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The Comprehension of Tense–Aspect Morphology by Spanish Heritage Speakers in the United Kingdom

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Abstract: Whilst heritage Spanish has been widely examined in the USA, less is known about the acquisition of Spanish in other English-dominant contexts such as the UK, and studies rarely assess the baseline grammar that heritage speakers are exposed to directly. In this study, we implemented a semantic interpretation task to 17 bilinguals in the UK to investigate child heritage speakers' and their parents' comprehension of the preterite–imperfect aspectual contrast in Spanish, an area of known difficulty. The results show that the parents are consistently more accurate in accepting and rejecting the appropriate morphemes than the children. Further analysis shows that children's accuracy was best predicted by age at time of testing, suggesting that young heritage speakers of Spanish in the UK can acquire the target grammar. However, this general increase in accuracy with age was not found for the continuous reading of imperfective aspect. This finding implicates a more nuanced role of cross-linguistic influence in early heritage speakers' grammar(s), and partially explains greater difficulty with the imperfect observed in production studies with other heritage speakers.

1. Introduction

In this paper, we investigate Spanish heritage speakers' accuracy in the comprehension of past aspectual verb forms, specifically the preterite–imperfect contrast, in a context that has not received much attention in the literature thus far: the United Kingdom (UK) (Guardado 2018). Heritage speakers have been proven to be an important source of data for understanding and delimiting the human capacity for language (Lohndal et al. 2019; Polinsky and Scontras 2020) because they are a highly heterogeneous group whose grammatical outcomes typically differ from those of other native speakers of a language. One of the defining characteristics of heritage speakers is that they grow up as bilinguals in a context where their family language is not widely used outside the home (Valdés 2000; Rothman 2009). It is important to note, however, that the UK context is unique and merits careful investigation. In particular, the widespread presence of Spanish as a community language in the United States (USA) (e.g., Pascual y Cabo and de la Rosa Prada 2016) in contact with English over multiple generations may contribute to outcomes observed for Spanish heritage speakers in that context in a way that would not be predicted in the UK (Cazzoli-Goeta and Young-Scholten 2011).

Spanish has been claimed to "axiomatically co-exist" with English in the USA (Pascual y Cabo and de la Rosa Prada 2016), reflecting its high visibility as the second most widely spoken language in that country (Lipski 2008), with approximately 17% of the population being of "Hispanic" background (Pascual y Cabo 2018). Silva-Corvalán (1994) noted that whilst Spanish is maintained at the community level in Los Angeles by the constant arrival of new immigrants, the majority of families undergo language shift from Spanish to English, with individuals in the third generation typically functionally

reliant on English. More recently, Velázquez (2019) has also documented "low ethnolinguistic vitality" of Spanish in a less urban community, with a similar pattern of the language being maintained at the community level but with families struggling to maintain the Spanish language as their children shift to dominance in English. Spanish heritage speakers, especially adults, have been widely studied in the USA, and these studies have uncovered a high degree of systematic divergence from "expected" linguistic norms throughout this community (see Pascual y Cabo 2018 or Montrul 2018 for recent reviews).

By way of contrast, previous research on Spanish speakers in the United Kingdom has highlighted that the community is "present but invisible" (Pozo-Gutiérrez 2003). As such, Spanish–English bilingualism is comparatively less studied in the UK context (Guardado 2018), to the extent that it is difficult to measure with any reliability the number of Spanish L1 speakers or bilinguals within families in the country. Block (2008) reviews demographic and migratory trends and estimates there to be approximately 300,000 Spanish speakers of Latin American origin alone in London, although Paffey (2019) provides a more conservative figure of 190,000 Spanish speakers from both Europe and Latin America in the city. Data from the 2019 Annual Population Survey on country of birth (ONS 2019) indicate that approximately 159,000 Spaniards are resident across the United Kingdom, with an estimated 486,000 residents who were born in Central and South America, although this includes non-Spanish-speaking countries including Caribbean nations, and the 307,000 North Americans in the UK includes Mexicans alongside US citizens and Canadians. Even assuming that all individuals who have migrated to the UK from North, Central and South America are L1 Spanish speakers, this only represents 1.4% of the total UK population, and a more realistic estimate of the Spanish-speaking community in the UK would place this figure below 1%. Guijarro-Fuentes and Marinis (2011) postulate that more favorable attitudes towards bilingualism in the UK may help young Spanish–English bilingual children converge on the baseline, in contrast to observed changes in the grammars of heritage speakers in the USA. Cazzoli-Goeta and Young-Scholten (2011), however, argue that heritage language maintenance amongst Spanish-speaking children in the UK is likely to be minimal due to the lack of a wider speech community.

Polinsky (2018) has addressed the question of what constitutes the appropriate baseline for acquisition by heritage speakers, and has argued that different patterns of language change in diaspora and "homeland" communities, and potential attrition in the baseline, may affect the grammatical outcomes of heritage language acquisition. It therefore stands to reason that different patterns of change and attrition may also obtain for diaspora communities in different contexts. To our knowledge, Domínguez (2013) is the only study which explicitly contrasts the outcomes of first-generation L1 Spanish attriters in the USA and UK. Domínguez compared the use of null and post-verbal subjects by L1 Spanish–L2 English speakers living in the UK and in the city of Miami. A large proportion of the population of Miami comes from Cuba, and speak a Caribbean variety of Spanish that has a more rigid Subject-Verb-Object order than other varieties and in which overt subjects are preferred over null subjects more frequently than in other varieties (Ortiz-López et al. 2017). The study shows that the Cubans in Miami exhibited adaptation of their use of overt and post-verbal subjects to the norms of the speech community of Miami; in contrast, the Spaniards in the UK exhibited no change to their subject use from the influence of English (see also Domínguez and Hicks 2016). Domínguez's work highlights the importance of the wider speech community in influencing the shape of the appropriate acquisition baseline for the heritage speaker generation, and highlights the potentially divergent pathways in L1 attrition that may also affect the baseline in the two different contexts, in line with Polinsky's (2018) comments with respect to the baseline.

Viewpoint or grammatical aspect was chosen for the present study since it is known to be vulnerable in Spanish heritage speakers in the USA (e.g., Montrul 2002), and no studies have been carried out for viewpoint aspect in Spanish heritage speakers the UK. As such, the aim of this study is to provide an initial comparison between these two contexts for bilingualism by focusing on the potential

differences in the input between the two countries.[1] In the remainder of this paper, we begin by defining viewpoint aspect and providing its organization in Spanish and English, before reviewing previous research on viewpoint aspect with adult and child heritage speakers of Spanish in the USA, wherein we highlight the research questions that we seek to address in this study. We then present the methods and materials, followed by the results obtained from the sample. Finally, we discuss these results in light of the research questions and the wider field of Spanish heritage language acquisition research.

2. Viewpoint Aspect in Spanish and English

Viewpoint aspect is a semantic universal that is related to 'different ways of viewing the internal temporal consistency of a situation' (Comrie 1976, p. 3).[2] Examples 1–4 highlight viewpoint aspectual differences in the English and Spanish verbal systems:

1. Mary played tennis　　　　　　　　　　　ENGLISH SIMPLE PAST
2. Mary was playing tennis　　　　　　　　　ENGLISH PAST PROGRESSIVE
3. María jugó　　　　　　al　　tenis　　SPANISH PRETERITE
   María play-PAST-PRETERITE to-the tennis
   'María played tennis'
4. María jugaba　　　　　al　　tenis　　SPANISH IMPERFECT
   María play-PAST-IMPERFECT to-the tennis
   'María played tennis'; 'María was playing tennis'

While each of these sentences is understood to take place within the past, each one has a slightly different range of interpretations. Moreover, the fact that Spanish (4) can be equivalent to both English (1) and (2), and equally that English (1) can be equivalent to both Spanish (3) and (4), as seen in the glosses, highlights that there are cross-linguistic differences in the expression of viewpoint aspect that need to be adequately explained in a theoretical account.

In this paper, we follow Arche's (2014) analysis of viewpoint aspect, in which 'temporal and aspectual interpretation is obtained by virtue of the relations that intervals of time establish between each other' (Arche 2014, p. 795). Three intervals are ordered to yield tense and viewpoint aspect: the "reference time", which is typically equivalent to the speech time; the "event time", which denotes the interval occupied by the event or state of a verb; and the "assertion time", which is the time about which an assertion is being made in an utterance.[3] This interval-ordering approach builds upon Reichenbach's (1947) primitives, as refined by Klein (1994). Klein's proposal is that tense and viewpoint aspect derive from two independent orderings: the relationship between the event time and assertion time yields viewpoint aspect, and the relationship between the assertion time and reference time separately yields tense. For example, for aspect a "within" ordering predicate yields an imperfective reading, whilst an "overlap" ordering predicate yields a perfective reading, corresponding to the difference between the Spanish verb forms in examples (3) and (4).

Zagona (1990) and Stowell (1993) had proposed a syntactic representation of interval ordering by which tense could be yielded. Following Klein's (1994) proposal of the parallel organization of tense and viewpoint aspect, Demirdache and Uribe-Extebarria (2000) extended this proposal to provide a uniform representation of both tense and viewpoint aspect. In this representation, ordering predicates in the

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1　The study reported here is part of a wider project in which the cross-linguistic differences between English and Spanish in viewpoint aspect allow us to test the predictions of the Feature Reassembly Hypothesis (Lardiere 2009). This is outside the scope of the present study.

2　A related semantic notion is lexical aspect, which consists of a number of properties that distinguish predicate types such as states, accomplishments, activities and achievements (Vendler 1967). A stative predicate describes a situation which has no internal structure, whereas accomplishments, activities, and achievements are types of eventive predicates and are dynamic as they involve a process (Verkuyl 1993). The focus in this paper is on viewpoint aspect, but lexical aspect is occasionally referenced in the review of previous studies.

3　We follow Arche's (2014) terminology; the other authors cited here use slightly different terms to denote the same intervals.

head of the Aspect phrase (AspP) and the Tense phrase (TP) order the event time (EvT), in the specifier of the verb phrase (VP), and the assertion time (AT), in the specifier of AspP (yielding viewpoint aspect), and the AT and the reference time (RefT), in the specifier of TP (yielding tense). This proposal is represented in Figure 1.
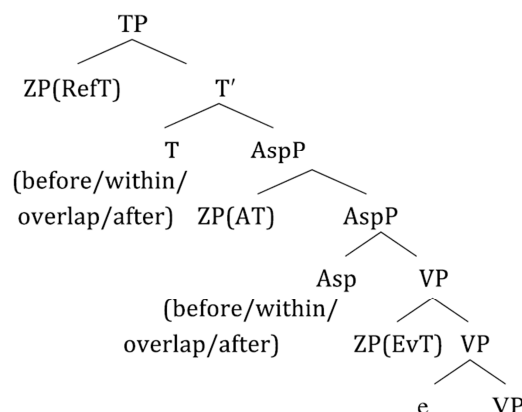

Figure 1. The structural derivation of viewpoint aspect (Arche 2014, p. 796; Demirdache and Uribe-Extebarria 2000, p. 163).

Where Arche's proposal differs from similar ordering accounts of viewpoint aspect (e.g., Demirdache and Uribe-Extebarria 2000) is that she also incorporates quantification of the verbal predicate into the account as a quantifier (QP) within the event time, and as such is able to differentiate multiple readings of the imperfective. For instance, the progressive reading obtains because the assertion time is within one instance of an event (QP = |1|), while in continuous contexts, the reading obtains because the assertion time specifies an interval during which a state holds (QP = ∃). For the habitual reading, multiple instances of the verb are repeated within a timeframe (QP > 1). Similarly, the perfective viewpoint naturally asserts overlap between the event time and assertion time for a limited number of occasions, which may be assumed to be one unless otherwise specified (QP = |1|).

As such, because Arche's analysis distinguishes multiple readings of the imperfective, it allows us to more accurately map how the English and Spanish verbal systems relate to one another than in other accounts of viewpoint aspect. Recall from examples (1–4) that (1), the English simple past, corresponded to both (3) and (4), the Spanish preterite and imperfect verb forms, respectively, and that (4), the Spanish imperfect, corresponded to both (1) and (2), the English simple past and past progressive. Using Arche's analysis, we can explain this difference in interpretation between the languages in terms of which readings map to which morphological form; in Spanish, the preterite yields a perfective reading associated with the "overlap" ordering predicate, whereas the imperfect is associated with the imperfective habitual, continuous and progressive readings derived from the "within" ordering predicate. In English, the past progressive is only associated with the progressive reading, whereas the simple past is associated with perfective, habitual and continuous readings. The expression of aspectual readings of the two principle verb forms in the two languages is schematized in Figure 2, and examples of each reading in both English and Spanish are provided in Table 1.

Table 1. Examples of each of the four readings in Arche (2014) approach to viewpoint aspect, taken from Domínguez et al. (2017, p. 435).

| Reading	Example in English	Example in Spanish
Perfective	Marta was ill last Sunday	Marta estuvo enferma el domingo pasado
Habitual	Marta sang/used to sing in a choir	Mara cantaba/solía cantar en un coro
Continuous	Marta was ill when I visited her	Marta estaba enferma cuando la visité
Progressive	Marta was singing when we arrived	Marta cantaba/estaba cantando cuando llegamos
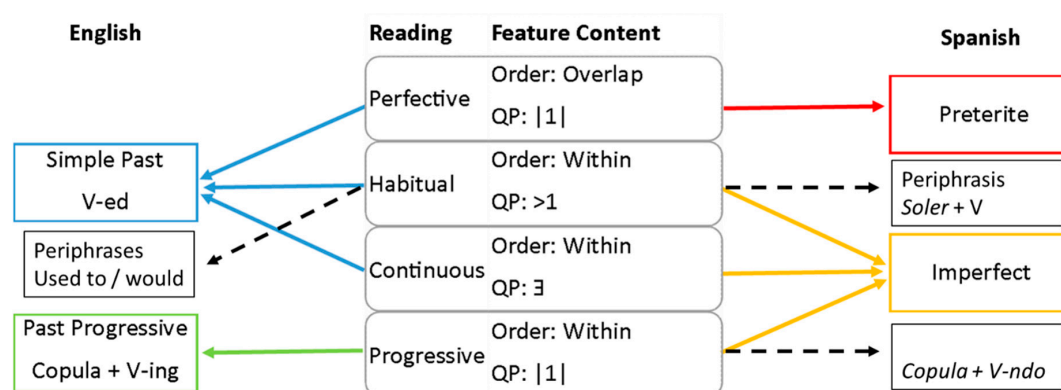
Figure 2. The form–feature mapping of viewpoint aspect in English and Spanish (Domínguez et al. 2017, p. 437).

As can be seen in Figure 2, periphrastic forms are available for habitual readings in both languages, and a dedicated past progressive form also exists in Spanish ("Copula + V-ndo"). Nonetheless, the difference in form–meaning mappings between the two languages clearly demonstrates a difference in feature configuration between Spanish and English. Specifically, whilst both languages associate perfective and progressive readings with different morphological forms, the habitual and continuous readings are associated with the simple past in English and the imperfect in Spanish (see Domínguez et al. 2017 for further details).

Previous research on Spanish heritage speakers (e.g., Montrul 2002) has often followed an account of viewpoint aspect morphology in which a form is either [+perfective], [−perfective] or—as in the case of the English simple past—[±perfective] (e.g., Giorgi and Pianesi 1997). The advantage of using a more granular approach such as Arche's (2014) is that it allows us to generate more precise predictions of where cross-linguistic influence may have a greater effect on heritage speakers' grammars.[4] Where a simpler account of viewpoint aspect would predict that heritage speakers exposed to both English and Spanish would have some difficulty establishing the differences between the preterite and imperfect verb forms, Arche's account allows us to more precisely predict that the locus of difficulty would be in the habitual and continuous readings, where the two languages are least similar. The lack of continuous periphrases in either language may then make it comparatively harder than the habitual to disassociate from the simple past and perfective morphology for heritage speakers of Spanish.

This difference of how features are bundled onto lexical items and the functional morphology of the two languages has been shown to predict L2 Spanish accuracy of L1 English speakers under a feature-based account of second language acquisition (i.e., following Lardiere 2009). In a cross-sectional analysis of learners at different stages of Spanish learning, Domínguez et al. (2017) found that the continuous reading is especially problematic for such learners, even at advanced levels, where the habitual and progressive readings were more successfully acquired.

3. Viewpoint Aspect in Spanish Heritage Speakers

Montrul (2016) and Polinsky (2018) both highlight that viewpoint aspect morphology is vulnerable in heritage speaker grammars, especially compared to the related temporal domain of tense morphology. Past aspectual morphology has been shown to diverge in the grammars of Spanish heritage speakers in the USA. Studies with adult heritage speakers have typically involved both production and comprehension data, whilst studies with children have exclusively focused on production data.

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[4] Giorgi and Pianesi (1997) argue that the core difference between Spanish and English is in feature selection, whereas Arche's (2014) analysis presents the difference between the two languages as one of feature assembly (see Domínguez et al. 2017, p. 436). This is relevant to the Feature Reassembly approach adopted in our wider project, but is outside the scope of this paper.

Montrul (2002, 2009) utilized a range of oral and written production and comprehension tasks to assess viewpoint aspect in adult heritage speakers of Spanish in the USA. Montrul (2002) elicited production data using a narrative retelling task using images depicting the *Little Red Riding Hood* fairy tale and a written morphology recognition task, in which participants were given a short narrative and required to fill in 30 blanks with the appropriate aspectual choice. In addition, Montrul (2002) used a sentence conjunction judgment task to assess the participants' comprehension of the completion entailments of preterite and imperfect morphology. A truth value judgment task was also used to assess their knowledge of verbs that change predicate class, the habitual reading of the imperfect, and differing interpretations of genericity and specificity in relation to the morphemes.

Montrul (2002) divided adult participants by age of onset of bilingualism in English, with a group of 16 simultaneous bilinguals (from birth to age 3), 15 US-born sequential bilinguals (from age 4 to 7), and Latin American-born 8 child L2 learners (from age 8 to 12). There was also a control group of 20 monolingually-raised Spanish speakers who had lived in the USA for at least six months and at most four years. In the morphology recognition task, the simultaneous bilinguals were significantly different as a group from the other bilinguals and monolinguals. Meanwhile, the narrative retelling task showed that all of the bilingual groups were statistically different from the monolingual controls, but not from each other overall, with some differences in accuracy with the preterite with stative predicates and the imperfect with accomplishment and achievement predicates. Montrul argues that these results represent "incomplete acquisition" of the preterite–imperfect contrast by the early bilinguals, and early L1 attrition of the contrast by the child L2 learners, both of which are said to stem from reduced input to Spanish. Montrul specifically suggests that reduced input in Spanish leads to these divergent outcomes.[5]

In the later study, Montrul (2009) redeployed both production tasks and a shortened version of the sentence conjunction judgment task, dividing the participants by proficiency in Spanish as measured using cloze and vocabulary tests. All the heritage speakers were born in the USA, with 29 having advanced proficiency, 21 intermediate proficiency and 15 low proficiency in Spanish. Focusing on accuracy with the preterite and imperfect verb forms, the narrative retelling task found an overall overuse rate of 1.8% for the preterite across the heritage speaker groups, and an overuse rate of 3.8% for the imperfect. In other words, 1.8% of the heritage speakers' uses of the preterite were in imperfective contexts, and 3.8% of the uses of the imperfect were in perfective contexts, whereas the monolingual controls did not use either morpheme in inappropriate contexts. As such, the data from these groups conflict somewhat with the evidence from the 2002 study, where all the bilinguals differed significantly from the monolingual controls. However, the morphology recognition task showed clear differences between the groups. For the preterite, the advanced proficiency group had an accuracy rate of 92.6%, the intermediate proficiency group 92.2% and the low proficiency group 82.3%. For the imperfect, the accuracy rates were 85.2%, 69.9% and 60.4%, respectively. An ANOVA revealed that all groups were significantly more accurate with the preterite than the imperfect, and that the groups were significantly different from each other. In the sentence conjunction judgment task, all of the bilingual groups overall rejected the illogical use of the preterite and accepted the logical use of the imperfect, although the lower and intermediate proficiency groups only weakly rejected the preterite form, and all three groups gave substantially lower acceptance ratings to the imperfect verb forms than the monolingual controls. Based on these results, Montrul argues that heritage speakers know the preterite–imperfect contrast, but that errors affect the imperfect verb form more than the preterite verb form (Montrul 2009, p. 256). This higher rate of difficulty for the imperfect form concords with research of L1 English-L2 Spanish learners (e.g., Domínguez et al. 2017), who also find this form more difficult.

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5   Montrul (2008), exploring the concept of *Incomplete Acquisition*, constitutes a more complete examination of the role of reduced input for heritage speakers.

Montrul and Perpiñan (2011) collected data from 60 heritage speakers of Spanish, alongside 60 L2 learners, using the written morphology recognition task and shortened version of the sentence conjunction judgment task used in Montrul's studies. The heritage speakers were divided into three groups by proficiency level in Spanish: 23 advanced, 21 intermediate and 16 low proficiency. In the morphology recognition task, the advanced group had an accuracy rate of 90.3% for the preterite and 84.2% for the imperfect; the intermediate group's rates were 92.2% and 69.9%; and the low proficiency group's rates were 83.5% and 61.3%, respectively. Overall, in the sentence conjunction task, the heritage speaker groups distinguished between the preterite and imperfect verb forms, although they accepted the imperfect and rejected the preterite at lower rates than the monolingually raised controls.

Montrul (2009), and Montrul and Perpiñan (2011) compared the heritage speakers' accuracy with viewpoint aspect morphology and with mood morphology, specifically the indicative–subjunctive contrast in Spanish. In both studies, the heritage speakers were more accurate with viewpoint aspect than with mood. Montrul (2009, p. 265) argues that this reflects acquisition order: in monolingual acquisition, viewpoint aspect is fully understood before age eight, whereas this is not achieved with subjunctive morphology until closer to adolescence.

Anderson (2001) conducted a longitudinal case study of two Puerto Rican Spanish–English bilingual siblings from ages 6;7–8;5 and 4;7–6;5. Anderson collected 12 samples of the children's individual interactions with their mother over this 22-month period, and extracted all verb forms and analyzed their production across all aspects of the verbal morphology system. For both children, their errors with using the correct aspectual form represented the lowest amount of errors they produced, at 8.5% of the total errors for the younger child and 9.6% of the total errors for the older child. Almost all of the aspectual errors consisted of using the preterite in lieu of the imperfect, although Anderson provides only one example of this: *ella fue una niña* "she #was-PRET a girl" for *ella era una niña* "she was-IMP a girl", which is a continuous context. However, since this behavior seems to be limited to certain verbs, Anderson suggests that the children maintain the preterite–imperfect contrast overall.

Silva-Corvalán (2003) examined the production rates of six bilingual children from backgrounds of varying dominance in Spanish or English between ages 5;1–5;11, and compared them to the production rates of ten second and third generation adult bilinguals from her earlier fieldwork in Los Angeles (Silva-Corvalán 1994). These children included two of her grandchildren, whose language development was more extensively chronicled in a later volume (Silva-Corvalán 2014). Of the ten adults, Silva-Corvalán (1994) observed that nine used imperfect morphology in perfective contexts with stative predicates, whilst in imperfective contexts, five of the adults consistently used the imperfect, three individuals used the preterite in some contexts, one showed non-use of the imperfect in a number of obligatory contexts, and one showed no productive use of the form. The first generation adult bilinguals in Los Angeles, who had been raised monolingually, showed monolingual-like behavior in their use of preterite and imperfect verb forms.

Across three hours of Spanish recordings for most children (closer to one hour for her grandchildren), three of the children correctly used the imperfect in all imperfective contexts, while the remaining three occasionally used the preterite in these contexts. Silva-Corvalán especially highlights some habitual contexts for which this is the case. Conversely, only one child correctly used the preterite in all perfective contexts, and the remaining children all produced some imperfect verb forms. Silva-Corvalán concludes that "by age 5;1–5;6, when bilingual US-born children start kindergarten, they have not yet acquired the complete system of tense, mood, and aspect in Spanish" (Silva-Corvalán 2003, p. 386). She also notes that the children in English-dominant contexts display the same reduced preterite–imperfect distinction as the adult bilinguals in her 1994 study, even though this reduced system is not part of the input that they receive. Consequently, she also argues that this simplification of the Spanish verbal system results from an interrupted acquisition process resulting from reduced Spanish input in childhood (Silva-Corvalán 2003, p. 393).

Cuza et al. (2013) used *Little Red Riding Hood* narrative prompts with child and adult heritage speakers. Seven children between ages 5;0–7;4, six children aged 8;1–9;11, and eleven adult heritage speakers took part in the study, and monolingual child and adult controls were taken from the CHILDES database, which used the *Frog* story (Mayer 1969). Comparing production rates, chi-squared tests revealed that the bilingual children produced significantly more preterite and fewer imperfect and present verb forms than their monolingual peers. In contrast, the adult bilinguals produced significantly more preterite and present verb forms, and fewer imperfect verb forms than the adult monolinguals. Chi-squared tests also revealed that the younger children produced significantly fewer preterite and imperfect contexts than the older children did. Cuza et al. (2013) argue that their results indicate that heritage speakers' knowledge of the preterite may be attrited, as the older children had increased their use of this form, but the use of the preterite had reduced again for the adult heritage speakers. Conversely, the fact that the overall proportion of imperfect used in the narrative does not increase with age across the bilingual groups suggests that their competence with the imperfect may not increase at all. Montrul (2009, p. 251) does, however, highlight that the *Little Red Riding Hood* story effectively provides a sequence of perfective events with few opportunities to use progressive and habitual contexts, which may explain this consistently low production rate of the imperfect across all of the bilingual groups, especially given that the monolingual controls had used a slightly different narrative retelling task.

Finally, Cuza and Miller (2015) used a question-after-story task with 19 children (aged 5;5–11;11) and 12 of their parents. In this task, the parents were given a stimulus in oral and written form that established an episodic or characterizing situation with an illustrative photo, and were then asked a question, the answer to which was expected to be preterite in episodic situations and imperfect in characterizing situations. Episodic situations are conceptually included in Arche's (2014) perfective reading, and characterizing situations are equivalent to her habitual reading. The children produced 69% preterite and 17% imperfect verb forms in episodic contexts, and 34% preterite and 41% imperfect in characterizing contexts. The parents, on the other hand, produced 85% preterite and 11% imperfect in episodic contexts, and 1% preterite and 92% imperfect in characterizing contexts. Cuza and Miller suggest that the reduced accuracy rates in using the preterite in episodic contexts is related to certain stative predicates where the preterite–imperfect contrast has further interpretive entailments. As such, they consider that the parents performed at ceiling and therefore the input received by the children was not a contact variety. In contrast to the Cuza et al. (2013) study, Cuza and Miller (2015) observed that accuracy with the preterite morpheme was generally similar for all of the children, whereas the accuracy with the imperfect morpheme increased substantially with age. However, they did not test whether there was a meaningful correlation between each child's age at time of testing and their accuracy.

These studies all show that viewpoint aspect is a vulnerable area in the grammars of heritage speakers in the USA. Apart from a tendency to overuse the imperfect with stative predicates in perfective contexts, the imperfect seems to be more vulnerable than the preterite, which was used instead of the imperfect in a number of habitual and continuous contexts. However, a number of questions remain unresolved, specifically as to what the source of divergence in the heritage speakers' grammars is. Montrul (2002) and Silva-Corvalán (2003) have implicated a reduction in input, although none of the studies surveyed above directly assessed what amount of input the bilinguals received. Cuza and Miller (2015) found no divergence in the input in their participants, but since this was the only study to directly assess whether viewpoint aspect had undergone attrition in the parents' grammars, there is still no clear consensus in the literature as to whether this could be a potential source for observed divergence in other populations. Finally, since Cuza and Miller (2015) observed a trend for delayed development of accuracy with the imperfect with older children, the question of whether a relationship truly holds between heritage speakers' age and their grammatical accuracy remains to be formally addressed. Consequently, in this paper, we seek to address the following research questions:

- Is there evidence of contact-induced change (i.e., attrition) in the baseline grammar for acquisition?

- If we observe that the heritage speakers' grammars differ from the baseline grammar, does this difference correlate with the amount of input they receive in Spanish?
- Is there a correlation between increased age and increased accuracy in the heritage speakers' grammars?

Prior research on the grammars of monolingually raised Spanish speakers in the UK suggests that grammatical attrition has not happened for other morphosyntactic properties (Domínguez 2013). As such, we predict that there will be no evidence of grammatical attrition in viewpoint aspect in the baseline grammars for the heritage speakers in the UK. Given the association made by previous authors as to the role of input quantity on heritage language acquisition (Montrul 2002; Silva-Corvalán 2003), we predict that we will observe a correlation between input quantity and any observed divergence in the heritage speakers' grammars. In view of Cuza and Miller's (2015) results, we predict that there will be a correlation between the heritage speakers' age and their grammatical accuracy.

4. Materials and Methods

To answer these questions, a semantic interpretation task (adapted from the Spanish Learner Language Oral Corpus (SPLLOC; splloc.soton.ac.uk); (Mitchell et al. 2008; Domínguez et al. 2013)) was administered using a web-based interface to seventeen Spanish–English bilingual children and their parents in the UK. In addition to the semantic interpretation task, the parents also completed a questionnaire (Bilingual Language Experience Calculator (BiLEC); e.g., Unsworth 2015) that allowed two measures of language exposure to be calculated for each child: relative exposure and cumulative exposure. Both of these were administered in a session where production tasks targeting aspectual distinctions in Spanish and lexical access in Spanish and English were also administered.

The instructions, contexts and test items for the semantic interpretation task were all presented with written and spoken forms concurrently available on the same screen. The task targeted three aspectual readings of the imperfect verb form—habitual, continuous and progressive—in addition to the perfective reading of the preterite verb form. There were 18 contexts following which two summaries or continuations of the context were given that differed according to which verb form was appropriate given the context. These were balanced according to the appropriate morpheme. As such, there were 9 contexts in which the preterite verb form was expected to be accepted and the imperfect verb form rejected, corresponding to 9 perfective contexts; there were 9 contexts in which the imperfect was expected to be accepted and the preterite rejected, corresponding to 3 habitual, 3 continuous and 3 progressive contexts. The participants had to rate the acceptability of two sentences, one with imperfect and one with preterite morphology, in each context. All of the progressive contexts were introduced with the adverb *mientras* ("while"), and a mixture of test sentences with and without temporal adverbs were used in the remaining contexts. An example of each of the four conditions is given in Table 2:

Table 2. Example contexts and test items for each condition.

Condition	Example Context and Test Items
Perfective (one-time event) (*n* = 9)	Anoche, Anita la Abeja se despertó cuando pasaron tres trenes por su casa. Esto nunca había pasado antes. *'Last night, Anita the Bee woke up when three trains passed by her house. This had never happened before.'* Anita la Abeja oyó los trenes de madrugada (PRETERITE) #Anita la Abeja oía los trenes de madrugada (IMPERFECT) *'Anita the bee hear-PRET/#hear-IMP the trains through the night'*
Habitual (*n* = 3)	Hace varios años, Olivia la Oveja era profesora. Le gustaba pasar la última hora de cada día contando historias a los niños para que apreciaran la magia de leer. *'Many years ago, Olivia the Ewe was a teacher. She liked to spend the last hour of every day telling stories to the children so that they would learn the magic of reading.'* #Olivia la Oveja les leyó a los niños (PRETERITE) Olivia la Oveja les leía a los niños (IMPERFECT) *'Olivia the Ewe #read-PRET/read-IMP to the children'*

Table 2. *Cont.*

Condition	Example Context and Test Items
Continuous (*n* = 3)	Cuando Gabriel el Gato llegó a la fiesta de Raquel la Ratona, notó las decoraciones maravillosas. '*When Gabriel the Cat arrived at Raquel the Mouse's party, he noticed the marvellous decorations.*' #El cartel adornó la pared cuando Gabriel llegó (PRETERITE) El cartel adornaba la pared cuando Gabriel llegó (IMPERFECT) '*The banner #hang-*PRET*/hang-*IMP *on the wall when Gabriel arrive-*PRET'
Progressive (*n* = 3)	Raquel la Ratona estaba sentada, comiendo galletas, cuando vio a Gabriel el Gato llegando a la fiesta. '*Raquel the Mouse was sitting, eating cookies, when she saw Gabriel the Cat arriving at the party.*' #Mientras Raquel la Ratona comió galletas, llegó Gabriel (PRETERITE) Mientras Raquel la Ratona comía galletas, llegó Gabriel (IMPERFECT) '*While Raquel the Mouse #eat-*PRET*/eat-*IMP *cookies, arrive-*PRET *Gabriel*'

While rating tasks used with adults typically employ a larger 5- or 7-point scale, to reduce the cognitive complexity of the task for children at younger ages in the study, the scale used in this study was only 3-points, with the instructions asking them to accept or reject each verb form according to their intuitions. All participants, both parents and children, used the same scale to ensure comparability. Four children selected the mid-point of the scale for some items, and these selections were treated as missing data.[6] The participants' ratings were input as +1, −1 or missing, and these positive and negative values were then coded as accurate or inaccurate based on the expected rating for each morpheme in each context. As an example, a positive rating for the preterite morpheme in a perfective context would be accurate, as would a negative rating for the preterite morpheme in a habitual context. These were used to calculate each participants' mean accuracy for each morpheme in each context type.

The participants were seventeen bilingual children, and twelve of their parents, from eleven families living in the south east of England. The children were aged between 5;6 and 15;6, seven of them were younger than 10;0 and ten were older than 10;0, with a median age of 10;1. All of the parents grew up in Spanish-speaking countries and migrated to the UK as adults. Six of the families were from Spain and the remaining five were from Latin America, two each from Mexico and Argentina and one from Colombia. Although some of these regions show differences in preference for the present perfect and preterite verb forms in certain sub-types of perfective context (see discussion in Howe and Schwenter 2003), there is no variation in the grammaticality of the preterite–imperfect contrast, and, as such, we did not expect variation in the parents' responses due to their country of origin. Eleven of the children were born in the UK whilst six were not.[7] Eleven children were in families where only one parent spoke Spanish, and the remaining six were in families where both parents spoke Spanish. Chi-squared tests conducted using the chisq.test() function in R (R Core Team 2013) suggested that there was no relationship between either of these variables and the children's overall accuracy.[8]

All subjects gave their informed consent for inclusion before they participated in the study. The study and research protocol was approved by the Faculty of Arts and Humanities Ethics Committee of the University of Southampton (project number 46537, approved 06/02/2019).

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[6]　Three of the children contrasted the midpoint with a positive or negative score for the competing verb form in one context, suggesting uncertainty; one preterite in each of a continuous and progressive context and one imperfect in a habitual context. The remaining child had two similar contexts; one for the imperfect in a perfective context and one imperfect in a habitual context. No items were unrated by more than one child.

[7]　Of the non-UK born children, one was born in Germany and the family moved to the UK when she was 0;5. The remainder were born in Spain. One family arrived in the UK when the children were 1;5 and 2;7. One child arrived with her family at 2;0. The last family, whose children arrived at 0;1 and 5;5, had previously lived in the UK and had older bilingual children who were not included in the study due to their more complicated language history as returnees. Whilst this last child arrived when she was substantially older than the other non-UK born children, her age of onset of bilingualism was 1;9.

[8]　For variety of Spanish: with one degree of freedom, $X^2 = 0.643$, $p = 0.423$. For whether the child was born in the UK or not: with one degree of freedom, $X^2 = 1.513$, $p = 0.219$. For whether the child has one or two Spanish-speaking parents: with one degree of freedom, $X^2 = 0.521$, $p = 0.4703$.

Due to this relatively small number of participants, non-parametric statistical analyses are appropriate, as the sample size is not large enough to check that assumptions regarding the distribution of the data necessary for parametric tests hold. For this reason, we measured the relationships between the predictor variables (exposure to Spanish and age at time of testing) and the children's accuracy using Spearman's rank correlations. Spearman's rank establishes whether there is a meaningful relationship between the rank order of the measurements for each variable, not the measurements themselves. A Mann–Whitney (Wilcoxon) rank-sum test was used to establish whether the parents' and children's grammars were different from each other. These tests were carried out using the cor.test(method="spearman") and wilcox.test() functions in the R statistical analysis software package (R Core Team 2013). The "grammar of graphics" ggplot2 library was used to create graphs plotting accuracy against each of these variables (Wickham 2016).

5. Results

Table 3 shows the mean accuracy (%) and standard deviation for each morpheme in each context for the children and parents. The (#) symbol indicates that the morpheme is inappropriate in that context, and, thus, the accuracy rate is for rejecting the morpheme. The results demonstrate relative stability in the baseline grammars, with the parents reliably distinguishing between the preterite and imperfect in all contexts. This is slightly lower within the separate imperfective readings, although this is due to the small number of items for each context. The children, on the other hand, demonstrate greater variability in their results, and consistently have greater difficulty rejecting the non-target morpheme in each context, with a lower set of accuracy rates in the continuous contexts.

Table 3. Parents' and children's mean accuracy (%) and standard deviation with both morphemes in each of the four context types.

Context Type and Verb Form	Parents (n = 12)	Children (n = 17)
Perfective, Preterite	0.954 (0.074)	0.703 (0.211)
Perfective, Imperfect (#)	0.954 (0.057)	0.566 (0.292)
Imperfective, Preterite (#)	0.921 (0.095)	0.595 (0.248)
Imperfective, Imperfect	0.926 (0.091)	0.686 (0.249)
Habitual, Preterite (#)	0.833 (0.174)	0.627 (0.389)
Habitual, Imperfect	0.861 (0.172)	0.725 (0.294)
Continuous, Preterite (#)	0.889 (0.164)	0.458 (0.319)
Continuous, Imperfect	0.972 (0.096)	0.625 (0.319)
Progressive, Preterite (#)	0.944 (0.129)	0.549 (0.372)
Progressive, Imperfect	0.861 (0.223)	0.706 (0.351)

As such, these results constitute preliminary evidence that there is no attrition or divergence in the input the children receive, and that this group of heritage speakers behave differently to their parents. In order to confirm whether the impressionistic difference between the children and their parents was statistically meaningful, we computed a Mann–Whitney (Wilcoxon) rank-sum test, comparing the parents' and heritage speakers' accuracy for each verb form within each context type. This is summarized in Table 4. The results show that the difference was highly significant ($p < 0.01$) for accepting the preterite in perfective contexts and rejecting it in imperfective contexts, specifically so for the continuous and progressive contexts. There was also a significant difference in accepting the imperfect in imperfective contexts ($p < 0.05$), and for accepting the same morpheme in continuous contexts specifically and rejecting it in perfective contexts ($p < 0.01$). There was no statistical difference between the parents and heritage speakers for rejecting the preterite in habitual contexts, or for accepting the imperfect in habitual or progressive contexts. Again, the fact that there were only three items for these conditions may explain this lack of difference, especially since the children's performance with imperfective contexts overall is statistically different from their parents'. Therefore,

these results indicate that there are substantial differences between the parents' and heritage speakers' grammars, although this may differentially affect different aspectual readings.

Table 4. Mann–Whitney (Wilcoxon) rank-sum tests for differences between the parent and heritage speaker groups.

Context Type and Verb Form	*W* Value	*p* Value
Perfective, Preterite	31	0.0011
Perfective, Imperfect (#)	22	0.0003
Imperfective, Preterite (#)	25.5	0.0006
Imperfective, Imperfect	47.5	0.0136
Habitual, Preterite (#)	75	0.1987
Habitual, Imperfect	78	0.2427
Continuous, Preterite (#)	28.5	0.0011
Continuous, Imperfect	35	0.0015
Progressive, Preterite (#)	39	0.0024
Progressive, Imperfect	77.5	0.2282

The second research question concerns whether there is an association between the children's exposure to Spanish and their accuracy with the preterite–imperfect contrast. The questionnaire provided two measures of exposure: relative exposure, which is the proportion of current exposure that is in Spanish, and cumulative exposure, which measures the total amount of time in months that each child has been exposed to Spanish. Spearman's rank correlations were tested for both of these variables in turn. Table 5 summarizes the correlation values for relative exposure, and Figure 3 plots the children's accuracy against their relative exposure to Spanish.
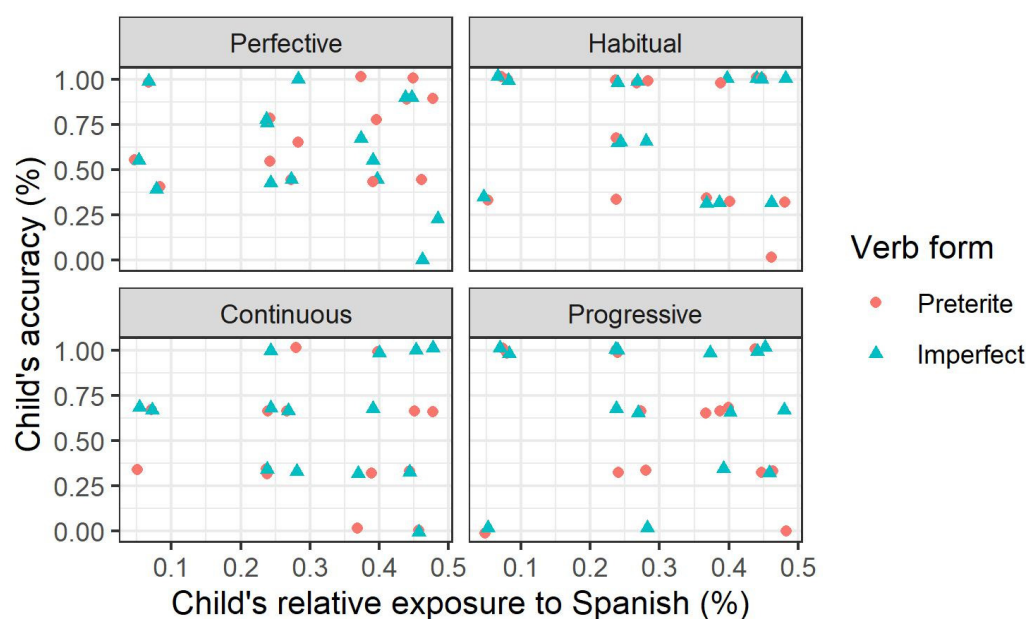

Figure 3. Children's relative exposure to Spanish and their accuracy for each morpheme in four contexts (perfective, habitual, continuous and progressive).
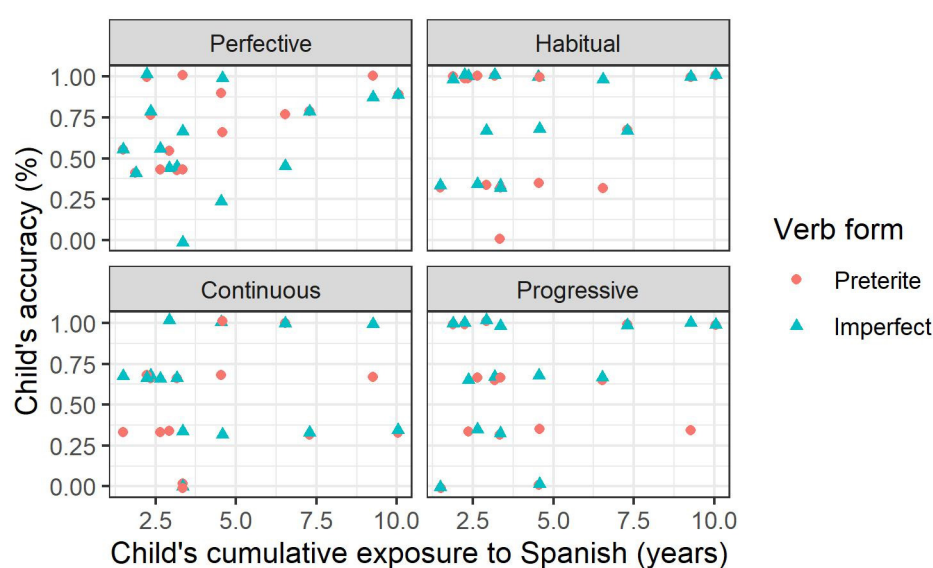
Table 5. Spearman's rank correlations for children's accuracy for each morpheme in each context and their relative exposure to Spanish.

Context Type and Verb Form	*S* Value	*rho* Estimate	*p* Value
Perfective, Preterite	437.02	0.220	0.432
Perfective, Imperfect (#)	693.43	−0.238	0.393
Imperfective, Preterite (#)	746.17	−0.332	0.226
Imperfective, Imperfect	570.18	−0.018	0.949
Habitual, Preterite (#)	686.79	−0.226	0.417
Habitual, Imperfect	526.85	0.059	0.834
Continuous, Preterite (#)	458.16	−0.007	0.981
Continuous, Imperfect	441.33	0.030	0.919
Progressive, Preterite (#)	748.69	−0.337	0.219
Progressive, Imperfect	618.89	−0.105	0.709

None of the rank order correlations for relative exposure were significantly different from 0. This suggests that there is no relationship between the current percentage of the total input that children receive that is in Spanish and their accuracy with the preterite–imperfect distinction. Turning to the second measure of input quantity, Table 6 summarizes the correlation values for cumulative exposure, and Figure 4 plots the children's accuracy against their cumulative exposure to Spanish.

Table 6. Spearman's rank correlations for children's accuracy for each morpheme in each context and their cumulative exposure to Spanish.

Context Type and Verb Form	*S* Value	*rho* Estimate	*p* Value
Perfective, Preterite	296.69	0.470	0.077
Perfective, Imperfect (#)	421	0.248	0.372
Imperfective, Preterite (#)	575.21	−0.027	0.924
Imperfective, Imperfect	524.49	0.063	0.822
Habitual, Preterite (#)	576.62	−0.030	0.916
Habitual, Imperfect	454.31	0.189	0.501
Continuous, Preterite (#)	395.17	0.131	0.654
Continuous, Imperfect	504.21	−0.108	0.713
Progressive, Preterite (#)	538.19	0.039	0.890
Progressive, Imperfect	427.71	0.237	0.397

Figure 4. Children's cumulative exposure to Spanish and their accuracy for each morpheme in four contexts (perfective, habitual, continuous and progressive).

As was the case for relative exposure, none of the Spearman's rank correlations were significantly different from 0. Again, this suggests that there is no relationship between the total amount of input the children have received in Spanish lives and their accuracy with the preterite–imperfect contrast. The accuracy at accepting the preterite in perfective contexts was trending towards significance ($p = 0.077$), which may suggest that a larger sample with more test items may find a statistically significant difference in this context. However, the fact that this is not likely to be the case for the remaining accuracy rates suggests that cumulative exposure is not a reliable predictor for accuracy.

Since neither of these variables had any significant relationship with the children's accuracy, this suggests that reduced input is not likely to be the source of the observed divergence in the heritage speakers' grammars. Finally, we consider the relationship between the child's age at time of testing and their accuracy in Spanish. The correlations are summarized in Table 7, and the variables are plotted in Figure 5.

Table 7. Spearman's rank correlations for children's accuracy for each morpheme in each context and their age at time of testing.

| Context Type and Verb Form	*S* Value	*rho* Estimate	*p* Value
Perfective, Preterite	304.5	0.457	0.087
Perfective, Imperfect (#)	214.21	0.617	0.014
Imperfective, Preterite (#)	221.64	0.604	0.017
Imperfective, Imperfect	285.31	0.491	0.063
Habitual, Preterite (#)	310.44	0.446	0.096
Habitual, Imperfect	307.1	0.451	0.091
Continuous, Preterite (#)	340.99	0.251	0.388
Continuous, Imperfect	453.95	0.002	0.9938
Progressive, Preterite (#)	260.05	0.536	0.040
Progressive, Imperfect	194.8	0.652	0.008
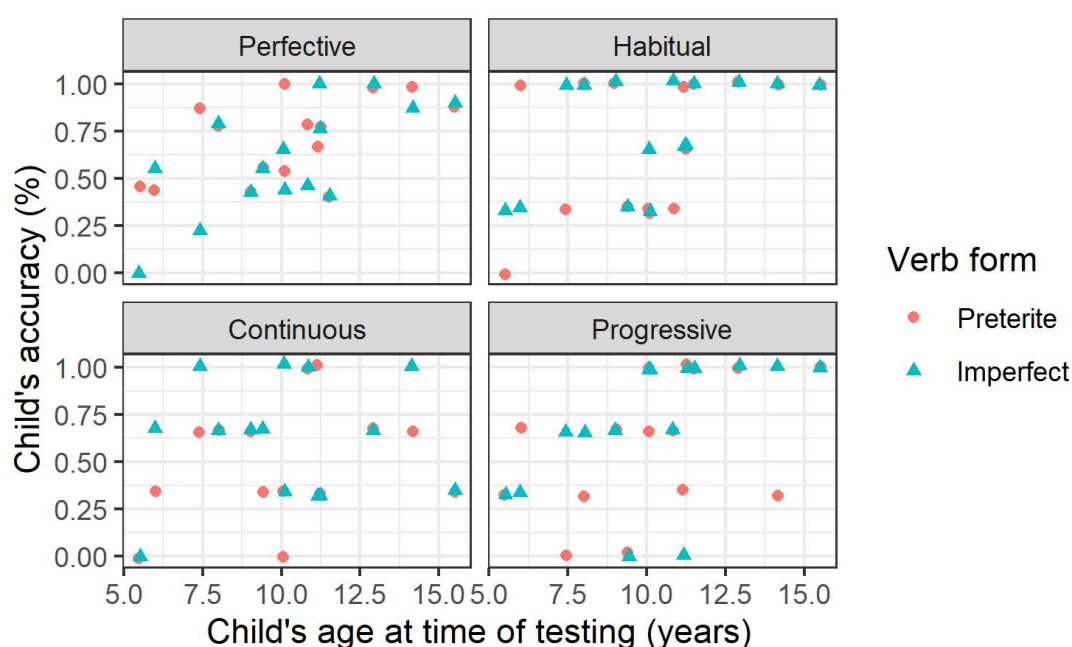
Figure 5. Children's age in years at time of testing and their accuracy for each morpheme in four contexts (perfective, habitual, continuous and progressive).

The children's age at time of testing was associated with improved accuracy across almost all form-meaning pairs, with the exception of accepting the imperfect and rejecting the preterite in continuous contexts. Older children were significantly more likely to reject the imperfect in perfective

contexts, and there was a trend towards significance for their accuracy in accepting the preterite in the same contexts. Likewise, across all imperfective contexts there was a statistical association between children's increased age and their correct rejection of the preterite, with a trend towards significance in accepting the imperfect. Within these imperfective contexts, there was a trend towards significance between age and increased accuracy in both rejecting the preterite and accepting the imperfect for habitual contexts, and significant relationships between increase age and increased accuracy in rejecting the preterite verb form and accepting the imperfect verb form in habitual contexts.

In sum, these results show that there are substantial differences between the L1 Spanish-L2 English adults' and their heritage speaker children's grammars of Spanish viewpoint aspect in the UK. A series of correlation tests using Spearman's rank suggested that there was no relationship between the amount of input the children received and their grammatical accuracy, but there was a relationship between the children's age at time of testing and their grammatical accuracy. The only context type the children showed no improvement with was continuous ones.

6. Discussion

In line with existing literature on the acquisition of the preterite–imperfect contrast by Spanish heritage speakers, we administered a semantic interpretation task to child heritage speakers and their parents to address three research questions. Firstly, we were interested in whether there was any evidence of attrition in the parental grammars, with the prediction that this would not be the case, following Domínguez's (2013) investigation of subject pronouns with potential L1 attriters in the UK. The parents in this study had high rates of accuracy in accepting the correct morpheme and rejecting the incorrect morpheme across all contexts. Whilst the performance is not quite at ceiling, this effect is likely due to the small number of items, especially in the individual imperfective readings, and ceiling is within one standard deviation of the mean for all values. However, it is important to qualify that this only constitutes preliminary evidence for lack of attrition in the parental baseline. A full-scale comparison of the parents' performance on this task with matched individuals in Spanish-dominant contexts would be necessary to confirm this, which has not yet been carried out with this version of the semantic interpretation task. An interesting initial comparison can be made to the comprehension task from the SPLLOC database from which the task in this study was derived. Domínguez et al. (2013, pp. 570–71) report that the monolinguals accepted and rejected the verb forms as expected. These monolinguals' mean accuracy rates were similar to those reported here for the baseline in accepting the appropriate morpheme, and slightly lower for rejecting the inappropriate morpheme (Domínguez et al. 2017, p. 448).

The overall percentages for the baseline in the present study are also comparable to those observed in the baseline grammars by Cuza and Miller (2015) in their production study, and they are consistent with the lack of attrition in this generation observed by Silva-Corvalán (1994). Therefore, the present study provides additional confirmation to Cuza and Miller's (2015) suggestion that the divergence observed in the preterite–imperfect contrast in heritage speakers of Spanish does not obtain because of divergence in the input, but can instead be interpreted as an innovation in the children's grammars. Polinsky and Scontras (2020, pp. 13–15) highlight the input (including quality, quantity and cross-linguistic influence) and processing constraints as being potential "triggers" for divergence from the baseline, with heritage speakers especially likely to restructure their grammars to avoid ambiguity, reduce irregularity and simplify representations where possible. Considering these broad categories in relation to the present study, the preterite–imperfect contrast does not clearly align with any of the three restructuring scenarios proposed by Polinsky and Scontras. The present study was not designed to formally assess online processing or input quality, and we remain agnostic as to whether these are involved in the outcomes observed for the heritage speakers in this study. Both input quantity and cross-linguistic influence were incorporated into the study design, and the remainder of the discussion is focused on the roles they play in explaining this innovation in the children's grammars.

A further explanation for the observed difference between the children and their parents in accurately rejecting the incorrect morpheme may be the documented "yes-bias", which describes the fact that heritage speakers are known to be unwilling to reject sentences as they are often insecure in their linguistic knowledge (Polinsky 2018, p. 68). The data from this study confirm this observation: the heritage speakers' accuracy as a group is consistently 10–15% less accurate at rejecting the incorrect morpheme than for accepting the correct morpheme. However, this bias would not explain the further differences in accuracy between the parents and children, or the lower accuracy rates for both rejecting the preterite and accepting the imperfect for the continuous reading.

As to the second research question, we tested the claim (e.g., Silva-Corvalán 2003) that heritage speakers' documented divergence from expected norms in the preterite–imperfect contrast is the result of reduced input in childhood. We used two measures of input, calculated using the Bilingual Language Experience Calculator (BiLEC) (e.g., Unsworth 2015), to assess this claim: current relative exposure to Spanish and cumulative exposure throughout childhood. Neither of these measures was associated with increased accuracy in the semantic interpretation task. This was contrary to our prediction that this would be the case, based on the claims in the literature. In her comparison of accuracy with the preterite–imperfect and indicative–subjunctive contrasts, Montrul (2009) observed that heritage speakers' greater accuracy with viewpoint aspect than mood morphology reflects an order of acquisition effect. Therefore, it is plausible that viewpoint aspect is comparatively resilient to reduced input, which may affect other parts of the grammar, such as mood.

For the third research question, we used correlation tests to formally assess Cuza and Miller's (2015) observation that children's accuracy for episodic and characterizing situations increased with age, including the whole range of imperfective readings. These tests revealed that there was a significant relationship between increased age and increased accuracy for four of the morpheme–context pairs, and four morpheme–context pairs where this relationship was trending towards significance. This provides tentative confirmation of Cuza and Miller's (2015) observation. However, this was not the case for accuracy in the continuous contexts, for either rejecting the preterite verb form or accepting the imperfect verb form. This suggests that this viewpoint aspect reading is persistently problematic for heritage speakers. Recall also that the group mean accuracy for both morphemes was lower in continuous contexts than for the other readings for the children. We interpret this result as showing that the oldest heritage speakers in this study do not have accurate knowledge of the preterite–imperfect contrast with the continuous reading, but that they do acquire this knowledge for the other two readings associated with the Spanish imperfect.

The continuous is the same reading of the imperfect that has been found to be most difficult for L2 learners to master due to the form–meaning mapping difference between English and Spanish (Domínguez et al. 2017), and this is consistent with the cross-linguistic difference in form–meaning mappings for this reading that follows from Arche's (2014) analysis. Under this analysis, it is possible that cross-linguistic influence from English may lead the heritage speakers to variably associate the continuous reading with both perfective and imperfective morphology, reflected in their lower accuracy rates for both accepting the imperfect and rejecting the preterite in these contexts. This feature-based approach to heritage speakers' linguistic competence provides evidence that cross-linguistic influence in heritage speakers' grammars can be highly specific, including when the wider system of form–meaning mappings within the same contrast appear to be more stable. A focus on perfective and habitual contexts in the previous production studies, and testing aspects of the preterite–imperfect contrast such as completion entailments in comprehension studies (e.g., Montrul 2002), may have masked this area of divergence in earlier research.

Whilst Arche's (2014) separation of the imperfective readings has not been tested in L1 acquisition, the literature on the acquisition of viewpoint aspect by monolingually raised Spanish-speaking children includes comprehension data that are relevant to the discussion here. In two picture selection tasks, Hodgson (2005) has shown that monolingual five- to six-year-olds perform near ceiling in associating the preterite verb form with completed situations, and had a clear preference for associating the

imperfect verb form with situations that were in progress, although the accuracy for these progressive contexts was slightly lower. García del Real-Marco (2015) deployed a picture selection task and truth value judgment task with monolingual five-year-olds to assess their knowledge of the association between the preterite and completion and the imperfect and progressivity, including the imperfective paradox in which the imperfect is ambiguous with respect to completion. The five year olds were more variable in associating the preterite with complete situations and the imperfect with ongoing situations than adults, with this variability arising in contexts where they had to link the imperfective verb forms to a discourse context. García del Real-Marco concludes that the five year olds in the study know the semantic distinction between the preterite and imperfect for perfective and progressive situations, respectively.

Bearing in mind that the semantic distinction for at least part of the preterite–imperfect contrast is present for monolingual children around age 5, the documented bilingual delay (see Polinsky and Scontras 2020, p. 13) may be the source of divergence seen for the youngest children in this study. This could partially explain the general correlations observed for the majority of the form-reading pairs. Likewise, the fact that the semantic interpretation task is more cognitively demanding than the picture selection or truth value judgment tasks used in the L1 acquisition studies may also partially explain the age-based correlations. Additionally, the observed "yes-bias" associated with heritage speakers has also been widely documented with young children (Ambridge and Rowland 2013), suggesting that lower accuracy rates in rejecting the incorrect morpheme with the younger children in the study may also stem from this bias. Nonetheless, neither of these factors can explain the lack of correlations for the continuous reading, or the substantial variation between participants at different ages; the data points in Figure 5 show that the youngest child is occasionally more or equally accurate in comparison with some of the older children. More data from children at the youngest and oldest ends of the spectrum in this study are necessary in order to disentangle the factors associated with age and the observed increase in accuracy.

It is also striking that there was a correlation between age and generally increased accuracy, but not for cumulative exposure. Since an increase in cumulative exposure can only happen alongside an increase in age, it would be logical to expect a similar correlation to hold for both variables. The lack of a correlation for cumulative exposure may reflect inconsistency and inaccuracy in parental reports of past and current estimates of language exposure. Another explanation is that cumulative exposure only partially reflects a child's age, since changes in relative exposure throughout this time span modulate the total. Thus a heritage speaker aged 12;6 who was dominant in Spanish before starting pre-school followed by a sudden drop to less than 10% exposure has only 1.88 years of exposure to Spanish, whereas a heritage speaker aged 5;6 whose relative exposure is still as high as 46% has 3.34 years of exposure to Spanish. It is possible that expressing cumulative exposure as a fraction of their age would yield a more reliable measure of the effect of input quantity and age on heritage speakers' grammatical outcomes. However, the small number of items and participants in this study means that the tentative conclusions drawn here cannot be confirmed without additional research. With sufficient data, a statistical model that incorporated exposure measures and participants' age at time of testing together could be evaluated, although the fact that only test age had any significant correlation with the children's grammatical accuracy in these data suggests that a more complex model may not provide a better fit.

Whilst Spanish–English bilingualism has historically been less studied in the UK than in the USA, the results of this comprehension study with child heritage speakers and their parents in the UK has documented both a lack of systematic changes in the parents' grammars for this structure and a highly specific change in the heritage speakers' grammars affecting the continuous reading of the imperfect. An interesting result is that in spite of the large differences in the presence and multi-generational use of Spanish in the USA compared to the UK, we uncovered similar patterns of behavior in the comprehension of viewpoint aspect of Spanish heritage speakers in the UK to that observed in production and comprehension studies of in the USA. The fact that age was the most

consistently predictive factor with the exception of continuous contexts provides evidence that the observed vulnerability in viewpoint aspect in heritage speakers may be the result of cross-linguistic influence differentially affecting this reading, whereas acquisition of the baseline grammar may be assumed to obtain for the remaining readings.

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