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Authors

Brooks, Patricia J.
Sekerina, Irina A.

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Shallow Processing of Universal Quantification: A Comparison of Monolingual and Bilingual Adults

Patricia J. Brooks (pbrooks@mail.csi.cuny.edu) & Irina A. Sekerina (sekerina@mail.csi.cuny.edu)

Department of Psychology, College of Staten Island and the Graduate Center of City University of New York
2800 Victory Blvd., Staten Island, NY 10314 USA

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Summary

Recent studies in sentence processing suggest that listeners often engage in shallow syntactic processing, and construct interpretations that do not capture the true content of a sentence (e.g., Ferreira et al, 2002; Sanford & Sturt, 2002). Clahsen & Felser (2006) have suggested that L2 learners are especially prone to shallow processing and often rely on lexical-semantic as opposed to syntactic information across a range of different constructions. Our study examines shallow processing in interpreting universal quantifiers. Brooks & Braine (1996) observed numerous errors in children in contexts where sets of objects are in partial one-to-one correspondence (see Figure 1). Brooks & Sekerina (in press) were surprised to find that even college students made similar errors as children in a picture-choice task, with many performing at chance. Here we use a sentence-picture verification task to examine whether undergraduates still exhibit chance performance in processing universal quantifiers. We compare monolingual (N=98) and bilingual speakers of English as an L2 (N=82) to explore Clahsen & Felser's hypothesis with fluent bilinguals.



Every alligator is in a bathtub - 'No'
Every bathtub has an alligator in it - 'Yes'

Figure 1: Example Stimulus Picture and Sentences

In addition to a language background questionnaire, participants were administered the Culture-Fair IQ test (Cattell & Cattell, 1973) and the Need for Cognition test (Cacioppo et al., 1984) to ensure that the monolingual and bilingual groups were well matched. Participants heard a series of sentences over headphones, each paired with a color drawing presented simultaneously on a computer screen (see Figure 1). Participants judged whether the sentence matched the picture. Sixteen target sentences

containing universal quantifiers were presented along with 72 fillers (e.g., reversible active and passive sentences).

Results

Performance was near ceiling for filler sentences (95% correct across types). For target sentences with universal quantifiers, accuracy was significantly worse, with more than 1 in 5 college students performing at chance on these trials, consistent with shallow processing. Accuracy was correlated with Culture-Fair IQ ($r = .30, p < .05$) and Need for Cognition ($r = .25, p < .05$) in monolinguals, and with Culture-Fair IQ ($r = .26, p < .05$) in bilinguals. Culture-Fair IQ and Need for Cognition were uncorrelated in both groups. RTs were uncorrelated with accuracy, indicating that there was no speed-accuracy trade-off. Counter to Clahsen & Felser (2006), performance on quantifier sentences did not vary as a function of language background. We now are using eye movements to examine how attention allocation during sentence processing differs for students with poor versus good comprehension.

Table 1: Scores for Need for Cognition, Culture-Fair IQ, and Sentence-Picture Verification (Quantifier Trials).

Group	NFC	CF IQ	Accuracy Mean, Range	% at Chance
Monolingual	6.0	21.7	87.9 (50-100%)	20.4%
Bilingual	5.9	21.1	86.0 (50-100%)	24.4%

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