

**What do listeners expect when the speaker is disfluent:  
Something unfamiliar or something hard to name?**

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Arnold et al. (2007) demonstrated that after hearing a disfluency (“thee uh” versus “the”) listeners develop an expectation that the speaker will refer to an unfamiliar object. They argued the unfamiliarity bias arises from listeners’ assumptions that unfamiliar objects are harder to name. In natural language, familiarity and ease of naming are confounded. Therefore, Arnold et al.’s results cannot distinguish whether disfluencies bias for: (a) objects that listeners have less experience with; (b) objects that are harder to name, or (c) objects that require longer referring expressions.

We used novel shapes, some with artificial names, to tease apart these hypotheses. Familiarity and length predict that a disfluency will bias listeners to unnamed novel shapes, which require descriptions. In contrast, ease of naming predicts that shapes with novel names will initially present more difficulty because the new names are hard to retrieve.

We created four sets of easy-to-group novel shapes. Participants learned three names for three of the groups, rotated across lists to avoid naming preferences. (A perspective manipulation was included in the design but is not reported here, because the results were ambiguous between participants not taking perspective and participants not understanding the manipulation).

In Experiment 1, a training phase taught participants the names passively until reaching ceiling performance. This was followed by a test phase in which eye-movements were recorded as participant followed instructions to click on one of four objects in a display. On critical trials, the display included two named shapes in two colors and two unnamed shapes in the same two colors. The referent (named vs. unnamed) and fluency (fluent vs. disfluent) were manipulated. We measured biases during the ambiguous adjective region (200ms after color onset to 200ms after average noun onset), calculating the ratio of looks to the named shape over looks to both named and unnamed shapes of the mentioned color. When hearing a disfluent instruction, listeners looked more at the named shape, resulting in a main effect of disfluency ( $F(1,27)=5.52, p<.03$ , ratios were quasi-logit transformed prior to ANOVA). Thus, disfluencies created a bias towards the named shapes, despite the fact that they were more familiar to the listeners and required shorter referring expressions than shapes without names. This result clearly supports the ease of naming hypothesis.

If name retrieval is perceived as the source of difficulty, making retrieval easier should eliminate the effect. In Experiment 2, we increased training by adding a phase where participants actively named the shapes. As predicted, increased practice eliminated the named-preference ratio during the processing of the color; this bias did not differ across conditions ( $F_s < 1$ ). Interestingly, the effect seems to be driven by the listener’s perceived difficulty, and not by the listener’s attribution about the source of the speaker’s disfluency. In both experiments, post-experimental debriefings indicated that participants believed that the speaker produced more disfluencies for the shapes without names.

These results extend previous evidence that disfluencies are attributed to a difficulty the speaker is having, and demonstrate that listeners may assess difficulty based on their own experience.

**Displays.** a red 'plinuk', a blue (identical) 'plinuk', a red unnamed shape, a blue (identical) unnamed shape.

**Instructions.**

Named-Fluent	"Click on the red plinuk."
Named-Disfluent	"Click on thee uh red plinuk."
Unnamed-Fluent	"Click on the red one that's like a flower."
Unnamed-Disfluent	"Click on thee uh red one that's like a flower."

**References.**

Arnold, J.E., Hudson Kam, C.L. & Tanenhaus, M.K. (2007). If you say thee uh- you're describing something hard: the on-line attribution of disfluency during reference comprehension. *Journal of Experimental Psychology: Learning, Memory & Cognition*, 33, (5), 914-930.