Expressing the unseen: Learning to encode inference as an information source

Humans can learn about an event through direct visual experience (e.g., seeing someone break a glass) or indirectly, through inferences from visual clues (e.g., seeing pieces of broken glass). Cross-linguistically, information source can be encoded in evidential systems that often distinguish between visual and inferential morphemes.[1] However, in both cognition and language, the boundary between visual perception and inference is subtle. For instance, people routinely misremember things that they have only inferred as things that they have directly seen[2,3]. Furthermore, cross-linguistically, inferential access is sometimes collapsed with visual access under a direct or firsthand marker while at other times, it is encoded separately from visual access and treated as indirect.[4]

We propose that these disparate facts can be explained by positing varieties of inference depending on whether the inferential cues are more or less indirect. The more direct the visual-inferential cues, the closer an inference appears to perception. To test this assumption, we use an Artificial Language Learning paradigm[5,6] to test the acquisition of different evidential morphemes in adult speakers of English (a language that does not mark evidentiality morphologically). Unlike past studies, we ask whether the nature of the visual clues that lead to inference has an impact on acquiring an evidential system that marks a single information source (either inference or visual experience).

In Experiment 1, 47 English-speaking adults were exposed to an "alien" language that was similar to English but had a novel verb-final morpheme, *ga*, and had to figure out what *ga* meant. They were shown 14 vignettes (Fig.1A-B) in which a puppet gained access to an event through observation of someone's action (Visual Access) or inference from visual clues at the event endpoint (Inferential Access; 7 events per access type). At the end of each vignette, the puppet produced a sentence with or without *ga* shown in a speech bubble (e.g., *Frog square drewga*). Participants were either assigned to the Visual or the Inferential system depending on which access was marked by *ga*. Participants then completed a Comprehension task: they saw 12 new vignettes (6 per access type) and had to say whether *ga* was used correctly or not. On half of the trials the puppet erroneously used *ga* (50% misses, 50% incorrect inclusions). There was no significant difference between the Inferential and Visual system ($t(45)= .50$, $p=.61$) with performance slightly above chance.

Experiment 2($N=47$) replicated Experiment 1 but increased the indirectness of visual clues provided for the Inference events by removing the agent from the end of the Inferential Access vignettes (Fig.1C). No learnability difference was observed between the Visual and Inferential Systems ($t(45)=.75$, $p=.45$). However, a comparison across experiments showed a learnability advantage for Experiment 2 ($F(1,94)=11.23$, $p=.001$) for both evidential systems. As expected, the increase in the indirectness of visual clues in the Inferential Access trials sharpened the contrast to Visual Access and benefited the encoding of both types of access in language since ourst is an evidential system that only makes a two-way distinction.

These findings reveal sub-types within the class of inferential access and suggest that the variable status of inferentials across evidential systems could be explained by the availability of different types of inferential evidence and/or assessments of this evidence cross-linguistically.

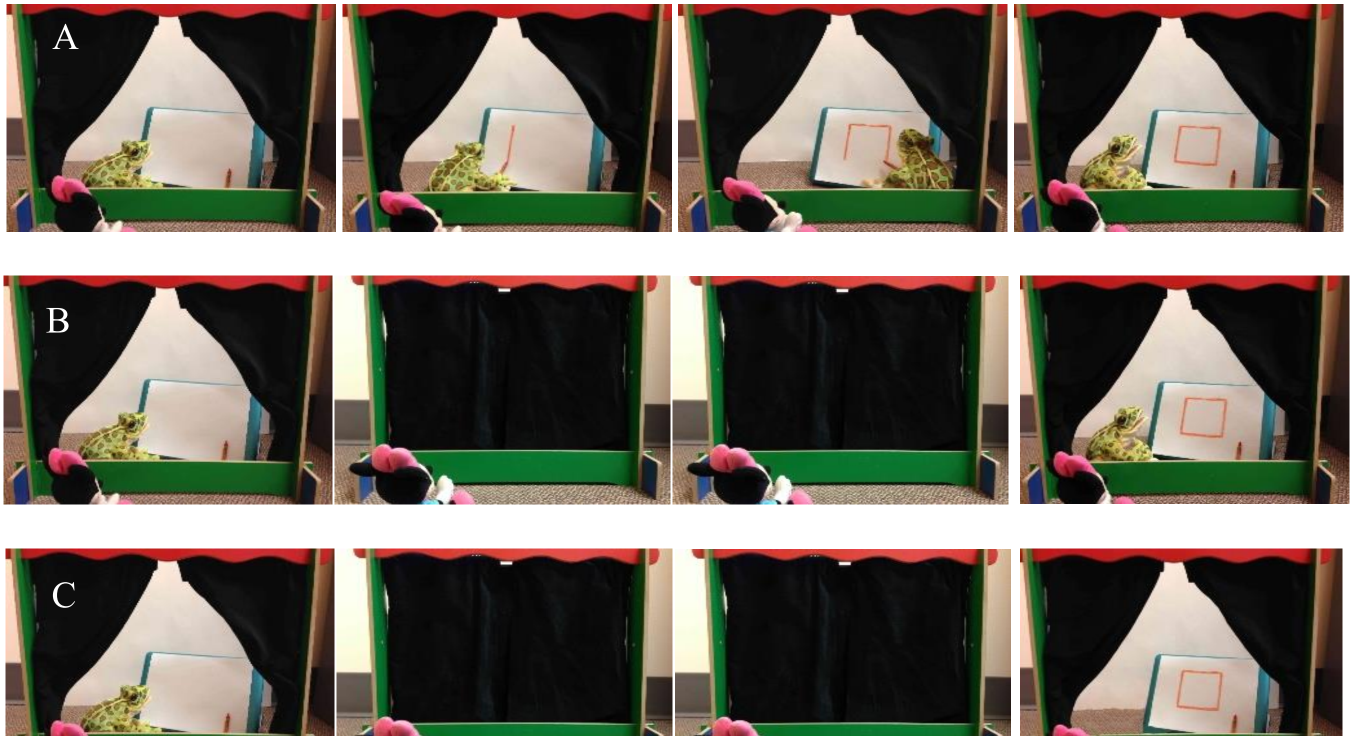

Figure 1. Sample vignette for each Access Type: (A) Visual (Exp.1 and 2); (B) Inferential (Exp.1); (C) Inferential (without an agent; Exp.2). Minnie would later describe the event.

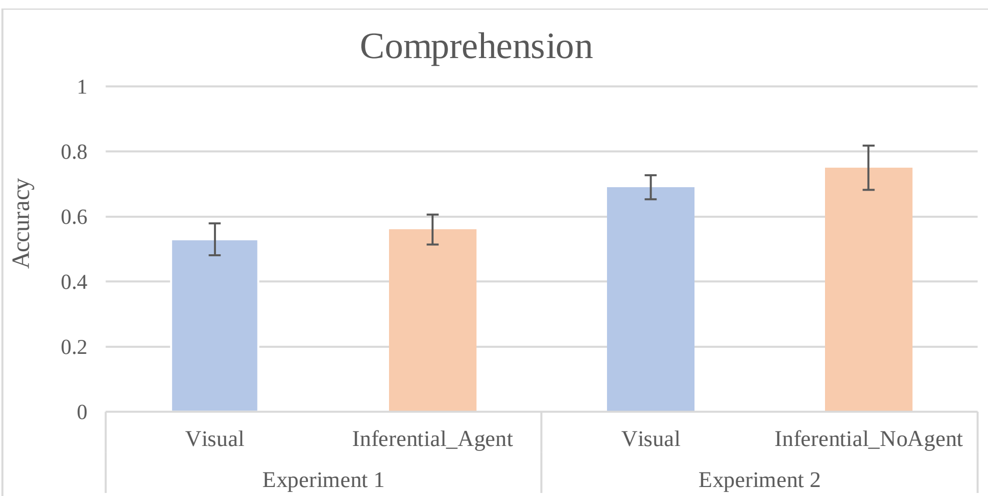

Figure 2. Accuracy Means Across Systems and Experiments. Error bars represent ± 1 S.E.

References

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