The role of language context in the acquisition of novel words

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Researchers have developed a robust understanding of how mutual exclusivity is used by word learners to make predictions about possible referents (e.g. Markman & Wachtel, 1988). Yet, most studies have focused on acquiring words in isolation, despite children's input consisting of words embedded in rich linguistic contexts (Hoff-Ginsberg, 1990). We propose that such linguistic contexts play an equally important role in acquiring word meanings. While a large body of work has investigated children's use of language context to acquire verb meanings (e.g. Gleitman, 1990), considerably less attention has been given to the role of language context in the acquisition of noun meanings. We know that adults use verb information to predict upcoming familiar nouns (Altmann & Kamide 1999), but it is not clear whether, or how, such linguistic information is used to acquire the meanings of novel words.

In the present experiment, we ask whether adults can use verb information to predict upcoming **novel** nouns during sentence processing, just as they can for familiar nouns (as in Altmann & Kamide 1999). Further, we ask how their use of this language context cue compares to their use of mutual exclusivity alone. On each of 24 trials, participants saw two images—one novel and one known—and were asked to select one (e.g. "Mary wants to eat the wug. Click on the wug!"). Crucially, while mutual exclusivity was always informative, the language context (here, the verb "eat") was only informative when one of the available referents was edible (and uninformative when both were; see Figure 1). In half of the trials, the correct referent was novel (e.g. unfamiliar fruit with the label "wug"), and in the other half, the correct referent was known (e.g. bananas).

Figure 2 shows a mixed-effect analysis of participant reaction times (log RT and untransformed raw RT). Each model included **word type** and **language context** as simple coded fixed effects and by-participant random intercepts. Overall, participants took longer to select the target referent when the language context was uninformative ($\chi^2(1)=55.42$, $p<0.001$; $\beta=350.39$, SE=44.62, t=7.85) and took longer to select the target referent when the target word was novel ($\chi^2(1)=8.38$, $p<0.001$; $\beta=143.79$, SE=44.66, t=3.22). An interaction between word type (known, novel) and language context (informative, uninformative) suggests that the main effect of word type depended on language context ($\chi^2(1)=13.36$, $p<0.001$): participants took significantly longer to select novel targets, but only when the language context was uninformative ($\beta=327.22$, SE=89.23, t=3.67, see Figure 2).

Our results suggest that learners can use verb information to predict upcoming nouns equally well, regardless of whether the nouns are novel or known. Further, learners may be able to use rich language contexts to predict the meanings of upcoming novel words, even **before** these words are heard. This process could have a facilitative effect on word-learning, whereby meanings are first predicted and then reinforced upon hearing the novel word. In ongoing work, our lab is conducting several follow-up experiments to ask whether (and at what age) children can similarly make use of language context to acquire novel word meanings, and whether children can leverage both the language context and mutual exclusivity in sophisticated ways to acquire novel words in noisy environments. Our findings will not only have important implications for theories of word learning, but will also emphasize the important role that language itself plays in children's early vocabulary development.

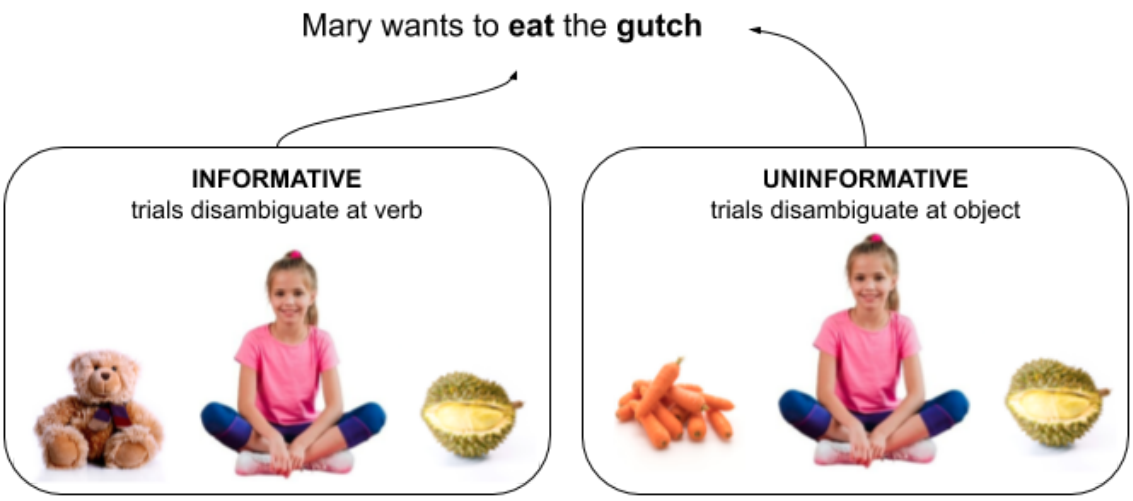
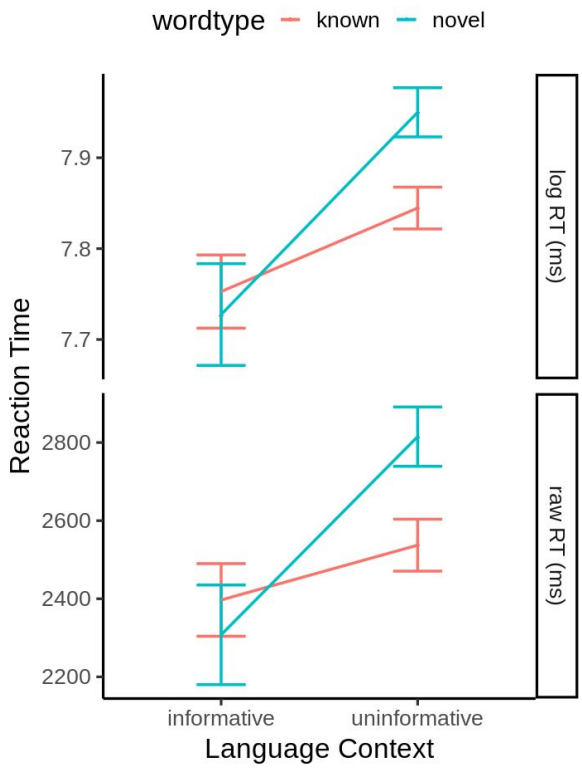


Figure 1. Two sample trials. Participants hear the sentence “Mary wants to eat the” followed by known (e.g. carrots) or novel (e.g. gutch) nouns. The verb “eat” is informative when one referent is edible and uninformative when both are.



Log RT

	Est	SE	t
(Intercept)	7.81	0.03	251.01
wordtype	0.04	0.02	2.07
langcontext	0.16	0.02	9.48
wordtype:langcontext	0.14	0.03	4.05

Raw RT

	Est	SE	t
(Intercept)	2569.12	76.77	33.46
wordtype	143.79	44.66	3.22
langcontext	350.39	44.62	7.85
wordtype:langcontext	327.22	89.23	3.67

Figure 2. (left) Plot of log and raw RT by language context and word type; error bars are standard error. (above) Model coefficients for log RT and raw RT analysis.

References. Altmann & Kamide (1999) Incremental interpretation at verbs: restricting the domain of subsequent reference. *Cognition*. Gleitman (1990) The structural sources of verb meanings. *Language Acquisition* Hoff-Ginsberg (1990) Maternal speech and the child’s development of syntax: A further look. *Journal of child language*. Markman & Wachtel (1988) Children’s use of mutual exclusivity to constrain the meaning of words. *Cognitive psychology.*