The Competition Model and Adult Second Language Learning: Cross-Language Similarity and L2 Morphosyntax Learning

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Abstract

Adult second language learners arrive at the language learning situation with an already formed first language grammar system in place. The study of cross-language similarity across the first and second languages explores how the similarities and differences in the two languages make learning more or less difficult, particularly for adult learners. From a Competition Model (MacWhinney, 1997) framework, the authors and their colleagues have conducted research examining the relationship between cross-language similarity and adult second language learning and processing with actual learners and in training paradigms with naïve learners; converging methodological approaches have been used (eye tracking, event related brain potentials, self- paced reading, and grammaticality judgments). We review these studies and describe the predictions derived from the Competition Model framework as a function of whether grammatical constructions are formed similarly or differently in the two languages or are unique to the second language. We conclude with a description of Brian MacWhinney's influence on this body of research.

Keywords: *Competition Model, Cross-Language Similarity, Grammaticality, L2 Morphosyntax Learning*

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[1]Introduction

How does an adult's first language (L1) impact the learning of a second language (L2)? We ask this question in relation to learning L2 morphosyntax. In a series of studies, we and our colleagues have used the predictions of the Unified Competition Model (MacWhinney, 2005) as a basis for exploring the consequences of cross-language similarity for learning L2 morphosyntax. These studies have involved testing actual language learners as well as training then testing naïve learners. These studies use a variety of methodologies (self-paced reading, event- related brain potentials, eye tracking, and behavioral grammaticality judgments) to gain traction on the relationship between cross-language similarity and L2 morphosyntax learning. In all of these studies, we have used morphosyntactic constructions that are similar, different, and unique across languages. We use a violation paradigm to assess sensitivity to grammatical violations using the tasks listed above.

The initial investigation in this line of work was conducted by Tokowicz and MacWhinney (2005). They defined similar constructions as those that would be formed in a similar manner in both languages in terms of which grammatical features had to agree or be explicitly marked. Different constructions were those in which the two languages both marked a grammatical feature, but the languages differed in terms of whether those features had to agree or be explicitly marked in a particular construction or with particular words. Finally, unique constructions were those in which the relevant grammatical feature did not exist in L1 and was unique to L2. Thus, similar constructions should encourage transfer across languages, different constructions should lead to competition across languages, and constructions that are unique to the L2 should encourage neither transfer nor competition.

A construction such as demonstrative determiner number agreement would be considered similar in English and Spanish because both languages have number agreement and expect agreement between a demonstrative determiner and its noun, as in (1).

(1) Ese/*Esos gato duerme. [That/*Those cat sleeps.]

In this example[2], the point at which the violation of agreement could be detected is the noun, *gato*, and this word is underlined for illustration. By contrast, definite determiner number agreement would be considered different between English and Spanish because although both languages use definite determiners and number agreement in some instances, in English the definite determiner doesn't have to agree with the noun in number, whereas it does in Spanish, as in (2).

(2) El (*Los) gato duerme. [TheSING/*ThePL cat sleeps.]

Lastly, a construction such as definite determiner gender agreement would be considered unique to Spanish because English does not use a grammatical gender system.

(3) El/*La gato duerme. [TheMASC/*TheFEM cat sleeps.]

[2] Note that this sentence is for example purposes only; actual stimuli were typically longer.

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Based on the predictions of the Unified Competition Model, we would anticipate that similar constructions as in (1) would engender transfer and it would therefore be easiest for learners to detect violations in these constructions. Different constructions should be difficult because of competition. Constructions that are unique to L2 should not benefit from transfer but also should not suffer from competition; processing of these constructions should therefore rely on input-driven learning (e.g., MacWhinney, 1997). In particular, according to the Competition Model, processing will be facilitated the stronger and more valid the cues are in the input. In the case of grammatical gender in Spanish, it is a fairly regular (valid) system (Alfonso, Domínguez, Álvarez, & Morales, 2014) and is typically taught early and often in classrooms in the sense that nouns are rarely taught separate from their determiners, which carry gender information. And because of the requirement for gender agreement throughout the language system, even naturalistic input should have regular opportunities for learning.

In the first investigation in this line of work, Tokowicz and MacWhinney (2005) tested native English speakers who were learning University Spanish. Participants read similar, different, and unique constructions with and without violations embedded in sentences while their brain responses were recorded. Tokowicz and MacWhinney anticipated stronger sensitivity (both behaviorally and as measured by brain responses) for similar and unique constructions than for the different construction. Event-related brain potentials (ERPs) were derived from the continuous electroencephalogram to permit comparisons between conditions. In line with predictions, participants were sensitive to the distinction between grammatical and ungrammatical sentences for the similar and unique conditions, but not the different condition. Behaviorally, however, participants had higher accuracy for the similar and different constructions than for the unique constructions, which were near chance. From the perspective of the Competition Model, it is not surprising that the similar condition showed sensitivity in both the ERP and the behavioral grammaticality judgments, whereas sentences in the other two conditions did not. However, it was surprising to find a dissociation between the online (ERP) data and the offline grammaticality judgment data in the different and unique conditions, in which we would have expected similar sensitivity in both measures (see also Chen, Shu, Liu, Zhao, & Li, 2007; McLaughlin, Osterhout, & Kim, 2004). This pattern underlines the fact that these two types of tasks access different types of processing. Further investigation of the behavioral data in this study (McClain & Tokowicz, 2006) demonstrated that grammaticality judgments are related to the number of words that agree with the critical word of the sentence in gender and/or number prior to the grammaticality judgment. For example, in a sentence such as (4), the verb is the only piece of agreeing information (in number) with the critical noun (camión). In contrast, in (5), there are two pieces of agreeing information: the verb (está) and the adjective full (llena), which are both singular.

(4) El/*Los camión está en el garaje. [The$_{SING}$/*The$_{PL}$ truck is in the garage.]

(5) La/*Las caja está llena de libros. [The$_{SING}$/*The$_{PL}$ box is full of books.]

The correlation McClain and Tokowicz reported between pieces of agreeing information and judgment accuracy suggests that end-of-sentence judgments may reflect an accumulation of evidence across an entire sentence, pointing to a possible source of dissociation between

online measures, which are taken at the point of the violating (or not) word, and offline measures that are taken at the end of the sentence.[3] Given this information, it is less surprising to find a dissociation between these measures, particularly because McClain and Tokowicz found that the unique construction happened to have the fewest agreeing words. Focusing on the ERP results that measure processing at the critical word, we can take the findings to suggest that learners are more sensitive to violations in the similar and unique conditions, consistent with the idea that competition led to a decrease in sensitivity in the different condition.

The final section of Tokowicz and MacWhinney (2005) was entitled "Creating improvements in performance". There, they discussed an ongoing pilot study that was aimed at improving participants' behavioral performance to better match their performance as measured by ERP. This was motivated particularly by participants' performance in the unique condition in which behavioral performance was near chance and yet ERP sensitivity was most pronounced. That initial pilot study was followed up by a more thorough one by Tolentino (2008) in which participants were tested in four between-subjects conditions. Participants in all conditions completed an initial block in which sentences were shown and acceptability judgments were made, similar to the Tokowicz and MacWhinney study. This was followed by a block in which participants were shown one of the following (grammaticality judgments were made in all conditions): (a) word pairs with/without a violation; (b) word pairs with/without a violation and judgments that were followed by feedback; (c) sentences with/without a violation; or (d) sentences with/without a violation and judgments that were followed by feedback. During the third block of trials, sentences were again shown without feedback. Judgments were most accurate in the condition in which word pairs had been presented and feedback was provided in the middle block (see the logic of feature focusing of the Knowledge-Learning-Instruction Framework of Koedinger, Corbett, & Perfetti, 2012). Given these findings, Tolentino (2008) used this word pairs plus feedback condition in a full ERP study. She examined the increase in performance during the interpolated block of trials in which the word pairs plus feedback were shown, as well as during the third block of trials in which sentences were shown without feedback. In the third block, a further manipulation was implemented such that some of the items in Block 3 had previously been seen in Block 2 (half as identical repetitions, half with a change in grammatical acceptability).

Sentence acceptability judgments were significantly more accurate in Block 2 than in Block 1 (as determined using d', a measure of sensitivity that takes response bias into account). Given that the pilot study had shown no similar improvement when sentences without feedback were continued for an equivalent number of trials, the switch to word pairs plus feedback was most likely responsible for the increase in accuracy. Moreover, judgments were also significantly more accurate in Block 3 (for both new and repeated items) than in Block 1. This sustained accuracy suggests that the intervention carried out during the interpolated block changed the way that the participants responded to the sentences. ERPs were recorded throughout Tolentino (2008). The findings showed that the increase in behavioral sensitivity observed in Block 3 was accompanied by an increase in online sensitivity as measured by the P600 ERP component. This finding is related to

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[3] The correlation between pieces of agreeing information and grammaticality judgment accuracy was present only for ungrammatical sentences (which generally had lower accuracy). See Tokowicz and Warren (2010) for additional details.

the observation of increased ERP sensitivity with increased L2 proficiency (e.g., Rossi, Gugler, Friederici, & Hahne, 2006).

Two findings are notable from the Tolentino study. First, performance on the grammaticality judgment task improved when word pairs were removed from sentence context and feedback was provided. As a reminder, the pilot study indicated that performance was most improved when both word pairs and feedback were used. Taken together, the findings suggest that isolating the violations from the sentences somehow aided learners in being able to perform better not only during the interpolated block but also in the later block of sentences. This may be because reading sentences in L2 is challenging and it aids attention or noticing and therefore learning when the violations are isolated, so their positions and types are more salient. Furthermore, having feedback likely assists with the yes bias that learners tend to exhibit when performing grammaticality judgment tasks (e.g., Tokowicz & MacWhinney, 2005); getting feedback can assist learners in calibrating their responses. Notably, these improvements carried over to the third block of trials when sentences were again provided without feedback.

The second notable finding is that the improvement in behavioral performance was accompanied by an increase in online sensitivity to violations as measured at the P600 component. Given that there was no condition in this study in which only sentences were provided without feedback, it is not possible to definitively determine that the change in online performance is due to the change in judgment performance. But we can look for a correlation between changes in grammaticality judgment sensitivity across blocks and the change in online P600 sensitivity to ungrammaticality across blocks. Across the three cross-language similarity conditions, changes in d' correlated with the change in online P600 sensitivity significantly only for the unique condition, which had the worst performance across all conditions and showed improvement from Block 1 (see Figure 1). This correlation supports the possibility that the change in behavioral performance drove a change in ERP sensitivity. Given that the unique condition is the condition in which learning should be most relevant according to the Competition Model, because the construction is not already part of the L1 system, it is reasonable that this is the condition that should benefit most from this form of intervention.

Tokowicz and Warren (2010) directly followed up on Tokowicz and MacWhinney (2005). They also tested very early English L1 learners of Spanish and used the similar, different, and unique conditions from Tokowicz and MacWhinney. However, Tokowicz and Warren added an additional similar condition (similar2) and used self-paced reading rather than ERPs with a fixed presentation rate to permit participants to process at their preferred speed. The similar2 condition included a violation of demonstrative determiner- noun number agreement, i.e., Esa/*Esas clase empieza al mediodía. *This/*These class begins at noon.* The benefit of including this similar2 condition is that it is directly parallel to the different condition because they both involve violations of number agreement between determiners and nouns. This makes the comparison between the similar2 and different conditions better controlled such that any observed differences are more likely to be related to transfer. Tokowicz and Warren's participants showed longer reading times for ungrammatical than grammatical sentences in the two similar and different conditions, but not the unique condition, on the word at which the ungrammaticality became apparent. Sensitivity analyses (d') on the grammaticality judgments also confirmed higher sensitivity to ungrammaticality in the two similar and the different

conditions than in the unique condition. Transfer accounts, like the Competition Model, predict the participants' sensitivity to ungrammaticality in the two similar conditions, but would predict that participants should have more difficulty detecting ungrammaticality in the different condition, given that the different condition requires participants to make a distinction (between singular and plural definite and possessive determiners) that they don't have to make in their L1. The fact that participants did not detect the ungrammaticality in the unique condition suggests that they had not yet learned grammatical gender in Spanish well.

Figure 1
D' by Cross-Language Similarity and Block (Adapted from Tolentino, 2008)
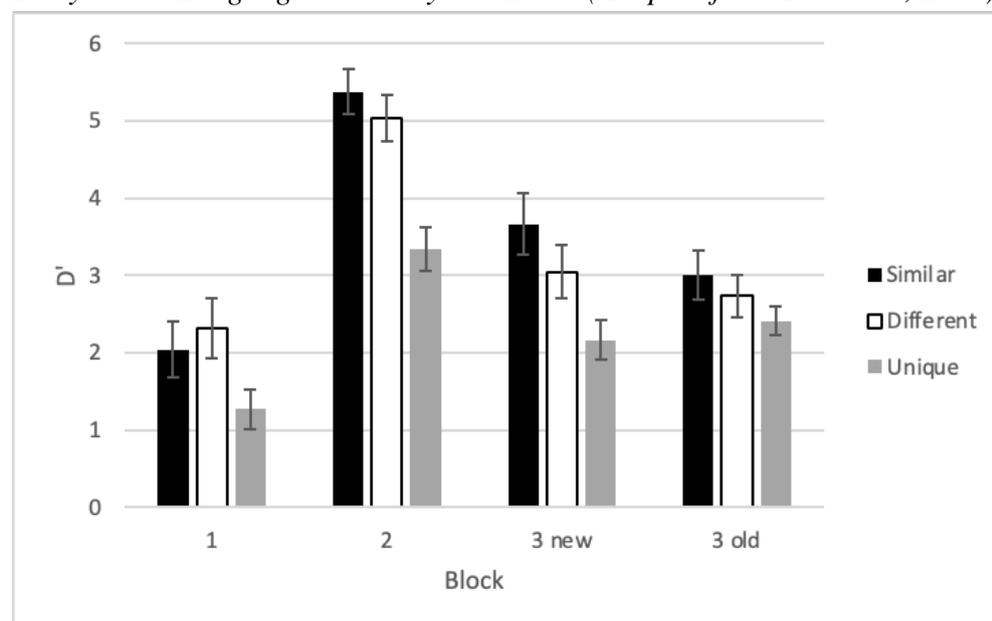
Tolentino and Tokowicz (2014) followed up these studies by conducting a training study in which native English speakers were taught a miniature version of Swedish (vocabulary and grammar), including a similar, different, and unique construction (see Table 1). The grammatical constructions were taught to participants in one of three between-subjects instructional manipulations: contrast plus color highlighting of the relevant location of the violation (Salience Group), contrast plus highlighting with grammatical explanations (Rule & Salience Group), or neither (Control Group; see Table 2). Participants were tested in a pretest and three posttests across two weeks.

Table 1
Sample Stimuli from Tolentino and Tokowicz (2014)

Similar	Different	Unique
(Demonstrative determiner- noun number agreement)	(Singular noun phrase definiteness marking)	(Indefinite singular article- adjective gender agreement)
Den där pojken leker.	Pojken leker.	En ung pojke leker.
De där pojkarna leker.	En pojke leker.	Ett ungt djur leker.

Table 2

Instructional Conditions from Tolentino and Tokowicz (2014) (Example from the Different Condition)

Control	Salience	Rule & Salience
Pojken leker. Filckan springer.	Pojke**n** leker. **En pojke** leker.	Pojke**n** leker. **En pojke** leker.

> Notice that definiteness is marked by attaching "(e)n" or "(e)t" to the end of a noun without the preceding articles "en/ett".

Overall, the results demonstrated better performance on similar and unique constructions than on different constructions and better performance on the final posttest than on earlier tests (e.g., Sabourin & Stowe, 2008; Sabourin et al., 2006). There was little difference between instructional conditions for the similar condition, which is perhaps to be expected given that transfer from L1 is possible. For different constructions, both the Salience and Rule & Salience (at posttest 3) conditions yielded better performance than the Control condition. For unique constructions, the Rule & Salience (at posttest1) and Salience conditions outperformed the Control condition. These results suggest that although the three training conditions didn't differ with respect to the similar construction, salience was particularly helpful in training different constructions, likely because the visual enhancement drew attention to the critical areas in the sentences where agreement was necessary (see Han, Park, & Combs, 2008, for a review), which aided the learner in overcoming competition from L1. Unique constructions benefited most (in terms of effect sizes) from the Rule & Salience condition. The presentation of a grammatical rule or explanation for a construction that does not exist in L1 was likely useful because it provided necessary background (e.g., "Notice that you add a "t" to adjectives that follow the "ett" article but not the "en" article."). The salience aspect of this condition helped to draw attention to the words where agreement was necessary, which, combined with the rule, may have been a powerful training mechanism. The overall pattern of performance as well as the pattern of interaction with instructional condition is consistent with the predictions of the Competition Model.

Tuninetti, Warren, and Tokowicz (2015) continued to look for evidence of transfer effects in L2 learning based on similarity, difference, and uniqueness in the ways that language processing cues would map from L1 to L2. However, this study had a few important differences from most previous work in this line of research. First, instead of manipulating morphosyntactic agreement, Tuninetti et al. focused entirely on syntax and manipulated word order in English. Second, instead of testing a single group of L2 learners, for whom each violation condition mapped to a single kind of transfer (i.e. similar, different, unique), Tuninetti et al. tested two learner groups: L2 learners with L1s of Mandarin Chinese or Arabic. Differences across Mandarin Chinese and Arabic meant that the same English word-order violation could be similar for learners from one L1 but different for learners from the other L2.

This is important because when there is only a single mapping between violations and kinds of transfer, it is difficult to rule out the possibility that some confounding factor could independently make some violations harder to detect than others for L2 learners. Having a single violation map to multiple kinds of transfer eliminates the potential for this kind of confound. Third, this study was conducted with eye tracking. Fourth, the L2 learners in this study were considerably more advanced than the L2 learners in previous studies.

Tuninetti et al. (2015) had L1 English, L1 Mandarin Chinese, and L1 Arabic readers read English sentences while their eyes were being tracked and judged their grammaticality. The sentences were either grammatical, e.g., *She pulled the short skirt up over her leggings,* or were ungrammatical because the object noun was moved to before the article and adjective of its noun phrase (noun-article condition), e.g., *She pulled skirt the short up over her leggings,* or ungrammatical because the order of the object adjective and noun were switched (noun-adjective condition), e.g., *She pulled the skirt short up over her leggings.* Nouns and articles have similar orders and properties in Arabic and English, but Mandarin does not have articles in the same way English does, so the noun-article condition was classified as similar for Arabic L1 learners of English, and unique for Mandarin L1 learners of English. This means there should be positive transfer for Arabic L1 learners, i.e., they should detect noun-article violations quickly and often, and no transfer for Mandarin L1 learners, i.e., they might detect violations of this type less quickly or often. Nouns come after adjectives in Mandarin and English, but before adjectives in Arabic, so the noun-adjective condition was classified as similar for Mandarin L1 learners of English and different for Arabic L1 learners of English. This means that there should be positive transfer for Mandarin L1 learners, i.e., they should detect noun-adjective violations quickly and often, and negative transfer for Arabic L1 learners, i.e., they should have difficulty detecting noun-adjective violations. Tuninetti et al. found that all groups of participants' grammaticality judgments were most accurate for the noun-article violation sentences and participants also showed the earliest eye movement disruption in this condition. Both L2 English groups were less accurate at detecting noun-adjective violations and showed some evidence of longer-lasting eye movement disruption in this condition, but there were no clear differences between the two groups reflecting different kinds of transfer.

The results of Tuninetti et al. (2015) do not fit with the results of the other experiments in this line of work in that there was little to no evidence of transfer effects. All violations were detected similarly quickly. One potential reason for this is that the L2 learners in Tuninetti et al. were more proficient than the learners in the other studies. Tuninetti et al.'s learners were students taking college classes in their L2 rather than learners in the first few semesters of their L2. This is important because transfer effects are likely to be clearer and more evident nearer the beginning of learning, when new routines have not yet been established for the new language. With increased proficiency comes more efficient language processing; Efficiency is likely to be improved via sensitivity to the new language's properties rather than by porting over processing routines optimized for a different language. Another factor that may have played into the lack of transfer effects is that Tuninetti et al. tested word-order violations rather than violations of morphosyntactic particles or endings. Word order is relatively rigid in English and is reinforced by almost every sentence that a learner encounters. This is different from features tested in previous studies, like word-specific gender marking, demonstrative determiner agreement, or verbal aspect markers, in that features like these are less frequently

encountered and therefore not likely to be learned as well. And indeed, of the two violations of word order in Tuninetti et al., results showed better detection of the one that violated patterns present in almost every sentence than the one that violated patterns encountered less frequently.

Since Tuninetti et al. (2015) was published, a new literature has sprung up investigating the conditions under which L1 speakers fail to notice word transpositions while reading their L1 (e.g., Liu, Li, Cutter, Paterson, & Wang, 2022; Mirault, Snell, & Grainger, 2018). This work has aimed to address the following questions: when do readers incorporate visuospatial information about word location into the mental representations they build during sentence comprehension, are words are accessed and processed serially or in parallel during reading, and can top-down expectations for a particular order of words override bottom-up evidence for a different order? These are quite different from the questions about transfer in language learning that were addressed in Tuninetti et al., but it is worth considering whether Tuninetti et al. can inform these questions and whether the fact that L1 speakers sometimes fail to notice word transpositions might change the way we think about Tuninetti et al. and its results. In Tuninetti et al.'s adjective-noun condition, two adjacent words were swapped, like in the rest of this word transposition literature. However, in their noun-article condition, the noun moved to a position two words before where it belonged. In Tuninetti et al., L1 English speakers were 99% accurate at identifying noun-article violations and 95% accurate at detecting either no violation or noun-adjective violations. The fact that readers were better at detecting the noun-article violations is consistent with multiple accounts of why readers fail to detect transposed words. Accounts that explain readers' lack of detection of word transpositions as being the result of two words being accessed or processed close enough in time that their positions in a visuospatial representation are assigned concurrently (Engbert, Nuthmann, Richter, & Kliegl, 2005; Snell, van Leipsig, Grainger, & Meeter, 2018) would likely predict lower detection rates for word swaps that are adjacent and higher detection rates for swaps that involve three words. But accounts that predict that words are processed and integrated into a sentence one by one (e.g. Reichle, Warren, & McConnell, 2009) also would predict higher detection rates for the noun-article condition, because there are more cues to ungrammaticality in this condition (see Tuninetti et al., 2015, for discussion). The 95-99% overall accuracy that Tuninetti et al. observed is considerably higher than many of the accuracies reported in the word transposition literature (see Huang & Staub, 2021, for a review) and suggests that their participants almost always noticed word transpositions. This very high accuracy may be because most studies in this literature have used speeded grammaticality judgments, whereas Tuninetti et al. did not put time pressure on their participants. These high accuracy rates limit the amount that Tuninetti et al. can contribute to the literature on word-transposition detection and vice versa. The questions that Tuninetti et al. (2015) address with respect to cue strength, transfer effects in language learning, and violation detection intersect in important and interesting ways with another relatively recent literature on noisy channel comprehension (e.g., Gibson, Bergen & Piantadosi, 2013). One goal of this noisy channel literature has been to characterize changes in how heavily a comprehender relies on particular cues depending on properties of the context. For example, when reading in a context with many typos, a comprehender may rely more heavily on top-down expectations about what a sentence should mean than on the exact letters of the bottom-up input they are processing, and therefore overwrite (or possibly not process) violations in the input (Gibson et al., 2013). The fact that reliance on cues in L1 can shift adds

to the complexity of considering the transfer of cue-weightings from L1 to L2 during language learning and is an interesting issue to consider within the Competition Model framework.

Ongoing Research

In addition to the research described above, we have several ongoing studies that interface with these. In the first, we further investigate violations like those explored by Tokowicz and Warren (2010). Getty, Adams, Tokowicz, & Warren (2024) tested native Mandarin speakers on violations of English morphosyntax following the similar, different, and unique scheme. Two of the conditions (one of the similar conditions and the different condition) focus on number agreement because there has been disagreement about whether number is able to be learned by native Mandarin speakers (e.g., Jiang, 2003, 2007; Rusk et al., 2020).

Also, Tkacikova, Warren, and Tokowicz (2023) followed up on Tolentino and Tokowicz (2014) by teaching native English speakers a miniature version of Slovak (vocabulary and grammar) using Tolentino and Tokowicz's Salient condition. Testing involved the self-paced reading task as used by Tokowicz and Warren (2010). Tkacikova et al. further examined the role of musical training and musical ability to assess whether individuals with more musical training and higher musical ability would be more sensitive to violations of grammar in a newly-learned L2, particularly in the different condition, which is expected to generate the greatest amount of competition across languages.

These ongoing studies add to the already-existing body of research in this area and help us to answer additional questions about the role of cross-language similarity in adult L2 learning. Taken together, the findings from these studies suggest that constructions that are similar in L1 and L2 benefit from positive transfer, whereas those that are different in L1 and L2 do not and are susceptible to competition, although the gravity of that competition for processing depends on a number of factors (e.g., proficiency in L2, processing speed required for the task).

Constructions that are unique to L2 vary the most in what is observed across studies, and seem the most changeable based on additional pieces of information, training in the form of an interpolated block (with focusing and feedback), etc. These findings are broadly supportive of the Competition Model and have provided a useful framework for examining the way that adults learn a new language. We thank Brian MacWhinney for his many contributions to the field and to our work in particular. We'd like to share some of the ways that Brian has impacted us in particular.

Brian's Influence

Tessa's exposure to Brian's ideas began when she started collaborating with Natasha on the line of work discussed in this chapter. Having been trained from a Chomskian viewpoint, at first Tessa saw the Competition Model and its components of cue-weightings and transfer as being primarily relevant to L2 learning. But over the years she has come to think of these mechanisms as core principles of cognition and all language processing. Thinking in this way has changed the direction of her major research program, e.g., how and why different language

users bring different sources of knowledge to bear during language use (e.g. Dresang, Warren, Hula, & Dickey, 2021; Warren & Dickey, 2021) and she is grateful.

When Natasha began working with Brian as a postdoctoral fellow her previous work had focused on vocabulary learning. She was excited to do work with him on grammar learning but discovered that he was interested in working with her on vocabulary learning. They decided to meet in the middle, and they applied lessons learned from her work on translation ambiguity (see, e.g., Tokowicz, Rice, & Ekves, 2023), which occurs when a word in one language has more than one translation in the other language, to new work on morphosyntax learning. This was quite fitting because this had been the motivation for her application to work with Brian after reading his chapter on L2 acquisition and the Competition Model (MacWhinney, 1997). The work that she completed with Brian has formed the basis for a major line of her ongoing research and for her current grant funding. She is honored to have been able to work with Brian on these issues, to have learned from him, have had his support, and to continue to engage with him intellectually.

Leida was Natasha's PhD student and was therefore exposed to Brian's work through Natasha. Her research in this area was some of her foundational work and formed the basis for her master's thesis, comprehensive exam (Tolentino & Tokowicz, 2011), and dissertation (Tolentino & Tokowicz, 2014).

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