Referential modification and memory for object features

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Referential expressions (e.g., *sleeveless dress*) often include modifiers which can be used to characterize or uniquely identify the intended referent. The use of adjective modifiers improves memory for named objects compared to using nouns only (Yoon, et al, 2016). Evidence from the online processing literature demonstrates that addressees consider multiple candidate referents that are temporarily consistent with the unfolding noun phrase (Eberhard et al., 1995), and further that these temporary considerations improve memory for those candidate referents (Lord & Brown-Schmidt, 2022). Here we contrast three hypotheses about the link between language and memory for individual object features. One hypothesis is that lexicalizing one feature (e.g., *sleeveless* dress) strengthens its representation, making it more memorable than other features (e.g., dress length). Alternatively, the lexicalized feature may serve as a retrieval cue for the other feature, boosting subsequent memory for both. Finally, it is possible that lexicalizing one feature of an object does not impact memory for any individual object features. We test these hypotheses in two language-memory studies (E1-E2) in spoken English. E1 (N = 112, Prolific, pre-registered) tested memory for images that had been named in modified phrases in a 2AFC paradigm that required distinguishing the previously-viewed target from minimally different foils. At study, all expressions were modified. At test, we manipulated whether the target was presented along with a foil image that differed from the target in 1) the critical (named) feature; 2) the unnamed feature; 3) both features. **Results:** A logistic mixed effects model of the memory data compared accuracy across the 3 foil types. Participants (Ps) were more accurate at identifying the target when the foil *mismatched* on the named vs. the unnamed feature (p = .034; **Figure 2**). This finding supports the hypothesis that lexicalizing one object feature improves memory for that particular feature instead of the object as a whole.

E2 is a pre-registered follow-up (N=192, Prolific) designed to replicate the E1 finding that memory was better when the foil mismatched on the named vs. unnamed feature, at over 85% power. At study, Ps viewed pairs of unrelated images (e.g., dress and giraffe) and heard an audio description of one (the target) in English. The description was either a bare noun (e.g. *the dress*) or a pre-nominally modified expression (e.g. *the sleeveless dress*). Critical stimuli were clothing items with two critical features: one named (e.g., sleeveless), and one unnamed (e.g., long). On distractor trials Ps were asked to click on the animal. At test, Ps viewed two images, one which had been viewed at study, and one new (foil) image. Ps were asked to select the clothing item that they remembered seeing previously and were told to pay attention to details. We manipulated the properties of the foil image such that it differed from the target in 1) the critical (named) feature; 2) the unnamed feature; or 3) both features. **Results:** A logistic mixed effects model of the memory data compared accuracy across the 3 foil types. In addition to overall better memory when expressions had been modified (p<.001), there were significant interactions between modification at study and foil type at test (**Figure 3**). Accuracy was higher when the foil mismatched the target on <u>both</u> the named and unnamed feature vs. when it mismatched on only <u>one</u> feature, an effect that was enhanced when expressions were modified at study (p <. 05). Critically, for modified expressions only, Ps were more accurate at identifying the target when the foil image mismatched the target image on the named feature vs. when it mismatched on the unnamed feature (p < .0001); this effect was not observed when the target expression had been unmodified, resulting in a significant modification * foil type interaction (p <.001). This finding supports the hypothesis that lexicalizing one object feature improves memory for that particular feature more so than other features of the object.

Conclusion: Consistent with evidence that individual object features are not bound in memory (Brady, et al., 2013), our findings suggest that modification supports memory for individual features of named entities, perhaps by guiding attention to those features, and point to the intriguing possibility that nonlexicalized referent properties may be independently forgotten.
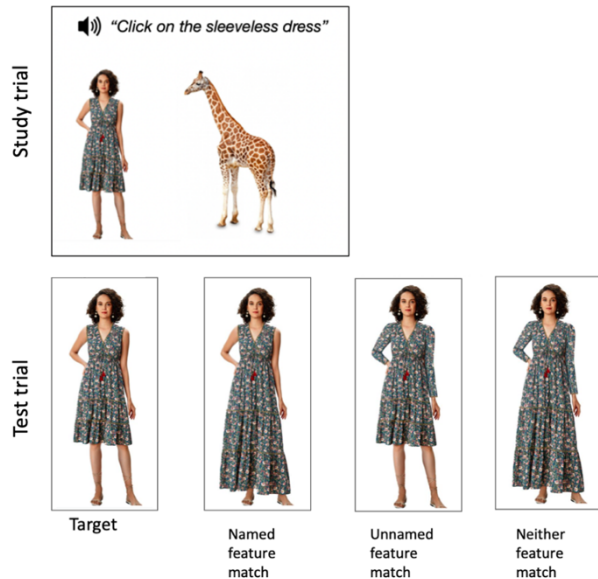
Figure 1

Figure 1. Schematic of the experimental procedure. At study participants see two pictures (e.g., dress, giraffe) and one is named with a modified noun phrase. At test participants see two similar images (two dresses) and must identify which is the target (seen at study). Test trials always present the target and one of 3 foil types: (1) foil matches named feature and mismatches unnamed feature; (2) matches unnamed feature and mismatches named feature; (3) matches neither feature.

Figure 2. E1: Accuracy in 2AFC memory test. Error bars represent by-participant standard error of the mean. Data points represent mean accuracies for each participant.

Figure 3. E2: Accuracy in 2AFC memory test. Error bars represent by-participant standard error of the mean. Data points represent mean accuracies for each participant.

Figure 2
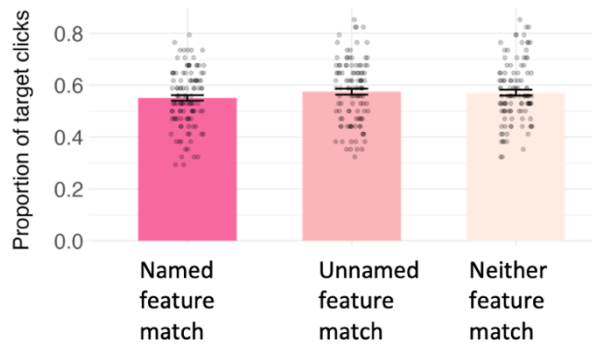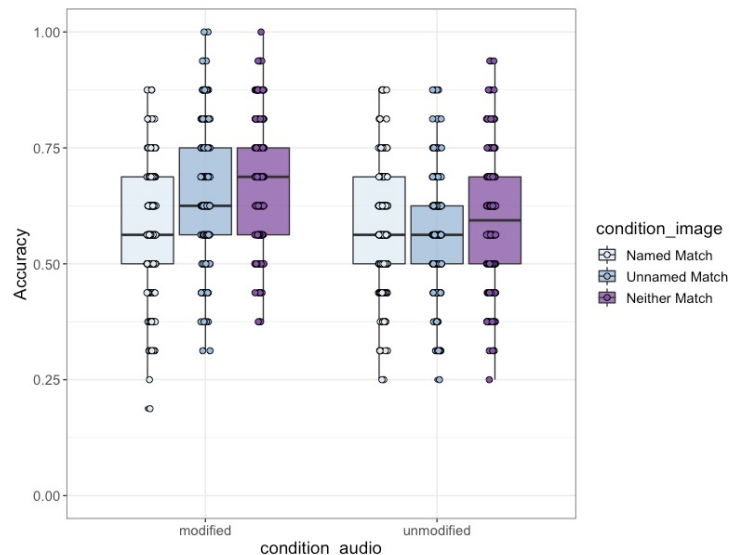

Figure 3

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