The [+SP] group also completed a Spanish proficiency test and a L2 Spanish Pronoun Interpretation Task (L2 Spanish PIT), which aimed to ensure that the learners had an appropriate knowledge of Spanish pronouns prior to completing the main experimental tasks. The main hypotheses were tested using data elicited through three main experimental tasks; a Written Production Task (WPT), a Pronoun Interpretation Task (PIT) and a Language Relations Questionnaire (LRQ). The tests taken by each participant group are summarised in Table 4.

Group type	Participants	Group Name	Tests
Learner	L1 English L2 Spanish L3 Chinese	[+SP]	Background Questionnaire Chinese proficiency test Spanish proficiency test L2 Spanish PIT Written Production Task Chinese Pronoun Interpretation Task Language distance questionnaire
Learner	L1 English L2 non-null subject language L3 Chinese	[-SP]	Background Questionnaire Chinese proficiency test Written Production Task Chinese Pronoun Interpretation Task Language distance questionnaire
Control	Chinese native speakers	Chinese controls	Background Questionnaire Written Production Task Chinese Pronoun Interpretation Task
Control	Spanish native speakers	Spanish controls	Background Questionnaire Written Production Task Spanish Pronoun Interpretation Task L2 Spanish PIT

Table 4: Summary of the tasks completed by each participant group

The use of arguments is addressed by the Written Production Task (WPT) which establishes the extent to which the L3 learners appropriately use null subject or object pronouns compared with the native Chinese speakers. The interpretation of arguments is examined in the Pronoun Interpretation Task (PIT), based on test items that ask the learners to give a judgement regarding the antecedent of an embedded null or overt argument. The format of the PIT allows for two main criteria to be examined; i) embedded null or overt arguments and ii) referential or quantified antecedents. Learners

also took a Language Relations Questionnaire (LRQ) that specifically investigates the learners' perceptions of the relationship between English, Spanish and Chinese in order to discuss the role of such perceptions in the source of transfer debate. The remainder of this Chapter provides more detail regarding the participants and the tasks.

4.2 Background tests and participants

Before I outline the main experimental tasks, I begin by outlining the additional 'background' tests (i.e. background questionnaire, proficiency tests) which aimed to provide a linguistic profile of the participants, ensuring that the learners were suitable to take part in the study and to divide the learners into groups according to their proficiency in Chinese. These background tests are a small but important part of the study that attempt to control for some of the additional complexities that have been noted in L3 acquisition studies. For example, previous studies (Cenoz, 2003; De Angelis, 2007; Rast, 2010; Williams & Hammarberg, 1998) highlight that the proficiency level in the L2 and the L3 is a significant factor that should be taken in account when analysing L3 data. In the following sections, I present the results of the background questionnaire for the learners, followed by the proficiency tests. This is then followed by an account of the native speaker control groups.

4.2.1 The learner participants

25 learners completed a background questionnaire (see Appendix A) to gain a profile of each student, including factors such as age, gender, first language and any additional languages known (including: age when first learning the language, current status of learning and self-assessed proficiency in that language). The learner participants were students enrolled at the University of Southampton who have British English as their L1 and were learning Chinese as a foreign language at the time of testing. The majority of the learners were studying two or more foreign languages at the time of testing; all of the students had substantial previous experience learning a second language (between the ages of 12 and 18 years old). The learners were approached through their Chinese language classes and were divided into two groups, depending on whether or not they had previously learnt Spanish, as follows:

i) L2 Spanish Group (n=15): [+SP]

ii) L2 Non-Null Subject Language Group (n=10): [-SP]

I would like to note here that the number of students in each group is lower than desired; it was difficult to find students with the appropriate linguistic background, especially learners who had no previous experience of Spanish and therefore, the size of the groups reflect this. There were 15 students in the [+SP] group; the average age was 21 and within the group there were 7 males and 8 females. The key criteria for this group were that they had previous experience in learning Spanish as an L2 to at least an intermediate level which was confirmed in the background questionnaire and Spanish proficiency tests. As shown in Table 5, the other previously acquired languages for the [+SP] group include French, German, Welsh, Italian, and Portuguese. All of the learners in this group confirmed that their L1 is English and that they grew up in the UK.

Participant	Language History
LS01	Welsh, French, German, Spanish
LS02	French, Spanish
LS03	French, Spanish
LS04	French, Spanish, Italian
LS05	French, Spanish, Portuguese
LS06	French, Spanish
LS07	French, Spanish
LS08	French, Spanish
LS09	French, Spanish
LS10	French, Spanish
LS11	French, Spanish
LS12	French, Spanish
LS13	Spanish
LS14	French, Spanish
LS15	French, Spanish

Table 5: Language history of the [+SP] group

There were 10 learners in the [-SP] group; the average age was 20, consisting of 3 males and 7 females. The main criteria for this group were that they had no previous experience learning Spanish or any NSL, prior to learning Chinese as an L3. As shown in Table 6, other languages previously acquired for the [-SP] group include French, German and Cantonese.

Participant	Language History
LX01	French, German
LX02	French, German
LX03	French
LX04	French
LX05	French
LX06	Cantonese
LX07	German
LX08	French
LX09	French
LX10	French

Table 6: Language history of the [-SP] group

Although French is a Romance language (like Spanish) it does not allow null subjects in finite clauses. Therefore, it is reasonable to assume that the learners in this group did not have any previous experience with null subjects, which was the significant difference between the two learner groups in this study. All of the learners in this group confirmed that their L1 is English and that they grew up in the UK.

4.2.1.1 Chinese Proficiency Test

The Chinese proficiency test (see Appendix B) was completed by both learner groups to provide an insight into their level of learning in Chinese. This measure was taken to avoid using self-assessed proficiency levels. The proficiency test consisted of four multiple-choice cloze sections which were selected from mock exams of the HSK (Hanyu Shuiping Kaoshi) test. The HSK test is China's national standardised test which has been designed to assess proficiency in the Chinese of non-native speakers from beginner to advanced level. The test is administered worldwide at test centres and consists of several different sections. It was not possible to test each participant at official test centres for this study and therefore, the 'fill-in-the-blanks' cloze test (C-test) sections from two mock exams were selected. The C-test is a widely used measure to assess language proficiency in a variety of settings, for example, language placement tests. A C-test usually comprises of 20-25 blank spaces which allows for the participants to complete the task in less than 30 minutes as well as a simple and fast scoring system for the researcher (Eckes & Grotjahn, 2006).

The HSK test ranges from Level 1 (beginner) to Level 6 (advanced); the test items selected for this study were aimed at Level 3 students (intermediate). There were 4 sections consisting of 5 sentences in Chinese with some words missing which have been replaced with blank spaces, followed by a set of answers (a-e). There were 20 blanks in total, meaning the final score was out of 20. The HSK mock exams provided an answer key which was used to identify the number of correct answers chosen by each participant. The pass rate for the HSK Level 3 test is 60%, at which point the learner should be considered as intermediate. Therefore, the learners who scored <60% have been grouped as 'beginners' and the learners who scored >60% have been grouped as 'intermediate-advanced' (I-A).

Initially, I considered separating the 'intermediate' and 'advanced' learners by adding another boundary (i.e. 60-80% intermediate; 80-100% advanced) in order to account for the fact that some students scored very highly in the test (i.e. scoring 100%). However, I did not have any real basis to further divide the group, since the only definite outcome of the test is that anyone that scores over 60% should be considered as 'intermediate'. For this reason, I have named this group 'I-A' to represent the fact that some learners may be more proficient than 'intermediate'. I do not anticipate that this will cause any issues, since the results will comment on any general developmental patterns between beginner learners and those of a 'higher' level of learning. The learners have been divided this way in order to provide an insight into L3 transfer at both the initial stages and more advanced stages of learning.

The results of the Chinese proficiency test are detailed in Table 7 for the [+SP] group and Table 8 for the [-SP] group. The scores are presented in terms of the number of correct answers given (out of the possible 20 blanks) as well as a percentage of the total. The 'stage of learning' refers to the course in which the learner was enrolled in the second semester of the academic year (which was the time of testing); Stage 1 is for beginners and Stage 6 is the most advanced level. In the [+SP] group, there were 4 learners who scored <60% and were assigned to the beginner group and 11 learners who scored >60% and were assigned to the I-A group (Table 7). In the [-SP] group there were 5 learners in the beginner group and 5 learners in the I-A group (Table 8).

Participant Number	Score (/20)	Score (%)	Stage of learning	Proficiency Group
LS08	9	45%	1	BEGINNER
LS09	6	30%	1	BEGINNER
LS10	12	60%	4	BEGINNER
LS14	10	50%	1	BEGINNER
LS01	16	80%	1	I-A
LS02	18	90%	1	I-A
LS03	16	80%	2	I-A
LS04	20	100%	5	I-A
LS05	20	100%	5	I-A
LS06	19	95%	5	I-A
LS07	20	100%	5	I-A
LS11	20	100%	3	I-A
LS12	13	65%	5	I-A
LS13	20	100%	3	I-A
LS15	18	90%	3	I-A

Table 7: Results of the Chinese Proficiency Test for the [+SP] group.

Participant Number	Score (/20)	Score (%)	Stage of learning	Proficiency Group
LX03	8	40%	2B	BEGINNER
LX05	4	20%	1B	BEGINNER
LX07	7	35%	1B	BEGINNER
LX08	9	45%	1B	BEGINNER
LX10	6	30%	1B	BEGINNER
LX01	17	85%	1B	I-A
LX02	16	80%	4	I-A
LX04	16	80%	4	I-A
LX06	13	65%	1B	I-A
LX09	19	95%	4	I-A

Table 8: Results of the Chinese Proficiency Test for the [-SP] group

Although the Chinese proficiency test was implemented to improve the accuracy of the testing, these results do not seem completely reliable; for example, there were some learners who were in the first year of learning Chinese (2 x semesters, stage 1B) and scored very highly, whilst other students who had been learning Chinese for a few years (e.g. stage 4) had a much lower score than expected. This indicates that the test may not accurately represent the learners' proficiency in Chinese. One possible reason is that

Level 3 of the HSK was not the most appropriate to test learners that ranged from beginner to advanced; for example, the beginners may not have understood much of the test and guessed the answers. Consequently, I decided to group the learners according to their stage of learning at the time of testing instead of relying on the proficiency test results. Under this analysis, the students who were learning Chinese for 2-4 semesters (stage 1 or 2) have been grouped as beginners, whilst the remainder of the learners (stage 3, 4, 5) have been grouped in the I-A group. The final sub-groups for the [+SP] group are shown in Table 9 and the final sub-groups for the [-SP group are shown in Table 10. Although this was unexpected and is not an ideal change to the experimental design, I felt that this was necessary to ensure a more reliable way to examine the results.

Participant Number	Stage of learning	Proficiency Group
LS01	1B	BEGINNER
LS02	1B	BEGINNER
LS03	2B	BEGINNER
LS08	1B	BEGINNER
LS09	1B	BEGINNER
LS14	1B	BEGINNER
LS04	5	I-A
LS05	5	I-A
LS06	5	I-A
LS07	5	I-A
LS10	4	I-A
LS11	3	I-A
LS12	5	I-A
LS13	3	I-A
LS15	3	I-A

Table 9: Sub-groups for the [+SP] group

Participant Number	Stage of learning	Proficiency Group
LX01	1B	BEGINNER
LX03	2B	BEGINNER
LX05	1B	BEGINNER
LX06	1B	BEGINNER
LX07	1B	BEGINNER
LX08	1B	BEGINNER
LX10	1B	BEGINNER
LX02	4	I-A
LX04	4	I-A
LX09	4	I-A

Table 10: Sub-groups for the [-SP] group

4.2.1.2 Spanish Proficiency Test and Spanish Pronoun Interpretation Task

As well as the Chinese proficiency test, the [+SP] group also completed a Spanish proficiency test (see Appendix C) and L2 Spanish PIT (see Appendix D) to measure their level of proficiency and knowledge of null subjects in Spanish. Any students scoring well below average would not be included in the final data analysis. The reason for this is the possibility of transfer from L2 Spanish for this group; if a learner has not fully acquired a certain property (i.e. use of null subjects) or their proficiency is too low, this will surely have an effect on the acquisition of a similar property in the L3 at the beginner stages. This highlights the importance of testing the learners' proficiency but also their knowledge of the given property in their L2, to ensure that the learners' have an appropriate level of knowledge that may be transferred into the L3 (Rothman, 2015).

The Spanish proficiency test consisted of a multiple-choice cloze test taken from a past paper of the DELE exam. The DELE (Diplomas of Spanish as a Foreign Language) test is designed and implemented by the Instituto Cervantes and commonly used to assess Spanish proficiency of non-native speakers of all levels. The task selected for this study features an authentic text with 20 blank spaces so this test was scored out of 20. This was followed by a set of 3 possible answers for each blank space. The task selected is at 'Nivel Superior' (C1) for advanced learners, since the test aims to ensure that the students are at least intermediate in Spanish. The pass rate is 60%, at which learners are considered to be advanced learners of Spanish.

Table 11 shows the results of the Spanish proficiency test. The table shows the number of correct answers given by each participant as well as a percentage of the total correct answers. The learners that scored >60% (n=7) are assumed to have reached an advanced level of Spanish. The other learners (n=8) did not score above 60%, indicating that they have not reached an advanced level of learning and were under consideration for being excluded from the final data analysis.

Participant Number	Score (/20)	Score (%)
LS01	9	45%
LS02	11	55%
LS03	9	45%
LS04	7	35%
LS05	12	60%
LS06	11	55%
LS07	13	65%
LS08	12	60%
LS09	4	20%
LS10	9	45%
LS11	14	70%
LS12	12	60%
LS13	11	55%
LS14	15	75%
LS15	16	80%

Table 11: Results of the Spanish Proficiency Test

Whilst the proficiency level is an important aspect to test, I am more concerned with whether or not the learners have acquired the use and knowledge of null subject pronouns in Spanish as a prerequisite for taking the test. This is because if a learner has not acquired knowledge of null subjects, then this property may not be available for transfer into an additional language, or at least the property will be transferred in an incomplete or inaccurate state, regardless of the proficiency of the learner. For this reason, I consulted the results of the Spanish Pronoun Interpretation Task before deciding whether or not any learners were excluded from the data analysis.

The L2 Spanish PIT tested whether or not the learners have acquired knowledge of the appropriate uses of null and overt arguments in Spanish. The test followed the same conventions as the Pronoun Interpretation Task (PIT) in Chinese (see Section 4.3.2) but

includes different test items (to avoid repetition for the learners); this was also completed by the Spanish control group, which provided a set of 'target' interpretations. There were three tokens for each of the test items; the number of responses that match the target response set by the native speakers was calculated as a percentage of the total possible responses. As demonstrated by Table 12, the majority of the [+SP] group performed very well in the L2 Spanish PIT, indicating that they have acquired the appropriate interpretations of null and overt arguments in Spanish.

Participant Number	Score (/27)	Score (%)
LS01	17	63%
LS02	21	78%
LS03	15	56%
LS04	23	85%
LS05	24	89%
LS06	21	78%
LS07	23	85%
LS08	24	89%
LS09	19	70%
LS10	22	81%
LS11	24	89%
LS12	22	81%
LS13	15	56%
LS14	20	74%
LS15	25	93%

Table 12: Results of the Spanish Pronoun Interpretation Test

There are two learners who did not perform as well as the others; LS03 and LS13 scored 56% and furthermore, their results of the Spanish proficiency test were low (45% and 55%). Since I did not have a pass rate for the L2 Spanish PIT, I decided to include both of these learners in the data analysis with caution and will consult their individual results in the data analysis to ensure that they do not cause any anomalies.

4.2.2 Controls

In addition to the two learner groups, there were two control groups that participated in the study. The first control group consists of Chinese native speakers (n=20). In the background questionnaire, the participants confirmed that their L1 is Chinese (Mandarin)

and their country of birth is China (see Table 13 for more detail). Some of the Chinese control group were tested in China (n=2) whilst the others were students studying at the University of Southampton (n=18) at the time of testing. The participants were aged between 21 and 35 years old (average age 24 years old). This group completed the Written Production Task (WPT) and the Pronoun Interpretation Task (PIT) which will be used to evaluate the acquisition of these properties by the learner groups.

Area/Province	Number of native speakers (/18)[9]
North	6
Northeast	3
East	3
Southeast	2
South	1
West	1
Northwest	1
Central	1

Table 13: Summary of the area/province of origin of the Chinese control group

The second control group consists of Spanish native speakers (n=20) from Spain (n=18) and Mexico (n=2). In the background questionnaire, they confirmed that their L1 is Spanish. Some of the control group were tested in Spain (n=14) whilst the others were exchange students studying at the University of Southampton (n=6). The participants were aged between 20 and 45 years old (average age is 32 years old). One participant was not included in the final data analysis; although they signed up for the test because they considered themselves a Spanish native speaker, their responses to the background questionnaire revealed that Spanish was not their L1 (they were L1 Romanian-L2 Spanish-L3 English). The Spanish control group completed the L2 Spanish PIT to provide target responses for the learner group as well as the Written Production Task (WPT) and a Spanish version of the Pronoun Interpretation Task (PIT). [10] The results of this group will be used to corroborate any transfer or influence from Spanish in the results of the [+SP] group.

[9] There are only 18 of 20 Chinese speakers reported here; two participants chose not to disclose this information.

[10] The Spanish version was a translation of the Chinese PIT and therefore, has not been included in any more detail.

The following section outlines the three main experimental tasks that were administered in the study.

4.3 Experimental task design

4.3.1 Written Production Task (WPT)

The WPT focused on the use of null and overt arguments in Chinese, providing a semi-spontaneous setting for participants to use null subjects and null objects. Importantly, this task differed from the other main task in that it was minimally elicited and provided a more natural setting for the learners to use or avoid pronouns. As shown in Figure 2, the task was based on a storyboard of illustrations which outlines the daily routine of the fictional character 'John', showing various activities undertaken by him and his family members (see Appendix A for full storyboard).

Figure 2: Sample of the WPT storyboard.

The illustrations have been designed so that the learners can use a null subject or null object (once they have introduced 'John' for the first time) as well as overt pronouns. The number of null and overt subjects and objects will be counted for each paragraph and compared to the average number used by the controls. This will indicate any over- or under-use of pronouns.

The 'daily routine' was chosen as the theme of the storyboard, as this is a topic that all of the learners are aware of and it does not require specialist vocabulary nor does it rely on specialist knowledge.[11] In total, there are 15 illustrations which were drawn for the purpose of this study. The instructions stated that the learners did not have to comment

[11] This was confirmed with the Chinese language tutors.

on all of the illustrations and they should be used as a guide for their written paragraph. There was no word limit for the WPT, but the learners could not save the task and come back to it or return to a previous page and had to complete it before moving on. The aim of the task was to provide an insight into whether or not the learner groups were target-like in their use null subjects/objects in their written production, when arguments have not been drawn to their attention.

The Chinese written texts produced by the learner groups and control groups were analysed by two Chinese native speakers who were postgraduate students at the University of Southampton. These students were given all of the written productions (both learners and controls), with a set of guidelines which explained the aims of the project as a whole and the task itself. I met with each student to outline how they should analyse the texts. Firstly, I asked them to read through each text carefully and highlight any instances of subject or object pronoun use. I spent some time ensuring they understood the concept of null subjects and null objects. I asked the students to highlight any instances of 'John' in bold, overt subject pronouns (i.e. he) by underlining, null subject pronouns using the symbol Ø, overt object pronouns by italicising, and finally, null object pronouns with the symbol '*'. In addition, I asked the students to translate each text into English. I was able to check the two analyses side-by-side to confirm the accuracy. For the written productions produced by the Spanish controls, I coded the texts myself which were then checked by a Spanish native speaker to confirm the analysis.

4.3.2 Pronoun Interpretation Task (PIT)

4.3.2.1 Pilot testing

The pilot test focused on the PIT since this was the most complex part of the experimental design. The Chinese version was initially written in English by myself and translated into Chinese by two native Chinese postgraduate students at the University. There were several rounds of pilot testing, since the original feedback indicated that there were some issues. The problem with some of the Chinese test items was the choice of verb; whilst Chinese null arguments are documented to be allowed relatively freely, there are some contexts for which a lack of topic did not sound natural for a native speaker. It was noted that certain verbs are more appropriate for null subject and null object use and therefore, were used frequently in the test items (i.e. to know, to see).

Furthermore, the pilot test revealed that null object test items required a slightly different format to the others (also noted by Zhao, 2008), since null objects need to be identified with a topic somewhere in the preceding discourse, otherwise an ungrammatical sentence is produced. Originally, the null object contexts had the same format as the other test items; however, the lack of discourse topic caused a great deal of confusion to the native speakers who piloted the test and it was suggested that providing a clear antecedent via a short context is more natural. Unfortunately, this does induce a bias towards the (correct) disjoint reading rather than an ambiguous interpretation between the co-referential and disjoint reading, but it was more important to ensure that the sentences were grammatical and understandable in Chinese. These sentences still assess the extent to which the learners are aware of this particular restriction on null objects in Chinese.

As well as piloting the test in Chinese, it was also important to make sure that the PIT sentence types were understandable in Spanish, since the same PIT was translated into Spanish so that the control groups had the same test items to ensure consistency. The Spanish version was translated into Spanish by myself (checked and verified by a Spanish native speaker) and piloted with four Spanish native speakers at the University of Southampton. The issues with the Spanish test were mainly related to the way in which verbs such as 'to like' are expressed in Spanish. Whilst straightforward in English and Chinese, 'to like' (*gustar*) has a reflexive property and requires the indirect object marker *a* in some contexts in Spanish. As a result, it is not straightforward to use this verb in a subject- or object-drop context; therefore, the PIT needed to be altered to take this into consideration.

4.3.2.2 PIT

The PIT focused on the interpretation of null and overt arguments in Chinese, to examine the acquisition of the referential properties of subjects and objects. In contrast to the WPT, the PIT explored the acquisition of arguments in an elicited setting, providing test items with either null or overt arguments in the embedded clause of a sentence and asking the learners to decide on their interpretation in the main clause (see Appendix F for full Chinese version).

Recall from the previous Chapter that Chinese embedded null and overt subjects and overt objects can refer to either a referential noun phrase (RNP) or a quantified noun phrase (QNP) in the main clause (co-referential reading) or someone else in discourse (disjoint reading), whilst embedded null objects cannot have a co-referential reading and must have a disjoint reading. Furthermore, embedded overt pronouns cannot have a QNP antecedent in the main clause in Spanish, which is captured by Overt Pronoun Constraint (OPC) (Montalbetti, 1984), whilst it has been suggested that the OPC does not apply to Chinese (Zhao, 2008, 2012). The PIT was adapted from other studies which set out to explore the acquisition of the OPC in Japanese, Spanish and Chinese (Kanno, 1997; Rothman, 2009; Zhao, 2008). Although the OPC principle is not the only focus of the experiment, this style made it easy to test the interpretation of both types of embedded argument as well as both types of antecedent (referential and quantified). As a result, the task could test all of the referential properties of subject- and object-drop of interest in one task.

In the PIT, the test items were short sentences in Chinese which consisted of a main clause and an embedded clause. In the main clause, the subject was either RNP, for example 'John' or QNP, for example 'someone'. The subordinate clause contained either a null or overt subject, or a null or overt object. The number and gender of the main clause subject and the embedded argument were matched so that the embedded element could ambiguously refer to either the main clause subject (the co-referential reading) or someone outside of the sentence in the general discourse (the disjoint reading). The example in (33) demonstrates a RNP antecedent and the example in (34) demonstrates a QNP antecedent:

(33) *John$_i$ shuo ta$_{i/j}$ qu guo lun dun.*
John$_i$ says that he$_{i/j}$ has been to London.
Question: According to the sentence, who is John saying has been to London?

(34) *You ren$_i$ shuo ta$_{i/j}$ ren shi John.*
Someone$_i$ says that he$_{i/j}$ knows John.
Question: According to the sentence, who is 'someone' saying knows John?

Each sentence was followed by a question regarding the interpretation of the embedded clause argument, asking the reader to indicate who they think is the antecedent of the embedded clause. There are five possible answers from which the participants chose, for example:

a) Himself (John) [co-referential reading] → the embedded subject/object only refers to the main clause subject.
b) Another person [disjoint reading] → the embedded subject/object only refers to someone in the discourse, outside of the main sentence.
c) Either (a) or (b) [ambiguous] → it is possible that the embedded subject/object ambiguously refers to either the main clause subject or someone in the discourse.
d) Incorrect sentence → the sentence is ill-formed somehow (i.e. ungrammatical).
e) I don't understand the sentence → the participant does not understand the meaning of the sentence provided.

The majority of the test items followed this format, with the exception of the null object test items. As outlined in Chapter 3, Chinese embedded null objects can only refer to a referent in the discourse (disjoint reading) and cannot refer to the main clause subject (co-referential reading). Furthermore, null objects require a context from which the null element can recover its content, as noted from the pilot test and by Zhao (2008). Therefore, the embedded null object sentences had a short context preceding the test sentence, which outlined a situation which contained the appropriate antecedent and eased the interpretation of the null element. See (35) for an example with a RNP antecedent and (36) for a QNP antecedent.

(35) Situation: some friends are talking about who knows $Bill_i$…
John shuo David ren shi
John say David know
'$John_j$ says that David knows $(him)_{i/*j}$'
Question: According to the sentence, who does David know?

(36) Situation: some friends want to know who saw $David_i$…
You ren shuo John kan jian le
Someone say John see PAST
'$Someone_j$ says that John saw $(him)_{i/*j}$'
Question: According to the sentence, who did someone say John saw?

In addition to these types of test item, the task also included some topic chain constructions (n=3)[12] to investigate the extent to which the learners are aware of the

[12] There are only three tokens for Topic Chains, whilst there are five for the other test items; this was an oversight in the experimental design which attempted to take into account the additional complexity and length of these paragraphs. In further testing, I would make sure there was the same number for all test items.

Topic NP Deletion rule. In Chinese, a 'topic chain' (TC) is formed when a topic is introduced at the start of the sentence and is then deleted from the subject position in the remainder of the sentence. For this type of test item, there was a series of short sentences forming a paragraph in Chinese, in which a topic was introduced at the start of the context and was then supressed (i.e. not overtly realised) during the rest of the text. This created a chain of deleted topics which referred to the main topic of the text. Towards the end of the context another topic was introduced, followed by an overt subject that could ambiguously refer to either the first or second topic. The question then required the participant to choose an antecedent for the final null subject, either the highest or the nearest topic that was introduced (37).

(37) *Amy gongzuo hen nuli, xiangyao xiuxi yixia qu dujia*,
Amy work very hard, want to rest a bit go with vacation
bingqie yaoqing ta jiejie yiqi, shifen jidong。
and invite her sister together very excitement
'Amy works very hard, Ø wants to take a break and go on holiday, Ø asked her sister to come, Ø is very excited'.
Question: in this paragraph, who is very excited?
a) Amy b) Her sister c) Either a) or b) d) Incorrect sentence
e) I don't understand the sentence

In TCs, the subject of the final action is usually interpreted as the first, main topic of the context, despite the switch in topic during the discourse. This type of construction is also possible in Spanish, where a null subject can be used in [+topic shift] contexts. However, it has been suggested that the ambiguity involved with this type of construction is less acceptable in Spanish (Liceras & Díaz, 1999: 28).

In the PIT, the main test sentences were in Chinese, with characters and pinyin for the learner participants which was advised by Chinese language tutors. For all tasks, the instructions, contexts, questions and answers were provided in the participants' native language to minimise any misunderstandings or issues in the task design. In the PIT, there were 9 sentence categories; the main 8 types each had 5 tokens whilst TCs had 3 tokens. Therefore, there were 43 sentences in total in this task. The sentence categories are summarised according to their code in Table 14 and examples are provided in Table 15 (see Appendix F for all test items).

Matrix Subject Type	Embedded Clause Subject Type	Sentence Type Code	Number of items
Referential	Overt Subject	ROS	5
Referential	Null Subject	RNS	5
Quantified	Overt Subject	QOS	5
Quantified	Null Subject	QNS	5
Referential	Overt Object	ROO	5
Referential	Null Object	RNO	5
Quantified	Overt Object	QOO	5
Quantified	Null Object	QNO	5
Referential	Null Topic Chain	TC	3

Table 14: Summary of sentence type and sentence type code of PIT test items

Sentence Type Code	Example
ROS	*John shuo ta qu guo lundun* John say he have been London 'John$_i$ says that he$_{i/j}$ has been to London'
RNS	*Lisa shuo ren shi Mary* Lisa say know Mary 'Lisa$_i$ says that (she)$_{i/j}$ knows Mary'
QOS	*You ren shuo ta jian guo shou xiang* Someone say he seen prime minister 'Someone$_i$ says that he$_{i/j}$ met the prime minister'
QNS	*You ren shuo ren shi John* Someone say know John 'Someone$_i$ says that (he)$_{i/j}$ knows John'
ROO	*John shuo David mei you jian guo ta* John say David no seen him 'John$_i$ says that David did not see him$_{i/j}$'
RNO	**Situation:** some friends are talking about who knows Bill$_i$… *John shuo David ren shi* John say David know 'John$_j$ says that David knows (him)$_{i/*j}$'
QOO	*You ren shuo Mary ren shi ta* Someone say Mary know her 'Someone$_i$ says that Mary knows her$_{i/j}$'
QNO	**Situation:** some friends want to know who saw David$_i$… *You ren shuo John kan jian le* Someone say John see PAST 'Someone$_j$ says that John saw (him)$_{i/*j}$'
TC	*Amy gongzuo hen nuli, xiangyao xiuxi yixia qudujia,* Amy work very hard, want to rest a bit go on holiday *bingqie yaoqing ta jiejie yiqi, shifen jidong* and invite her sister together very excitement 'Amy$_i$ works very hard, (she) wants to take a break and go on holiday, (she) asked her sister$_j$ to come, (she)$_{i/j}$ is very excited'.

Table 15: Summary and examples of the sentence types in the PIT

4.3.3 Language Relations Questionnaire (LRQ)

The learners also completed a Language Relations Questionnaire (LRQ) based on the typological relationship between English, Spanish and Chinese (see Appendix G for full questionnaire). This was given to both learner groups, regardless of whether or not they have previously learnt Spanish. The reason for the inclusion of this type of questionnaire stems from the fact that the typological relationship between the L1/L2 and the L3 in this study is not clear or straightforward. Furthermore, it has been suggested in the L3 acquisition literature that the role of the learners' perceptions could affect the source of transfer and should be considered as an influential factor in cross-linguistic transfer studies (Hammarberg, 2009; Kellerman, 1977; Montrul et al., 2011; Ringbom, 2007). Therefore, it seems logical to take this into account and be able to comment on whether or not the personal perceptions of the learners regarding typological similarities and differences has any correlation with the quantitative results of the two main tasks.

The questionnaire has been designed to encourage the learners to reflect on the relationship between English, Spanish and Chinese in a general sense, but also at different linguistic levels. For example, the first two questions asked how similar the languages are in terms of vocabulary, sounds, grammar, sentence structure and words asking for a response on a scale (ranging from similar to different). Another question type asked the learners how easy or difficult it is for a native speaker of English to learn Spanish or Chinese (easy, fairly easy, difficult and fairly difficult); this was repeated for Spanish native speakers and Chinese native speakers. The final question presented four different tree diagrams that represented possible relationships between English, Spanish and Chinese, from which the participants selected one option (see Figure 3). The results of this questionnaire will contribute to the discussion on the role of 'typology' by providing some insight into whether or not the way in which learners perceive typological relationships relates to their acquisition of an additional foreign language.

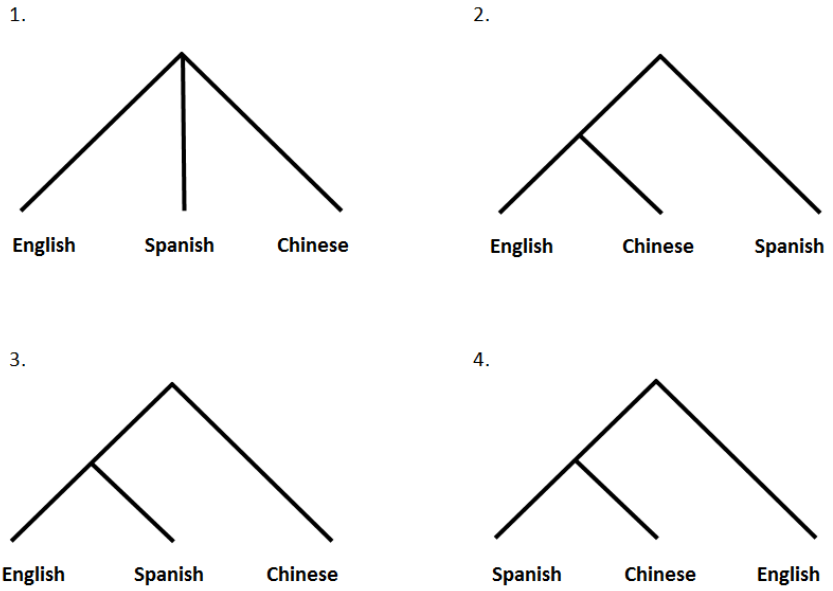


Figure 3: Tree diagrams to represent the relationship between English, Spanish and Chinese.

4.4 Summary

In this Chapter, I have provided the rationale and details of the chosen experimental design. Starting with the learner participants, I outlined the background questionnaire and the proficiency testing. These tasks gathered a linguistic profile of each student and allowed me to group the learners according to whether or not they had previous experience learning Spanish as well as their proficiency in Chinese. This was followed by a detailed account of the control groups (Chinese and Spanish). The remainder of the Chapter provided an outline and examples from the three main experimental tasks: the WPT, PIT and LRQ.

Chapter 5: Data Analysis

5.1 Introduction

In previous Chapters, I have outlined that the aim of this study is to explore the role of previously acquired languages in L3 acquisition, focusing on the source of transfer and the conditions that determine transfer. Whilst previous studies have suggested that transfer may come from either the L1 or L2 and that 'similarity' is an important factor, there are some remaining issues. For example, it is not clear how we should make predictions for cross-linguistic transfer between unrelated languages. Therefore, this study tests the acquisition of null and overt arguments in L3 Chinese by learners with L1 English-L2 Spanish ([+SP]) and L1 English-L2 non-null subject language ([-SP]). The proposal is that accounts of structural similarity should be more detailed and should consider the linguistic features associated with the property being acquired.

The results of the background questionnaire and proficiency tests have been reported in Chapter 4, since they served to provide a linguistic profile of the learner participants and divide the learners into proficiency groups. In this Chapter, I will present the results of the main experimental tasks; a Written Production Task (WPT), a Pronoun Interpretation Task (PIT) and a Language Relations Questionnaire (LRQ). The aim of the WPT and PIT was to reveal the learner groups' use and interpretation of subject and object pronouns in Chinese, comparing the performance of the [+SP] and [-SP] groups, as well as the Chinese control group. In the case that there is transfer from L2 Spanish, there is also a control group of Spanish native speakers that will be able to corroborate the findings. The LRQ provides an insight into the role of the learners' perceptions of the typological similarity between languages, i.e. whether or not this has any effect on their L3 acquisition. Table 16 provides a summary of the tasks completed by both the learner and the control groups, as was outlined in Chapter 4.

Group type	Participants	Group Name	Tests
Learner	L1 English L2 Spanish L3 Chinese	[+SP]	Background Questionnaire Chinese proficiency test Spanish proficiency test L2 Spanish PIT Written Production Task Chinese Pronoun Interpretation Task Language Relations Questionnaire
Learner	L1 English L2 non-null subject language L3 Chinese	[-SP]	Background Questionnaire Chinese proficiency test Written Production Task Chinese Pronoun Interpretation Task Language Relations Questionnaire
Control	Chinese native speakers	Chinese controls	Background Questionnaire Written Production Task Chinese Pronoun Interpretation Task
Control	Spanish native speakers	Spanish controls	Background Questionnaire Written Production Task Spanish Pronoun Interpretation Task L2 Spanish PIT

Table 16: Summary of the tasks completed by each participant group

The Chapter is divided into three parts in order to report on the main experimental tasks, presenting the results for each of the four groups, as well as sub-group data and individual results where applicable.

5.2 Written Production Task (WPT)

The WPT aimed to provide an insight into how learners of Chinese use null and overt arguments in their written production in a minimally elicited setting. The task was based on a storyboard which depicts the daily routine of a character named 'John', performing typical daily tasks, such as brushing his teeth (refer to Figure 2 for example). The task was designed to provide an opportunity for participants to use any of the arguments of interest in the study; overt subject pronouns, null subject pronouns, overt object pronouns and null objects pronouns (although it is not expected that many objects will be used). The theme of the storyboard was chosen since it is a topic that the participants will be familiar with and does not rely on specialist knowledge or vocabulary, meaning that it is applicable to learners of any proficiency (see Chapter 4 for more detail).

In terms of the hypotheses (as outlined in Chapter 3), if the [+SP] and [-SP] groups performed similarly in their use of null subjects, this suggests that there was no transfer from Spanish for the [+SP] group and that Chinese null subjects have been learnt in a similar way for the two groups (either easily or with problems depending on whether or not the groups were target-like with the Chinese controls). However, if there were differences between the learner groups in their use of null subjects, this could indicate transfer from Spanish; positive influence in the case that the [+SP] group outperform the [-SP] group or negative influence in the case that the [+SP] group underperform. If negative influence is observed, this could be due to the amount of reassembly of features associated with null subjects that is required for the learners who have previously used null subjects in their L2 Spanish. In terms of overt subjects, this task shows whether or not the use of overt subjects in general is problematic for the learners. If the learners used overt subjects in a similar way, this could indicate transfer from English which is the L1 for both learner groups. If the learners used overt subjects in a different way, this could indicate that each group has transferred from a different background language.

The data from this task were analysed in two ways:

i. Descriptively: the total number of pronouns used and the number of occurrences of each separate pronoun (John, null subject, overt subject, null object, overt object) have been provided as raw counts. The frequency of pronoun use was divided by the total number of pronouns used (per group) which yields a percentage that represents the frequency of which each pronoun was used.

ii. Statistically: the number of occurrences of each pronoun was entered into SPSS. [13] The standard test for normality indicated that the data is not normally distributed. As a result, the non-parametric Kruskal Wallis H test was used, which compares means across more than two groups when the data cannot be assumed to be normally distributed: the test reveals any significant differences (<.05) between the groups. This test made post-hoc pairwise comparisons between groups and the results were automatically adjusted to take into account the errors that can occur with multiple comparisons of the same data

[13] SPSS: Statistical Package for Social Sciences, a software package which provides statistical analysis of data.

(i.e. the Bonferroni adjustment). This involves multiplying the significance value by the number of comparisons made.

For the statistical analysis, the test statistic H will be reported as well as the *p* value to highlight any statistically significant differences for each pairwise comparison. In addition, the group mean and standard deviation for each group is reported for all data, as well as the effect size for each pairwise comparison in order to take into account variances within the data.[14] The effect size was calculated using the following formula: *effect size (Cohen's d) = [mean of group 1] – [mean of group 2] / pooled standard deviation.* [15] It should be noted that the statistical results from the task are to be taken with some caution, due to the low numbers of participants, especially in the [-SP] I-A group (n=3). The results have been reported nevertheless, although they are likely to lack true statistical power. Firstly, I will present the overall WPT results, followed by a report of the use of null subjects and overt subjects in more detail.

5.2.1 Results

Firstly, Table 17 shows the frequency of use of each type of argument (overt lexical subject, overt subject pronoun, null subject pronoun, overt object pronoun, null object pronoun), across the learner and control groups, which was calculated by counting the number of times each argument was used and dividing this number by the total number of arguments used by the group to give a percentage (%).

	Total	Overt Lexical Subject	Overt Subject Pronoun	Null Subject Pronoun	Overt Object Pronoun	Null Object Pronoun
Chinese Controls	193	47 (24%)	32 (17%)	114 (59%)	0	0
[-SP] Group	106	30 (28%)	41 (39%)	34 (32%)	1 (1%)	0
[+SP] Group	165	33 (20%)	77 (47%)	55 (33%)	0	0
Spanish Controls	270	58 (22%)	4 (1%)	207 (77%)	0	0

Table 17: Number and percentage of each type of argument used in the WPT

[14] The reporting of variances within quantitative data sets has been recently highlighted in the literature, calling for sufficient detail to be included to avoid relying solely on *p* values (e.g. Plonsky, 2013; Larson-Hall & Plonsky, 2015).

[15] The following assumptions are given for effect sizes based on this calculation: d= 0.2 shows a small effect size, d=0.5 shows a medium effect size and d≥0.8 shows a large effect size.

There were no null objects used in any of the texts, and therefore null objects will not be discussed further. The results also show that overt object pronouns were almost never used[16]; in the [-SP] group there was only one participant who used an overt object ('ta'/him) (38). As a result, overt object pronouns will also not be discussed further and the remainder of the data analysis will focus on the results for subject pronouns.

(38) "…*Ta you si kou ren, mama, baba, didi he ta".* (LX05)
He has four (classifier) people, mother, father, brother and him
'There are four people in his family, mother, father, brother and him'.

In terms of overt subjects, there were two types used by the participants; i) overt lexical subject (e.g. 'John') and ii) overt subject pronoun (e.g. 'he'). However, a closer look at the data shows that both of these arguments are used to refer to the same referent ('John') and are used within the text whenever a null pronoun is not used. Therefore, they have been combined and are represented as one category, 'Overt Subject' in the remainder of the analysis.

Next, I consider the results in terms of overt subject vs null subject use, to give a clear indication of which type of subject is used more frequently. The results in Table 18 (represented in Figure 4) show that the two control groups use overt and null subjects in a different way to each other. For the Chinese controls, 41% of the subjects used were overt and 59% were null; for the Spanish controls, only 23% of the subjects used were overt whilst 77% were null. This shows that the Chinese controls used more overt subjects and less null subjects than the Spanish controls, which suggests that there are some fundamental differences in the use of overt and null subjects in the two languages. The group results also show that the behaviour of the two learner groups is very similar for the use of both overt and null subjects and that both learner groups used more overt subjects but less null subjects than the Chinese control group.

	Chinese controls	**[-SP] group**	**[+SP] group**	**Spanish controls**
Overt subjects	79 (41%)	72 (68%)	110 (67%)	63 (23%)
Null subjects	114 (59%)	34 (32%)	55 (33%)	207 (77%)

Table 18: Group results for the WPT

[16] The objects included in the analysis are pronominal only (i.e. him), rather than lexical. It should be noted that the fact that no objects were elicited in this task is a limitation of the experimental design that should be rectified in any future research.

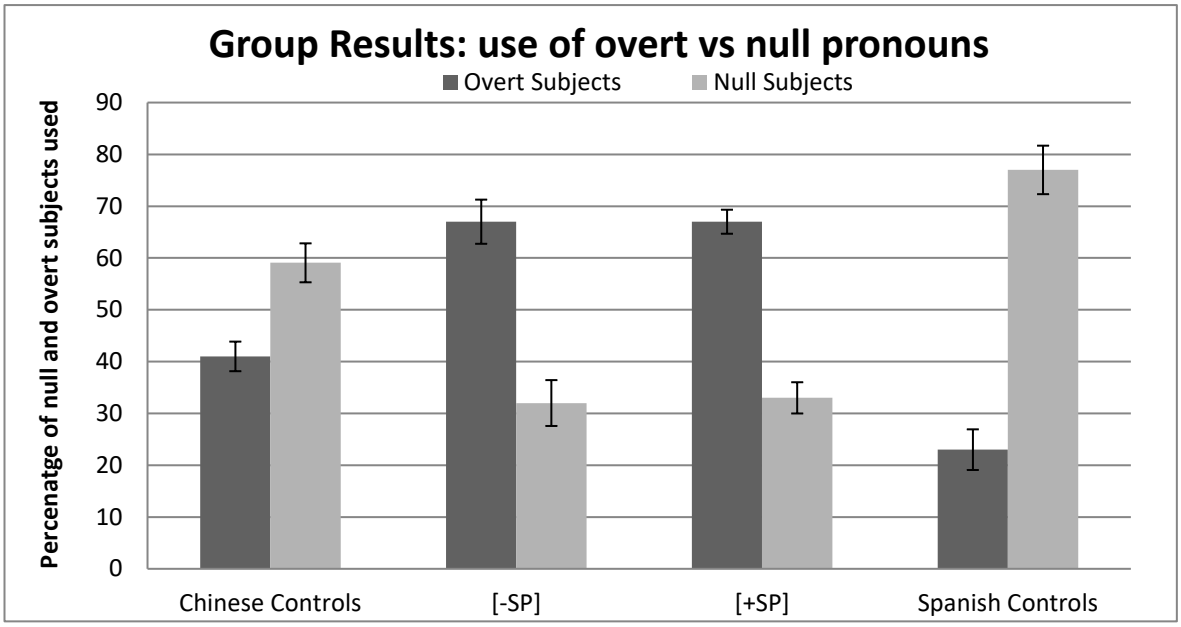


Figure 4: Percentage of overt vs null subjects used in the WPT[17]

The statistical analysis shows that there is no significant difference between the control groups in their use of overt subjects (see Table 19). However, there is a significant difference between the control groups in their use of null subjects (see Table 20). This is important for the current study, especially for the [+SP] group who need to be aware of these differences in their L3 acquisition of Chinese.

Group Mean (± Standard Deviation)		**Effect Size (d)**	**Test Stat. (H)**	**Adj. Sig. (*p*)**
Chinese Controls 3.95 (±2.856)	Spanish controls 3.15 (±3.924)	0.233	6.825	1.000
Chinese Controls	[+SP] Group 7.33 (±2.320)	1.299	-17.725	**.034**
Chinese Controls	[-SP] Group 7.20 (±4.264)	0.895	-14.525	.273
[+SP] Group	[-SP] Group	0.037	3.200	1.000
[+SP] Group	Spanish Controls	1.296	-24.550	**.001**

Table 19: WPT group results of the Kruskal Wallis pairwise comparisons (overt subjects)

[17] The error bars in Figure 4 are based on the standard deviation for each group.

Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
Chinese Controls 5.70 (±3.757)	Spanish controls 10.35 (±4.682)	1.095	-16.200	**.039**
Chinese Controls	[+SP] Group 3.67 (±3.016)	0.595	8.433	1.000
Chinese Controls	[-SP] Group 3.40 (±4.427)	0.560	10.650	.866
[+SP] Group	[-SP] Group	0.071	2.217	1.000
[+SP] Group	Spanish Controls	1.696	24.633	**.001**

Table 20: WPT group results of the Kruskal Wallis pairwise comparisons (null subjects)

These results provide an overview of the frequency at which null and overt subjects were used by each group in the WPT. The data will be explored in more detail in the following sections, to establish whether or not there is any effect of proficiency (i.e. sub-group results).

5.2.2 Use of null subjects

In this section, I will present the results for the use of null subjects in the WPT. As summarised above, if the [+SP] and [-SP] groups performed similarly in their use of null subjects, there was no transfer from Spanish for the [+SP] group. However, if there were differences in the learner groups use of null subjects, this could indicate transfer from Spanish. Figure 4 (p. 104) showed that the Chinese controls used less null subjects (59%) than the Spanish controls (77%), suggesting that there is a difference in the use of null subjects in the two languages. This is supported by a statistically significant difference between the control groups (see Table 20 above).

The examples below are extracts from the Spanish control group (39) and the Chinese control group (40) to demonstrate the difference in the frequency of use of null subjects for the same storyboard. In the Spanish extract, the main character of the storyboard (John/'Juan') is introduced at the beginning and subsequent references to the character are supressed; therefore, the remaining pronouns are null. In the Chinese extract, there are more cases where an overt subject (he) is used, even after the main character has been introduced.

(39) ***"Juan** se levanta a las siete. ø Se cepilla los dientes y ø se ducha. ø Se viste y ø baja a desayunar con la familia. A las ocho y media ø sale de casa y ø va al colegio acompañado. Al medio día ø almuerza con los compañeros del colegio*

y más tarde ø regresa a casa. Por la tarde ø hace los deberes. Antes de cenar ø saca al perro. Después de la cena ø ve la tele en familia y quince minutos antes de acostarse ø lee un poco". (NS08)

'John gets up at seven. (He) brushes his teeth and (he) has a shower. (He) dresses and (he) goes down for breakfast with the family. At eight thirty (he) leaves the house and (he) goes to school accompanied. At midday (he) east lunch with friends at school and later (he) goes home. In the afternoon (he) does homework. Before dinner (he) takes the dog out. After dinner (he) watches television with the family and 15 minutes before bed (he) reads a little.'

(40) **"约翰**起床后的第一件事就是刷牙洗脸和冲个澡，他和家人享用了丰盛的早餐之后∅便去上学了。中午十二点，他只是简单的和朋友吃了三明治作为午餐，放学后他乖乖的回家完成了作业，随后在妈妈做晚饭的时间中∅帮父母遛狗。晚上，他们一家四口享用了美味的晚餐，晚餐之后是全家的电视剧时间，看完了剧他便早早的睡下了为了充满精力的迎接新的一天。"

'The first thing for **John** is to get up, to brush his teeth and take a shower. **He** and his family enjoyed a hearty breakfast and then (he) went to school. At 12:00, **he** just had a sandwich for lunch with friends, and after class, **he** went back home to do the homework. After that, (he) walked the dog for the parents during the time of his mother cooking. In the evening, they had delicious dinner together. After dinner, it was the time for watching TV, and then **he** went to bed earlier in order to get full of energy to meet the new day.'

Figure 4 also showed that the [+SP] group used null subjects 33% of the time and the [-SP] group used null subjects 32% of the time, which reveals that null subjects are used at a similar frequency in both groups. Statistically, there were no significant differences between the two learner groups when compared with each other, or with the Chinese controls. However, there was a significant difference between the [+SP] group and the Spanish control group (Table 20), indicating that these learners did not use null subjects like the Spanish control group.

Sub-group results

Next, I investigate the results for the sub-groups of learners (beginners and I-A) compared with the two control groups, in order to establish any effect of proficiency for the learners in their use of null subjects. The sub-group results in Table 21 (represented in Figure 5) show that whilst the [-SP] group as a whole used null subjects at a similar rate as the [+SP] group and the Chinese controls, there could be an important effect of proficiency. The [-

SP] beginner group showed a very low use of null subjects (11%) in their written productions but on the other hand, the [-SP] I-A group showed a very high use of null subjects (74%). However, there was no significant difference between the [-SP] beginners or I-A group when compared with the Chinese control groups (see Table 22) according to the statistical data. Furthermore, the results show that it was the [+SP] beginner group that differed significantly from the Spanish controls; the [+SP] beginners only use null subjects 25% of the time and there was a significant difference with the Spanish controls.

	Chinese controls	[-SP] beginners	[-SP] I-A	[+SP] beginners	[+SP] I-A	Spanish controls
Null subjects	114 (59%)	8 (11%)	26 (74%)	16 (25%)	39 (38%)	207 (77%)

Table 21: Sub-group results for the WPT (use of null subjects)

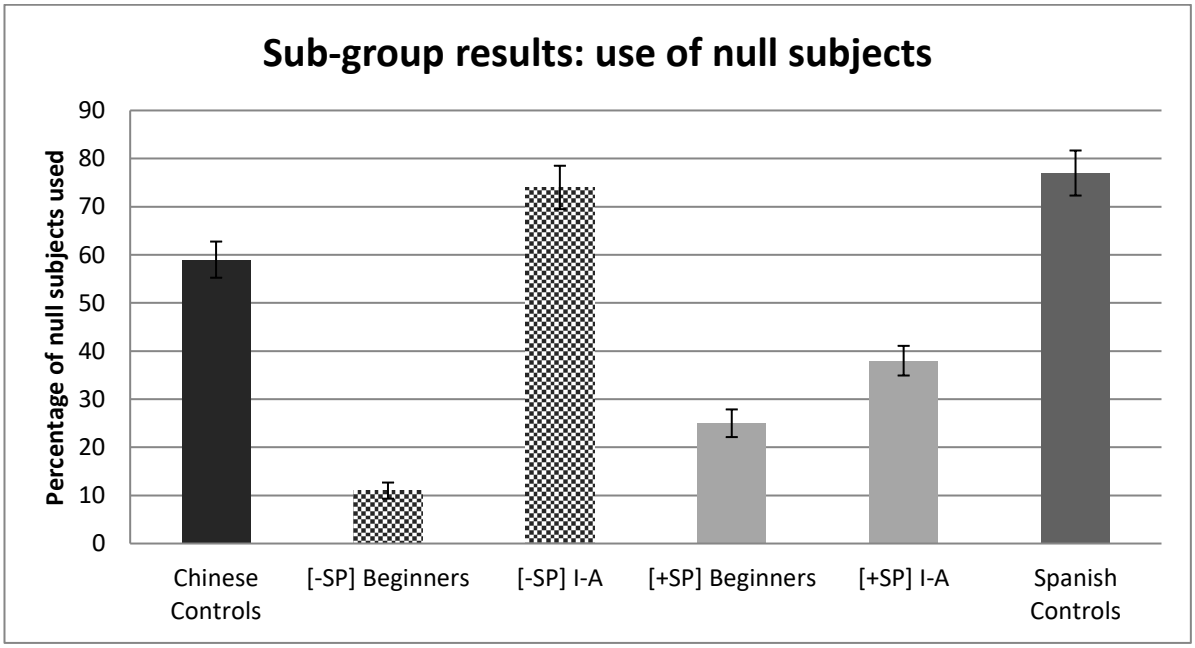


Figure 5: Percentage of null subjects used by each sub-group and the control groups

Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
Chinese Controls 5.70 (±3.757)	[+SP] Beginners 2.67 (±2.875)	0.905	12.933	1.000
Chinese Controls	[+SP] I-A 4.33 (±3.082)	0.398	5.433	1.000
Chinese Controls	[-SP] Beginners 1.14 (±1.676)	1.567	20.171	.221
Chinese Controls	[-SP] I-A 8.67 (±4.509)	0.715	-11.56	1.000
[+SP] Beginners	[-SP] Beginners	0.671	7.238	1.000
[+SP] I-A	[-SP] I-A	1.123	-17.000	1.000
[+SP] Beginners	Spanish Controls 10.35 (±4.682)	2.000	29.133	**.013**
[+SP] I-A	Spanish Controls	1.518	21.633	.063

Table 22: WPT sub-group results of the Kruskal Wallis pairwise comparisons (null subjects)

In order to explore these results further, the individual results for the Chinese controls and the two learner groups are presented in Table 23 (I-A groups are shaded in grey). The responses of each participant are shown, as well as the average number of pronouns used by the whole group (shown at the end of each column).

Chinese controls	Number of overt subjects used	Participant [+SP]	Number of null subjects used	Participant [-SP]	Number of null subjects used
NC01	4	LS01	5	LX01	4
NC02	1	LS02	7	LX03	0
NC03	5	LS03	1	LX05	0
NC04	3	LS08	0	LX06	3
NC05	8	LS09	0	LX07	1
NC06	8	LS14	3	LX08	0
NC07	8	LS04	4	LX10	0
NC08	5	LS05	3	LX02	4
NC09	0	LS06	10	LX04	13
NC10	8	LS07	6	LX09	9
NC11	6	LS10	5	**Average**	**3.4**
NC12	10	LS11	0		
NC13	4	LS12	3		
NC14	12	LS13	7		
NC15	8	LS15	1		
NC16	2	**Average**	**3.6**		
NC17	0				
NC18	11				
NC19	1				
NC20	10				
Average	**5.7**				

Table 23: Individual results for the [+SP] and [-SP] group in the WPT

This data indicates that in the [-SP] beginner group, there were four participants (LX03, LX05, LX08 and LX10) who did not use any null subjects at all whilst the other learners in this group used null subjects at a lower rate than the Chinese controls; this is likely to have contributed to the very low use of null subjects by this group. Furthermore, in the I-A group there is one participant (LX04) who used thirteen null subjects and one participant (LX09) who used nine null subjects in their written production, which is higher than the average used by the Chinese controls (and higher than most of the [+SP] I-A group); this is likely to have contributed to the high frequency of null subjects used by this group. This could suggest that there are important differences between the [-SP] groups and the Chinese controls which was not shown by the statistical analysis (possibly, due to the low numbers of participants). For the [+SP] group, the descriptive results suggest that both the beginners and the I-A group used less null subjects than the Chinese controls; for the beginners, this could be due to the two participants (LS08, LS09) who did not use any

null subjects in their written production whilst three others used less null subjects than the Chinese controls (on average). In the [+SP] I-A group there was one student (LS11) who did not use any null subjects and five learners who used less null subjects than the Chinese controls. This could also indicate a potential problem for the [+SP] learners when compared with the Chinese controls, although the average rate of null subjects used is higher for the [+SP] group.

In summary, the overall group results suggest that the two learner groups performed similarly to each other regarding the percentage of null subjects used in the WPT, which is supported by the statistical analysis. However, the sub-group results (descriptive and individual results) show that the [-SP] group used far fewer null subjects at the beginner level and used more null subjects than the Chinese controls at the I-A level. These results also show that the [+SP] groups used less null subjects than the Chinese controls; however, the [+SP] group average use of null subjects was higher than the [-SP] group which could indicate a more target-like use of null subjects for the [+SP] group.

5.2.3 Use of overt subjects

In this section, I will present the results for the use of overt subjects (lexical subject and subject pronouns) in the WPT. As summarised above, if the learners used overt subjects in a similar way, this could show transfer from English (the L1 for both learner groups). If the learners used overt subjects in a different way, this could indicate that each group has transferred from a different background language. The results presented in Figure 4 (p.104) showed that the Chinese control group used overt subjects more often (41%) than the Spanish control group (23%). However, there was no significant difference between the two groups to indicate any major dissimilarity between the control groups (see Table 19). The two learner groups used overt subjects more often than either of the control groups; the [+SP] group overt subjects 67% of the time and the [-SP] group used overt subjects 68% of the time. The statistical data in Table 19 shows that there was no significant difference between the two learner groups overall. However, the pairwise comparisons show that there was a significant difference between the [+SP] group and the Chinese controls which could indicate that their use of overt subjects is non-target-like with the Chinese controls. There was also a significant difference between the [+SP]

group and the Spanish controls which indicate that the [+SP] group did not perform in line with the Spanish native speakers.

Sub-group results

Next, I will present the sub-group results for the use of overt subjects to provide an insight into whether or not there was any effect of proficiency. The results presented in Table 24 (represented in Figure 6) show that both the [+SP] beginners (75%) and [+SP] I-A groups (62%) used overt subjects more often than the Chinese controls (41%). The [-SP] beginners also used overt subjects more often (89%) whilst the I-A group used overt subjects (26%) less often than the Chinese controls. However, Table 25 shows that the only statistically significant differences were between the [+SP] beginners and [+SP] I-A group when compared with the Spanish controls; both groups used overt subjects more often than the Spanish controls.

	Chinese controls	[-SP] beginners	[-SP] I-A	[+SP] beginners	[+SP] I-A	Spanish controls
Overt subjects	79 (41%)	63 (89%)	9 (26%)	47 (75%)	63 (62%)	63 (23%)

Table 24: Sub-group results for the WPT (overt subjects)

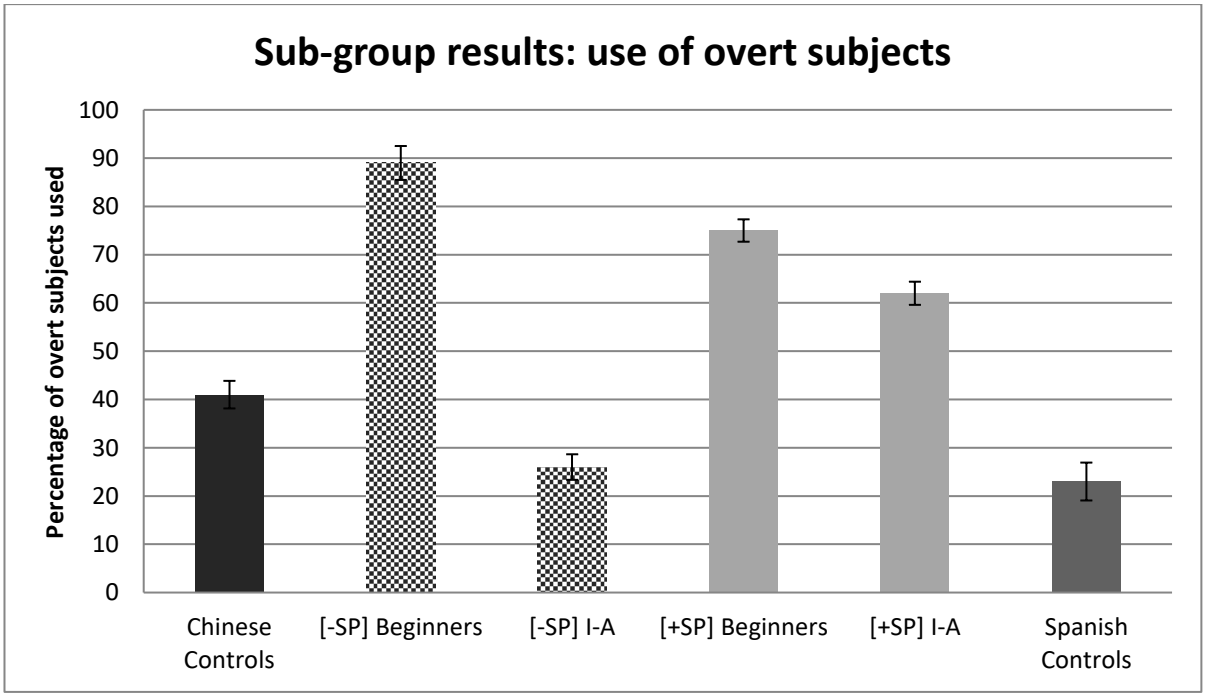


Figure 6: Percentage of overt subjects used by the sub-groups and control groups

Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
Chinese Controls 3.95 (±2.856)	[+SP] Beginners 7.83 (±2.317)	1.492	-20.308	.300
Chinese Controls	[+SP] I-A 7.00 (±2.398)	1.156	-16.003	.503
Chinese Controls	[-SP] Beginners 9.00 (±3.512)	1.577	-22.725	.087
Chinese Controls	[-SP] I-A 3.00 (±2.646)	0.345	4.608	1.000
[+SP] Beginners	[-SP] Beginners	0.393	-2.417	1.000
[+SP] I-A	[-SP] I-A	1.584	20.611	1.00
[+SP] Beginners	Spanish Controls 3.15 (±3.924)	1.452	-27.133	**.028**
[+SP] I-A	Spanish Controls	1.183	-22.828	**.036**

Table 25: WPT sub-group results of the Kruskal Wallis pairwise comparisons (overt subjects)

In order to explore these results further, Table 26 shows the individual results for the use of overt subjects for the Chinese controls and the two learner groups (I-A groups are shaded in grey).

Chinese controls	Number of overt subjects used	[+SP]	Number of overt subjects used	[-SP]	Number of overt subjects used
NC01	9	LS01	8	LX01	7
NC02	1	LS02	10	LX03	12
NC03	5	LS03	5	LX05	9
NC04	8	LS08	7	LX06	6
NC05	2	LS09	11	LX07	5
NC06	3	LS14	6	LX08	9
NC07	2	LS04	4	LX10	15
NC08	4	LS05	5	LX02	6
NC09	1	LS06	5	LX04	2
NC10	7	LS07	7	LX09	1
NC11	4	LS10	9	**Average**	**7.2**
NC12	2	LS11	11		
NC13	1	LS12	8		
NC14	5	LS13	5		
NC15	1	LS15	9		
NC16	6	**Average**	**7.3**		
NC17	1				
NC18	10				
NC19	5				
NC20	2				
Average	**3.95**				

Table 26: Individual results for the [+SP] and [-SP] group in the WPT

The individual data shows that for the [-SP] beginners, all the learners used more than the average number of overt subjects used by the Chinese controls which is likely to have contributed to the high rate at which overt subjects are used by this group. Furthermore, in the [-SP] I-A group there are two learners (LX04, LX09) who used less than the average number of overt subjects used by the Chinese controls; this is likely to account for the observation that the [-SP] I-A group used less overt subjects than the Chinese controls. Interestingly, these are the same learners who used null subjects more often than the others. This could indicate that there was a difference in the use of overt subjects between the [-SP] groups and the Chinese controls that was not detected by the statistical analysis. For the [+SP] beginners and I-A group, all the learners used more than the average number of overt subjects used by the Chinese controls which accounts for

the high use overt subjects by these groups. Similarly, this could indicate a difference in the use of overt subjects between the [+SP] groups and the Chinese controls.

In summary, the descriptive and individual results show that both learner sub-groups showed 'non-target-like' behaviour in their use of overt subjects when compared with the Chinese control group; the [+SP] group used overt subjects more often than the Chinese controls at both proficiency levels, whilst the [-SP] beginner group used overt subjects more often and the [-SP] I-A group used less overt subjects than the Chinese controls. There were significant differences between the [+SP] group and the Spanish controls at both levels of learning, indicating that the [+SP] group have not transferred their use of overt subjects from Spanish.

5.2.4 Summary of WPT results

The results of the WPT are summarised below, to highlight the main findings. Table 27 and Table 28 report on the overall group and sub-group results for the use of null and overt subjects. The descriptive, statistical and individual results are summarised to provide a comprehensive view of the findings; in some cases, the findings highlight that the statistical analysis should be taken cautiously and the summary outlines my overall conclusion taking all of the data into account.

Null subjects

Group descriptive	[+SP] and [-SP] target-like with Chinese controls
Group statistics	No sig. diff. between learner groups and Chinese controls
Sub-groups descriptive	[-SP] beginners low use, [-SP] I-A high use [+SP] beginners and I-A, low use
Sub-groups statistics	No sig. diff. between sub-groups and Chinese controls
Sub-groups individual results	[-SP] beginners: all used fewer null subjects than Chinese controls [-SP] I-A: 2 out of 3 learners used more null subjects than Chinese controls [+SP] beginners and [-SP] beginners: almost all used fewer null subjects than Chinese controls
Summary	The learner groups used null subjects similarly to each other, although the [+SP] groups may have been slightly more 'target-like' than [-SP] groups as their average was closer to that of the Chinese controls

Table 27: Summary of the WPT results for null subject use

Overt subjects

Group descriptive	[+SP] and [-SP] target-like with Chinese controls
Group statistics	Sig. diff. between [+SP] group and Chinese controls
Sub-groups descriptive	[-SP] beginners high use, [-SP] I-A low use [+SP] beginners high use, [+SP] I-A high use
Sub-groups statistics	No sig. diff. between sub-groups and Chinese controls
Sub-groups individual results	[-SP] beginners: all used more subjects than Chinese controls [-SP] I-A: 2 out of 3 learners used less overt subjects than Chinese controls [+SP] beginners: all used higher number of overt subjects than Chinese controls [+SP] I-A: all used higher number of overt subjects than Chinese controls
Summary	Sub-group descriptive and individual results suggest that all groups are non-target-like with Chinese controls

Table 28: Summary of the WPT results for overt subject use

5.2.5 Discussion

The goal of the WPT was to investigate the use of null and overt arguments in Chinese by the two learner groups [+/-SP], to provide an insight into the source of transfer for the L3 learners and the role of structural similarity in L3 transfer. Firstly, I will discuss the results for the use of null subjects which are syntactically different in Chinese and Spanish, given that they are licensed and identified in different ways. It was predicted that if the [+SP] and [-SP] groups performed similarly in their use of null subjects, it was likely that there was no transfer from Spanish for the [+SP] group. In this case, Chinese null subjects have been learnt in a similar way for the two groups. However, if there were differences in the use of null subjects, this could show transfer from Spanish, either positive influence if the [+SP] group were more target-like or negative influence if the [-SP] group were more target-like. The latter result could be due to the amount of reassembly of the features associated with null subjects for the [+SP] learners.

The first important result is that the WPT task provides evidence of an underlying structural difference in the use of null subjects in Chinese and Spanish, manifested by the difference in the frequency of use of null subjects and supported by a significant difference between the two control groups. The Chinese controls used null subjects less often than the Spanish control group. This difference could be a consequence of *pro*-drop (Spanish) vs. topic-drop (Chinese). Recall that for Spanish *pro*-drop, the relevant feature that licenses null subjects is in [Spec, IP] (i.e. the [uD] feature), required syntactically to satisfy the EPP; the feature set has been summarised as [VAR: *pro*]. Furthermore, the referent of a null subject is thought to be identified by rich inflectional morphology or more specifically, agreement features on verbs. In contrast, Chinese null subjects are a different kind of empty category, whereby the relevant feature is not in [Spec, IP], but in [Spec, CP]; the EPP feature of C causes movement of the empty category to [Spec, CP]. This has been summarised as [VAR: empty category]. In addition, there is no inflectional morphology to identify the referent of a null subject and the content is identified by a deleted topic in the context. As a result, it seems as though the underlying difference between Chinese and Spanish null subjects is related to where and how the feature is assembled in each language, i.e. the feature responsible for null subjects is expressed in [Spec, IP] in Spanish but [Spec, CP] in Chinese and the acquisition task for learners of Spanish is to reassemble the [VAR: *pro*] feature in Chinese. The consequence of this is

evident through a difference in the use of null subjects, which tend to be used more frequently in Spanish since the feature is expressed on the verb and is easily recoverable, and less frequently in Chinese since the feature is not expressed on the verb and relies more heavily on a deleted topic and the surrounding context.

For the L3 learners, especially the [+SP] group, this difference could be significant and affect the way in which they acquire the use of null subjects in Chinese. The WPT group results indicated that both learner groups performed similarly overall, having a target-like use of null subjects in Chinese compared with the Chinese control group. This finding suggests that the underlying difference in the use of null subjects in Chinese and Spanish that we have seen above was not particularly problematic for the [+SP] learners who used null subjects in a target-like way in Chinese. In other words, they are able to reassemble the [VAR: *pro*] feature from Spanish to Chinese [VAR: empty category]. Furthermore, there was a significant difference between the [+SP] group (beginners) and the Spanish controls, which indicates that the [+SP] group are not negatively affected by their L2 Spanish at the initial stages. Crucially, a closer look at the sub-group results shows that the [-SP] group underused null subjects in the beginner stages of learning whilst the I-A group overused null subjects. Although the statistical analysis does not indicate this, the individual results corroborate this finding. This is an important finding that suggests that the [-SP] learners did not use null subjects appropriately at both levels of learning. This could indicate that the [-SP] group do not know the most appropriate interpretations for null subjects in Chinese and have not acquired the [VAR: empty category] feature. The [+SP] beginners used more null subjects than the [-SP] beginners, which could show that previous experience with Spanish increases the likelihood that null subjects will be used.

Another interesting result is that although the [+SP] I-A group used null subjects more often than the [+SP] beginners and have therefore improved on their performance, the frequency of null subjects used was still less than the Chinese controls. This could indicate that the [+SP] group were affected by the underlying differences between Chinese and Spanish null subjects at later stages of learning. However, the results do suggest that overall, the reassembly of [VAR: *pro*] to [VAR: empty category] is not hugely problematic for the [+SP] learners.

In summary, there does seem to be a small advantage for learners who have previous knowledge of a null subject language, when learning Chinese. Since there is no

inflectional morphology to recover null subjects in Chinese, it is possible that this indicates to learners that null subjects are used less often in Chinese. In other words, the lack of agreement features on Chinese verbs could be sufficient evidence for the [+SP] learners that Chinese null subjects are used at a different rate to the Spanish null subjects they have already acquired. The study did not test learners who were in the very 'initial state' of L3 acquisition; it is possible that there was initial transfer directly from Spanish which has been overcome, but we cannot assume this. In terms of the role of features in structural similarity, these findings could indicate that features associated with a property are important for L3 transfer, especially when the languages are typologically unrelated.

In terms of overt subjects, it was predicted that if the learners used overt subjects in a similar way, this could indicate transfer from English which is the L1 for both learner groups. However, if the learners used overt subjects in a different way, this could indicate that each group has transferred from a different background language. The WPT results showed that there were no significant differences between the Chinese and Spanish controls in their use of overt subjects. However, both learner groups used overt subjects in a non-target-like way (shown by the descriptive and individual results). For the [+SP] group, this was unlikely to be transfer from Spanish, since there were also significant differences between the [+SP] group and the Spanish control group. Previous studies have reported difficulties in acquiring overt subjects for L1 English learners in L2 acquisition studies, attributing problems to the presence of competing sets of overt subjects in interlanguage (e.g. Sorace & Filiaci, 2006). In the current study, both learner groups have three (or more) competing sets of overt subjects and therefore, it is not necessarily surprising that they should find it difficult to acquire the use of overt subjects in Chinese. The fact that the two learner groups performed similarly in their use of overt subjects could indicate transfer from L1 English, since the [+SP] and [-SP] groups have this language in common.

In summary, the WPT results indicate that the [+SP] group were slightly more target-like than the [-SP] group with the use of null subjects, suggesting that previous knowledge of a null subject language is beneficial in learning Chinese and that feature reassembly between Spanish and Chinese is not particularly problematic. For overt subjects, the results show similar behaviour for the two learner groups which suggests that they may

have transferred from their L1 English or at least acquired the use of overt subjects in a similar way.

5.3 Pronoun Interpretation Task (PIT)

Whilst the WPT tested the L3 learners' use of null and overt arguments, the PIT focused on the interpretation of null and overt arguments in order to examine the acquisition of the referential properties of subjects and objects in L3 Chinese. The PIT tested the interpretations in a context with both referential (RNP) and quantified (QNP) antecedents in the main clause and a null/overt argument in the embedded clause. The task was therefore adapted from previous studies which examined these properties in conjunction (i.e. Kanno, 1997; Rothman, 2009; Zhao, 2008). Recall that Chinese embedded null and overt subjects and overt objects can refer to either RNP or QNP in the main clause (co-referential reading) or someone else in discourse (disjoint reading), whilst embedded null objects cannot have a co-referential reading and must refer to someone else in discourse (disjoint reading). Furthermore, it has been highlighted that in Chinese an embedded overt pronoun can have a quantified antecedent, although this is blocked in Spanish (i.e. the OPC does not apply to Chinese) (Zhao, 2008, 2012). As a result, the PIT assessed the behaviour of null and overt arguments, as well as the behaviour of overt pronouns specifically related to the OPC principle.

The PIT consisted of bi-clausal sentences, followed by a question. In the main clause of the sentence, the subject was either referential (R) (see (41)) or quantified (Q) (see (42)) and in the embedded clause, the subject was either null (NS) or overt (OS).

(41) John$_i$ shuo ta$_{i/j}$ qu guo lun dun.
John$_i$ says that he$_{i/j}$ has been to London.
Question: According to the sentence, who is John saying has been to London?

(42) You ren$_i$ shuo ta$_{i/j}$ ren shi John.
Someone$_i$ says that he$_{i/j}$ knows John.
Question: According to the sentence, who is 'someone' saying knows John?

There were also sentences with an embedded object, both null (NO) and overt (OO). The question which followed each sentence elicited the participants' interpretation of the embedded argument, giving five options to choose from; (a) co-referential reading with the main clause subject, (b) disjoint reading of someone else in the discourse, (c)

ambiguous reading (either (a) or (b) is possible), (d) incorrect sentence and (e) I don't understand the sentence (see Chapter 4 for more detail).

The PIT aimed to test whether or not the [+SP] learners transfer their knowledge of the interpretation of null and overt subjects from L2 Spanish, testing the hypothesis that L3 transfer is guided by structural similarities. It was predicted that if the [+SP] and [-SP] groups performed similarly in their interpretation of null or overt arguments, this suggests that there was no transfer from Spanish for the [+SP] group and that the behaviour of null and overt arguments in Chinese has been learnt in a similar way for the two groups, either easily or with problems depending on whether the groups were target-like. However, if there were any differences in the learner groups in their interpretations of arguments, this could indicate transfer from Spanish; positive influence in the case that the [+SP] group are more target-like and negative influence in the case that the [-SP] group are more target-like.

For the data analysis, the responses of all of the participants have been collected and sorted by group. For the learner groups, the results have also been divided according to their sub-group (beginner or I-A). The data from this task were analysed in two ways:

i. Descriptively: for each sentence type, the responses for each option (a – e) have been calculated as a percentage of the total possible responses for that sentence type.[18]

ii. Statistically: the number of responses for each sentence type was entered into SPSS. The standard test for normality indicated that the data is not normally distributed; as a result, I used a non-parametric Kruskal-Wallis H test to compare the data across the groups. The analysis also performed post-hoc pairwise comparisons between the groups and automatically adjusted the significance value to take into account the possible errors that can occur when making multiple comparisons. As with the WPT, the test statistic H, *p* value, group mean, group standard deviation and effect size for the pairwise comparisons will be reported (refer to Section 5.2. for more detail).

[18] In similar studies, the responses for the ambiguous reading (c) were added together to the score for (a) only or (b) only, when the ambiguous reading is allowed. However, this made little to no difference to the results and did not provide further insight and therefore, I have reported the scores for (a), (b) and (c) separately.

As outlined for the WPT, the statistical results from the tasks should be taken with some caution, due to the low numbers of participants, especially in the [-SP] I-A group (n=3). Therefore, the results are likely to lack significant statistical power. In the following sections, I will present the results of each sentence type, according to the group and sub-group results. A summary of the PIT results is provided in Section 5.3.6.

5.3.1 Embedded null subjects

Firstly, I will present the results for embedded null subjects with i) a referential antecedent (RNP) and ii) a quantified antecedent (QNP). Null subjects are possible in finite clauses in both Chinese and Spanish, although they are not possible in the finite clauses of English. In terms of referential properties, in both Chinese and Spanish, null subjects can have a co-referential reading (a) or a disjoint reading (b). Since there is no additional context to provide a topic in the discourse, it is expected that (a) will be preferred for these sentences in Chinese. Null subjects can refer to either a referential (RNP) (43) or a quantified (QNP) (44) antecedent in the main clause, with no binding restrictions.

(43) a. Lisa shuo ren shi Mary [Chinese]
Lisa say (she) know Mary
'Lisa$_i$ says that (she)$_{i/j}$ knows Mary'.

b. Lisa dice que conoce a Mary. [Spanish]
Lisa says that knows Mary
'Lisa$_i$ says that (she)$_{i/j}$ knows Mary'.

(44) a. You ren shuo ren shi John [Chinese]
Someone say know John
'Someone$_i$ says that (he)$_{i/j}$ knows John'

b. Alguien dice que conoce a John. [Spanish]
Someone says that knows John
'Someone$_i$ says that (he)$_{i/j}$ knows John'.

Since null subjects in finite clauses are not allowed in English, it is not possible to see transfer from L1 English for these sentence types. The [+SP] group have previous experience in using and interpreting null subjects and therefore, it was predicted that the [+SP] beginner group will out-perform the [-SP] beginner group. However, Spanish and Chinese null subjects are syntactically different (supported by the WPT results) which means that the [+SP] group may be less target-like at later stages of learning, as they

need to apply the different syntactic mechanisms. If the two learner groups performed similarly to each other, it is unlikely that there has been transfer from Spanish for the [+SP] group.

5.3.1.1 RNS (referential noun phrase + embedded null subject)

Group Results

Table 29 shows the group results for sentences with a referential noun phrase in the main clause and an embedded null subject (RNS). As expected, the Chinese controls showed a preference for the co-referential reading (a) which they chose 84% of the time, since there is no additional context to favour the disjoint reading. The Spanish controls also showed a strong preference for (a) (74%) and there was no significant difference between the Chinese and Spanish control groups for any of the responses for RNS sentences (see Table 30). Therefore, the first finding is that there are no major differences in the preferred interpretation for RNS in the main clause and an embedded null subject in Spanish and Chinese.

In terms of the learners, the [+SP] group chose (a) 69.3% of the time and similarly, the [-SP] group chose (a) 64% of the time. As shown in Table 30, there was no significant difference between the two learner groups in their choice of (a). However, the pairwise comparisons do show that there was a significant difference between the [-SP] group and the Chinese control group in choosing (a) but there was no difference between the [+SP] and the Chinese control group. This suggests that the [-SP] group may have been non-target-like with the Chinese controls but the [+SP] group data were in line with the Chinese controls in terms of the co-referential reading of embedded null subjects.

In terms of the other readings, the [+SP] group chose the ambiguous reading (c) less often (4%) than the Spanish control group (25%) and chose 'Incorrect' (d) more often (25.3%) than the Spanish control group (0%). As a result, there were significant differences between the [+SP] group and the Spanish control group for (c) and (d). These findings show that the [+SP] learners are behaving differently from the Spanish controls for some readings.

RNS	CHINESE CONTROLS	[-SP] GROUP	[+SP] GROUP	SPANISH CONTROLS
a) Co-referential reading	84%	64%	69.3%	74%
b) Disjoint reading	0%	6%	1.3%	1%
c) Ambiguous (a or b)	8%	2%	4%	25%
d) Incorrect	8%	22%	25.3%	0%
e) I don't understand	0%	6%	0%	0%

Table 29: Group results for RNS sentences

RNS	Group Mean (± Standard Deviation)		Effect Size (d)	Test Statistic (H)	Adj. Sig. (*p*)
a) Co-ref.	Chinese Controls 16.80 (±2.049)	Spanish controls 14.80 (±1.095)	1.217	2.800	1.000
	Chinese Controls	[+SP] Group 10.40 (±1.517)	3.550	8.900	0.97
	Chinese Controls	[-SP] Group 6.40 (±.548)	6.934	13.900	**.001**
	[+SP] Group	[-SP] Group	3.507	5.000	1.000
	[+SP] Group	Spanish Controls	3.326	6.100	.596
b) Disjoint	No significant differences[19]			4.813	.186
c) Ambiguous	Chinese Controls 1.60 (±1.140)	Spanish controls 5.00 (±1.414)	2.647	-6.700	.378
	Chinese Controls	[+SP] Group .60 (±.894)	0.976	3.900	1.000
	Chinese Controls	[-SP] Group .20 (±.447)	1.617	5.600	.721
	[+SP] Group	[-SP] Group	0.581	1.700	1.000
	[+SP] Group	Spanish Controls	3.755	10.600	**.020**
d) Incorrect	Chinese Controls	Spanish controls .00 (±.000)	0.000	6.200	5.27
	Chinese Controls	[+SP] Group 3.80 (±.837)	1.967	-7.500	.234
	Chinese Controls	[-SP] Group 2.20 (±.837)	0.536	-1.900	1.000
	[+SP] Group	[-SP] Group	1.912	5.600	.739
	[+SP] Group	Spanish Controls	0.000	-13.700	**.001**
e) I don't understand	No significant differences			6.316	.097

Table 30: Group statistical results of the Kruskal Wallis pairwise comparisons (RNS)

In summary, the group results for RNS sentences show that the [+SP] and [-SP] groups chose (a) at a similar rate, although the [+SP] group may be more target-like (according to the statistics).

[19] In the case that SPSS did not detect any significant differences for a response option, individual pairwise comparisons are unavailable to report.

Sub-group Results

Table 31 shows the sub-group results for RNS sentences to establish whether or not there was any effect of proficiency. The [+SP] beginners chose the co-referential reading (a) more often (80%) than the [-SP] beginners (51.4%). The pairwise comparisons show that there was no significant difference between the [+SP] beginners group and the Chinese controls but there was a significant difference between the [-SP] beginners and the Chinese control group (see Table 32). This is taken to indicate that the [-SP] beginners were non-target-like with the Chinese controls, but the [+SP] beginners' interpretations were target-like. At the I-A stage, we see that the [-SP] group chose (a) more often (93%) than the [+SP] group (62.2%) and furthermore, there was a significant difference between the [-SP] I-A group and the Chinese control group. However, since the preferred reading for the Chinese controls is (a), this cannot reasonably be analysed as 'non-target-like' behaviour.

In the RNS group results, we saw that the [+SP] group chose the ambiguous reading (c) significantly less often than the Spanish controls and chose 'Incorrect' (d) significantly more often than the Spanish controls. The sub-group results reveal that the [+SP] I-A group were not in line with the Spanish controls (see Table 32). Furthermore, the results indicate that there was a significant difference between the [+SP] I-A group and the [-SP] I-A group in choosing (d) for RNS sentences.

RNS	**[-SP] GROUP**		**[+SP] GROUP**	
	Beginners	**Intermediate-advanced**	**Beginners**	**Intermediate-advanced**
a) Co-referential reading	51.4%	93%	80%	62.2%
b) Disjoint reading	5.7%	7%	0%	2%
c) Ambiguous (a or b)	2.9%	0%	7%	2.2%
d) Incorrect	31.4%	0%	13%	33.3%
e) I don't understand	8.6%	0%	0%	0%

Table 31: Sub-group results for RNS sentences

RNS	Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
a) Co-ref.	Chinese Controls 16.80 (±2.049)	[+SP] Beginners 4.80 (±1.095)	7.305	13.800	.181
	Chinese Controls	[+SP] I-A 5.60 (±.548)	7.466	10.200	.953
	Chinese Controls	[-SP] Beginners 3.60 (±.548)	8.801	18.900	**.009**
	Chinese Controls	[-SP] I-A 2.80 (±.447)	9.440	22.700	**.001**
	[+SP] Beginners	[-SP] Beginners	1.385	5.100	1.000
	[+SP] I-A	[-SP] I-A	5.599	12.500	.345
	[+SP] Beginners	Spanish Controls 14.80 (±1.095)	9.132	11.000	.681
	[+SP] I-A	Spanish Controls	10.626	7.400	1.000
b) Disjoint	No significant differences			3.944	.558
c) Ambiguous	Chinese Controls 1.60 (±1.140)	[+SP] Beginners .40 (±.548)	1.341	6.900	1.000
	Chinese Controls	[+SP] I-A .20 (±.447)	1.617	9.100	1.000
	Chinese Controls	[-SP] Beginners .20 (±.447)	1.617	9.100	1.000
	Chinese Controls	[-SP] I-A .00 (±0.00)	0.000	11.300	.365
	[+SP] Beginners	[-SP] Beginners	0.340	2.200	1.000
	[+SP] I-A	[-SP] I-A	0.000	2.200	1.000
	[+SP] Beginners	Spanish Controls 5.00 (±1.414)	4.290	14.500	.058
	[+SP] I-A	Spanish Controls	4.577	16.700	**.013**
d) Incorrect	Chinese Controls 1.60 (±1.342)	[+SP] Beginners .80 (±.837)	0.715	5.000	1.000
	Chinese Controls	[+SP] I-A 3.00 (±.000)	0.000	-7.800	1.000
	Chinese Controls	[-SP] Beginners 2.20 (±.837)	0.536	-3.400	1.000
	Chinese Controls	[-SP] I-A .00 (±.000)	0.000	11.200	.490
	[+SP] Beginners	[-SP] Beginners	0.000	-8.400	1.000
	[+SP] I-A	[-SP] I-A	0.000	19.000	**.004**
	[+SP] Beginners	Spanish Controls .00 (±.000)	0.000	-6.200	1.000
	[+SP] I-A	Spanish Controls	0.000	-19.000	**.004**
e) I don't understand	No significant differences			10.345	.066

Table 32: Sub-group statistical results of the Kruskal Wallis pairwise comparisons (RNS)

Individual Results

In order to explore these results further and gain an insight into how reliable the above findings are, I present the individual results for the two learner groups in Table 33.

[+SP]	Responses					[-SP]	Responses				
LS01	a	a	a	a	a	LX01	a	a	a	a	a
LS02	d	a	a	a	d	LX03	d	d	d	d	d
LS03	a	a	c	a	a	LX05	b	a	a	e	a
LS08	a	a	a	a	a	LX06	a	d	d	a	a
LS09	a	d	a	a	d	LX07	a	a	d	a	d
LS14	a	a	a	a	c	LX08	d	b	a	a	a
LS04	a	a	a	a	a	LX10	a	e	a	e	c
LS05	a	a	a	a	a	LX02	a	a	a	a	a
LS06	a	a	a	a	c	LX04	a	a	a	a	a
LS07	a	a	a	a	a	LX09	a	a	a	b	a
LS10	a	b	d	d	d						
LS11	d	d	d	d	d						
LS12	d	d	d	d	d						
LS13	d	d	a	a	a						
LS15	a	a	a	a	a						

Table 33: Individual results for RNS sentences

The individual results show that in the [-SP] beginners group, there were four learners who chose 'incorrect sentence' (d) and two learners who chose 'I don't understand' (e). It is reasonable to conclude that these beginner learners do not know the appropriate interpretations of RNS sentences. In comparison, the [+SP] beginners chose the preferred response (a) more often and are more in line with the Chinese controls. However, in the [+SP] I-A group there were four learners who chose option (d) which suggests that some of the learners in this group do not know the appropriate interpretations of RNS sentences (even though the statistical analysis does not reflect this).

In summary, the group results for RNS sentences show that the [+SP] beginners were more target-like with the co-referential reading than the [-SP] beginners, who did not perform in line with the Chinese controls. On the other hand, the [-SP] I-A group responses were more in line with the Chinese controls (despite the statistical difference) than the [+SP] I-A group. For the ambiguous reading (c) and 'incorrect' (d) readings, the results show that the [+SP] I-A group did not behave in line with the Spanish control group. This points towards a developmental affect for the [+SP] learners, who behave less like the Spanish controls at later stages of learning.

5.3.1.2 QNS (quantified noun phrase + embedded null subject)

Group Results

Table 34 shows the group results for sentences with a quantified noun phrase in the main clause and an embedded null subject (QNS) which are mostly in line with the RNS sentence data. As with the RNS sentences, the Chinese control group preferred the co-referential reading (a) (59%), as did the Spanish controls (41%). In contrast to the RNS data, the QNS pairwise comparisons show a significant difference between the Chinese controls and the Spanish controls for the disjoint reading (b); the Chinese controls chose the disjoint reading (b) less often (6%) than the Spanish (24%). This indicates that the disjoint reading is preferred more often for QNS sentences in Spanish.

In line with the RNS results, the [-SP] group chose the co-referential reading (a) less often (40%) than the Chinese control group (59%). There was a significant difference between the [-SP] group and the Chinese controls but there was no significant difference between the [+SP] learners and the Chinese control group. This further indicates that the [-SP] group may have been overall less target-like than the [+SP] group with embedded null subjects. The data for the QNS sentences shows that the [+SP] group chose the ambiguous reading (c) less often and the 'Incorrect' option (d) more often than the Spanish control group, in line with the RNS data. There was a significant difference between the [+SP] group and the Spanish controls in choosing (c) and (d). This finding shows that the [+SP] group did not perform in line with the Spanish control group for both RNS and QNS sentence types.

QNS	CHINESE CONTROLS	[-SP] GROUP	[+SP] GROUP	SPANISH CONTROLS
a) Co-referential reading	59%	40%	42.7%	41%
b) Disjoint reading	6%	20%	14.7%	24%
c) Ambiguous (a or b)	22%	12%	6.7%	33%
d) Incorrect	9%	18%	30.7%	2%
e) I don't understand	4%	10%	5.3%	0%

Table 34: Group results for QNS sentences

QNS	Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
a) Co-ref.	Chinese Controls 11.80 (±3.962)	Spanish controls 8.20 (±1.643)	1.187	3.500	1.000
	Chinese Controls	[+SP] Group 6.40 (±2.608)	1.610	6.900	.381
	Chinese Controls	[-SP] Group 4.00 (±3.082)	2.197	10.800	**.022**
	[+SP] Group	[-SP] Group	0.840	3.900	1.000
	[+SP] Group	Spanish Controls	0.826	3.500	1.000
b) Disjoint	Chinese Controls 1.20 (±.447)	Spanish controls 4.80 (±1.304)	3.693	-9.700	**.039**
	Chinese Controls	[+SP] Group 2.20 (±3.271)	0.428	-.700	1.000
	Chinese Controls	[-SP] Group 2.00 (±1.000)	1.033	-3.200	1.000
	[+SP] Group	[-SP] Group	0.083	-2.500	1.000
	[+SP] Group	Spanish Controls	1.044	9.000	.069
c) Ambiguous	Chinese Controls 4.40 (±2.510)	Spanish controls 6.60 (±.548)	1.211	-4.000	1.000
	Chinese Controls	[+SP] Group 1.00 (±.707)	1.844	7.100	.329
	Chinese Controls	[-SP] Group 1.20 (±1.304)	1.599	6.900	.372
	[+SP] Group	[-SP] Group	0.190	-.200	1.000
	[+SP] Group	Spanish Controls	8.853	11.100	**.016**
d) Incorrect	Chinese Controls 1.80 (±.837)	Spanish controls .40 (±.548)	1.978	6.000	.618
	Chinese Controls	[+SP] Group 4.60 (±1.140)	2.799	-7.300	.284
	Chinese Controls	[-SP] Group 1.80 (±1.483)	1.204	.500	1.000
	[+SP] Group	[-SP] Group	2.117	7.800	.204
	[+SP] Group	Spanish Controls	4.696	-13.300	**.002**
e) I don't understand	No significant differences			4.099	.251

Table 35: Group statistical results of the Kruskal Wallis pairwise comparisons (QNS)

In summary, the group results for QNS sentences support the findings for RNS sentences in that the [+SP] learners were more target-like with the Chinese control group and did not perform in line with the Spanish control group for all the responses.

Sub-group Results

Table 36 shows the sub-group results for QNS sentences. In contrast to the RNS sentences, the [+SP] beginners chose the co-referential reading (a) less often (36.7%) than the [-SP] beginner group (45.7%). There was a significant difference between the [+SP] beginners and the Chinese controls in choosing (a) but not between the [-SP] beginners and the Chinese controls (Table 37) which was not seen for the RNS sentences. The [-SP]

I-A group chose (a) less often (26.7%) than the [+SP] I-A group (46.7%). Furthermore, there was a significant difference between the [-SP] I-A group and the Chinese controls in choosing (a) as with the RNS sentences. These results suggest that the [+SP] beginners and [-SP] I-A group were non- target-like with QNS sentences.

The QNS sub-group results show the same significant differences between the [+SP] I-A group and the Spanish controls in choosing the ambiguous reading (c) and 'incorrect' (d). The results also indicate that there was a significant difference between the [+SP] I-A group and the [-SP] I-A group in choosing (d) for the QNS sentences.

QNS	[-SP] GROUP		[+SP] GROUP	
	Beginner	Intermediate-advanced	Beginners	Intermediate-advanced
a) Co-referential reading	45.7%	26.7%	36.7%	46.7%
b) Disjoint reading	17.1%	26.7%	20%	11.1%
c) Ambiguous (a or b)	8.6%	20%	13.3%	2.2%
d) Incorrect	17.1%	20%	23.3%	35.6%
e) I don't understand	11.4%	6.7%	6.7%	4.4%

Table 36: Sub-group results for QNS sentences

QNS	Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
a) Co-ref.	Chinese Controls 11.80 (±3.962)	[+SP] Beginners 2.20 (±1.483)	3.209	17.000	**.032**
	Chinese Controls	[+SP] I-A 4.20 (±1.483)	2.540	10.800	.764
	Chinese Controls	[-SP] Beginners 3.20 (±2.280)	2.660	14.000	.171
	Chinese Controls	[-SP] I-A .80 (±.837)	3.842	21.500	**.002**
	[+SP] Beginners	[-SP] Beginners	0.519	-3.000	1.000
	[+SP] I-A	[-SP] I-A	2.824	10.700	.797
	[+SP] Beginners	Spanish Controls 8.20 (±1.643)	3.834	14.300	.146
	[+SP] I-A	Spanish Controls	2.555	8.100	1.000
b) Disjoint	Chinese Controls 1.20 (±.447)	[+SP] Beginners 1.20 (±1.643)	1.204	2.800	1.000
	Chinese Controls	[+SP] I-A 1.00 (±1.732)	0.158	4.700	1.000
	Chinese Controls	[-SP] Beginners 1.20 (±1.304)	0.975	2.000	1.000
	Chinese Controls	[-SP] I-A .80 (±.837)	0.596	3.800	1.000
	[+SP] Beginners	[-SP] Beginners	1.483	-.800	1.000
	[+SP] I-A	[-SP] I-A	0.147	-.900	1.000
	[+SP] Beginners	Spanish Controls 4.80 (±1.304)	2.191	14.300	.118
	[+SP] I-A	Spanish Controls	2.479	16.200	**.039**
c) Ambiguous	Chinese Controls 4.40 (±2.510)	[+SP] Beginners .80 (±.447)	1.997	9.400	1.000
	Chinese Controls	[+SP] I-A .20 (±.447)	2.329	15.400	.061
	Chinese Controls	[-SP] Beginners .60 (±.894)	2.017	12.300	.325
	Chinese Controls	[-SP] I-A .60 (±.548)	2.091	11.400	.499
	[+SP] Beginners	[-SP] Beginners	0.283	2.900	1.000
	[+SP] I-A	[-SP] I-A	0.799	-4.000	1.000
	[+SP] Beginners	Spanish Controls 6.60 (±.548)	11.598	13.500	.176
	[+SP] I-A	Spanish Controls	12.798	19.500	**.004**
d) Incorrect	Chinese Controls 1.80 (±.837)	[+SP] Beginners 1.40 (±.548)	0.565	2.700	1.000
	Chinese Controls	[+SP] I-A 3.20 (±.837)	1.672	-7.500	1.000
	Chinese Controls	[-SP] Beginners 1.20 (±1.095)	0.616	5.500	1.000
	Chinese Controls	[-SP] I-A .60 (±.548)	1.696	1.100	.847
	[+SP] Beginners	[-SP] Beginners	0.230	2.800	1.000
	[+SP] I-A	[-SP] I-A	3.676	17.600	**.013**
	[+SP] Beginners	Spanish Controls	1.824	-9.300	1.000

		.40 (±.548)			
	[+SP] I-A	Spanish Controls	3.956	-19.500	**.003**
e) I don't understand	No significant differences			6.238	.284

Table 37: Sub-group statistical results of the Kruskal Wallis pairwise comparisons (QNS)

Individual Results

The individual results for the learner groups are reported in Table 38.

[+SP]	Responses					[-SP]	Responses				
LS01	b	a	a	a	a	LX01	e	a	d	a	e
LS02	d	d	d	d	d	LX03	b	a	d	a	a
LS03	b	a	b	c	c	LX05	c	a	c	a	a
LS08	e	a	e	d	a	LX06	d	d	c	e	d
LS09	b	a	a	b	d	LX07	b	b	a	a	a
LS14	b	c	c	a	a	LX08	b	b	a	a	b
LS04	b	a	d	a	a	LX10	e	a	d	a	a
LS05	a	a	a	a	a	LX02	d	c	d	a	a
LS06	b	b	a	d	d	LX04	e	d	b	a	b
LS07	a	a	a	a	a	LX09	c	a	c	b	b
LS10	b	d	e	a	d						
LS11	d	d	d	d	d						
LS12	d	d	d	d	d						
LS13	b	c	d	a	a						
LS15	e	a	a	a	a						

Table 38: Individual results for QNS sentences

The results show that for the [+SP] beginners, there was one learner (LS02) who only chose 'incorrect sentence' (d) for QNS sentences and another learner (LS08) who chose (d) and (e) more often than the other options; this is likely to have contributed to the difference between the [+SP] beginners and the Chinese controls (which was not seen for the RNS sentences). On the other hand, the [-SP] beginners chose (d) and (e) less often than the [+SP] beginners and therefore, were more target-like. The results also show that two of the learners in the [-SP] I-A group (LX02, LX04) chose (d) and (e) for QNS sentences; since there are so few learners in this group, this is likely to have caused the significant difference between this group and the Chinese controls in choosing (a) (since there are less preferences for (a)). In the [+SP] I-A group there were also several learners who choose (d) and (e), although there is no significant difference with the Chinese controls. This could indicate that both I-A groups are non-target-like in choosing (a) for QNS sentences, but only the [-SP] I-A group shows a statistical difference due to low

participant numbers. Overall, the individual results highlight that the responses for QNS sentences are much more varied than for the RNS sentences, indicating that both groups are less aware of the appropriate interpretations of QNS sentences.

In summary, the results for embedded null subjects suggest that the [+SP] beginners were target-like in choosing the co-referential reading (a) for RNS sentences, but the [-SP] group were non-target-like. On the other hand, the results for QNS sentences suggest that the [+SP] beginners were non-target-like whilst the [-SP] beginners were target-like. The [+SP] group showed some significant differences with the Spanish control group at the I-A stage for both sentence types, which indicates that the learners behaved less like the Spanish controls with increased proficiency.

5.3.2 Embedded overt subjects

5.3.2.1 ROS (referential noun phrase + embedded overt subject)

Next, I will present the results for the contexts which featured an embedded overt subject with a referential noun phrase antecedent (ROS). In ROS sentences, the embedded subject can have the co-referential reading (a), the disjoint reading (b) or the ambiguous reading (c) (45).

(45) a. John shuo ta qu guo lun dun [Chinese]
John say he have been London
'John$_i$ says that he$_{i/j}$ has been to London'.

b. John dice que él ha ido a Londres. [Spanish]
John says that he has been to London
'John$_i$ says that he$_{i/j}$ has been to London'.

Any of these readings are allowed in all three languages, but may not behave in exactly the same way. If the two learner groups performed similarly, this could indicate transfer from English (since English is the L1 for both groups). However, if the learner groups performed differently, this could suggest that they have transferred from different background languages.

Group Results

The group results for ROS sentences are presented in Table 39. The Chinese control group chose either the co-referential reading (64%) or the ambiguous reading (36%) only. The Spanish control group interpretations were very similar, with a small percentage that preferred the disjoint only reading (4%). The learner group results show that the [-SP] group chose (a) 56% of the time and the [+SP] group chose (a) 26.7% of the time; therefore, both groups choose (a) less often than the Chinese controls. The statistical analysis shows that there was a significant difference between the [+SP] group and the Chinese controls as well as the [-SP] group and the Chinese controls (see Table 40) which indicates that neither group were target-like in choosing (a). The [+SP] group chose (b) 16% of the time, which resulted in a significant difference between the [+SP] group and Chinese controls who did not choose it at all.

ROS	CHINESE CONTROLS	[-SP] GROUP	[+SP] GROUP	SPANISH CONTROLS
a) Co-referential reading	64%	56%	26.7%	48%
b) Disjoint reading	0%	6%	16%	4%
c) Ambiguous	36%	36%	57.3%	48%
d) Incorrect	0%	0%	0%	0%
e) I don't understand	0%	2%	0%	0%

Table 39: Group results for ROS sentences

ROS	Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
a) Co-ref.	Chinese Controls 12.80 (±2.168)	Spanish controls 9.60 (±1.140)	1.846	4.200	1.000
	Chinese Controls	[+SP] Group 4.00 (±.707)	5.457	13.900	**.001**
	Chinese Controls	[-SP] Group 5.60 (±1.342)	3.993	10.300	**.033**
	[+SP] Group	[-SP] Group	1.491	-3.600	1.000
	[+SP] Group	Spanish Controls	5.903	9.700	.054
b) Disjoint	Chinese Controls .00 (±.000)	Spanish controls .80 (±.447)	.000	-6.000	.536
	Chinese Controls	[+SP] Group 2.40 (±.548)	.000	-13.500	**.001**
	Chinese Controls	[-SP] Group .60 (±.548)	.000	-4.500	1.000
	[+SP] Group	[-SP] Group	3.284	9.000	0.65
	[+SP] Group	Spanish Controls	3.199	-7.500	.202
c) Ambiguous	Chinese Controls 7.20 (±2.168)	Spanish controls 9.60 (±.894)	1.447	-6.400	.474
	Chinese Controls	[+SP] Group 8.60 (±.894)	0.844	-3.100	1.000
	Chinese Controls	[-SP] Group 3.60 (±.1342)	1.997	6.300	.503
	[+SP] Group	[-SP] Group	4.385	9.400	.059
	[+SP] Group	Spanish Controls	1.118	3.300	1.000
d) Incorrect	No significant differences			.000	1.000
e) I don't understand	No significant differences			3.000	.392

Table 40: Group statistical results of the Kruskal Wallis pairwise comparisons (ROS)

In summary, the ROS group results show that both learner groups may have been non-target-like in choosing (a) when compared with the Chinese controls. Next, I consider the sub-group results.

Sub-group Results

Table 41 presents the sub-group results for ROS sentences. As a reminder, the Chinese controls chose (a) 64% of the time. The [+SP] beginners only chose (a) 23.3% of the time and there was a significant difference between the [+SP] beginners and the Chinese controls which is not seen for the [-SP] beginners. The [-SP] I-A group chose (a) more often than the Chinese controls (66.7%) and there was a significant difference between the [-SP] I-A group and the Chinese controls. The [-SP] I-A group also showed a significant difference with the Chinese controls in choosing the ambiguous reading (c) (see Table 42). The two learner groups performed quite differently to each other in choosing the disjoint reading (b) which is reflected by a significant difference between the two 'I-A' groups.

Furthermore, the [+SP] I-A group chose (b) (20%) more often than the Chinese control group (0%) and there was a significant difference between the [+SP] I-A group and the Chinese controls. The sub-group results demonstrate that the sub-groups differed from the Chinese controls for ROS sentences for most of the readings. The effect sizes for these statistical differences is very small, which may indicate these results are not that significant and therefore, should be taken with caution.

ROS	[-SP] GROUP		[+SP] GROUP	
	Beginner	**Intermediate-advanced**	**Beginner**	**Intermediate-advanced**
a) Co-referential reading	51.4%	66.7%	23.3%	28.9%
b) Disjoint reading	8.6%	0%	10%	20%
c) Ambiguous (a or b)	37.1%	33.3%	66.7%	51.1%
d) Incorrect	0%	0%	0%	0%
e) I don't understand	2.9%	0%	0%	0%

Table 41: Sub-group results for ROS sentences

ROS	Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
a) Co-ref.	Chinese Controls 12.80 (±2.168)	[+SP] Beginners 1.40 (±.548)	7.209	23.000	**.000**
	Chinese Controls	[+SP] I-A 2.60 (±.548)	6.450	14.6000	.110
	Chinese Controls	[-SP] Beginners 3.60 (±1.342)	5.103	11.700	.475
	Chinese Controls	[-SP] I-A 2.00 (±.000)	.000	19.100	**.007**
	[+SP] Beginners	[-SP] Beginners	2.146	-11.300	.569
	[+SP] I-A	[-SP] I-A	.000	4.500	1.000
	[+SP] Beginners	Spanish Controls 9.60 (±1.140)	9.168	18.800	**.008**
	[+SP] I-A	Spanish Controls	7.826	10.400	.842
b) Disjoint	Chinese Controls .00 (±.000)	[+SP] Beginners .60 (±.548)	.000	-7.800	1.000
	Chinese Controls	[+SP] I-A 1.80 (±.447)	.000	-19.000	**.003**
	Chinese Controls	[-SP] Beginners .60 (±.548)	.000	-7.800	1.000
	Chinese Controls	[-SP] I-A .00 (±.000)	.000	.000	1.000
	[+SP] Beginners	[-SP] Beginners	.000	.000	1.000
	[+SP] I-A	[-SP] I-A	.000	19.000	**.003**
	[+SP] Beginners	Spanish Controls .80 (±.447)	0.399	2.600	1.000
	[+SP] I-A	Spanish Controls	2.237	-8.600	1.000
c) Ambiguous	Chinese Controls 7.20 (±2.168)	[+SP] Beginners 4.00 (±.707)	1.984	9.400	1.000
	Chinese Controls	[+SP] I-A 4.60 (±.548)	1.644	6.000	1.000
	Chinese Controls	[-SP] Beginners 2.60 (±1.342)	2.551	14.000	.160
	Chinese Controls	[-SP] I-A 1.00 (±.000)	.000	19.400	**.006**
	[+SP] Beginners	[-SP] Beginners	1.305	4.600	1.000
	[+SP] I-A	[-SP] I-A	.000	13.400	.218
	[+SP] Beginners	Spanish Controls 9.60 (±.894)	6.948	13.800	.178
	[+SP] I-A	Spanish Controls	6.743	10.400	.869
d) Incorrect	No significant differences			.000	1.000
e) I don't understand	No significant differences			5.000	.416

Table 42: Sub-group statistical results of the Kruskal Wallis pairwise comparisons (ROS)

In summary, the ROS group results show that overall the two learner groups both differed from the Chinese controls in their preferences. This indicates that the learner groups behaved similarly with overt subjects, indicating possible transfer from the same background language.

5.3.2.2 QOS (quantified noun phrase + embedded overt subject)

In this next section, I will present the results for embedded overt subjects with a quantified noun phrase antecedent (QOS). QOS sentences are straightforward in English and Chinese and can have a co-referential reading (a) or a disjoint reading (b) (46). However, in Spanish embedded overt subjects cannot have the co-referential reading (a), since this interpretation is blocked by binding restrictions (i.e. OPC principle) (46).

(46) a. You ren shuo ta jian guo shou xiang [Chinese]
Someone say he seen prime minister
'Someone$_i$ says that he$_{i/j}$ met the prime minister'.

b. Alguien dice que él encontró con el primer ministro. [Spanish]
Someone says that he met with the prime minister
'Someone$_i$ says that he$_{*i/j}$ met the prime minister'.

The [+SP] learners have L1 English which is not restricted by the OPC principle but they also have knowledge of the OPC restrictions which govern in their L2 Spanish. Therefore, the [+SP] learners may transfer their knowledge of embedded overt subjects from either their L1 English or their L2 Spanish. If the two learner groups performed differently, this could be a result of transfer from L2 Spanish for the [+SP] group. On the other hand, it is possible that transfer will occur from L1 English for both groups which will be manifested by similar behaviour by the two learner groups.

Group Results

Table 43 shows that as expected, the Chinese controls preferred the co-referential reading (a) (51%) or the ambiguous reading (c) (47%), since an embedded overt subject is not restricted by binding conditions in Chinese. In contrast, the Spanish control group chose the disjoint reading (b) 44% of the time and (c) 35% of the time. However, 19% of the Spanish controls chose the co-referential reading (a) which was unexpected. The individual results show that there was one Spanish native speaker (NS09) that chose (a) consistently and a few other cases where it was chosen. It is possible that the participants did not read the question carefully, or that the OPC observation does not hold for all

cases in Spanish.[20] Nevertheless, there was an important significant difference between the Chinese and Spanish control groups in their choice of the disjoint reading (b) (see Table 44). This shows that there is a key difference between these languages regarding the appropriate antecedent for an embedded overt subject; i.e. the disjoint reading (b) is preferred in Spanish and the co-referential reading (a) or ambiguous reading (c) is preferred in Chinese when the antecedent is quantified.

In terms of the learner groups, the QOS group results suggest that neither learner group was target-like with the Chinese controls. Both groups used the co-referential reading (a) less often than the Chinese controls; the [+SP] group chose (a) 10.7% of the time and the [-SP] group chose (a) 22% of the time (there were significant differences between the [+SP] group and the Chinese controls as well as the [-SP] group and the Chinese controls, see Table 44). In terms of the other readings, the [-SP] group chose the ambiguous reading (c) less often (26%) than the Chinese controls (47%); in the pairwise comparisons there was a significant difference between the [-SP] group and the Chinese controls.

QOS	CHINESE CONTROLS	[-SP] GROUP	[+SP] GROUP	SPANISH CONTROLS
a) Co-referential reading	51%	22%	10.7%	19%
b) Disjoint reading	2%	42%	38.7%	44%
c) Ambiguous (a or b)	47%	26%	42.7%	35%
d) Incorrect	0%	8%	6.7%	1%
e) I don't understand	0%	2%	1.3%	1%

Table 43: Group results for QOS sentences

[20] The data for QOS sentences highlight the potentially unreliable nature of the OPC: it seems as though its main purpose is to describe certain observations in languages such as Spanish, but it is not clear why it applies to Spanish, but not to English or Chinese. The Spanish native speakers do not completely reject the co-referential reading, which suggests that the OPC is not a UG constraint.

QOS	Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
a) Co-ref.	Chinese Controls 10.20 (±3.114)	Spanish controls 3.80 (±1.483)	2.624	6.600	.447
	Chinese Controls	[+SP] Group 1.60 (±1.817)	3.373	12.200	**.006**
	Chinese Controls	[-SP] Group 2.20 (±.447)	3.596	11.200	**.015**
	[+SP] Group	[-SP] Group	0.453	-1.000	1.000
	[+SP] Group	Spanish Controls	1.326	5.600	.781
b) Disjoint	Chinese Controls .40 (±.548)	Spanish controls 8.80 (±1.643)	6.858	-14.500	**.001**
	Chinese Controls	[+SP] Group 5.80 (±1.483)	4.830	-9.400	.068
	Chinese Controls	[-SP] Group 4.20 (±1.304)	3.799	-6.100	.603
	[+SP] Group	[-SP] Group	1.145	3.300	1.000
	[+SP] Group	Spanish Controls	1.916	5.100	1.000
c) Ambiguous	Chinese Controls 9.40 (±3.209)	Spanish controls 7.00 (±1.732)	0.930	3.700	1.000
	Chinese Controls	[+SP] Group 6.40 (±1.342)	1.219	5.500	.810
	Chinese Controls	[-SP] Group 2.60 (±1.342)	2.764	12.400	**.005**
	[+SP] Group	[-SP] Group	2.831	6.900	.364
	[+SP] Group	Spanish Controls	0.387	1.800	1.000
d) Incorrect	No significant differences			5.943	.114
e) I don't understand	No significant differences			1.118	.773

Table 44: Group statistical results of the Kruskal Wallis pairwise comparisons (QOS)

In summary, the QOS group results show that both learner groups differed from the Chinese controls in their use of (a), (b) and (c).

Sub-group Results

Table 45 Shows the sub-group results for QOS sentences. Recall that in the group results, the [+SP] and [-SP] learners used the co-referential reading (a) significantly less often than the Chinese controls. The sub-group results show that both the [+SP] beginners (13.3%) and the [+SP] I-A group (8.9%) chose the co-referential reading (a) less often than the Chinese controls and there was a significant difference between both [+SP] beginners and the I-A group and the Chinese controls (see Table 46). The sub-group results also show that the [-SP] I-A group chose the co-referential reading less often than the Chinese controls (33%) and were significantly different from the Chinese control group.

Furthermore, the [-SP] group differed significantly from the Chinese controls in their choice of the ambiguous reading (c) at both levels of learning. The [-SP] beginners chose (c) 31.4% of the time and the [-SP] I-A group chose (c) 13.3% of the time, which reflect that the [-SP] used (c) less often than the Chinese controls (47%). There were also significant differences between the [-SP] sub-groups and the Chinese controls. Overall, all sub-groups had problems with the interpretations of QOS sentences.

	[-SP] GROUP		**[+SP] GROUP**	
QOS	**Beginners**	**Intermediate-advanced**	**Beginners**	**Intermediate-advanced**
a) Co-referential reading	17.1%	33.3%	13.3%	8.9%
b) Disjoint reading	45.7%	33.3%	36.7%	40%
c) Ambiguous (a or b)	31.4%	13.3%	50%	37.8%
d) Incorrect	2.9%	20%	0%	11.1%
e) I don't understand	2.9%	0%	0%	2.2%

Table 45: Sub-group results for QOS sentences

QOS	Group Mean (± Standard Deviation)		Effect Size (d)	Test Statistic (H)	Adj. Sig. (*p*)
a) Co-ref.	Chinese Controls 10.20 (±3.114)	[+SP] Beginners .80 (±1.304)	3.937	19.300	**.006**
	Chinese Controls	[+SP] I-A .80 (±.837)	4.122	18.300	**.011**
	Chinese Controls	[-SP] Beginners 1.20 (±.447)	4.045	15.100	.082
	Chinese Controls	[-SP] I-A 1.00 (.707)	4.074	16.700	**.032**
	[+SP] Beginners	[-SP] Beginners	0.410	-4.200	1.000
	[+SP] I-A	[-SP] I-A	0.258	-1.600	1.000
	[+SP] Beginners	Spanish Controls 3.80 (±1.483)	2.148	13.700	.176
	[+SP] I-A	Spanish Controls	2.491	12.700	.292
b) Disjoint	Chinese Controls .40 (±.548)	[+SP] Beginners 2.20 (±.837)	2.544	-10.100	.994
	Chinese Controls	[+SP] I-A 3.60 (±1.817)	2.384	-14.500	.126
	Chinese Controls	[-SP] Beginners 3.20 (±1.483)	2.50	-13.600	.201
	Chinese Controls	[-SP] I-A 1.00 (±.707)	0.948	-3.400	1.000
	[+SP] Beginners	[-SP] Beginners	0.830	-3.500	1.000
	[+SP] I-A	[-SP] I-A	1.885	11.100	.653
	[+SP] Beginners	Spanish Controls 8.80 (±1.643)	5.06	13.100	.258
	[+SP] I-A	Spanish Controls	3.001	8.700	1.000
c) Ambiguous	Chinese Controls 9.40 (±3.209)	[+SP] Beginners 3.00 (±.707)	2.754	12.900	.293
	Chinese Controls	[+SP] I-A 3.40 (±1.140)	2.491	11.400	.586
	Chinese Controls	[-SP] Beginners 2.20 (±1.095)	3.003	16.700	**.038**
	Chinese Controls	[-SP] I-A .40 (±.548)	3.909	23.600	**.000**
	[+SP] Beginners	[-SP] Beginners	0.868	3.800	1.000
	[+SP] I-A	[-SP] I-A	3.354	12.200	.408
	[+SP] Beginners	Spanish Controls 7.00 (1.732)	3.023	9.700	1.000
	[+SP] I-A	Spanish Controls	2.455	8.200	1.000
d) Incorrect	No significant differences			9.736	0.83
e) I don't understand	No significant differences			3.222	.666

Table 46: Sub-group statistical results of the Kruskal Wallis pairwise comparisons (QOS)

In summary, the results for the QOS sentences show that both the [+SP] and [-SP] learner groups differed from the Chinese controls in their interpretations of overt subjects. The [+SP] group (beginners and I-A) chose the co-referential reading (a) less often than the Chinese controls; the [-SP] I-A group also found this difficult as well as showing difficulties with the ambiguous reading (c). It was predicted that if the learner groups performed

similarly to each other, this indicates that transfer may have occurred from the same background language (i.e. English).

5.3.3 Embedded null objects

In this section, I will present the data for sentences with an embedded null object. In Chinese, embedded null objects cannot have the co-referential reading (a). In example (47) and (48) the embedded null object cannot refer to the subject in the main clause and must have a disjoint reading. The results show whether or not the learners know that there is a restriction on embedded null objects, in that they cannot be co-referential with a matrix clause subject. Null objects of this kind are not grammatical in Spanish (see (47) and (48)).

(47) Some friends are talking about who knows Lisa…

a. Mary shuo Amy ren shi [Chinese]
Mary say Amy know
'Mary$_i$ says that Amy knows (her$_{*i/j}$)'.

b. *Mary dice que Amy conoce. [Spanish]
Mary says that Amy knows
'Mary says that Amy knows (her)'.

(48) Some friends are talking about who hates Peter…

a. You ren shuo John tao yan [Chinese]
Someone say John hate
'Someone$_i$ says that John hates (him$_{*i/j}$)'.

b. *Alguien dice que John odia. [Spanish]
Someone says that John hates
'Someone says that John hates (him)'.

For this sentence type, it is not possible to see transfer from L1 English for the learner groups, since null objects are not allowed in English. It was predicted that if the two learner groups performed similarly (target-like or non-target-like), this shows that the groups may have transferred from the same background language.

5.3.3.1 RNO (referential noun phrase + embedded null object)

Group Results

Table 47 shows the group results for sentences with an embedded null object and a referential noun phrase antecedent (RNO). As expected, the data shows that the Chinese control group chose the disjoint reading 97% of the time whilst there were no responses for the co-referential only reading (b). This supports the notion that embedded null objects in Chinese only have the disjoint reading, referring to someone outside of the sentence in discourse. Also, as expected, the Spanish controls chose 'incorrect' (d) 91% of the time, showing a strong rejection of the null object sentences, since null objects of this kind are not allowed in Spanish. There was a significant difference between the two control groups in their choice of (b) and (d) (see Table 48).

In terms of the learners, the [+SP] group and the [-SP] group chose (b) at a similar rate; however, there was a significant difference between the [-SP] group and the Chinese controls but not between the [+SP] group and the Chinese controls (see Table 48) which indicates that the [-SP] group were non-target-like. There was also a significant difference between the [+SP] group and the Spanish controls in choosing the disjoint reading (b), which indicates that the [+SP] learner interpretations are in line with the Chinese controls but not with the Spanish controls.

RNO	CHINESE CONTROLS	[-SP] GROUP	[+SP] GROUP	SPANISH CONTROLS
a) Co-referential reading	0%	10%	2.7%	1%
b) Disjoint reading	97%	54%	58.7%	6%
c) Ambiguous (a or b)	2%	10%	5.3%	0%
d) Incorrect	1%	24%	32%	91%
e) I don't understand	0%	2%	1.3%	2%

Table 47: Group results for RNO sentences

RNO	Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
a) Co-ref.	No significant differences			3.066	.382
b) Disjoint	Chinese Controls 19.40 (±.548)	Spanish controls 1.20 (±.837)	25.727	15.000	**.000**
	Chinese Controls	[+SP] Group 8.80 (±1.095)	12.242	5.100	1.000
	Chinese Controls	[-SP] Group 5.40 (±1.140)	15.652	9.900	**.047**
	[+SP] Group	[-SP] Group	3.041	4.800	1.000
	[+SP] Group	Spanish Controls	7.798	-9.900	**.047**
c) Ambiguous	No significant differences			5.078	.166
d) Incorrect	Chinese Controls .20 (±.447)	Spanish controls 18.20 (±.447)	40.268	-14.900	**.000**
	Chinese Controls	[+SP] Group 4.80 (±1.789)	3.527	-9.200	.077
	Chinese Controls	[-SP] Group 2.40 (±1.140)	2.540	-5.500	.822
	[+SP] Group	[-SP] Group	1.599	3.700	1.000
	[+SP] Group	Spanish Controls	10.276	5.700	.066
e) I don't understand	No significant differences			2.375	.498

Table 48: Group statistical results of the Kruskal Wallis pairwise comparisons (RNO)

The main finding from the RNO group results is that the [-SP] group were non-target-like in choosing the co-referential reading which is not allowed in Chinese.

Sub-group Results

Table 49 shows the sub-group results for RNO sentences. The data shows that there was a significant difference between the [-SP] I-A group and the Chinese controls in choosing (b), whilst the [-SP] beginner group were target-like. In terms of the significant difference that was seen between the [+SP] group and the Spanish controls in the group results, the sub-group results reveal that it was the [+SP] I-A group which was significantly different.

RNO	[-SP] GROUP		[+SP] GROUP	
	Beginners	**Intermediate-advanced**	**Beginners**	**Intermediate-advanced**
a) Co-referential reading	11.4%	6.7%	6.7%	0%
b) Disjoint reading	45.7%	73.3%	60%	57.8%
c) Ambiguous (a or b)	14.3%	0%	6.7%	4.4%
d) Incorrect	28.6%	13.3%	26.7%	35.6%
e) I don't understand	0%	6.7%	0%	2.2%

Table 49: Sub-group results for RNO sentences

RNO	Group Mean (± Standard Deviation)		Effect Size (d)	Test Statistic (H)	Adj. Sig. (*p*)
a) Co-ref.	No significant differences			5.216	.390
b) Disjoint	Chinese Controls 19.40 (±.548)	[+SP] Beginners 3.60 (±.548)	28.832	11.700	.498
	Chinese Controls	[+SP] I-A 5.20 (±.837)	20.073	5.500	1.000
	Chinese Controls	[-SP] Beginners 3.20 (±.837)	22.900	14.000	.162
	Chinese Controls	[-SP] I-A 2.20 (±.447)	34.396	19.800	**.005**
	[+SP] Beginners	[-SP] Beginners	0.565	2.300	1.000
	[+SP] I-A	[-SP] I-A	4.471	14.300	.139
	[+SP] Beginners	Spanish Controls 1.20 (±.837)	3.392	-12.300	.377
	[+SP] I-A	Spanish Controls	4.778	-18.500	**.011**
c) Ambiguous	No significant differences			7.667	.176
d) Incorrect	Chinese Controls .20 (±.447)	[+SP] Beginners 1.60 (±.548)	2.799	-9.900	1.000
	Chinese Controls	[+SP] I-A 3.20 (±1.304)	3.077	-15.100	.085
	Chinese Controls	[-SP] Beginners 2.00 (±1.225)	1.952	-11.000	.656
	Chinese Controls	[-SP] I-A .40 (±.548)	0.399	-1.500	1.000
	[+SP] Beginners	[-SP] Beginners	0.421	-1.100	1.000
	[+SP] I-A	[-SP] I-A	2.799	13.600	.190
	[+SP] Beginners	Spanish Controls 18.20 (±.447)	33.196	12.600	.314
	[+SP] I-A	Spanish Controls	15.388	7.400	1.000
e) I don't understand	No significant differences			5.577	.350

Table 50: Sub-group statistical results of the Kruskal Wallis pairwise comparisons (RNO)

Individual Results

In order to explore these results in more detail, the individual results for the two learner groups for RNO sentences are presented in Table 51 (I-A groups are shaded grey).

[+SP]	Responses					[-SP]	Responses				
LS01	b	b	b	c	c	LX01	b	b	a	b	b
LS02	d	d	d	d	d	LX03	b	b	b	d	b
LS03	b	b	b	b	b	LX05	d	c	a	a	c
LS08	b	b	a	b	b	LX06	d	c	d	a	d
LS09	d	d	d	b	a	LX07	d	d	d	b	c
LS14	b	b	b	b	b	LX08	b	b	b	b	b
LS04	d	d	d	d	d	LX10	d	d	c	b	b
LS05	b	b	b	b	b	LX02	b	b	b	b	b
LS06	d	d	c	b	b	LX04	e	d	a	d	b
LS07	b	b	b	b	b	LX09	b	b	b	b	b
LS10	d	d	d	e	d						
LS11	b	b	b	b	b						
LS12	b	b	b	b	b						
LS13	b	b	d	b	b						
LS15	d	d	d	c	d						

Table 51: Individual results for RNO sentences

The results show that for the [-SP] beginner group, there were two learners (LX05, LX06) who did not choose the target response (b) at all, and one learner (LX07) who only chose (b) once. This is likely to have contributed to the difference suggested between the [-SP] group and the Chinese controls, since these learners opted for (b) less often, but (a), (c) and (d) more often than the Chinese controls. The [-SP] I-A learners showed a consistent use of (b) (although learner LX04 is more hesitant); it is unclear why there should be a statistical difference between this group and the Chinese controls and therefore, this will be ignored. For the [+SP] learners, there are two learners (LS02, LS04) who only chose 'incorrect sentence' (d) which accounts for the high percentage of responses for this reading. Overall, there were more choices for (b) than for the [-SP] group, which means that the [+SP] group may have been more target-like in choosing (b) for RNO sentences.

In summary, the RNO results show significant differences between the [-SP] group and the Chinese controls. On the other hand, there were no significant differences between the [+SP] group and the Chinese controls; in conjunction with the individual results, this could suggest that the [+SP] group were more target-like with null objects. Furthermore, the [+SP] I-A group performed differently to the Spanish controls, confirming that there is no evidence of transfer from Spanish.

5.3.3.2 QNO (quantified noun phrase + embedded null object)

Group Results

Table 53 shows the results for sentences with an embedded null object and a quantified antecedent (QNO). The data demonstrates that the Chinese control group also preferred the disjoint reading (b) (97%) and never the co-referential reading (a) when the antecedent is quantified and the Spanish control group further showed that these sentences are not possible in Spanish by choosing 'incorrect' (90%). There was a significant difference between these groups in choosing (b) and (d) which confirms the difference between the two languages for QNO sentences (see Table 54). In terms of the learners, the [+SP] group chose the disjoint reading (b) more often (62.7%) than the [-SP] group (38%); there was a significant difference between the [-SP] group and the Chinese controls (but not with the [+SP] group) which indicates that the [-SP] group were non-target-like. Furthermore, the [-SP] group chose (a) 36% of the time which is not allowed in Chinese and there was a significant difference between the [-SP] group and the Chinese controls.

QNO	CHINESE CONTROLS	[-SP] GROUP	[+SP] GROUP	SPANISH CONTROLS
a) Co-referential reading	0%	36%	8%	3%
b) Disjoint reading	97%	38%	62.7%	4%
c) Ambiguous (a or b)	0%	0%	2.7%	1%
d) Incorrect	2%	22%	22.7%	90%
e) I don't understand	1%	4%	4%	2%

Table 52: Group results for QNO sentences

QNO	Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
a) Co-ref.	Chinese Controls .00 (±.000)	Spanish controls .60 (±.894)	.000	-3.100	1.000
	Chinese Controls	[+SP] Group 1.20 (±1.095)	.000	-6.200	.479
	Chinese Controls	[-SP] Group 3.60 (±.894)	.000	-12.700	**.002**
	[+SP] Group	[-SP] Group	2.401	-6.500	.398
	[+SP] Group	Spanish Controls	0.600	-3.100	1.000
b) Disjoint	Chinese Controls 19.40 (±.894)	Spanish controls .80 (±.837)	21.478	14.600	**.001**
	Chinese Controls	[+SP] Group 9.40 (±2.302)	5.726	5.000	1.000
	Chinese Controls	[-SP] Group 3.80 (±1.643)	11.794	10.400	**.031**
	[+SP] Group	[-SP] Group	2.800	5.400	.883
	[+SP] Group	Spanish Controls	4.965	-9.600	.060
c) Ambiguous	No significant differences			4.098	.251
d) Incorrect	Chinese Controls .40 (±.548)	Spanish controls 18.00 (±1.225)	18.547	-14.600	**.000**
	Chinese Controls	[+SP] Group 3.40 (1.342)	2.926	-8.500	.130
	Chinese Controls	[-SP] Group 2.20 (±.837)	2.544	-5.300	.913
	[+SP] Group	[-SP] Group	1.072	3.200	1.000
	[+SP] Group	Spanish Controls	11.363	6.100	5.96
e) I don't understand	No significant differences			.792	.851

Table 53: Group statistical results of the Kruskal Wallis pairwise comparisons (QNO)

In summary, the QNO group results show that the [-SP] group chose (b) less often than the Chinese controls and chose (a) more often than the Chinese controls; this suggests that this group were non-target-like with QNO sentences (which was also shown by the RNO sentences).

Sub-group results

Table 54 shows the sub-group results for QNO sentences. The data shows that the [-SP] beginners and I-A group chose the disjoint reading (b) less often than the [+SP] beginners and I-A group. As shown in Table 55, there was a significant difference between the Chinese controls and the [-SP] group at both proficiency levels which shows that their interpretations were non-target-like. Although the group results did not show any differences, the sub-group results presented here show that there was a significant difference between the [+SP] I-A group and the Spanish controls in their choice of the

disjoint reading (b). As with the RNO sentences, this is taken to show that the [+SP] group performed like the Chinese controls, rather than the Spanish controls.

QNO	[-SP] GROUP		[+SP] GROUP	
	Beginners	**Intermediate-advanced**	**Beginners**	**Intermediate-advanced**
a) Co-referential reading	45.7%	13%	13.3%	4.4%
b) Disjoint reading	31.4%	53%	56.7%	66.7%
c) Ambiguous (a or b)	0%	0%	6.7%	0%
d) Incorrect	17.1%	33%	23.3%	22.2%
e) I don't understand	5.7%	0%	0%	6.7%

Table 54: Sub-group results for QNO sentences

QNO	Group Mean (± Standard Deviation)		Effect Size (d)	Test Statistic (H)	Adj. Sig. (*p*)
a) Co-ref.	Chinese Controls .00 (±.000)	[+SP] Beginners .80 (±1.304)	.000	-5.900	1.000
	Chinese Controls	[+SP] I-A .40 (±.548)	.000	-4.600	1.000
	Chinese Controls	[-SP] Beginners 3.20 (±.447)	.000	-18.600	**.003**
	Chinese Controls	[-SP] I-A .40 (±.548)	.000	-4.600	1.000
	[+SP] Beginners	[-SP] Beginners	2.462	-12.700	.166
	[+SP] I-A	[-SP] I-A	0.00	.000	1.000
	[+SP] Beginners	Spanish Controls .60 (±.894)	0.178	-.600	1.000
	[+SP] I-A	Spanish Controls	0.269	.700	1.000
b) Disjoint	Chinese Controls 19.40 (±.894)	[+SP] Beginners 3.40 (±.894)	17.897	11.000	.682
	Chinese Controls	[+SP] I-A 6.00 (±1.581)	10.433	5.300	1.000
	Chinese Controls	[-SP] Beginners 2.20 (±.837)	19.862	16.400	**.043**
	Chinese Controls	[-SP] I-A 1.60 (.894)	19.910	19.200	**.007**
	[+SP] Beginners	[-SP] Beginners	1.385	5.400	1.000
	[+SP] I-A	[-SP] I-A	3.426	13.900	.172
	[+SP] Beginners	Spanish Controls .80 (±.837)	3.002	-12.100	.417
	[+SP] I-A	Spanish Controls	4.110	-17.800	**.018**
c) Ambiguous	No significant differences			7.519	.185
d) Incorrect	Chinese Controls .40 (±.548)	[+SP] Beginners 1.40 (±.548)	1.824	-8.700	1.000
	Chinese Controls	[+SP] I-A 2.00 (±1.225)	1.686	12.200	.339
	Chinese Controls	[-SP] Beginners 1.20 (±.447)	1.599	-6.900	1.000
	Chinese Controls	[-SP] I-A 1.00 (±.707)	0.948	-5.200	1.000
	[+SP] Beginners	[-SP] Beginners	0.399	1.800	1.000
	[+SP] I-A	[-SP] I-A	0.999	7.000	1.000
	[+SP] Beginners	Spanish Controls 18.00 (±1.225)	17.493	12.900	.239
	[+SP] I-A	Spanish Controls	13.061	9.400	1.000
e) I don't understand	No significant differences			4.674	.457

Table 55: Sub-group statistical results of the Kruskal Wallis pairwise comparisons (QNO)

In summary, the RNO and QNO results show that the [+SP] group were target-like in correctly identifying that embedded null objects can only refer to the disjoint reading (b) in Chinese. It is important to note that unlike null subjects, this finding cannot be direct transfer from Spanish since null objects of this kind are not allowed in Spanish. On the other hand, the [-SP] group were non-target-like with RNO and QNO sentences.

5.3.4 Embedded overt objects

The PIT also tested the interpretations for sentences with an embedded overt object which will be presented in this section. Embedded overt objects can have the co-referential reading (a) or disjoint reading (b) in English, Spanish and Chinese, although there may be some differences in the preferred antecedent (as with overt subjects). Furthermore, there are no binding restrictions related to the antecedent (see (49) (50)). It is not anticipated that either learner group will find the interpretations of overt objects particularly difficult.

(49) a. John shuo David mei you jian guo ta [Chinese]
John say David no seen him
'John says that David did not see him'.

b. John dice que David no lo vio. [Spanish]
John says that David no CL saw
'John says that David did not see him'.

(50) a. you ren shuo John kan jian ta le [Chinese]
Someone say John seen him PAST
'Someone says that John saw him'.

b. Alguien dice que John le vio. [Spanish]
Someone says that John CL saw
'Someone says that John saw him'.

Since there are no inherent differences in the interpretations of embedded overt objects, it has been predicted that if the two learner groups perform similarly, this could indicate transfer from English (the L1 of both groups). If the learners perform differently, this could suggest that the learners have transferred from different background languages.

5.3.4.1 ROO (referential noun phrase + embedded overt object)

Group results

Table 56 shows the group results for sentences with a referential noun phrase and an embedded overt object (ROO). The results show that the Chinese controls preferred the co-referential reading (a) (54%) or the ambiguous reading (c) (41%). The Spanish controls were similar, preferring either (a) (51%) or (c) (40%). In terms of the learners, the [+SP] learners chose (a) less often (24%) than the Chinese controls and there was a significant difference between the [+SP] group and the Chinese controls which indicates they were

non-target-like (see Table 57). There was also a difference between the [+SP] group and the Spanish controls in choosing (a) which suggests that this was not transfer from Spanish.

ROO	CHINESE CONTROLS	[-SP] GROUP	[+SP] GROUP	SPANISH CONTROLS
a) Co-referential reading	54%	56%	24%	51%
b) Disjoint reading	5%	8%	8%	5%
c) Ambiguous (a or b)	41%	30%	56%	40%
d) Incorrect	0%	4%	4%	4%
e) I don't understand	0%	2%	8%	0%

Table 56: Group results for ROO sentences

ROO	Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
a) Co-ref.	Chinese Controls 10.80 (±3.701)	Spanish controls 10.20 (±3.899)	0.157	.600	1.000
	Chinese Controls	[+SP] Group 3.60 (±1.817)	2.469	11.200	**.015**
	Chinese Controls	[-SP] Group 5.60 (±1.140)	1.898	7.400	.275
	[+SP] Group	[-SP] Group	1.318	-3.800	1.000
	[+SP] Group	Spanish Controls	2.169	10.600	**.025**
b) Disjoint	No significant differences			1.034	.793
c) Ambiguous	Chinese Controls 8.20 (±2.950)	Spanish controls 8.00 (±2.739)	0.070	.100	1.000
	Chinese Controls	[+SP] Group 8.40 (±1.342)	0.087	-.300	1.000
	Chinese Controls	[-SP] Group 3.00 (±1.225)	2.302	9.400	.066
	[+SP] Group	[-SP] Group	4.202	9.700	.052
	[+SP] Group	Spanish Controls	0.185	-.400	1.000
d) Incorrect	No significant differences			3.818	.282
e) I don't understand	No significant differences			4.391	.222

Table 57: Group statistical results of the Kruskal Wallis pairwise comparisons (ROO)

Overall, the ROO group results show that the [+SP] group were non-target-like with the Chinese control group, which was not seen for the [-SP] group. This is unlikely to show transfer from Spanish since there were also differences between the [+SP] group and the Spanish control group.

Sub-group results

Table 58 shows the sub-group results for ROO sentences. The results show that the [+SP] beginners only chose option (a) 20% of the time and there was a significant difference

between the [+SP] beginner group and the Chinese controls (see Table 59). However, this has been overcome with proficiency, as there was no significant difference at the I-A level. Although the [-SP] group were overall target-like in the group results, the sub-group results indicate that the [-SP] I-A group chose (a) more often (66.7%) than the Chinese controls (54%) and that there was a significant difference between the [-SP] I-A group and the Chinese controls. The group results showed a significant difference between the [+SP] beginners and the Spanish controls in their choice of (a); the sub-group results reveal that it was the [+SP] beginners that were non-target-like (as shown in Table 59).

ROO	**[-SP] GROUP**		**[+SP] GROUP**	
	Beginners	**Intermediate-advanced**	**Beginners**	**Intermediate-advanced**
a) Co-referential reading	51.4%	66.7%	20%	26.7%
b) Disjoint reading	11.4%	0%	16.7%	2.2%
c) Ambiguous (a or b)	31.4%	26.7%	53.3%	57.8%
d) Incorrect	2.9%	6.7%	6.7%	2.2%
e) I don't understand	2.9%	0%	3.3%	11.1%

Table 58: Sub-group results for ROO sentences

ROO	Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
a) Co-ref.	Chinese Controls 10.80 (±3.701)	[+SP] Beginners 1.20 (±.837)	3.577	20.300	**.003**
	Chinese Controls	[+SP] I-A 2.40 (±1.673)	2.924	14.700	.106
	Chinese Controls	[-SP] Beginners 3.60 (±1.140)	2.629	9.900	1.000
	Chinese Controls	[-SP] I-A 2.00 (±.000)	.000	16.300	**0.42**
	[+SP] Beginners	[-SP] Beginners	2.399	-10.400	.848
	[+SP] I-A	[-SP] I-A	.000	1.600	1.000
	[+SP] Beginners	Spanish Controls 10.20 (±3.899)	3.191	19.700	**.005**
	[+SP] I-A	Spanish Controls	2.599	14.100	.146
b) Disjoint	No significant differences			7.790	.168
c) Ambiguous	Chinese Controls 8.20 (±2.950)	[+SP] Beginners 3.20 (±.837)	2.305	11.500	.564
	Chinese Controls	[+SP] I-A 5.20 (±1.483)	1.284	5.500	1.000
	Chinese Controls	[-SP] Beginners 2.20 (±.837)	2.767	15.700	.068
	Chinese Controls	[-SP] I-A .80 (±.447)	3.507	21.100	**.002**
	[+SP] Beginners	[-SP] Beginners	1.194	4.200	1.000
	[+SP] I-A	[-SP] I-A	4.017	15.600	.072
	[+SP] Beginners	Spanish Controls 8.00 (±2.739)	2.370	11.300	.615
	[+SP] I-A	Spanish Controls	1.271	5.300	1.000
d) Incorrect	No significant differences			2.283	.809
e) I don't understand	No significant differences			6.033	.303

Table 59: Sub-group statistical results of the Kruskal Wallis pairwise comparisons (ROO)

In summary, the ROO results suggest that the learner groups performed differently to each other and that the [+SP] beginners were non-target-like. This could indicate that the two learner groups are being influenced by different background languages in the acquisition of overt objects.

5.3.4.2 QOO (quantified noun phrase + embedded overt object)

Group results

Table 60 shows the results for the sentences with a quantified subject and an embedded overt object (QOO). The data indicates that the control groups preferred the disjoint reading (b) (50% for Chinese controls and 35% for Spanish controls) when the antecedent was quantified. However, there were no significant differences between any of the

groups which suggest that the learner groups were overall target-like with QOO sentences (see Table 61).

QOO	CHINESE CONTROLS	[-SP] GROUP	[+SP] GROUP	SPANISH CONTROLS
a) Co-referential reading	21%	28%	12.2%	20%
b) Disjoint reading	50%	44%	47.3%	35%
c) Ambiguous (a or b)	26%	16%	31.1%	23%
d) Incorrect	0%	4%	2.7%	17%
e) I don't understand	3%	8%	6.8%	5%

Table 60: Group results for QOO sentences

QOO	Group Pairwise Comparisons	Test Statistic (H)	Adj. Sig. (*p*)
a) Co-ref.	No significant differences	4.975	.174
b) Disjoint reading	No significant differences	3.177	.365
c) Ambiguous (a or b)	No significant differences	5.089	.165
d) Incorrect	No significant differences	7.412	.060
e) I don't understand	No significant differences	.643	.887

Table 61: Group statistical results of the Kruskal Wallis pairwise comparisons (QOO)

Sub-group results

Table 62 shows the sub-group results for the QOO sentences. The [+SP] beginners chose (a) less often (3.3%) than any group and there was a significant difference between the [+SP] beginners and the Chinese controls (see Table 63). As with the ROO sentences, the QOO results show that the [+SP] beginners chose the co-referential (a) less often than the Spanish control group (20%) and that there was a significant difference between the [+SP] beginners and the Spanish controls. Therefore, the [+SP] beginners were non-target-like with the Chinese and Spanish controls in choosing (a).

The sub-group results also show that there was a significant difference between the [-SP] I-A group and the Chinese controls in choosing the disjoint reading (b). Furthermore, the [-SP] I-A group chose the ambiguous reading (c) less often (13%) than the Chinese controls, which is reflected by a significant difference between the [-SP] I-A group and the Chinese. Therefore, the [-SP] I-A group were non-target-like in choosing (b) and (c). The [+SP] beginners chose 'incorrect' (d) less often (0%) than the Spanish controls (17%) and there was also a significant difference between the [+SP] beginners and the Spanish controls for (d). This is taken to show that the [+SP] group have not transferred from Spanish for QOO sentences.

QOO	[-SP] GROUP		[+SP] GROUP	
	Beginners	**Intermediate-advanced**	**Beginners**	**Intermediate-advanced**
a) Co-referential reading	31.4%	20%	3.3%	18.2%
b) Disjoint reading	42.9%	47%	56.7%	40.9%
c) Ambiguous (a or b)	17.1%	13%	33.3%	29.5%
d) Incorrect	2.9%	7%	0%	4.5%
e) I don't understand	5.7%	13%	6.7%	6.8%

Table 62: Sub-group results for QOO sentences

QOO	Group Mean (± Standard Deviation)		Effect Size (d)	Test Stat. (H)	Adj. Sig. (*p*)
a) Co-ref.	Chinese Controls 4.20 (±3.114)	[+SP] Beginners .20 (±.447)	1.798	17.200	**.024**
	Chinese Controls	[+SP] I-A 1.60 (±.894)	1.134	7.400	1.000
	Chinese Controls	[-SP] Beginners 2.20 (±.837)	0.877	3.600	1.000
	Chinese Controls	[-SP] I-A .60 (±.548)	1.610	14.200	.137
	[+SP] Beginners	[-SP] Beginners	2.980	-13.600	.188
	[+SP] I-A	[-SP] I-A	1.348	6.800	1.000
	[+SP] Beginners	Spanish Controls 4.00 (±1.581)	3.270	19.400	**.006**
	[+SP] I-A	Spanish Controls	1.868	9.600	1.000
b) Disjoint	Chinese Controls 10.00 (±5.523)	[+SP] Beginners 3.40 (±.548)	1.681	11.500	.558
	Chinese Controls	[+SP] I-A 3.60 (±1.817)	1.556	10.700	.789
	Chinese Controls	[-SP] Beginners 3.00 (±1.871)	1.697	12.500	.353
	Chinese Controls	[-SP] I-A 1.40 (±1.140)	2.156	19.500	**.006**
	[+SP] Beginners	[-SP] Beginners	0.290	1.800	1.000
	[+SP] I-A	[-SP] I-A	1.450	8.800	1.000
	[+SP] Beginners	Spanish Controls 7.00 (±2.646)	1.884	10.500	.857
	[+SP] I-A	Spanish Controls	1.498	9.700	1.000
c) Ambiguous	Chinese Controls 5.20 (±3.114)	[+SP] Beginners 2.00 (±1.000)	1.383	8.000	1.000
	Chinese Controls	[+SP] I-A 2.60 (±1.342)	1.084	5.600	1.000
	Chinese Controls	[-SP] Beginners 1.20 (±1.789)	1.575	13.100	.257
	Chinese Controls	[-SP] I-A .40 (±.548)	2.146	17.000	**.030**
	[+SP] Beginners	[-SP] Beginners	0.552	5.100	1.000
	[+SP] I-A	[-SP] I-A	2.146	11.400	.571
	[+SP] Beginners	Spanish Controls 4.60 (±2.510)	1.360	7.300	1.000

	[+SP] I-A	Spanish Controls	0.993	4.900	1.000
d) Incorrect	Chinese Controls .00 (±.000)	[+SP] Beginners .00 (±.000)	.000	.000	1.000
	Chinese Controls	[+SP] I-A .40 (±.548)	.000	-5.600	1.000
	Chinese Controls	[-SP] Beginners .20 (±.447)	.000	-2.800	1.000
	Chinese Controls	[-SP] I-A .20 (±.447)	.000	-2.800	1.000
	[+SP] Beginners	[-SP] Beginners	.000	-2.800	1.000
	[+SP] I-A	[-SP] I-A	0.399	2.800	1.000
	[+SP] Beginners	Spanish Controls 3.40 (±3.912)	.000	12.800	**.044**
	[+SP] I-A	Spanish Controls	1.074	7.200	1.000
e) I don't understand	No significant differences			1.949	.856

Table 63: Sub-group statistical results of the Kruskal Wallis pairwise comparisons (QOO)

In summary, the [+SP] beginners were non-target-like in choosing (a) when compared with the Chinese and Spanish control groups for ROO and QOO sentences. The results also suggest that the [+SP] group did not transfer from Spanish; therefore, the two learner groups could have been influenced by different background languages.

5.3.5 Topic Chains

In this section, I will present the results for Topic Chain (TC) constructions. As outlined in Chapter, 4, TC test items were featured at the end of the PIT and aimed to test the extent to which L3 learners are aware of the possibility of TC constructions in Chinese. As a reminder, TC constructions have been well documented in the anaphoric relations of Chinese; once a topic is introduced as the focus of the context, lower copies of the topic can be supressed to give a chain of null subjects. The strength of the anaphoric relationship to the original topic is tested by introducing another topic in the context. Consequently, any further null subjects could ambiguously refer to either the first or the second topic in the context, although the first topic if often preferred. In the PIT, there were three test items which explored the learners' interpretations of TCs. Each TC was followed by a question, which asked the reader to choose one of five options, to establish their interpretation of the appropriate antecedent of a topic chain construction (51).

(51) *Amy gongzuo hen nuli, xiangyao xiuxi yixia qu dujia,*
Amy work very hard, want to rest a bit go with vacation
bingqie yaoqing ta jiejie yiqi, shifen jidong。
and invite her sister together very excitement

'Amy$_i$ works very hard, (she) wants to take a break and go on holiday, (she) asked her sister$_j$ to come, (she)$_{i/j}$ is very excited'.

Question: in this paragraph, who is very excited?
a) Amy b) Her sister c) Either (a) or (b)
d) Incorrect e) I don't understand

This type of construction is very typical in Chinese, in which it is not unusual for the final, embedded null subject to refer back to the original topic (i.e. Amy), even though another topic has been introduced (i.e. her sister). This type of construction is also possible in Spanish, where a null subject can be used in [+topic shift] context. However, it has been suggested that the ambiguity involved with this type of construction is less acceptable in Spanish (Liceras & Díaz, 1999: 28). It was predicted that if the [+SP] and [-SP] learner groups performed similarly to each other (i.e. show a preference for the same antecedent), this suggests that there was no transfer from Spanish for the [+SP] group. However, if there are any differences in the learners' interpretations, this could suggest that the [+SP] group have been influenced by Spanish.

The TC group results are presented in Table 64. The results show that as expected, the Chinese controls preferred the highest antecedent (a) for these sentences (55%). However, the results for the Spanish control group were very varied and shared equally across (a) (33%), (b) (33%) and (c) (32%). The learners' responses were also very varied, although the results show that both groups performed similarly to each other in showing a preference for the nearest antecedent (b) rather than the highest antecedent (a). This shows that neither group are performing in line with the Chinese control group. In the statistical analysis (see Table 65), there were no significant differences between any of the groups in their responses for TC constructions. This finding suggests that TCs are not difficult to acquire for the L3 learner groups.

	CHINESE CONTROL	**[-SP] GROUP**	**[+SP] GROUP**	**SPANISH CONTROL**
(a) Highest antecedent	55%	23.3%	26.7%	33%
(b) Nearest antecedent	30%	36.7%	46.7%	33%
(c) Either (a) or (b)	13.3%	26.7%	17.8%	32%
(d) Incorrect	1.7%	3.3%	2.2%	2%
(e) I don't understand	0%	10%	6.7%	0%

Table 64: Group results for topic chain constructions

	Group Pairwise Comparisons	Test Statistic (H)	Adj. Sig. (*p*)
(a) Highest antecedent	No significant differences	1.375	.711
(b) Nearest antecedent	No significant differences	2.039	.564
(c) Either (a) or (b)	No significant differences	2.272	.518
(d) Incorrect	No significant differences	.000	1.000
(e) I don't understand	No significant differences	5.280	.152

Table 65: Group statistical results of the Kruskal Wallis pairwise comparisons (TC)

The sub-group results are presented in Table 66, showing that there was no effect of proficiency level on the results. The findings for the sub-groups are the same as the group results, showing that there were no significant differences between any of the groups (see Table 67). Therefore, the results from the TC constructions show that the Chinese and Spanish controls perform similarly to each other and both learner groups perform similarly to the control groups. This suggests that TCs are not difficult to acquire in L3 Chinese.

	[-SP] GROUP Beginner	[-SP] GROUP Intermediate - advanced	[+SP] GROUP Beginner	[+SP] GROUP Intermediate- advanced
(a) Highest antecedent	19%	33.3%	16.7%	33.3%
(b) Nearest antecedent	38.1%	33.3%	55.6%	40.7%
(c) Either (a) or (b)	28.6%	22.2%	11.1%	22.2%
(d) Incorrect	0%	11.1%	0%	3.7%
(e) I don't understand	14.3%	0%	16.7%	0%

Table 66: Sub-group results for topic chain constructions

	Group Pairwise Comparisons	Test Statistic (H)	Adj. Sig. (*p*)
(a) Highest antecedent	No significant differences	4.719	.451
(b) Nearest antecedent	No significant differences	3.175	.673
(c) Either (a) or (b)	No significant differences	7.788	.168
(d) Incorrect	No significant differences	2.429	.787
(e) I don't understand	No significant differences	9.562	.089

Table 67: Sub-group statistical results of the Kruskal Wallis pairwise comparisons (TC)

Since the control group results were unexpected, I examined the responses for each individual TC construction for each control group to explore this further. The three test items are represented as TC1, TC2 and TC3. This analysis has been conducted by collecting the number of responses for each option (a-e); there were 20 possible

responses for each TC (as there were 20 controls in each group). By examining the number of responses for each TC, a clear pattern emerges.

The Spanish control group data is shown in Table 68, showing that (b) was favoured for TC1 (15/20), (c) was favoured for TC2 (12/20) and (a) was favoured for TC3 (17/20). The Chinese control group data is shown in Table 69, indicating a similar pattern for TC1 which favoured (b) (18/20) and for TC3 which favoured (a) (17/20). Therefore, both the Spanish and Chinese control groups chose the nearest antecedent (b) for TC1 and the highest antecedent (a) for TC3. Crucially, the results differed for each group for TC2; the Spanish controls chose the ambiguous reading (c) whilst the Chinese controls chose the highest antecedent (a) (15/20). These findings indicate that for two of the three topic chain constructions, the control groups performed very similarly, showing that there were no major differences in the use of TCs in Chinese and Spanish.

Response	TC1	TC2	TC3
A	0	3	17
B	15	5	0
C	4	12	3
D	1	0	0
E	0	0	0

Table 68: Results for the Spanish control group for topic chain constructions

Response	TC1	TC2	TC3
A	1	15	17
B	18	0	0
C	1	4	3
D	0	1	0
E	0	0	0

Table 69: Results for the Chinese control group for topic chain constructions

However, the results for TC2 were as expected, showing that Chinese speakers preferred the highest antecedent whilst Spanish speakers preferred the nearest antecedent. Whilst it is possible that TCs are actually interpreted in a similar way in each language, it is also possible that there were problems with the test-items. Although I aimed for these items to be unbiased to a particular reading, it could be that the context that was used for each topic chain produced a bias towards a certain interpretation. In addition, the low number of TC test items could have had a negative effect on the results.

Nevertheless, the TC results reported that there were no significant differences in the learners' interpretations. Therefore, the conclusion from the TC constructions is that there is no obvious influence from Spanish for the [+SP] learners and that these constructions are straightforward to acquire for both [+SP] and [-SP] learners.

5.3.6 Summary of the PIT results

Table 70 summarises the results of the PIT, taking into account the descriptive, statistical and individual results to provide a comprehensive overview.

Sentence Type	Summary of finding(s)
RNS	• [+SP] and [-SP] similar (descriptively) • [-SP] statistically different to Chinese controls • [+SP] beginners more target-like than [-SP] beginners
QNS	• [+SP] and [-SP] similar (descriptively) • [-SP] statistically different to Chinese controls • [-SP] beginners more target-like than [+SP] beginners
ROS	Similar preferences for both groups: transfer from L1 English
QOS	Similar preferences for both groups: transfer from L1 English
RNO	• [-SP] statistically different to Chinese controls • [+SP] group target-like
QNO	• [-SP] group used (b) (target response) less often and (a) (not allowed in Chinese) more often than Chinese controls • [-SP] statistically different to Chinese controls • [+SP] group target-like
ROO	• [+SP] less target-like than [-SP] group • Transfer from different background languages
QOO	• [+SP] beginners less target-like than [-SP] beginners • No evidence of L2 Spanish for [+SP] group
TC	• [+SP] and [-SP] similar preferences: no influence from L2 Spanish for [+SP] group, possible transfer from L1 English

Table 70: Summary of the results of the Pronoun Interpretation Task

5.3.7 Discussion

The goal of the Pronoun Interpretation Task was to explore the acquisition of the referential properties of null and overt arguments, i.e. the interpretations of subject and object pronouns, by the two learner groups [+/-SP]. The results of the PIT will contribute to the discussion on the nature of structural similarity. As a reminder, the main research questions aim to establish i) the source of transfer for the L3 learners and ii) the role of features in structural similarity. Given that the study explores speakers of three typologically unrelated languages, if the data provides evidence that the learner groups have been influenced from their background languages, this strengthens the argument that L3 transfer is ultimately guided by more specific structural considerations, rather than typological distinctions. In this discussion, I will outline the findings for embedded null arguments (both subjects and objects), followed by embedded overt arguments (both subjects and objects), discussing the extent to which the data is able to answer the research questions.

Firstly, I will consider the results for embedded null subjects (RNS, QNS). There were no major differences between Chinese and Spanish in terms of the interpretations of an embedded null subject with either a referential or quantified antecedent in the main clause. This is manifested in the control group results, which showed that there was no significant difference between the Chinese and Spanish controls in their interpretations of embedded null subjects in RNS sentences. This differs from the WPT results, in which the underlying syntactic differences between Chinese and Spanish were evident. The lack of differences in the interpretations of null subjects between the control groups means that the findings for embedded null subjects cannot be related directly to the role of feature reassembly. Nevertheless, the data provides an insight into the source of transfer and whether or not previous experience with a null subject language, i.e. the [+SP] learners, is beneficial in acquiring null subjects in L3 Chinese.

The Chinese control group responses confirmed that the co-referential reading (a) was the preferred interpretation, and therefore, was the target response for embedded null subjects. The learner group results show that the [+SP] beginners were target-like with the interpretations of RNS sentences, reflected by the fact that there were no significant differences between the [+SP] learners and the Chinese controls and the individual results.

However, there was a significant difference between the [-SP] beginners and the Chinese controls and the individual results corroborated that the [-SP] beginners seem less target-like. I predicted that if the two learner groups performed differently to each other in their responses for embedded null subjects, this could suggest that the [+SP] group have been influenced by Spanish in their acquisition of null subjects in L3 Chinese. The findings indicate that previous knowledge of a null subject language has been beneficial for the [+SP] beginners who are more in line with the Chinese controls. This suggests some level of transfer from L2 Spanish for the [+SP] learners, which cannot be attributed to typological similarities between Spanish and Chinese. Therefore, this points towards a crucial role for structural similarities; it is likely that the [+SP] learners find the interpretations of null subjects more straightforward and are more confident than the [-SP] learners because they have previous experience of null subjects.

Next, I will consider the results for embedded null objects. In line with the results for null subjects, the results for null objects showed that the [+SP] group were target-like whilst the [-SP] group were not (according to statistical and individual results). In both the RNO and QNO sentences, the Chinese controls preferred the disjoint reading only and the Spanish controls rejected the sentences with null objects, to reflect that they are not allowed in Spanish. The [-SP] group showed significant differences with the Chinese controls in choosing the disjoint reading, which were not evident for the [+SP] group. Interestingly, the fact that the [+SP] group were better at interpreting null objects cannot be direct transfer from Spanish, since Spanish does not allow null objects of the kind used in the task. Furthermore, the [+SP] group were non-target-like with the Spanish controls, which confirms that their performance was not a result of transfer from Spanish. Nevertheless, the [+SP] group acquired the appropriate interpretations of embedded null objects better than the [-SP] group. These findings show further support for the observation that previous knowledge of a null subject language is beneficial to the [+SP] learners. It is possible that there is a general 'null argument' feature that is activated in a null subject language grammar, which facilitates learners in subsequent language acquisition. Alternatively, the findings could be related to the fact that although Spanish does not allow null objects in the same way as in Chinese, they are allowed in some contexts. Therefore, it is possible that the [+SP] learners use their knowledge of the

possibility of null arguments from Spanish in their L3 Chinese and have a slight advantage over the [-SP] learners.

In summary, the results for embedded null arguments indicate that the [+SP] group were overall more target-like in the interpretations of null subjects and null objects than the [-SP] group, suggesting that previous knowledge of a null subject language is facilitative in L3 acquisition.

Next, I discuss the findings for embedded overt arguments. In line with the WPT results, the overall finding of the PIT is that both learner groups differ from the Chinese controls in their use of overt subjects. In terms of the source of transfer, I predicted that if the two learner groups performed similarly, they may have transferred from English (the L1 of both groups) and if the learners performed differently, this could suggest that the learners have transferred from different background languages. The results for embedded overt subjects with a referential antecedent (ROS) show that both learner groups chose the co-referential reading (a) significantly less often than the Chinese controls; for the [+SP] group it was the beginners and for the [-SP] group it was the I-A group that were non-target-like. Crucially, for the [+SP] beginners, there was also a significant difference with the Spanish controls, indicating that their non-target-like behaviour was not influence from Spanish and therefore, could be transfer from L1 English. These findings show that both learner groups were non-target-like with ROS interpretations and indicate transfer from L1 English (especially for the [+SP] group).

For sentences with an embedded overt subject and a quantified antecedent (QOS), English and Chinese are thought to be similar in allowing any interpretation whilst Spanish blocks the co-referential reading (a). Therefore, I predicted that if the two groups performed similarly this could indicate transfer from English, but if they performed differently to each other, this could show influence from Spanish for the [+SP] group. The PIT results show that overall, both the [+SP] and [-SP] learners were non-target-like compared with the Chinese controls in choosing the co-referential reading (a). This finding suggests that the two learner groups performed similarly and showed transfer from the same background language (i.e. L1 English). The co-referential reading (a) is allowed in English, so it unclear why both learner groups chose this reading less often than the Chinese controls. However, the [-SP] group performed similarly to the [+SP] group for the co-referential (a) and disjoint (b) readings which ultimately suggests that

the groups acquired the interpretations of embedded overt subjects in a similar way. Overall, the data shows that both learner groups differed from the Chinese controls in their use of overt subjects (also shown by the WPT results) which provides evidence that transfer may have occurred from the same background language. In terms of structural similarity, this suggests that each property should be considered separately.

The findings for embedded overt objects (both ROO and QOO) indicate transfer from different background languages. The findings report that the groups performed differently to each other with ROO sentences which was predicted to show that the learners have transferred from different background languages. The main finding is that the [+SP] beginners have a lower preference for the co-referential reading (a) compared with the Chinese and Spanish controls than the [-SP] group, although this non-target-like behaviour has been overcome by the I-A level of learning. For some reason, the [+SP] beginners differ from the Chinese controls for overt objects, whilst the [-SP] beginners do not. This suggests that the two learner groups have not transferred from the same background language for overt objects and that the [-SP] beginners are more target-like with the Chinese controls. The [+SP] group are not likely to have been influenced from Spanish, due to the differences between the [+SP] beginners and the Spanish controls; as a result, the performance of the beginners could show influence from L1 English. The differences between the two learner groups further supports the observation that overt arguments are difficult for the [+SP] group; however, the [-SP] beginners do not find overt objects difficult (but they did have problems with overt subjects). This suggests that transfer is not necessarily wholesale in L3 acquisition and transfer affects can be different depending on the property being acquired.

Finally, for the topic chain sentences I predicted that if the learner groups performed similarly, there was no transfer from Spanish for the [+SP] group. However, if there were any differences in the learners' interpretations, this could suggest that the [+SP] learners have been influenced by Spanish. The findings show that there were no significant differences between any of the learner or control groups for the three topic chain constructions. The results do indicate that there may be some subtle differences between the Chinese and Spanish controls, in that the Chinese controls showed a stronger preference for the highest antecedent, whilst the Spanish control responses were shared equally between highest, nearest or both antecedents. This could show that the

difference in the syntactic licensing of null subjects (seen in the WPT) does have an effect on the interpretation of topic chain constructions. However, the two learner groups performed very similarly with this sentence type, suggesting that any differences between Chinese and Spanish were not difficult to overcome for the [+SP] group, who did not show influence from Spanish in their responses.

In summary, the PIT reveals some key findings. Firstly, the [+SP] learner group was more target-like with the interpretations of embedded null arguments (both subjects and objects) than the [-SP] group. Although this may not be directly related to the role of features, this does tell us that previous experience and knowledge of a null subject language is beneficial in the acquisition of L3 Chinese. Ultimately, this provides support for the prediction that L3 transfer does not always rely solely on typological distinctions, and that structural similarities are a deterministic factor. In addition, the PIT data provides evidence that transfer may not always be wholesale from one background language, based on the evidence that the [+SP] and [-SP] learners were influenced by different background languages (i.e. null subjects, null objects, overt objects) or the same background language (i.e. overt subjects).

5.4 Language Relations Questionnaire

5.4.1 Results

Finally, I will present the results of the LRQ. The aim was to explore the extent to which the L3 learners' perceptions of language relatedness influenced the source of transfer in L3 acquisition. This task has been included in this study in response to claims that a learner is more likely to transfer from a background language if they perceive that it is more similar to the target language, i.e. 'pyschotypology' (Kellerman, 1977; Ringbom, 1987; Rothman, 2011). In the present study, English, Spanish and Chinese are not closely related to each other in a typological context, but English and Spanish do share some structural similarities with L3 Chinese. Therefore, the questionnaire provides an insight into the perceptions of the learners regarding the relationship between English, Spanish and Chinese, to establish whether or not the learners have preconceptions about whether or not either of their background languages is more similar to their L3 Chinese.

The questionnaire poses a series of questions to the learners, based on how similar or different they think the languages are at various linguistic levels, i.e. grammar, word structure, sentence structure (see Appendix G for full list of questions). The findings of the questionnaire differ from the two main experimental tasks (the WPT and the PIT) given that the data is qualitative, i.e. it is based on the opinions of the learners who participated in the experiment. Therefore, the data will be discussed descriptively based on the learners' responses for each question. The number of responses for each option for a given question has been converted to a percentage of the total participants in the group to provide a representation of the most frequently chosen answer.

Question 1 asked the learners to reflect on the similarity between English and Chinese, firstly in terms of the languages as a whole and then in terms of vocabulary, sounds, grammar, sentence structure and word structure. The learners were given the options 'similar', 'fairly similar', 'neither', 'fairly different' and 'very different'. As shown in Table 71, the [+SP] group indicated that in general English and Chinese are either 'fairly different' (26.7%) or 'very different' (73.3%); the [+SP] group also preferred these options for vocabulary, sounds, grammar, sentence and word structure. The [-SP] group also indicated that in general English and Chinese are 'fairly different' (40%) or 'very different' (60%); however, the [-SP] group differed in their view of sentence structure, which they perceive to be 'fairly similar' (70%). Overall, both groups of learners indicated that they perceive English and Chinese to be different rather than similar to each other.

	General		**Vocabulary**		**Sounds**		**Grammar**		**Sentence structure**		**Word structure**	
	[+SP]	[-SP]	[+SP]	[-SP]	[+SP]	[-SP]	[+SP]	[-SP]	[+SP]	[-SP]	[+SP]	[-SP]
Similar	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Fairly similar	0%	0%	6.7%	20%	0%	0%	6.7%	20%	13.3%	70%	0%	10%
Neither	0%	0%	6.7%	10%	0%	10%	13.3%	10%	13.3%	0%	0%	0%
Fairly different	26.7%	40%	13.3%	20%	13.3%	0%	40%	50%	26.7%	20%	20%	10%
Very different	73.3%	60%	73.3%	50%	86.7%	90%	40%	20%	46.7%	10%	80%	80%

Table 71: Percentage of responses indicating the similarities and differences between English and Chinese

Question 2 asked the learners to reflect on the similarity between Spanish and Chinese, firstly in terms of the languages as a whole and then in terms of vocabulary, sounds, grammar, sentence structure and word structure. Again, the learners were given the options 'similar', 'fairly similar', 'neither', 'fairly different' and 'very different'. As shown in Table 72, the [+SP] group perceive that Spanish and Chinese are 'very different' to each other (80%); this was the most chosen option for vocabulary, sounds and word structure, whilst grammar and sentence structure are either 'fairly different' or 'very different'. In terms of the languages as a whole, the [-SP] groups perceive that Spanish and Chinese are 'neither' similar nor different (60%) or 'very different' (40%); at least 50% of the [-SP] group also chose 'neither' for vocabulary, sounds, grammar, sentence and word structure, whilst the remainder of the responses were for 'fairly different' or 'very different'.

	General		**Vocabulary**		**Sounds**		**Grammar**		**Sentence structure**		**Word structure**	
	[+SP]	[-SP]	[+SP]	[-SP]	[+SP]	[-SP]	[+SP]	[-SP]	[+SP]	[-SP]	[+SP]	[-SP]
Similar	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Fairly similar	0%	0%	7%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Neither	0%	60%	0%	60%	0%	50%	0%	60%	13%	60%	0%	50%
Fairly different	20%	0%	13%	0%	7%	10%	47%	20%	27%	30%	20%	20%
Very different	80%	40%	80%	40%	87%	40%	53%	20%	60%	10%	80%	30%

Table 72: Percentage of responses indicating the similarities and differences between Spanish and Chinese

The difference between the [+SP] and [-SP] responses is not unexpected for this particular question, since the [-SP] group do not have any experience learning Spanish; therefore, it is not unreasonable that they chose 'neither' more often than any other response. The findings for Question 1 and Question 2 showed that the [+SP] learners do not think that there are any prominent similarities between English-Chinese or Spanish-Chinese. This indicates that their perception is that Chinese is different from their L1 English and L2 Spanish (for the [+SP] group).

Question 3 asked the learners to indicate whether Spanish or Chinese is more similar to their L1 English, to further explore the extent to which the learners perceive similarities between English and Chinese. As shown by Table 73, when the learners were only given

the option of Spanish and Chinese to choose from, the [+SP] group indicated that Spanish is more similar to English than Chinese (93%). The [-SP] group shared this perception, choosing Spanish rather than Chinese (90%). This shows that the learners perceive that English and Spanish are more typologically similar than English and Chinese, supporting the findings for Question 1 in that the learners did not perceive any significant similarities between English and Chinese.

	[+SP]	[-SP]
Spanish	93%	90%
Chinese	7%	10%

Table 73: Percentage of responses to Question 3: 'which language is the most similar to English: Spanish or Chinese?'

Question 4 asked the learners to reflect on how difficult it is for an English native speaker to learn Spanish. As shown in Table 74, the [+SP] group indicated that is 'fairly easy' (60%) or 'easy' (13%) for an English native speaker to learn Spanish, although 27% of this group indicated that it is 'fairly difficult'. The [-SP] group do not have any experience learning Spanish; however, their responses were very similar; the [-SP] group indicated that it is 'fairly easy' (67%) or 'easy' (11%) for an English native speaker to learn Spanish, whilst 22% of this group think it is 'fairly difficult'. As a result, the data shows that both learner groups believe that English speakers find it 'fairly easy' to learn Spanish.

	[+SP]	[-SP]
Easy	13%	11%
Fairly Easy	60%	67%
Fairly Difficult	27%	22%
Difficult	0%	0%

Table 74: Percentage of responses to Question 4: 'how difficult is it for an English speaker to learn Spanish?'

Question 5 asked the learners to reflect on how difficult it is for an English native speaker to learn Chinese, which is relevant for both learner groups. As shown in Table 75, the [+SP] group indicated that it is 'difficult' (73%) or 'fairly difficult' (20%) to learn Chinese, whilst 7% of the group believed it is 'fairly easy' (7%). The [-SP] groups' responses differed slightly from the [+SP] group, as the most chosen option was 'fairly difficult' and this group chose 'difficult' (40%) less often than the [+SP] group. This could suggest that the [-SP] group do not think it is quite as difficult to learn Chinese as the [+SP] group. Nevertheless, both

groups of learners indicated that it is difficult for an English native speaker to learn Chinese.

	[+SP]	[-SP]
Easy	0%	0%
Fairly Easy	7%	0%
Fairly Difficult	20%	60%
Difficult	73%	40%

Table 75: Percentage of responses to Question 5: 'how difficult is it for an English speaker to learn Chinese?'

Question 6 asked the learners to reflect on how difficult it is for a Spanish native speaker to learn English, to further explore the learners' perceptions of how similar Spanish is to English. As shown in Table 76, the [+SP] group indicated that it is 'fairly easy' (57%) or 'easy' (7%) for a Spanish speaker to learn English; however, there were also some learners who indicated that it is 'fairly difficult' (36%). The [-SP] group believe that it is 'fairly easy' (78%) for a Spanish speaker to learn English. In summary, both learner groups indicated that Spanish native speakers do not find it particular difficult to learn English, which supports the findings from Question 3 and Question 4 that suggested the learners perceive some similarities between English and Spanish and that it is fairly easy for an English speaker to learn Spanish.

	[+SP]	[-SP]
Easy	7%	11%
Fairly Easy	57%	78%
Fairly Difficult	36%	11%
Difficult	0%	0%

Table 76: Percentage of responses to Question 6: 'how difficult is it for a Spanish speaker to learn English?'

Question 7 asked the learners to reflect on how difficult it is for a Spanish native speaker to learn Chinese. As shown in Table 77, the [+SP] group clearly indicated that it is 'difficult' (79%) or 'fairly difficult' (21%) for a Spanish speaker to learn Chinese. The [-SP] group also indicated that it is 'difficult' (33%) or 'fairly difficult' (56%) for a Spanish speaker to learn Chinese; however, there were also some learners who believe that it is 'easy' (11%). The difference between the groups is not surprising, given that the [-SP] group have no experience of learning Spanish. The data further supports the findings of Question 2

which suggested that the learners do not perceive any significant similarities between Spanish and Chinese, indicating that it is difficult for a Spanish speaker to learn Chinese.

	[+SP]	[-SP]
Easy	0%	11%
Fairly Easy	0%	0%
Fairly Difficult	21%	56%
Difficult	79%	33%

Table 77: Percentage of responses to Question 7: 'how difficult is it for a Spanish speaker to learn Chinese?'

Question 8 asked the learners to reflect on how difficult it is for a Chinese native speaker to learn English. As shown in Table 78, the [+SP] group indicated that it is 'difficult' (57%) or 'fairly difficult' (36%) for a Chinese speaker to learn English. The [-SP] group indicated that it is 'difficult' (11%) or 'fairly difficult' (67%) for Chinese speaker to learn English. There were more [-SP] learners that think it is 'fairly easy' (22%) than the [+SP] group (7%). Overall, both learners indicated that it is difficult for a Chinese speaker to learn English, which is in line with the findings from Question 1 which suggested no similarities between English and Chinese, as well as Question 5 which suggested that it is difficult for an English speaker to learn Chinese.

	[+SP]	[-SP]
Easy	0%	0%
Fairly Easy	7%	22%
Fairly Difficult	36%	67%
Difficult	57%	11%

Table 78: Percentage of responses to Question 8: 'how difficult is it for a Chinese speaker to learn English?'

Question 9 asked the learners to reflect on how difficult it is for a Chinese native speaker to learn Spanish. As shown in Table 79, the [+SP] groups' responses were quite divided with some learners indicating that it is 'easy' (57%) but others indicating that it is 'difficult' (29%). The [-SP] groups' responses were shared across the possible options which reflect the fact that these learners have no experience of learning Spanish. The data for the [+SP] group is interesting as it shows an asymmetry in the learners' perceptions; the [+SP] group indicated that it is difficult for a Spanish speaker to learn Chinese (Question 7), however, more than half of the group perceive that it is easy for a Chinese speaker to

learn Spanish. This provides further evidence that the [+SP] learners perceive Chinese to be very different and difficult to learn for English or Spanish speakers.

	[+SP]	[-SP]
Easy	57%	11%
Fairly Easy	7%	22%
Fairly Difficult	7%	33%
Difficult	29%	33%

Table 79: Percentage of responses to Question 9:'how difficult is it for a Chinese speaker to learn Spanish?'

Finally, **Question 10** asked the learners to reflect on the relationship between English, Spanish and Chinese if it were represented as a tree diagram and were given the following four tree diagrams which provide different visualisations of the relationship between the three languages (see Figure 7).

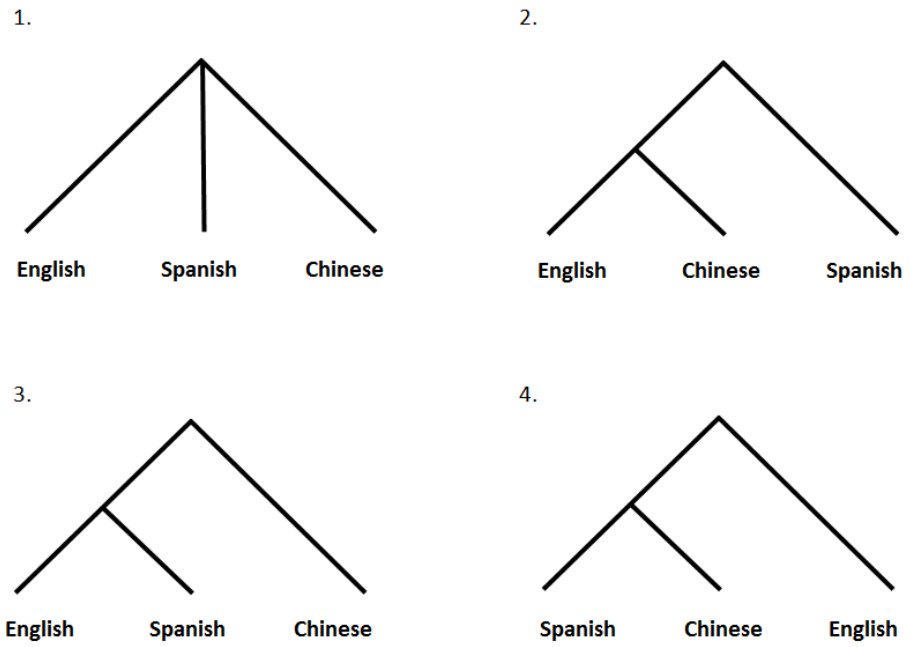


Figure 7: The relationship between English, Spanish and Chinese represented as four tree diagrams

In diagram (1) the three languages have an equal status within the tree diagram which would suggest a strong typological relationship between the languages. In diagram (2), English and Chinese are represented under the same node in the tree diagram, whilst Spanish is on a separate branch; this suggests that English and Chinese are more typologically related to each other whilst Spanish is not. In diagram (3), English and

Spanish are represented under the same node in the tree, whilst Chinese is on a separate branch, which suggests that English and Spanish are more related to each other whilst Chinese is not related to either language. In diagram (4), Spanish and Chinese are represented under the same node in the tree whilst English is on a separate branch, giving another alternative analysis that Spanish and Chinese are more related to each other and English is not related to either language. The learners were asked to choose one of these options to best represent the relationship between English, Spanish and Chinese. As shown in Table 80, all of the learners in the [+SP] group chose option (3), which indicates that English and Spanish are more closely related to each other, whilst Chinese is unrelated to these two languages.

	[+SP]	[-SP]
1	0	40%
2	0	0
3	100%	60%
4	0	0

Table 80: Percentage of responses to show the relationship between English, Spanish and Chinese as a tree diagram

This could be due to the fact that English and Spanish are both European languages and the similarities between them are more obvious. The [-SP] group also mainly chose (3); however, there were also four learners who chose option (1) which indicates that the three languages could be equally related. This could be due to the lack of experience in learning Spanish, meaning that they were unsure about the relationship between Spanish and Chinese. For the tree diagrams, there were no responses in either group to indicate a close relationship between English and Chinese (2) or Spanish and Chinese (4). Therefore, the learners' perceptions clearly identified that English and Spanish are more closely related that English and Chinese, which is believed to be very different.

5.4.2 Discussion

The LRQ explored the role of the learners' perceptions of the relatedness of the background languages and the target language in determining the source of transfer in L3 acquisition. According to previous studies (e.g. Kellerman, 1977; Ringbom, 1987; Rothman, 2011) the role of the learners' perceptions of language relatedness, or 'psychotypology', is an influential factor in L3 acquisition. This task aimed to provide an insight into the role of perceived typology for the L3 Chinese learners. For the [+SP] learners in particular, the background languages are not related to each other, yet there are similarities between the L1 and L2 and the target L3. As a result, it is important to establish whether or not the learners were aware that their L1, L2 and L3 are unrelated to each other and whether or not this plays any role in the acquisition of L3 Chinese.

Firstly, the results show that both groups of learners perceived that there are no significant similarities between English-Chinese and Spanish-Chinese, in terms of the languages as a whole and at various linguistics levels (vocabulary, grammar, sounds, sentence structure and word structure) (Question 1 and 2). This shows that the learners perceived that Chinese is different from their L1 English; crucially for the [+SP] group, they indicated that Chinese is also different from their L2 Spanish. The results also show a clear perception that English is more similar to Spanish, than it is to Chinese, shown by the results for Question 3. This indicates that both the [+SP] and [-SP] learners were aware that Chinese is not typologically similar to English or Spanish and these perceptions are not related to whether or not the learners have previously acquired Spanish.

The learners were asked about how difficult or easy it is for English native speakers to learn Spanish and Chinese (Question 4 and 5); the results show that they perceived Spanish to be easier to learn than Chinese. Similarly, for Spanish native speakers the learners indicated that it is easier to learn English than it is to learn Chinese (Question 6 and 7). However, the learners' indicated that Chinese native speakers find it easier to learn Spanish than to learn English (Question 8 and 9). Overall, these results show that the learners perceived that Chinese is more difficult to learn than Spanish. The [+SP] learners have previous knowledge of Spanish and have been learning Chinese for at least two semesters; presumably, these learners are basing their responses on their own language learning experience. This tells us that Chinese is thought to be a very different

language from their L1 and L2. The [+SP] learners did not perceive that there any general or specific similarities between Chinese and Spanish; these perceptions could play a role in the source of transfer in L3 acquisition.

In summary, the learners were aware that Chinese is typologically unrelated to English and Spanish and did not indicate that there are any significant structural similarities between Chinese and English/Spanish. The learners seem to identify more similarities between English and Spanish, also indicating that these languages are easier to learn than Chinese. This could be due to the fact that Chinese looks and sounds very different to European languages and the learners therefore, naturally group European languages together. These findings are corroborated by the results for Question 10, in which the [+SP] learners unanimously thought that English and Spanish are more related to each other whilst Chinese is unrelated to both English and Spanish. The learner groups differed in their perceptions of the difficulties in learning Spanish, which is not unexpected since the [-SP] group do not have experience in learning Spanish which may affect their perceptions of how similar Spanish is to another language.

Crucially, the findings suggest that the [+SP] learners did not perceive a privileged status for their L1/L2, which reflects the fact that neither of their background languages is typologically related to their L3 Chinese. This means that they are just as likely to transfer from either of their background languages, with no real preference for one over the other. In other words, perceived similarity is not useful for the L3 learners in this study (in line with Ringbom, 2007; Santos, 2014). Whilst other studies have reported a clear effect of psychotypology when two languages are typologically related (e.g. Rothman, 2011), this indicates that this effect cannot be expected in all language combinations. The conclusion from this questionnaire is that psychotypology is not a relevant factor when the three languages of the learners are typologically unrelated.

Chapter 6: Conclusion

6.1 Conclusions of the study

The aim of this study was to propose a more refined account of the conditions which determine the source of transfer in L3 acquisition, focusing on the potential role of linguistic features and feature reassembly in structural similarity. In Chapter 1, I introduced the main research questions as follows:

1. What is the source of transfer for the L1 English-L2 Spanish-L3 Chinese learners?
2. To what extent does the similarity between features in each language determine the source of transfer; is there evidence of feature reassembly in the acquisition of null subjects in L3 Chinese?

The study examined the use and interpretation of null and overt arguments by two groups of L3 learners; Group 1 consisted of L1 English-L2 Spanish-L3 Chinese learners (represented as [+SP]), and Group 2 were L3 Chinese learners with L1 English and L2 non-null subject language, who had no previous experience of learning Spanish (represented as [-SP]). In addition, each group was divided by proficiency into beginners or intermediate-advanced (I-A). English, Spanish and Chinese are typologically unrelated languages, although both English and Spanish have some structural similarities in common with Chinese. This provides a setting in which transfer could obtain from either the L1 or the L2. More specifically, Chinese and Spanish are similar in the sense that they are both null subject languages, although there are some key syntactic differences in their identification and licensing (summarised as a [VAR: *pro*] feature in Spanish and [VAR: empty category] feature in Chinese). On the other hand, Chinese and English are similar in the fact that neither Chinese nor English are restricted by the OPC principle (unlike Spanish). It was predicted that any cross-linguistic transfer observed for the [+SP] group (from L1 English or L2 Spanish) in the study would be determined by structural similarities between the previously learnt languages and the target L3, which are attributed to the way in which features are assembled in each language. In this Chapter, I will discuss the results of the experiment with the aim of establishing the extent to which each research question has been answered.

In terms of Question 1, 'what is the source of transfer for the L1 English-L2 Spanish-L3 Chinese learners?', the results do not show one clear source of transfer for the [+SP] group for all of the properties investigated. In terms of null subjects, the Written Production Task (WPT) showed that the [+SP] group and [-SP] group used null subjects in a similar way, although there were no significant differences between the [+SP] groups and the native speakers which indicates target-like behaviour (corroborated by individual results). In the PIT, the overall learner group results show that the [+SP] beginners were more target-like than the [-SP] beginners in providing appropriate interpretations of embedded null subjects. This means that the two learner groups did not perform in the same way for null subjects.

According to the predictions, if the learners perform differently to each other this suggests that the [+SP] group have been influenced by their L2 Spanish. This is based on a comparison between the two learner groups; both groups have L1 English and are learning Chinese as their L3 and the only difference between them is that the [+SP] group have previously acquired null subjects in their L2 Spanish (confirmed by the pre-tests) whilst the [-SP] group have not. Since the results indicate that the [+SP] beginners performed in a more target-like way than the [-SP] group in their use and interpretation of null subjects, we can conclude that the [+SP] group found it easier to acquire null subjects than the [-SP] group, presumably due to their previous knowledge of Spanish as an L2. This suggests that the [+SP] group have been positively influenced by their knowledge of null subjects in their L2 Spanish, which is taken to be the source of transfer.

In terms of overt subjects, the results of the experiments revealed that the two learner groups both differed in their use of overt subjects from the Chinese controls in the WPT and PIT. The WPT showed that there was no significant difference in the frequency of use of overt subjects in Chinese and Spanish; however, the task showed that both learner groups used more overt subjects than the Chinese controls. Furthermore, the [+SP] groups performed differently from the Spanish controls at both levels. Therefore, the WPT shows similar behaviour for the [+SP] and [-SP] groups, and that the [+SP] group were not influenced by their L2 Spanish, which could indicate transfer from the same background language. The only background language that all of the participants in the [+SP] and [-SP] groups have in common is their L1 English, which is taken to be the source of transfer for overt subjects in the WPT.

Crucially, the PIT tested the interpretations of sentences with an embedded overt subject with a quantified antecedent (QOS), which is the main similarity between English and Chinese. The OPC principle outlines the binding restrictions on embedded overt subjects, stating that in some languages an overt subject in an embedded clause cannot be licensed to a main clause subject, if that main clause subject is quantified. This applies to Spanish, but not to English and Chinese. The results indicated that both learner groups showed non-target-like behaviour in their interpretations. Since the learner groups performed in a similar way, as with the WPT this is taken to show influence from the same background language (i.e. L1 English).

Therefore, in response to Question 1, the data showed influence from L2 Spanish (for null subjects) and L1 English (for overt subjects), showing that the source of transfer for the L3 Chinese learners is not straightforward. Next, I will discuss these findings in the context of current L3 transfer models, in order to establish how these results contribute to current discussions.

The finding that the [+SP] group transferred from their L2 Spanish in acquiring null subjects would be predicted by a number of current models. Firstly, the 'L2 Status Factor' model (Bardel & Falk, 2007) predicts that L3 learners will transfer solely from their L2 which has a more dominant status than the L1. However, since the data also indicated transfer from L1 English, it is reasonable to conclude that this model cannot fully explain the results of this experiment. Therefore, L3 transfer in this experiment does not seem to solely depend on the status of the background language (whether or not it is the L1 or L2).

The Cumulative Enhancement Model (CEM) (Flynn et al., 2004) predicts that transfer can occur from either the L1 or the L2; although it claims that transfer enhances language acquisition or remains neutral (i.e. it is not non-facilitative). Whilst the results support the notion that transfer can occur from either the L1 or the L2, the CEM is not completely supported since the findings showed some non-facilitative behaviour. For example, the [+SP] and [-SP] groups' use and interpretation of overt subjects was problematic and non-target-like compared with the Chinese controls. The data indicated influence from L1 English, even though this was not beneficial for the L3 learners. Therefore, L3 transfer is not always facilitative and the CEM is not supported.

The Typological Primacy Model (TPM) (Rothman, 2010, 2011, 2013, 2015) would also likely predict transfer from L2 Spanish. According to the TPM, transfer can occur from either the L1 or the L2 and is guided by the typological similarity between the background languages and the target language. The TPM predicts that full transfer will occur from one background language only at the L3 initial state, once the learner has assessed which background language is more similar to the target L3. This assessment is based on a hierarchy of cues from the input: *Lexicon >Phonological/Phonotactic cues >Functional Morphology >Syntactic Structure.* The TPM prediction for the language combination in this study can be deduced by considering each level of the hierarchy. Firstly, the lexicon is unlikely to be an influential factor, since neither English nor Spanish can offer any lexical similarities given the fundamental differences in the historical origins of the languages, as well as the distinct forms (i.e. Latin alphabet in English and Spanish vs Chinese characters). However, there are some similarities between Spanish and Chinese at the phonological level. For example, it has been noted that whilst English allows complex codas (e.g. word-final *-nt* or *-ld*), they are disallowed in both Spanish and Chinese which only allow single consonant codas (Campos, 2009). Therefore, the TPM is likely to suggest full transfer from L2 Spanish due to a closer typological/structural relationship between Spanish and Chinese (rather than English and Chinese).

To some extent, since the results showed transfer from L2 Spanish in the acquisition of null subjects, the TPM predictions are supported. However, the fact that the results of the study also suggest that the [+SP] group transferred from their L1 English in acquiring overt subjects suggests that L3 transfer does not take place from the L2 only. The results indicate that it is possible for L3 learners to utilise knowledge of more than one background language in acquiring a property. The TPM predicts that L3 transfer will be wholesale from one background language only; therefore, we cannot say that the results of the current study fully support TPM predictions, although we also cannot disregard the role of the type of structural similarity outlined by the model. Since the results highlighted that transfer is not necessarily wholesale at the initial stages and may take place on a more partial and selective basis, this points towards the predictions of another model, the Scalpel Model (SM) (Slabakova, 2016). The SM claims that it is not necessarily more economical to choose one background language for linguistic transfer, which is supported by these findings.

Finally, the Linguistic Proximity Model (LPM) (Mykhaylyk et al., 2015; Westergaard et al., 2016) is likely to predict transfer from L2 Spanish for the [+SP] learners. The LPM claims that the linguistic property being acquired guides L3 transfer, which can occur from any background language and does not depend on the typological similarity of the languages. Since Spanish and Chinese both allow null subjects, I assume that the LPM would predict transfer of this property from L2 Spanish for the [+SP] learners. The results support this prediction, showing that previous knowledge of a null subject language was beneficial for the [+SP] learners and therefore, structural similarity based on the linguistic property being acquired could have an important role in the source of L3 transfer. Furthermore, the LPM does not postulate full transfer from one background language only and predicts that transfer may occur from any background language, although it is not always facilitative. The results indicate that transfer has occurred from L1 English for overt subjects and from L2 Spanish for null subjects, and is sometimes non-facilitative. Therefore, the main predictions of the LPM seem to be supported.

The results of this experiment support the predictions made by some of the current L3 transfer models, whilst disregarding others. The L2 Status Factor is not supported based on the evidence that transfer has taken place from the L1 and the L2 of the [+SP] learners. The CEM is not supported based on the finding that the [+SP] learners transferred from English in learning overt subjects, even though is not beneficial for acquiring L3 Chinese. The TPM prediction that transfer occurs from L2 Spanish is supported, although the model also postulates full transfer from one background language only which is not shown here. The SM prediction that transfer is not wholesale from one background language is supported. This claim, as well as the prediction that the [+SP] group will transfer from Spanish, is also made by the LPM. Therefore, aspects of the TPM, the SM and the LPM receive support from the results of the current study.

In summary, in terms of Question 1, 'what is the source of transfer for the L1 English/L2 Spanish/L3 Chinese learners?' this study shows that the [+SP] group transferred from L2 Spanish (for null subjects) as well as L1 English (for overt subjects). This indicates that in cases where the L1, L2 and L3 are typologically unrelated to each other, the predictions regarding the source of transfer are not straightforward. Furthermore, there is evidence that L3 transfer may not involve wholesale transfer of only one background language, but may take place on a more partial basis from either the L1 or L2 (depending on the

property). Crucially, the influence from the background languages that is shown cannot be a result of the overall typological proximity of the languages, since English, Spanish and Chinese are typologically unrelated languages. As a result, this highlights the importance of further exploring the role of structural similarity, which is examined by Question 2.

In terms of Question 2, 'to what extent does the similarity between features in each language determine the source of transfer; is there evidence of feature reassembly in the acquisition of null subjects in L3 Chinese?' the aim was to explore the role of features and feature reassembly in defining 'structural similarity'. Crucially, the results for Question 1 support the prediction that structural similarity is an important factor in L3 transfer which has been predicted by current proposals (i.e. TPM, LPM). Here, I consider the possibility that structural similarity is guided by linguistic features and the way in which they are assembled in each language, based on the Feature Reassembly Hypothesis (FRH) (Lardiere, 2000, 2009). The FRH was proposed for L2 acquisition and has not yet been explored in L3 acquisition, although in Chapter 2 I outlined the following logical predictions which follow from the main tenets of the FRH:

- L3 learners search both their L1 and L2 for morpholexical equivalents of a property.
- If a morpholexical equivalent is found in the L1/L2, L3 features are mapped onto the L1/L2 feature subset and if required, features are re-assembled onto relevant L3 lexical items.

Firstly, the WPT provided crucial evidence that there is a structural difference in the use of null subjects in Chinese and Spanish. There was a significant difference in the frequency of null subjects used by the Chinese and Spanish control groups; the data showed that the Spanish controls used more null subjects than the Chinese controls. The licensing of null subjects takes place in [Spec, IP] in Spanish by the presence of a crucial [uD] feature in T but in [Spec, CP] in Chinese, which has no [uD] feature. Furthermore, Spanish agreement features are on the verb and are easily recoverable whilst Chinese does not have agreement features at all. These differences were summarised as a difference in the features required for null subjects in each language: [VAR: *pro*] in Spanish and [VAR: empty category] in Chinese (outlined in Section 3.4.1). I suggest that the significant difference between the Chinese and Spanish controls could be an important consequence of these feature sets.

In terms of the [+SP] learners, the data indicated that this structural difference did not negatively affect the acquisition of null subjects in Chinese. As discussed earlier, the WPT revealed that previous knowledge of a null subject language was beneficial for the [+SP] learners, despite the need to reassemble [VAR: *pro*] to [VAR: empty category]. Therefore, to some extent, L3 transfer has been guided by the 'structural similarity' that exists between Chinese and Spanish. In other words, the fact that Chinese and Spanish both allow null subjects determines Spanish as the source of transfer in the acquisition of null subjects. Although this finding may not be particularly unexpected, it is an interesting result which shows that it is not especially difficult for the [+SP] learners to acquire null subjects in Chinese, even though they differ in syntactic licensing from Spanish null subjects.

In terms of linguistic features, this suggests that the feature reassembly from [VAR: *pro*] to [VAR: empty category] that presumably takes place between Spanish and Chinese was fairly straightforward for the [+SP] groups, particularly the beginner group. This result is a little unexpected if we consider the main tenets of the FRH for L2 acquisition. The FRH claims that any significant feature reassembly that is required should be more difficult than learning a new property for the first time. Therefore, in the context of this study, the FRH may predict that the [-SP] group should encounter fewer problems learning null subjects, since they do not have previous experience with null subjects and only need to reconfigure [VAR:] to [VAR: empty category]. On the other hand, the [+SP] group should encounter more problems, since they must reassemble the features associated with null subjects when they learn L3 Chinese. However, as we have seen from the results, this does not seem to be the case. Furthermore, the predictions of the FRH are based on the notion of Full Transfer/Full Access (Schwartz & Sprouse, 1996), although the results of the current study do not support Full Transfer in L3 acquisition.

As a result, it seems as though feature reassembly may be different in L3 acquisition compared with L2 acquisition and we need to take into consideration the L3 learners' previous experience of feature (re)assembly for a particular property. For example, the [+SP] beginners have L1 English which does not allow null subjects and L2 Spanish which does allow null subjects. We know that the [+SP] group have successfully acquired the use and interpretation of null subjects in their L2 Spanish (confirmed by pre-tests); the [+SP] beginners search their background languages (for morpholexical equivalents) and find

null subjects in Spanish and therefore, have a relevant structural similarity that can be transferred to L3 Chinese. It may be that the task for the [+SP] beginners is easier because they have access to the features associated with null subjects from L2 Spanish [i.e., VAR: *pro*], although they still need to be reconfigured in Chinese. On the other hand, the [-SP] beginners have L1 English (non-null subject language) and an L2 which also does not allow null subjects and therefore, the search of their background languages does not provide any evidence of null subjects. Since the [-SP] beginners have to search two background languages which do not have a relevant structural similarity for L3 Chinese null subjects, this could mean that the [-SP] learners acquire null subjects more slowly. Therefore, it is possible that feature reassembly does not operate in exactly the same way as outlined for L2 acquisition. In other words, discussions on the FRH in L3 acquisition may need to take into account that the L3 learners have more than one source of transfer and that L3 transfer may not be wholesale. As a result, it is possible that previous knowledge of relevant features facilitates L3 transfer, even when there is some level of reassembly required.

In order to further explore the finding that it is not problematic (i.e. straightforward) for the [+SP] beginners to acquire null subjects despite the need for feature reassembly, I consider the role of functional morphology. As a reminder, in the WPT, the [+SP] beginners were non-target-like with the Spanish controls but target-like with the Chinese controls. Spanish has rich verbal morphology which helps to license and identify null subjects whilst Chinese has no verbal morphology; this difference in agreement features could be sufficient evidence for the [+SP] beginners that null subjects are used differently in Chinese (i.e. less often) than in Spanish. The suggestion here is that the presence or absence of agreement features on the verb might be adequate evidence for the learners that null subjects are used differently and as a result, relevant features are reassembled quite easily in the target language.

In addition to the main research questions, the data allow for an analysis of the role of perceived typological similarity, or psychotypology, in determining the source of L3 transfer. There have been suggestions in the literature that the way in which learners perceive the proximity or relatedness between their background languages and the target language could be an influential factor in L3 transfer (e.g. Kellerman, 1977; Ringbom, 1987; Rothman, 2011). In order to explore the role of psychotypology, the Language

Relations Questionnaire (LRQ) asked the learners to reflect on the similarities between English, Spanish and Chinese as well as the difficulty in learning each language from different perspectives. The aim of this task was to demonstrate the extent to which the perceived similarity between languages plays an important role when the language combination consists of three typologically unrelated languages.

The questionnaire results showed that both groups of learners who took part in the experiment did not perceive any structural similarities between English-Chinese or Spanish- Chinese in general, or at individual linguistic levels (i.e. vocabulary, grammar, sounds, sentence structure and word structure). For the [+SP] learners in particular, this shows that the learners were aware that neither of their background languages is typologically related to their L3 Chinese and they perceived that neither of their background languages have relevant structural similarities in common with Chinese. Interestingly, the finding that the [+SP] learners did not perceive any similarities between Spanish and Chinese contrasts with the evidence provided in the other experimental tasks. The WPT and PIT results showed that previous knowledge of Spanish was helpful for the [+SP] learners in using and interpreting null subjects in Chinese. This indicates that the [+SP] learners are influenced by Spanish despite the fact that they were not aware that any structural similarities exist between Chinese and Spanish. These findings suggest that the perceived proximity between Spanish and Chinese does not play an important role in L3 transfer in this experiment and the source of transfer has not been guided by the typological or structural similarities perceived by the learners. In summary, the results of the LRQ suggest that psychotypology is not a particularly relevant factor in determining the source of transfer in L3 acquisition for typologically unrelated languages.

Based on the results of the experiment, it seems that the similarities or differences between the background languages and the target language must surely have a significant impact on L3 transfer, even when the languages are typologically unrelated. Furthermore, the results indicate that the definition of structural similarity can be extended and more powerful if we consider the role of linguistic features and feature reassembly. For example, in this study the WPT showed that there is an important difference between Chinese and Spanish in terms of the features responsible for null subjects in each language; the [+SP] group still outperformed the [-SP] group in the WPT whilst the beginner [+SP] group outperformed the [-SP] beginner group in the PIT. The

[+SP] group have an advantage in that one of their background languages also allows null subjects and they are able to reassemble the features associated with null subjects easily and quickly. In contrast, the [-SP] group have no evidence of null subjects in either of their background languages, which seems to result in a less target-like use of null subjects. This shows that the source of L3 transfer is guided by structural similarities and furthermore, for typologically unrelated languages we can predict the source of transfer based on the learners' previous knowledge and experience with relevant features (even if the features need to be reassembled in the target language). Furthermore, this indicates that the FRH may need to be adapted in the context of L3 acquisition to take into account the fact that L3 learners have multiple sources of transfer. In summary, an account of L3 transfer that takes features into account provides a more nuanced definition of structural similarity which is based on linguistic theoretical considerations, which is arguably lacking in some current L3 transfer models. Although the data from this experiment must be taken with caution (due to low participant numbers), it highlights the need to discuss L3 transfer in terms of features and feature reassembly which is likely to provide more detailed and more reliable predictions regarding the source of transfer.

6.2 Points for future research

In this final section, I will provide an evaluative reflection of the study and outline some of the main limitations that have been identified in the experiment, as well as points for future research in this area. Firstly, in terms of the methodology, as discussed in Chapter 4 there were some issues with the proficiency testing of the learner participants in Chinese. The aim was to use the results of the proficiency test which had been taken from a previous HSK exam, in order to avoid using self-assessed proficiency and provide additional accuracy. Unfortunately, the results of the Chinese proficiency test did not seem reliable enough to be used in the experiment; as discussed earlier, there were students who had only been studying Chinese for two semesters but scored very highly and other students who had been studying Chinese for a number of years but scored poorly on the test. As a result, this indicated that the test results should be reconsidered. The proficiency test may have failed because the extracts I selected from the HSK exam were aimed at intermediate learners only and was not able to provide a suitable insight into the proficiency of the learners who ranged from a beginner to an advanced level of

language learning. In response, I decided instead to divide the learners into groups based on the Chinese class in which they were enrolled at the time. This method of grouping the participants is thought to be considerably less reliable than using proficiency tests, which presents one of the limitations of the study. However, I anticipate that this is unlikely to have had a significant impact on the results, based on the fact that the change only affected a few students and not the majority. Nonetheless, this discrepancy should be revised for any future research on this topic, since it is less reliable to use this type of assessment in grouping learners into proficiency groups.

Secondly, one of the main limitations of the experiment is the low number of participants, particularly for the [-SP] I-A group (n=3). The language combination used in the study presented a difficulty in recruiting volunteer participants, since there were a limited number of students studying Chinese at the University of Southampton at the time of testing. In an attempt to overcome this obstacle, the participants were offered a monetary incentive to take part in the study and the tests were administered online to make the experiment as accessible as possible. The lack of participants in some groups was problematic for the data analysis, in which it became evident that the low number of participants could have a negative effect on the results, for example, a lack of statistical power. As a result, it has been noted throughout the experiment that the statistical results should be viewed tenuously. In future research on this topic, the low numbers of participants would need to be addressed to overcome this limitation.

Another potential limitation of the study is that the experiment did not test learners who were in the 'initial state' of learning. This is usually taken to mean the first few weeks of exposure to the L3 (e.g. Bruhn de Garavito & Perpiñán, 2014). As a result, the data cannot ascertain whether or not there was transfer from any previously learnt languages in the very initial stages, which may have been overcome later on. I did not test learners of Chinese in the first few weeks of exposure following discussions with the co-ordinator of Chinese Language studies at the University; I was advised that most English native speakers find Chinese very difficult initially due to the major differences in form between English and Chinese and may not be able to read any pinyin or characters for the majority of the first semester. Therefore, the beginner learners had completed one semester of learning and were beginning their second semester. However, this affects the way in which the results of this experiment can be directly compared to other studies which did

test learners at the 'initial stages'. Therefore, future research could explore the initial exposure to Chinese to establish whether or not there are any differences with the 'beginners' tested in this experiment.

Appendix A Background Questionnaire

1. Full Name:

   (NB: for administrative purposes only - you will remain anonymous in the study)

2. Age:

3. Gender: Male / Female

4. Is English your first language? Yes / No

5. In which country were you born?

6. Please use the box below to list any additional languages, other than English, that you know.

   In addition, please include:

i) at what age you started to learn the language

ii) if you are still learning it

iii) your self-assessed proficiency in that language (i.e. beginner, intermediate, advanced)

e.g. French, Year 8 (or 12 years old), NO, Intermediate

Appendix B Chinese Proficiency Test

Instructions

There are four exercises in this task. In each, complete the texts by choosing one of the six options provided below (A – E). Mark your answer by circling your choice.

HSK (Level 3: May 2013) Q 51 – 55.

(Example) 例如：她说话的（E）多好听啊！
1．从地图上看，黄河很（___）一个“几”字。
2．我相信在她的帮助下，你的汉语水平一定会（___）的。
3．谁能（___）黑板上的这个问题？
4. (___）到会议结束，大家也没想出办法来。
5．你是不是忘记把牛奶放冰箱里了？两包都（___）了。

A 像	B 坏	C 一直	D 提高	E 声音	F 回答
Xiang	huai	yi zhi	ti gao	sheng yin	hui da
‘like’	‘bad’	‘always’	‘increase’	‘sound’	‘answer’

HSK (Level 3: May 2013) Q 56 – 60.

(Example) 例如： A：你有什么（D）？
B：我喜欢体育。
6. A：我们在哪儿（___）？
B：国家体育馆北门吧，那儿离你家和我家都近。
7. A：昨天我生日，儿子送给我一（___）他画的画儿。
B：那你一定很高兴吧？
8. A：对不起，李经理，我迟到了。
B：没关系，先坐下开会吧，以后（___）点儿。
9. A：明天 30 号了，记得还（___）。
B：放心，我今天中午就去银行。
10. A：桌子上有蛋糕，你吃不吃？
B：不吃了，我在爷爷家吃（___）了才回来的。

A 饱	B 信用卡	C 见面	D 爱好	E 张	F 注意
‘full’	‘credit card’	‘meet’	‘hobby’	‘Zhang’	‘watch out’

HSK (Level 3: 31332) Q 51 – 55

(Example) 例如：她说话的（E）多好听啊！
11．老师，这次考试（___）用铅笔答题吗？
12．鱼（___）是有耳朵的，只是很多人都没注意到。
13．再想想，看能不能找到更简单的解决（___）。
14．这件事情太（___）了，让人很难相信。
15．13 号桌少了一双（____）和一个碗，你快送过去。

A 其实 B 奇怪 C 必须 D 筷子 E 声音 F 办法
'actually' 'strange' 'have to' 'chopsticks' 'sound' 'way'

HSK (Level 3: 31332) Q 56 - 60

(Example) 例如： A：你有什么（D）？
B：我喜欢体育。
16. A：张阿姨请我们去她家过节，带什么礼物好呢？
B：带（___）红酒或者买些水果都可以。
17．A：你试着慢慢地站起来，怎么样？
B：脚还是有点儿（___）。
18．A：经理，李先生来了，正在会议室等您。
B：好，我（___）过去。
19．A：您好，（___）是 99 元 7 角 5 分。
B：这是 100，不用找了。
20．A：你的汉语水平怎么提高得这么快？
B：我每天都看（___）报纸，而且还会听半个小时的新闻。

A 马上 B 疼 C 一共 D 爱好 E 中文 F 瓶
'right away' 'pain' 'altogether' 'hobby' 'Chinese' 'bottle'

Appendix C Spanish Proficiency Test

Instructions

Complete the following text by choosing one of the three options provided below to fill the blank space. Mark your answer by circling your choice.

Las virtudes del docente agrario

¿Es la modalidad agropecuaria distinta de las demás? Sí, aunque ____(1)____ lógica tiene coincidencias con la enseñanza técnica y con el resto; las características de las disciplinas que integran su programa, la ___(2)___ alejada de los centros poblados y la permanente actividad los 365 días en sus sectores didáctico-productivos, donde se trabaja con vida, animal o vegetal, que tiene ciclos inmodificables o cuando menos difíciles ___(3)___ acomodar, hacen que ___(4)___ una modalidad muy particular.____(5)____ tienen la responsabilidad de ___(6)___ la formación de los jóvenes con vocación ___(7)___ las actividades del campo deben ser, y de hecho lo son, especiales. El maestro, varón o mujer, de una escuela agropecuaria tiene un perfil diferente. Siempre ___(8)___ en condiciones de enseñar las cosas más disímiles, como construir un pequeño gallinero con ladrillos usados, conducir una planta de incubación, cultivar una pequeña ___(9)___ o conducir una sembradora con tecnología de última generación. A la par, en sus diarias jornadas, la permanente convivencia con sus alumnos y el diálogo ___(10)___ obligan a oír confesiones, aconsejar, guiar, sembrar valores con palabras y ejemplos, y ___(11)___ en muchas oportunidades se extiende en una pausa o en el asado compartido bajo un árbol ___(12)___ se siembra o se cosecha. Este tipo de docente no puede improvisar, ___(13)___ un largo período de formación, capacitación y ejercicio de sus funciones por la ___(14)___ que tiene en la capacitación de sus alumnos, que deberán salir ___(15)___ para la amplia gama de posibilidades laborales que ___(16)___ la empresa agropecuaria. Es necesario capacitar y actualizar permanentemente, de forma sistemática, ___(17)___ los decentes-técnicos, ___(18)___ buscar desde las conducciones de las escuelas que los más jóvenes ___(19)___ ese sentido de pertenencia, ese compromiso que ___(20)___ siempre a los docentes. Si los conseguimos, sin duda, ganarán ellos pero, sobre todo mejorará la educación y de este hecho nos beneficiaremos todos.

[Adaptado de La Nación, Argentina]

OPCIONES

1	A. en	B. de	C. por
2	A. ubicación	B. enclave	C. estancia
3	A. a	B. de	C. en
4	A. sea	B. es	C. será
5	A. Quienes	B. Que	C. Los cuales
6	A. preservar	B. conllevar	C. acercarse
7	A. con	B. por	C. a
8	A. es	B. está	C. tiene
9	A. semilla	B. huerta	C. recolección
10	A. lo	B. las	C. se
11	A. este	B. aquel	C. esto
12	A. mientras	B. como	C. antes de que
13	A. importa	B. necesita	C. dispone
14	A. reacción	B. relevancia	C. relación
15	A. preparados	B. preparándose	C. habiendo preparado
16	A. brinda	B. cuenta	C. resuelve
17	A. para	B. a	C. por
18	A. además	B. así que	C. así como
19	A. retoman	B. retomen	C. retomarían
20	A. caracterizó	B. caracterizaba	C. caracterice

Appendix D L2 Spanish Pronoun Interpretation Task

Referential noun phrase + embedded null subject (RNS)

1. John dice que juega al fútbol cada lunes.
   (John says that (he) plays football every Monday).
2. Lisa dice que quiere comprar un gato.
   (Lisa says that (she) wants to buy a cat).
3. John dice que nunca ha ido a Madrid.
   (John says that (he) has never been to Madrid).

Quantified noun phrase + embedded null subject (QNS)

1. Alguien dice que puede hablar tres idiomas.
   (Someone says that (he) can speak three languages).
2. Nadie dice que vio a David la semana pasada.
   (Nobody says that (he) saw David last weekend).
3. Nadie admitió que hubiera roto la ventana.
   (Nobody admitted that (he) had broken the window).

Referential noun phrase + embedded overt subject (ROS)

1. John dice que él nunca ha ido a Madrid.
   (John says that he has never been to Madrid).
2. David dice que él debería irse de vacaciones.
   (David says that he should go on holiday).
3. Mary dice que ella fue a Londres ayer.
   (Mary says that she went to London yesterday).

Quantified noun phrase + embedded overt subject (QOS)

1. Alguien dice que ella puede hablar tres idiomas.
   (Someone says that she can speak three languages).
2. Nadie admitió que ella hubiera roto la ventana.
   (Nobody admitted that she broken the window).
3. Alguien piensa que ella debería comprarse un coche nuevo.
   (Someone thinks that she should buy a new car).

Referential noun phrase + embedded null object (RNO)

1. Lisa dijo que Mary abandonó.
   (Lisa said that Mary abandoned (her)).
2. John cree que Peter odia.
   (John thinks that Peter hates (him)).
3. Peter dice que Bill abrazó.
   (Peter says that Bill hugged (him)).

Quantified noun phrase + embedded null object (QNO)

1. Alguien dice que John conoce.
   (Someone says that John knows (him)).
2. Alguien dice que John convenció.
   (Someone says that John persuaded (him)).
3. Nadie dice que John adora.
   (Nobody says that John adores (him)).

Referential noun phrase + embedded overt object (ROO)

1. Mary sabe que Amy lo vio.
   (Mary knows that Amy saw her).
2. John cree que Peter lo odia.
   (John thinks that Peter hates him).
3. John cree que David lo está ignorando.
   (John thinks that David is ignoring him).

Quantified noun phrase + embedded overt object (QOO)

1. Alguien dice que Mary la empujó.
   (Someone says that Mary pushed her).
2. Nadie dice que John lo adora.
   (Nobody says that John adores him).
3. Nadie dice que John lo evitó.
   (Nobody says that John avoided him).

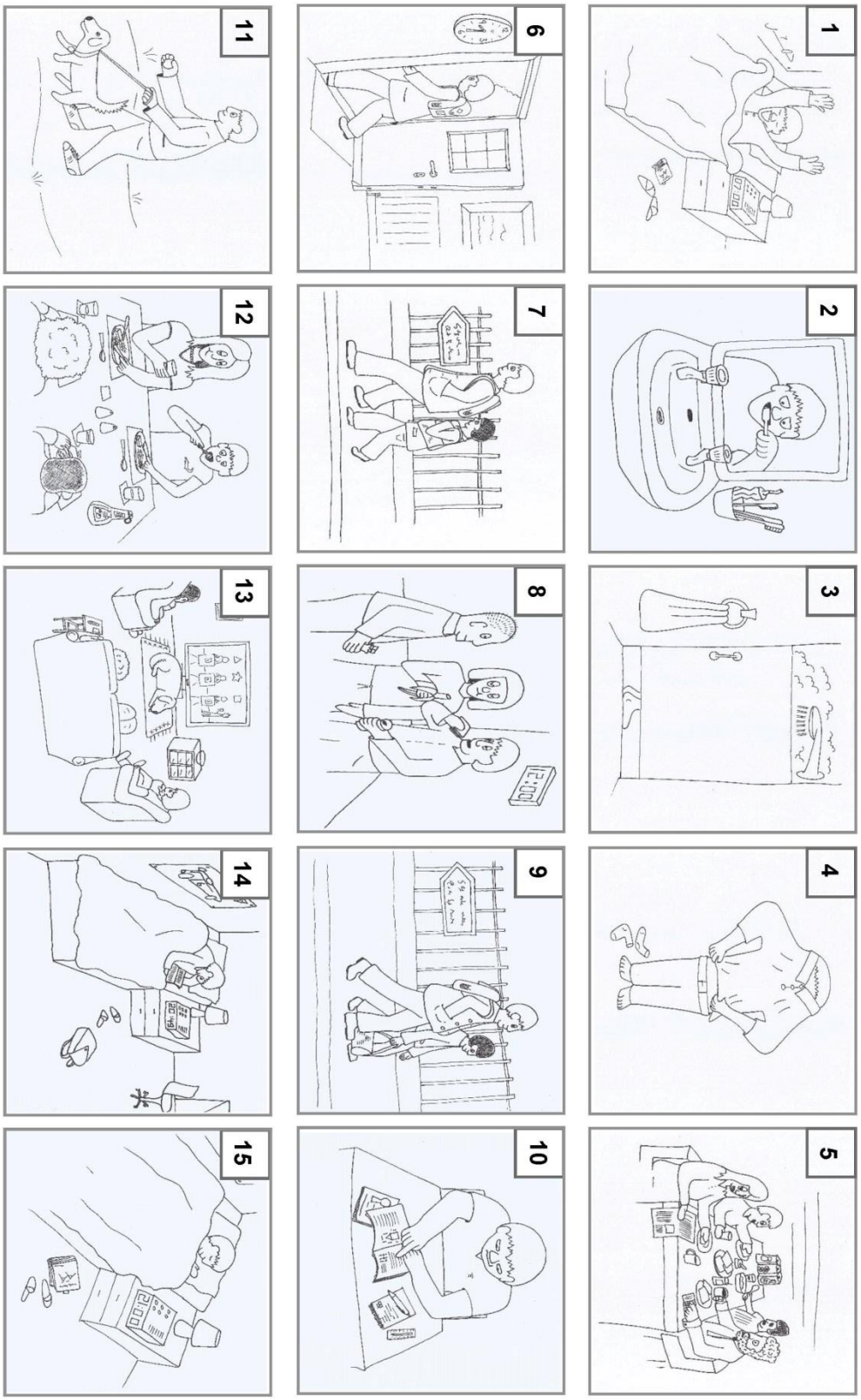
Topic Chain (TC)

1. Este fin de semana, John se va de viaje. Viajará a lo largo de la costa para que pueda visitar unas playas diferentes. Quiere nadar en el mar, aunque hace frío. Ha pedido a su hermano que también vaya. Quiere hacer una barbacoa en la playa.
   (This weekend, John is going on a trip. (He) will drive along the coast so that he can visit different beaches. (He) wants to swim in the sea, even if it is cold. (He) has asked his brother to go with him. (He) wants to have a barbecue on the beach).

2. Mary va a una clase de fotografía cada lunes. Quiere mejorar su técnica para que pueda sacar más fotos de su familia y sus amigos. Primero, necesita comprar una cámara nueva. Su amiga Sarah va a ayudarle. Quiere tomar un café después.
   (Mary goes to a photography class every Monday. (She) wants to improve so that (she) can take more photos of her friends and family. First, (she) needs to buy a new camera. Her friend Sarah is going to help her. (She) wants to get a coffee afterwards).

3. Amy se ha mudado a una nueva ciudad este fin de semana. El lunes, comienza un nuevo trabajo y está muy nerviosa. Ha comprado un apartamento muy bonito. Su amiga Lisa va a visitarla el próximo fin de semana. Quiere decorar al apartamento.
   (Amy has moved to a new city this weekend. On Monday, (she) starts at a new job and (she) is very nervous. (She) has bought a nice apartment to live in. Her friend Lisa is going to visit next weekend. (She) wants to decorate the apartment).

Appendix E Written Production Task (WPT)



Appendix F Pronoun Interpretation Task (PIT)

Referential noun phrase + embedded null subject (RNS)

1. John shuo qu guo lun dun.
   (John says that (he) has been to London).
2. Mary shuo tong guo le kao shi.
   (Mary says that (she) passed the exam).
3. Lisa shuo ren shi Mary.
   (Lisa says that (she) knows Mary).
4. John shuo zhao le yi ge xin gong zuo.
   (John says that (he) got a new job).
5. David shuo ren shi John.
   (David says that (he) knows John)

Quantified noun phrase + embedded null subject (QNS)

1. You ge ren shuo jian guo shou xiang.
   (Someone says that (he) met the prime minister)
2. You ren shuo ren shi John.
   (Someone says that (he) knows John).
3. You ge ren shuo de le zui hao de fen shu.
   (Someone said that (she) has the best grades).
4. You ge ren shuo qu guo lun dun.
   (Someone says that (she) has been to London).
5. You ge ren shuo chi wan le suo you shi wu.
   (Someone said that (he) had eaten all the food).

Referential noun phrase + embedded overt subject (ROS)

1. John shuo ta qu guo lun dun.
   (John says that he has been to London).
2. Mary shuo ta tong guo le kao shi.
   (Mary says that she passed the exam).
3. Lisa shuo ta ren shi Mary.
   (Lisa says that she knows Mary).
4. John shuo ta zhao le yi ge xin gong zuo.
   (John says that he got a new job).
5. David shuo ta ren shi John.
   (David says that he knows John).

Quantified noun phrase + embedded overt subject (QOS)

1. You ge ren shuo ta jian guo shou xiang.
   (Someone says that he met the prime minister).
2. You ren shuo ta ren shi John.
   (Someone says that he knows John).
3. You ge ren shuo ta de le zui hao de fen shu.
   (Someone said that she has the best grades).
4. You ge ren shuo ta qu guo lun dun.
   (Someone says that she has been to London).
5. You ge ren shuo ta chi wan le suo you shi wu.

(Someone said that he had eaten all the food).

Referential noun phrase + embedded null object (RNO)

1. Situation: some friends are talking about who knows Bill…
   John shuo David ren shi.
   (John says that David knows (him)).
2. Situation: some friends are asking if anyone has seen David lately…
   Peter shuo Bill kan jian le.
   (Peter says that Bill saw (him)).
3. Situation: Some friends are talking about who knows Lisa…
   Mary shuo Amy ren shi.
   (Mary says that Amy knows (her)).
4. Situation: Some friends are talking about who hates Amy…
   Lisa shuo Mary tao yan.
   (Lisa says that Mary hates (her)).
5. Situation: some friends want to know who likes David…
   John shuo Peter xi huan.
   (John said that Peter likes (him)).

Quantified noun phrase + embedded null object (QNO)

1. Situation: Some friends are talking about who likes David…
   Mei ge ren dou shuo John xi huan.
   (Everyone says that John likes (him)).
2. Situation: some friends want to know who saw David…
   You ren shuo John kan jian le.
   (Someone says that John saw (him)).
3. Situation: Some friends are talking about who knows Lisa…
   You ren shuo Mary ren shi.
   (Someone says that Mary knows (her)).
4. Situation: some friends want to know who likes Mary…
   Mei ge ren dou shuo Amy xi huan.
   (Everyone says that Amy likes (her)).
5. Situation: some friends are talking about who hates Peter…
   You ren shuo John tao yan.
   (Someone says that John hates (him)).

Referential noun phrase + embedded overt object (ROO)

1. John shuo David mei you jian guo ta.
   (John says that David did not see him).
2. Peter shuo Bill ren chu le ta.
   (Peter says that Bill recognises him).
3. Mary shuo Amy bu ren shi ta.
   (Mary says that Amy doesn't know her).
4. Lisa shuo Mary hen ta.
   (Lisa says that Mary hates her).
5. John shuo Peter ling ta yin xiang shen ke.
   (John said that Peter impressed him).

Quantified noun phrase + embedded overt object (QOO)

1. Mei you ren shuo John xiang xin ta.

(Nobody says that John believes him).

2. You ge ren shuo John kan jian ta le.
   (Someone says that John saw him).
3. You ge ren shuo Mary ren shi ta.
   (Someone says that Mary knows her).
4. Mei you ren ren wei John ren shi ta.
   (Nobody thinks that John knows him).
5. You ge ren shuo John hen ta.
   (Someone says that John hates him).

Topic Chain (TC)

1. Dan zuida de aihao shi ti zuqiu, meitian dou ti bingqie xiang chengwei zuqiu yundongyuan, Adam ye ti, zai gongyuan ti.
   (Dan's favourite hobby is playing football, (he) plays every day, (he) wants to be a footballer, Adam likes to play too, (he) plays in the park).

2. Amy gongzuo hen nuli, xiangyao xiuxi yixia qu dujia, bingqie yaoqing ta jiejie yiqi, shifen jidong.
   (Amy works very hard, (she) wants to take a break and go on holiday, (she) asked her sister to come, (she) is very excited).

3. Peter dushu henduo, zai zhoumo hua henchang sijian dushu meizhou dou huiqu tushuguan, xuyao xinshu, bingqie Shaohou he ta didi jianmian, xiang yihui qu chi bingjilig.
   (Peter reads a lot, (he) spends many hours reading books on the weekend, (he) goes to the library every week, (he) needs a new book, (he) will meet his brother at the library later, (he) wants to get ice-cream after).

Appendix G Language Relations Questionnaire (LRQ)

Q1: The relationship between English and Chinese:

	Similar	Fairly similar	Neither	Fairly different	Very different
How similar are English and Chinese language?					
How similar is English vocabulary and Chinese vocabulary?					
How similar are English sounds and Chinese sounds?					
How similar is English grammar and Chinese grammar?					
How similar is English sentence structure and Chinese sentence structure?					
How similar are English and Chinese words?					

Q2: The relationship between Spanish and Chinese:

	Similar	Fairly similar	Neither	Fairly different	Very different
How similar are Spanish and Chinese language?					
How similar is Spanish vocabulary and Chinese vocabulary?					
How similar are Spanish sounds and Chinese sounds?					
How similar is Spanish grammar and Chinese grammar?					
How similar is Spanish sentence structure and Chinese sentence structure?					
How similar are Spanish and Chinese words?					

Q3: In your opinion, which of the following languages is the most similar to English?

☐ Spanish ☐ Chinese

Q4: For a native English-speaker, how easy/difficult is it to learn Spanish?

☐ Easy ☐Fairly easy ☐ Fairly difficult ☐ Difficult

Q5: For a native English-speaker, how easy/difficult is it to learn Chinese?

☐ Easy ☐Fairly easy ☐ Fairly difficult ☐ Difficult

Q6: For a native Spanish-speaker, how easy/difficult is it to learn English?

☐ Easy ☐Fairly easy ☐ Fairly difficult ☐ Difficult

Q7: For a native Spanish-speaker, how easy/difficult is it to learn Chinese?

☐ Easy ☐Fairly easy ☐ Fairly difficult ☐ Difficult

Q8: For a Chinese native-speaker, how easy/difficult is it to learn English?

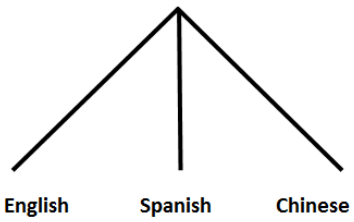
☐ Easy ☐Fairly easy ☐ Fairly difficult ☐ Difficult

Q9: For a Chinese native-speaker, how easy/difficult is it to learn Chinese?

☐ Easy ☐Fairly easy ☐ Fairly difficult ☐ Difficult

Q10: If you were asked to represent the relationship between English, Spanish and Chinese as a family tree, what would be the most appropriate relationship between the languages?

1.



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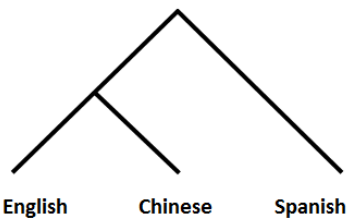

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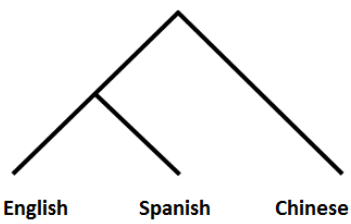

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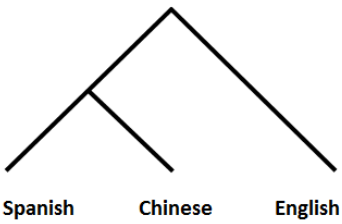

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