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Priming Cross-Linguistic Interference in Spanish-English Bilingual Children

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1. Introduction

While it is a defining fact of bilingualism that bilingual speakers know two languages, the way that those languages are organized in the mind is far from self-evident. Hypotheses about bilingual grammatical architecture range from the claim that there must be two separate grammars, one corresponding to each language (Genesee, Nicoladis, & Paradis, 1995; De Houwer, 2005), to the position that there is only one grammar, parts of which are used by one language alone but much of which overlaps ('shared-syntax': Hartsuiker, Pickering, & Veltkamp, 2004). While it is possible in principle for each language to be represented in its own isolated module, certain aspects of bilingual language use suggest that there is at least some degree of grammatical overlap between the two languages, both during development and in adulthood. For example, children and adults alike are susceptible to structural priming between their two languages, reusing a structure recently heard in one language in a production in the other. Identifying the nature of structural environments in which cross-linguistic influence can occur is critical for determining the extent of grammatical overlap in the bilingual mind, which in turn places a substantial constraint on explanations of language development in this population.

One potentially restricting case for grammatical sharing concerns structures that are grammatical in only one of a speaker's two languages, e.g., a verb-final embedded clause for a German-English bilingual. Bilingual adults generally do not experience overt structural intrusions from one language into the other (Grosjean, 1989), but children sometimes do (e.g., Döpke, 1998). This indicates that at some point the overlap between language representations may extend even to structures that should be associated with one language only. If this overlap does exist, then it should be possible to elicit the production of

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ungrammatical utterances by presenting structurally parallel but grammatical primes in the other language. We developed a novel cross-linguistic structural interference priming paradigm to test for this possibility, which, if confirmed, would be instrumental in determining the extent of representational overlap in the bilingual grammar. Our results obtained with Spanish-English bilingual children confirm that cross-linguistic interference priming can supply a signature of bilingual grammatical sharing.

2. Previous findings of grammatical sharing

While at least two contrasting hypotheses about the bilingual grammatical architecture are a priori plausible, a pair of empirical findings gesture toward an account in which there is overlap in the syntactic representations corresponding to each language whenever possible: spontaneous cross-linguistic structural interference, and cross-linguistic structural priming. Cross-linguistic structural interference refers to speakers' production of phrases in one language that appear to reflect structural properties that should only be present in the other language (Döpke, 1998; Yip & Matthews, 2007; van der Linden & Blok-Boas, 2005; De Houwer, 2005). For example, German-English bilingual children produce phrases containing OV order in English, an error not found in English monolingual children's productions ((1): Döpke, 1998).

(1) *can you that over bring* [CW-E4;0 (Döpke, 1998)]
AUX SUBJ OBJ P VERB
('can you bring that over?')

The target verb-final word order corresponding to these utterances in German is precisely represented in the children's English, even though no evidence for that word order can be found in child-directed speech. This indicates that the German structure in the grammar interferes with the English production. Likewise, noun-adjective combinations produced by French-English bilingual children sometimes display the constituent orders belonging uniquely to the language not in use (e.g., *"a book open", corresponding to the French *un livre ouvert* 'a book open': Nicoladis, 2006). Similar interference is also found in wh-in-situ productions in English by Cantonese-English bilingual children (Yip & Matthews, 2007) and in Dutch by French-Dutch bilingual children (Strik & Pérez-Leroux, 2011). Explanations of spontaneous cross-linguistic interference have taken on a variety of forms, ranging from derivational complexity accounts (Strik & Pérez-Leroux, 2011) to cue competition between languages (Döpke, 1998). Still, most maintain a categorical separation between the grammars of the two languages, attributing cross-linguistic influence to a temporary transfer of relatively specific grammatical knowledge, e.g., the setting of a single parameter, between otherwise distinct representational systems.

However, another set of findings could suggest a different interpretation of spontaneous cross-linguistic interference, namely cross-linguistic structural

priming. Structural priming broadly refers to the tendency to produce sentences containing previously experienced syntactic structures (Bock, 1986), and usually this phenomenon is interpreted as reflecting the presence of an abstract representation whose activation is maintained from one sentence to another. Hartsuiker et al. (2004) showed that this tendency is present in bilingual adults between their two languages just as it is in monolinguals' single language. For example, when a bilingual speaker of Spanish and English hears a passive in Spanish, she is likely to use a passive in the next production, even if that next production is in English (see also, e.g., Loebell & Bock, 2003; Bernolet, Hartsuiker, & Pickering, 2007; Shin & Christianson, 2009). A small number of analogous results have been found with bilingual children as well (e.g., Vasilyeva, Waterfall, Gámez, Gómez, Bowers, & Shimpi, 2010). Because Hartsuiker et al. found that participants' tendency to produce either an active or a passive sentence in Spanish – the target language – was dependent upon the construction in the previously heard English stimulus – in the source language – they proposed a 'shared-syntax' model of bilingual grammatical architecture, in which structures that exist in both languages are represented only once and are shared across the two languages. They are simply available for production and comprehension in each language, from within a single grammar. Recent work has pressed this point further and shown that the magnitude of cross-linguistic priming is just as great as the magnitude of within-language priming, which suggests that the two languages' constructions are internally represented as closely to one another as are those structural patterns that ostensibly belong to only one language (Kantola & Van Gompel, 2011).

Existing research has shown cross-linguistic priming to arise when the grammatical properties of the structural pattern in the source language and the target language are closely aligned, in terms of function, word order, and other conceptual and surface-level characteristics. But the structural interference that we observe during bilingual development naturally suggests that constructions that only belong to one language might in fact be represented in a language-independent format. We take this suggestion to indicate the plausibility of the unorthodox hypothesis that all representations are shared between languages, and if this is correct, then constructions that belong in only one should nevertheless be available for use in the other. In contrast to traditional priming that operates between grammatical utterances, this would give rise to structural interference priming, from a grammatical utterance in the source language to an ungrammatical utterance in the target language. We therefore created a cross-linguistic structural interference priming paradigm that would allow us to test whether presenting an English utterance that had no identical corresponding construction in Spanish would cause interference to emerge in bilingual children's productions.

3. The present study

The present study is designed to test the hypothesis that grammatical

sharing in the bilingual mind is so extensive as to encompass even constructions that only belong in one language. If this is correct, then we predict that we will be able to prime cross-linguistic structural interference in bilingual children by presenting a grammatical utterance in one language that corresponds to an ungrammatical utterance in the other language. We elected to investigate cross-linguistic interference in children's Spanish production of noun modification with an adjective, as in (2).

(2) a. *Un libro abierto*
a book open (D NOUN ADJ)
b. **Un abierto libro*
a(n) open book (D ADJ NOUN)

This construction meets all the criteria necessary for cross-linguistic interference priming. First, it is known and readily accessible to children in both languages. Second, it is easily depicted, so that a visual stimulus in addition to the prime utterance can serve to constrain the content (though not the structure) of the responses given by participants. Third, and most importantly, it is functionally the same in Spanish and in English but has different word orders in each language: the ungrammatical order in Spanish corresponds to the grammatical order in English.

The experiment was designed to investigate cross-linguistic interference priming with this construction in two basic tasks (details given below). First, the Spanish elicitation task was used to ascertain that participants possessed a default grammatical representation (corresponding to noun-adjective order). In this task no prime stimuli were presented, and both participant and experimenter spoke only Spanish. Second, the English-to-Spanish priming task aimed to determine the rate of ungrammatical adjective-noun productions in Spanish in the presence of an interfering (but grammatical) English adjective-noun prime. Here, unlike in the monolingual elicitation task, the experimenter spoke English and the child Spanish. The neutral English primes in this task were meant to establish participants' baseline rate of Spanish interference productions in a bilingual context, presenting stimulus utterances that would not prime any particular response type (i.e., they did not contain a modified DP). In the critical condition the English stimuli contained a modified DP with the interfering adjective-noun order.

Twenty-four bilingual 4- and 5-year-old children, who were speakers of Spanish and English, participated in this study (mean age=59.9 months, *SD*=6.9). They were drawn from 3 bilingual immersion preschools in the metropolitan DC area. We used the Peabody Picture Vocabulary Test (Dunn et al., 2007) and the Test de Vocabulario en Imágenes Peabody (Dunn et al., 1986) to determine their language proficiency in English and Spanish, respectively. These tests yielded a mean English receptive vocabulary score of 109.71 (*SD*=16.1) and a mean Spanish receptive vocabulary score of 97.17 (*SD*=14.1), both on a 100-point normed scale. Informal discussions with teachers suggested that approximately

1/3 of participants spoke some Spanish in the home, and that all had been exposed to Spanish for 2-3 years at the schools. No further information about language exposure was available. The data was collected over 2 days as part of a larger study. The elicitation task, the priming task, and the Spanish vocabulary task were conducted on the first day, and the English vocabulary task was conducted on the second. The production task responses were video-recorded and were subsequently transcribed and coded by the experimenter. Vocabulary tasks were administered and scored according to prescribed instructions.

3.1. Monolingual elicitation task

An elicitation task that was modeled after Nicoladis (2006) aimed to establish a baseline rate of children's (ungrammatical) Spanish adjective-noun use. Pictures were paired with verbal stimuli that would emphasize the difference between images in the surround and a central object (see Fig. 1a on the following page). The task of the participant was to name this 'different' object. The visual stimuli depicted common objects (e.g., closed books) distributed in an array such that all the objects on the periphery were identical to one another, while the center object (e.g., an open book) differed on a perceptually salient dimension. Twenty such arrays were created with corresponding Spanish verbal stimuli (e.g., for Fig. 1a, *Todos estos libros están cerrados* 'all these books are closed').

The elicitation task was administered similarly to Nicoladis (2006). The experimenter spoke only Spanish to the participant, explaining that she would show the participant a series of pages that had many pictures on them. The experimenter also pointed out that the object in the middle was different from the objects on the outer edges of the page. After the 20 pages had been viewed and the outer images described, the experimenter pointed to the target object in the center and asked, *Dime, ¿qué es esto?* 'Tell me, what is this?' If the child responded with an utterance containing an adjective and a noun that could plausibly describe that image, the experimenter moved on to the next item.

A target response would contain the Spanish-appropriate noun-adjective order (e.g., *un libro abierto* 'a book open'), while an interference response would contain the English-derived adjective-noun order (e.g., **un abierto libro* 'a(n) open book'). Other responses containing an adjective and a noun, such as relative clause responses (e.g., *un libro que está abierto* 'a book that is open'), were also accepted, as these also satisfied the goal of the task. If the participant's responses did not contain both an adjective and a noun (e.g., *está abierto* '(it) is open'), various supplementary prompts could be given, until after three attempts the experimenter moved on. In order to encourage productions in Spanish, the experimenter did not supply the participant with the lexical item when she indicated that she only knew the word for the target item in English. No hint was given as to the lexical identity of the modifier. If the participant continued to indicate that she could not give a response, the experimenter moved to the next item, until all 20 were completed.

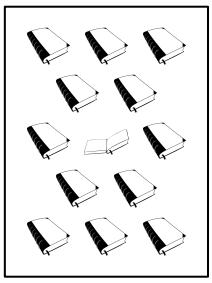
3.2. Bilingual interference-priming task

The second task was designed to determine whether cross-linguistic structural interference can be primed by grammatical utterances presented in the source language. We developed a novel bilingual picture-description task in which the experimenter spoke English but required the child to speak Spanish, by involving a monolingual Spanish-speaking puppet character in the interaction. Throughout the task, the child therefore listened to English-language prime utterances presented by the experimenter, but addressed her responses, in Spanish, to the puppet. The experiment had three phases: an introductory phase, in which the child 'met' the puppet; a practice phase, in which she learned how to complete the task; and a test phase. The test phase contained two blocks: a 'neutral priming' block, in which the experimenter presented English stimuli that should not prime interference in Spanish, and an 'interference block', which contained the critical English interference primes.

3.2.1. Introductory phase

The experimenter began by interacting with the puppet trapped inside the computer. The experimenter spoke with the puppet in Spanish and then introduced the puppet to the participant, which led the participant and the puppet to have a brief but engaging conversation that inspired the child to become invested in helping him. An animated video played as the puppet described, in Spanish, what had happened to get him stuck inside of the computer: he had tried to bribe a mean queen to let him go by giving her a variety of gifts, but she disliked all of them, so she trapped him anyway.

After this introduction, the experimenter explained in English three important details from the video and animation: the puppet was a monolingual Spanish-speaker and would not understand English; two, the puppet had no way of seeing out of the computer, so the participant would need to describe to him exactly what he should try to give the queen the next time; and three, if the participant helped the puppet give all the right gifts to the queen, she would free him, and the participant would get to play with him in real life.

a. 

b. 

Figure 1a: Sample visual stimulus from elicitation task.
Figure 1b: Sample visual stimulus from priming task.

3.2.2. Practice phase

Practice items were administered to teach the participant how to succeed in the task, with reference to slides like the one in Figure 1b. Each slide contained two images that were matched on the dimension of the relevant modifier (e.g., red apple and red strawberry). Although any image has an indeterminate number of potential descriptions, the stimulus sentence made salient what dimension the child was to attend to, i.e., "It was a green apple". This sentence mentions the color of the object as the relevant dimension, and therefore participants named the color dimension in their response. Crucially, the fact that the participant would need to attend to the modifier in the stimulus ensured that she would process the whole utterance rather than only attending to the object label.

The practice phase followed the introduction phase. The instruction was given in English using between one and three practice items. If the participant grasped the rule after the first or second training item, the remaining practice items were presented with an abbreviated version of the instruction.

(3) "The first thing that Pablo gave the queen was a bee, and that bee was angry so she didn't like it. So here are two more things he can give her. This one is a monkey, and it's happy. This one's a bee, and it's happy. Now, the monkey is too different – the queen wouldn't like that – but the bee is just a little bit different, and that's the thing that you should tell Pablo to give the queen. Can you tell him what to give her?"

The experimenter then advanced the program to the next slide, which caused the computer to play a brief Spanish prompt video in which the puppet character solicited a response from the participant (e.g., *¿Qué debo darle?* 'What should I give her?'). So long as the response contained both 'bee' and 'happy' in Spanish, positive feedback was given and the next item was begun.

3.2.3. Test phase

Following the practice phase, two blocks of experimental trials were presented, with no break in between. Just as in the training phase the experimenter addressed the child in English while the child herself spoke Spanish (directed to the puppet inside the computer). The first block presented 12 neutral primes, and the second block presented 12 interference primes. The neutral primes consisted of the auditory stimuli that were intended not to prime either order of adjective and noun in the participant's productions, by presenting the stimulus noun and adjective in a predicative construction (4a). The interference primes in contrast were designed to prime the English-derived adjective-noun ordering in a Spanish noun phrase (4b). Note that both examples in (4) correspond to Figure 1b, but they do so for ease of exposition only; each visual display was used in only one condition.

(4) "Then Pablo gave the queen something else she didn't like…
   a. "…That apple was green."
      (Block 1: neutral block, predicative construction)
   b. "…It was a green apple."
      (Block 2: interference (prime) block, adjective-noun construction)

The order of block presentation was held constant for all participants because of the tendency for children to perseverate in their actions, including in the selection and production of sentence types (cf. Snedeker & Yuan, 2008). The priming of interference would likely have 'bled' into the neutral block, had that latter block been presented second, thus limiting our ability to detect an effect of priming. The order of item presentation was varied within each block, and items were ordered such that no more than two sequential trials contained a modifier of the same type (i.e., color, size, aspect). Just as in the practice trials, the experimenter's verbal prompt was followed by a brief Spanish prompt video containing the puppet's solicitation of a suggestion, and the participant responded in Spanish. In this task, if the participant did not know the Spanish noun for an object, the experimenter provided it, given that the interaction already involved both languages. After all 24 trials were completed, the puppet was 'freed' and briefly engaged the participant in conversation in Spanish.

4. Results

Results from the elicitation task demonstrate that participants rarely produced the ungrammatical word order of adjective-noun in their descriptions of the central stimulus item, indicating that they possess the default Spanish target construction of noun-adjective to describe modified objects. Adjective-noun utterances comprised 3.8% of their responses (*SE*=1.2), while 31.4% of responses (*SE*=6.7) contained the noun-adjective order, 28.1% a relative clause (*SE*=6.8), and 36.7% (*SE*=6.1) were 'other' responses, in which participants did not supply both noun and adjective, or did so in a predicative construction.

Crucially, participants' tendency to use adjective-noun in their responses differed significantly from their tendency to use noun-adjective (*paired* $t(23)=2.81$, $p<0.02$). That participants produced a minimal number of their responses with the adjective-noun (interference) construction suggests that they have the requisite grammatical knowledge of Spanish noun modification: the simple noun-adjective construction. In short, they do not use the English-type construction in their Spanish in a monolingual Spanish, prime-free task.

It should be recalled that our main hypothesis predicts that participants will display an increased tendency to produce (ungrammatical) adjective-noun responses in Spanish after they hear a (grammatical) adjective-noun stimulus in English. To test this hypothesis we compare the results of the neutral block of the priming task to the results of the interference block of the same task. In the neutral block, the English auditory stimulus presented was neutral and did not

prime either an English-order (adjective-noun) or a Spanish-order (noun-adjective), so responses reflect a baseline production rate of adjective-noun in a bilingual discourse context. In the interference block, the English auditory stimulus could activate a representation that, if used in a Spanish production, would constitute cross-linguistic interference. As depicted in Figure 2 participants produced an average of 17.4% of their responses (*SE*=5.7) containing the (ungrammatical) adjective-noun order during the neutral block; during the priming block, the incidence of such responses increased to 32.6% (*SE*=6.8). (Grammatical) noun-adjective responses correspondingly decreased in frequency from the neutral block (*M*=57.3%, *SE*=7.7) to the interference block (*M*=45.8%, *SE*=7.1). The remainder of responses contained relative clauses, at roughly even rates (neutral block: *M*=16.0%, *SE*=5.7; interference block: *M*=14.6%, *SE*=5.3), and some predicative constructions (neutral block: *M*=9.4%, *SE*=3.9; interference block: *M*=6.9%, *SE*=4.0). Most crucially, the proportion of adjective-noun production in the interference block was significantly larger than in the neutral block (*paired* $t(23)=3.434$, $p<0.005$), suggesting that the presentation of an interference prime did influence the rate of interference productions in the bilingual task.

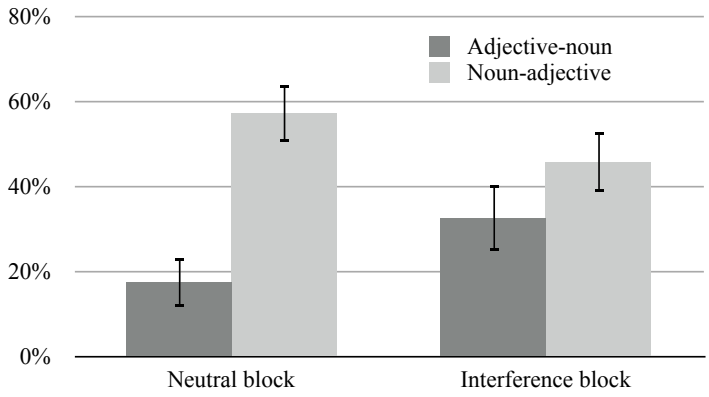


Figure 2: Mean percentage of adjective-noun and noun-adjective responses.

We also explored the possibility that cross-linguistic interference could be modulated by participants' language dominance. We computed participants' language dominance score, by calculating the difference between each participant's English and Spanish scores. Recall that we found a higher average score on the English vocabulary task than on the Spanish one. Our participants' average English dominance score was 12.54, with a rather large standard deviation (*SD*=21.48). In light of these values, we investigated the possibility that our participants' use of interfering constructions could be explained by their stronger English grammar. In the monolingual elicitation task, there was a marginal correlation between these values (*Pearson's r*=0.332, $p<0.15$), while in

the neutral block of the priming task, there was a strong correlation between them (*Pearson's* r=0.461, p<0.03). In contrast, however, there was no observable relationship between the tendency to produce cross-linguistic interference and participants' English-language dominance (*Pearson's* r=0.237, *ns*). It is therefore evident that cross-linguistic interference priming must be explained on grounds apart from the contribution of language dominance.

In addition we addressed the intuitive concern that cumulative English-language input may have affected the overall adjective-noun production rate in Spanish. Since we always primed interference in the second block of the priming task, we cannot factor out the effect of having previously heard at least 12 stimulus items in English (before the interference block) from that of hearing an interference prime. There are two reasons to believe, however, that the interference that we observe in the second block of the priming task is in fact the result of structural priming rather than of an accumulation of English activation. First, in both the neutral and the interference priming block, we do not see an increase in interference productions from the first half of a block to the second half of the same block; items 1-6 contained an equivalent proportion of interference utterances to items 7-12 (24 to 27), and similarly for 13-18 and 19-24 (46 to 48). These results are incompatible with the alternative explanation that cumulative English input generally results in an increase of cross-linguistic interference. Second, a supplementary pilot study suggests that when Spanish-English bilingual children are presented with 24 neutral stimulus utterances, the rate of adjective-noun production does not significantly differ between the first 12 items and last 12 items. The indication that interference is evenly distributed across the task, rather than concentrated in the second block, contradicts the claim that English activation has accumulated in the grammar.

5. Discussion

This study has demonstrated that unacceptable adjective-noun productions in Spanish increase when Spanish-English bilingual children hear the corresponding English structure. In showing this we have provided the first evidence that it is possible with bilingual children to prime cross-linguistic interference, and because this implies a shared representation of the relevant abstract structure, our results place a new constraint on accounts of bilingual grammar in development.

Further support for this view of grammar sharing comes from evidence of facilitation in bilingual morphosyntactic development: at times, bilingual children are shown to acquire certain aspects of morphosyntax at an accelerated rate relative to their monolingual peers (e.g., Kupisch, 2005; Hsin, 2012). For example, Hsin (2012) found that Spanish-English bilingual children reliably produce target-like wh-questions in English earlier than English monolingual children do. In view of the mounting evidence from cross-linguistic priming, this finding may simply be interpreted as a yet stronger indication that structures in the bilingual mind are broadly shared. Grammatical structure developed for

use in one language would thus be recruited for production in the other before it would have been developed on the basis of one-language input alone, again indicating shared grammatical resources, and this time leading to a positive outcome for the learner.

With respect to the interference elicited in the present study, several additional questions can be entertained. One relates to the particular stimulus utterances employed. The same head noun was used in the stimulus utterance and the target response, which was pursued in order to increase the likelihood that we would observe a priming effect (by providing a 'lexical boost': Pickering and Branigan, 1998). While the lexical boost is reported to be smaller in children than in adults (Rowland, Chang, Ambridge, Pine, & Lieven, 2012), it does arise in bilingual cross-linguistic priming in adults (Schoonbaert, Hartsuiker, & Pickering, 2005). Because we did not include a condition in which the lexical boost could not arise, it is unclear whether this is in fact necessary in order to observe interference priming. Similarly, it remains to be investigated to what extent cross-linguistic interference priming involves abstract syntactic representations, because the current findings are compatible with accounts in which (1) surface forms, (2) hierarchically structured representations, or (3) both are shared between the languages in a single grammar. In future work we will explore whether utterances containing, i.e., movement or opposing headedness can prime interference cross-linguistically, in an effort to further delineate the extent of bilingual grammatical sharing.

A more general issue that emerges from these results concerns the fact that adults by and large do not produce cross-linguistic interference. At first glance, this fact could appear unexpected for an account of bilingual grammar that claims such broad representational sharing during development. The simplest explanation for the lack of interference in adults, then, may be that potentially interfering connections are just pared away with more linguistic experience, but it is also possible that these links would be maintained throughout life, leaving behind behavioral traces subtler than the interference productions we have observed in this study. If the representation of each language is so intertwined, then perhaps the only way to avoid pervasive interference is to apply an additional cognitive mechanism to 'decide' what structures to use in a given linguistic act. The enhanced cognitive control seen in bilinguals – their inhibitory abilities, their facility with task-switching – is plausibly linked to the inhibition of interfering structures (Bialystok, Luk, & Craik, 2012), and therefore even in adults we may be able to observe the inhibition of non-target structures in action (cf. studies showing inhibitory effects in the lexical domain: e.g., Abutalebi & Green, 2007). Thus while structural interference priming with adults does not lead to overt interference productions (cf. Bernolet et al., 2007), the structures that cause interference may still exist: they are simply inhibited through habitual suppression of unwanted utterances. This does not imply that adults need to act intentionally to inhibit an ungrammatical utterance every time a competing structure is activated, but it does suppose that they can control the outcome of those activations before the corresponding sentence is articulated.

The explanation of why we do see overt cross-linguistic structural interference in bilingual children could fall correspondingly out of their limited cognitive control abilities, slow as these are to develop. And perhaps as cognitive control matures, bilingual children become more adept at inhibiting these structures, which in turn gives them further opportunities to practice that inhibition, leading to a ratcheting effect whose outcome is cognitive control superior to that of their monolingual peers (cf. Bialystok et al., 2012). Our current work explores this relationship between cognitive control and structural interference, in the pursuit of a holistic account of both.

6. Conclusion

This study has presented the first evidence of the possibility of priming cross-linguistic structural interference, a finding which we attribute to a greater degree of grammar sharing in the bilingual mind than has been previously hypothesized. Spanish-English bilingual children were shown to produce cross-linguistic interference when presented with an utterance in English that corresponded to an ungrammatical order in Spanish, suggesting that the representations that ought to be *used* in English are available for use in Spanish as well. In light of these results, further investigations will be required to determine the extent and nature of grammatical sharing, by studying both bilingual children and adults of different linguistic backgrounds (i.e., language pairs, contexts of exposure), as well as different kinds of structures that could plausibly emerge in a non-target language. With these, and perhaps with the importation of extralinguistic cognitive mechanisms, it is our hope that we will be successful in developing a sound account of grammatical development and language use in bilingualism.

References

Abutalebi J, & Green D. (2007). Bilingual language production: The neurocognition of language representation and control. *Journal of Neurolinguistics*. 20:242-275.

Bernolet, S., Hartsuiker, R.J., & Pickering, M.J. (2007). Shared syntactic representations in bilinguals: Evidence for the role of word-order repetition. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 33*(5):931–949.

Bialystok, E., Craik, F. I. M., & Luk, G. (2012). Bilingualism: consequences for mind and brain. *Trends in Cognitive Sciences*, *16*(4): 240-250.

Bock, K. (1986). Syntactic persistence in language production. *Cognitive Psychology*, 18:355– 387.

Bock, K., & Griffin, Z. (2000). The persistence of structural priming: Transient activation or implicit learning? *Journal of Experimental Psychology*, 129(2):177–192.

Brysbaert, M. & Duyck, W. (2010). Is it time to leave behind the revised hierarchical model of bilingual language processing after fifteen years of service? *Bilingualism: Language and Cognition*, 13(3):359–71.

De Houwer, A. (2005). Early bilingual acquisition: Focus on morphosyntax and the separate development hypothesis. In Kroll, J. and Groot, A. D., editors, *The handbook of bilingualism,* pages 30–48. Oxford: Oxford University Press.

Döpke, S. (1998). Competing language structures: The acquisition of verb placement by bilingual German-English children. *Journal of Child Language*, 25(3):555–584.

Dunn, L.M. & Dunn, D.M. (2007). Peabody Picture Vocabulary Test, fourth edition. Circle Pines, MN: American Guidance Service.

Dunn, L.M., Padilla, E.R., Lugo, D.E., & Dunn, L.M. (1986). Test de Vocabulario en Imágenes Peabody. Circle Pines, MN: American Guidance Service.

Genesee, F., Nicoladis, E., & Paradis, J. (1995). Language differentiation in early bilingual development. *Journal of Child Language*, 22(03):611–631.

Grosjean, F. (1989). Neurolinguists, Beware! The Bilingual Is Not Two Monolinguals In One Person. *Brain and language, 36(1)*:3–15.

Hartsuiker, R. J., Pickering, M. J., & Veltkamp, E. (2004). Is syntax separate or shared between languages? Cross-linguistic priming in Spanish-English bilinguals. *Psychological Science,* 15:409–414.

Hsin, L. (2012). Accelerated Acquisition in Spanish-English Bilinguals: the Structural Transfer Hypothesis. In Choi, J., Hogue, E.A, Punske, J., Tat, D., Schertz, J., & Trueman, A. (eds.), *Proceedings of the 29th West Coast Conference on Formal Linguistics*, pp. 108-116.

Kantola, L. & van Gompel, R. P. G. (2011). Between- and within-language priming is the same: Evidence for shared bilingual syntactic representations. *Journal of Memory and Cognition*, 39:276–290.

Loebell, H. and Bock, K. (2003). Structural priming across languages. *Linguistics*, 41(5):791–824.

Nicoladis, E. (2006). Cross-linguistic transfer in adjective-noun strings by preschool bilingual children. *Bilingualism: Language and Cognition, 9(1)*:15– 32.

Paradis, J. & Nicoladis, E. (2007). The influence of dominance and sociolinguistic context on bilingual preschoolers' language choice. *International Journal Of Bilingual Education And Bilingualism*, 10(3):277–297.

Pickering, M. & Branigan, H. (1998). The representation of verbs: Evidence from syntactic priming in language production. *Journal of Memory and Language,* 39(4):633–651.

Rowland, C., Chang, F., Ambridge, B., Pine, J., & Lieven, E. (2012). The development of abstract syntax: Evidence from structural priming and the lexical boost. *Cognition, 125*(1): 49-63.

Schoonbaert, S., Hartsuiker, R., & Pickering, R. (2005) The representation of lexical and syntactic information in bilinguals: Evidence from syntactic priming. *Journal of Memory and Language, 56:* 153-171.

Shin, J.-A. & Christianson, K. (2009). Syntactic processing in Korean-English bilingual production: Evidence from cross-linguistic structural priming. *Cognition*, 112(175–180).

Snedeker, J. & Yuan, S. (2008). Effects of prosodic and lexical constraints on parsing in young children (and adults). *Journal of Memory and Language, 58(2):*574–608.

Strik, N. & Pérez-Leroux, A. (2011). *Jij doe wat girafe?:* Wh-movement and inversion in Dutch-French bilingual children. *Linguistic Approaches to Bilingualism, 1(2)*:175–205.

Van der Linden, E. & Blok-Boas, A. (2005). Exploring possession in simultaneous bilingualism: Dutch/French and Dutch/Italian. *EUROSLA Yearbook, 5*: 103-135.

Vasilyeva, M., Waterfall, H., Gámez, P. B., Gómez, L. E., Bowers, E., & Shimpi, P. (2010). Cross-linguistic structural priming in bilingual children. *Journal of Child Language*, 37:1047–1064.

Yip, V. & Matthews, S. (2007). *The bilingual child*. Ernst Klett Sprachen.