

How do we decide what to mention?

Distractor homogeneity and referring expression generation

Emma Ward (emma.ward@ncf.edu), MSc Psychology of Language, University of Edinburgh
 Hannah Rohde, Linguistics, University of Edinburgh
 Alasdair Clarke, Psychology, University of Aberdeen
 Micha Elsner, Linguistics, Ohio State University

Introduction

REG algorithms incrementally select features to incorporate into referring expressions, but do not account for speakers' decisions between multiple features when each feature uniquely identifies the target. Given that visual accessibility has been shown to exert influence over human reference, REG algorithms should take this information into account.

Clutter and salience affect search times and reference. Search is also affected by the visual homogeneity of the distractors. This effect is hypothesized to extend to reference, such that a feature which varies heterogeneously among distractors is harder to find and less likely to be mentioned than one which is homogeneous among distractors.

Homogeneity

Visual search is more efficient when the distractors are more homogeneous. Does this extend to more complex stimuli?

Does more homogeneity of a feature among the distractors lead to speakers using that feature more often in referring expressions?

The current study

Experiment 1: Visual Search

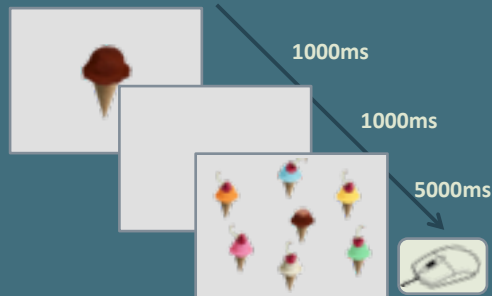
Pictorial cue depicting a single feature; participants click on the cued image

Experiment 2: Referential Communication

Spatial cue; participants describe the cued image for a hypothetical listener

Example trials

Visual Search



Referential Communication



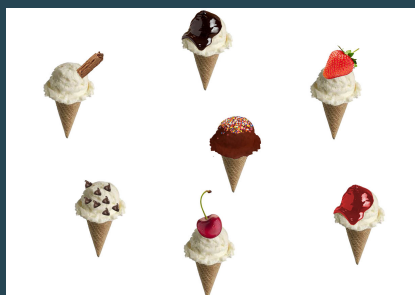
Results

Search and reference were unaffected by homogeneity. Multi-level models specifying random effects for participants and images were not improved by specifying a fixed effect of homogeneity.

Future research

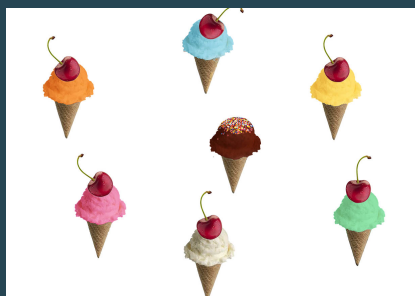
Refine stimuli and examine effects on visual search

- If a visual effect is found, re-run referential communication. Include a real listener and compare referential behaviours
- Examine listener's behaviour
- Do listeners perform better in a visual search when speakers use less variable features in their referring expressions?
- Do participants direct gaze to competitors more often when there is low variability or high variability?



High variability
Topping

Low variability
Flavour



High variability
Flavour

Low variability
Topping



★ Feature that speaker is expected to mention

References

- Arieli, D. (2001). Seeing sets: Representation by statistical properties. *Psychological Science*, 12(2), 157 - 162.
- Clarke, A. D. F., Elsner, M. & Rohde, H. (2013). Where's Wally: The influence of visual salience on referring expression generation. *Frontiers in Psychology*, 4, 329.
- Dale, R. & Reiter, E. (1995). Computational interpretation of the Gricean maxims in the generation of referring expressions. *Cognitive Science*, 19(8):233 - 263.
- Duncan, J. & Humphreys, G. W. (1989). Visual search and stimulus similarity. *Psychological Review*, 96(3), 433 - 458.
- Engelhardt, P. E. & Ferreira, F. (2014). Do speakers articulate over-described modifiers differently from modifiers that are required by context? Implications for models of reference production. *Language, Cognition and Neuroscience*, 29(8), 975 - 985.
- Fukumura, K., van-Gompel, R. P. G., & Pickering, M. J. (2010). The use of visual context during the production of referring expressions. *Quarterly Journal of Experimental Psychology*, 63(9), 1700 - 1715.
- Poiese, P., Spalek, T. M. & Di Lollo, V. (2008). Attentional capture by a salient distractor in visual search: The effect of target-distractor similarity. *Canadian Journal of Experimental Psychology*, 62(4), 233 - 236.
- van Deemter, K., Gatt, A., van der Sluis, I. & Power, R. (2012). Generation of referring expressions: Assessing the Incremental Algorithm. *Cognitive Science*, 36(5), 799 - 836.
- Wolfe, J. M. (2007). Guided Search 4.0: Current progress with a model of visual search. In W. D. Gray (Ed), *Integrated Models of Cognitive Systems* (99 - 119). Oxford: OUP.