The role of L1 verbal information in L2 syntactic processing

Amelia J. Dietrich and Paola E. Dussias
Penn State University, University Park, Pennsylvania, USA

Introduction

When bilinguals parse sentences in their second language, they face many uncertainties about how the people and objects in those sentences relate to one another. Recent psycholinguistic research has shown that relatively proficient bilinguals have access to the lexical and grammatical rules of each language; thus, a bilingual's two language systems are not entirely independent from each other. What, then, do second language learners do under these conditions of uncertainty? What information do they draw on to solve this "uncertainty" problem?

Models such as the *Garden-path model* and *Construal Hypothesis* propose that the bilingual parser is initially guided by **universal strategies applicable to all languages**. In contrast, other models argue that the bilingual parser is initially guided by **language-specific information (L1/L2)**, as suggested by experience-based models of language comprehension. One universal strategy proposed is the syntax-first model, in which syntax is the predominant factor affecting immediate parsing decisions. This means that when the parser is faced with a choice of building two syntactic structures, it will choose the syntactically simpler one, making this choice without the intervention of other sources of information.

Experience-based models, in contrast, argue that many relevant sources of information can have immediate effects on the interpretation of sentences. The frequency with which a verb is followed by a particular type of complement should affect ambiguity resolution (*verb bias*). **Verb bias** refers to the rate at which a given complement type occurs with a given verb (in a given language). If a verb shows a 'preference' for a particular complement type, we call that its **verb bias** ; e.g.: *believe* prefers a sentential complement in English (.50)*: John believed (that) the story was true.*

The present study investigates whether L2 learners are able to use L2 usage frequency information when parsing in their second language. Additionally, it provides support for experience-based models of sentence processing in general, for human sentence parsing in either the L1 or the L2.

Research Questions

What strategies will bilinguals use to parse in their L2?

Will bilinguals favor the syntactically simpler construction? (predicted by syntax-first models)

Will bilinguals use language specific information? (as predicted by experience-based models of parsing)

If they use language specific information, are they using that information from their L1 or their L2?

Methods

Seven same bias and 15 different bias verbs were embedded in temporarily ambiguous direct-object (2 and 4) and sentential-complement (1 and 3) sentence continuations:

(1) The CIA agent confirmed *the rumor* could mean a security leak
(2) The CIA agent confirmed *the rumor* when he testified before Congress
(3) The ticket agent admitted *the mistake* could mean a security leak
(4) The ticket agent admitted *the mistake* when he testified before Congress

Critically for our purposes, we manipulated verb bias and sentence continuation such that if verb bias from the L1 is accessed and used during L2 sentence processing, sentences (1) and (4) should be easy (and not difficult) to process. Highly proficient Spanish-English bilinguals read 36 experimental sentences and 72 fillers. Sentences were presented using a reading moving-window paradigm (Carpenter and Wooley, 1983). A comprehension question followed each sentence.

Participants:

22 Spanish-English bilinguals from across the Spanish-speaking world, immersed in English environment

7 High proficiency

15 Low(er) Proficiency

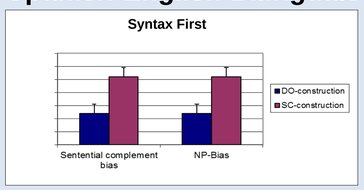
Groups were identified using a receptive (Lexical Decision Task) and a productive (Picture Naming) measure

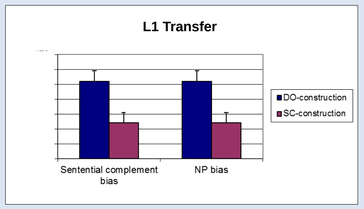
- high proficiency speakers had more than 68/72 pictures correctly named and less than 20 (out of 269) false alarms on a lexical decision task

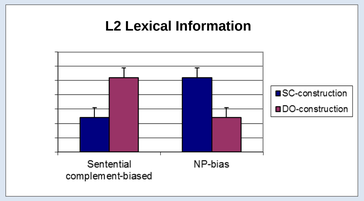
17 monolingual speakers of English

The Task: Self-paced Reading Moving Window Paradigm

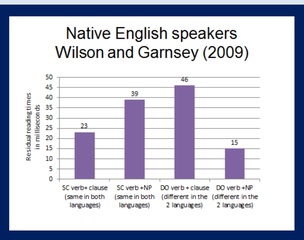
Hypothetical Results: Spanish-English Bilinguals







admitted the mistake when he…
admitted the mistake might not…



Results

In our original analysis, as seen in Figure 1 below, the higher proficiency speakers show sensitivity to L2 verb bias information during sentence reading and parsing. The lower proficiency group did not originally show this sensitivity. Nor did their reading times match the predictions made by any of the models discussed. It would appear that this group is in a period of transition, perhaps using a mix of techniques to properly parse in their L2. We believe that this is strong evidence for experience-based models of sentence processing.

In addition to reading time information and proficiency measures, at the end of the session all participants were asked to participate in an offline sentence completion task which provided us with information about which verb biases have been fully acquired by the bilinguals in this study and which have not yet been acquired. Participants were provided with a sentence such as: "*Mary remembered*_____," and asked to complete the sentence in a way that is both grammatically correct and semantically plausible. Taken as a whole, these responses were coded for completion type and a usage frequency was determined. Eight verbs were found to prefer different complement types in the bilingual usage than has been observed in the monolingual literature (Garnsey et al., 1997). One by one, the dispreferred usage of these verbs was identified in the response of each participant. Reading times for sentences containing one of these verbs and read by participants use the non-native preference were excluded from the analysis found in Figure 2 below. When we exlude those verbs which are unfamiliar to the low proficiency group, we see that they, too, are sensitive to verb bias information in thr L@.

Figure 1. Total Reading Times (RTs) for the critical region

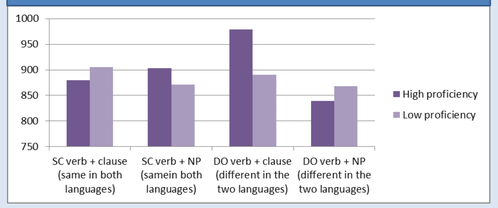
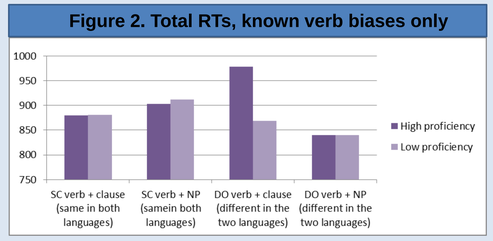


Figure 2. Total RTs, known verb biases only



Discussion

IMPLICATIONS FOR SENTENCE PROCESSING:

Exposure-based models of sentence processing better account for the present data. The more proficiency and exposure a person has in their second language, the more native-like their language processing becomes. By examining the variability between lower and higher proficiency bilinguals we observe that not just proficiency, experience with the language is very important. In fact, it appears to be their lack of familiarity with particular lexical items which was causing the non-native-looking reading times in our initial analysis.

IMPLICATIONS FOR BILINGUALISM:

Despite all of the literature supporting parallel activation of two languages at the lexical and syntactic levels, with enough proficiency L2 speakers are able to process in native-like ways, seemingly being able to strongly inhibit their L1 when processing in the L2.

Why is L2 verb bias knowledge special?

Verb bias is something that we don't teach in our language classes, it is acquired by experience with the language through reading, immersion, exposure, so the mechanisms that allow acquisition to happen are still operative in late learners throughout their immersion

Alternatively, the L1 may also be changing and becoming more L2-like. These topics require further investigation in future projects.

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