

Abstract

Recent research suggests that when people retrieve information from memory they tend to fixate the location where the information had appeared during encoding. We used this so-called "looking-at-nothing" – phenomenon to investigate if different information is activated in memory when people use a rule- or a similarity-based decision strategy. In two studies, participants first memorized multiple pieces of information about job candidates (exemplars). In subsequent test trials they judged the suitability of new candidates that varied in their similarity to the previously learned exemplars. Results showed that when using similarity, but not when using a rule, participants fixated longer on the previous location of exemplars that resembled the new candidates than on the location of dissimilar exemplars. This suggests that people using similarity retrieve previously learned exemplars, whereas people using a rule do not. Furthermore, the results show that eye movements can provide new insights into the memory processes underlying decision-making.

Introduction

- Similarity-based strategies involve the retrieval of similar exemplars from memory.
- Rule-based strategies rely on the comparison of the object under consideration to an abstract set of rules (Bailey, 2005; Hahn & Chater, 1998).
- Investigating the underlying memory processes is difficult, because they are not directly observable.
- We use eye tracking and the looking at nothing effect (e.g. Richardson & Spivey, 2000) to study differences in memorybased information search (Jahn & Braatz, 2014; Renkewitz & Jahn, 2012).

Hypotheses:

- When using a similarity-based strategy people look back to the locations where exemplars appeared.
- Fixation durations are a function of the exemplars' similarity.
- When using a rule-based strategy fixations to the exemplar locations should be rare and independent of exemplars' similarity.

Tracking eye movements to reveal memory processes during rule-versus similarity-based decision making

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Study 1: Strategy Instruction

- Memorization phase: Participants (N = 53) memorized multiple pieces of information about four job candidates. The job candidates always appeared in the same location on the computer screen.
- Strategy learning phase:
 - Determine suitability of job candidates
 - 2 Groups: (1) use rule-based strategy (2) use a similarity-based strategy
- Test phase:
 - Judge suitability of new test candidates while recording eye movements:
 - Auditorily presented
 - Differ in similarity to learned exemplars



Figure 1: Overview method study 1.

Results: Mean fixation durations as a function of item similarity

- When using similarity, gaze behavior varies as a function of exemplar similarity.
- When using a rule, participants do not look back to the exemplar locations.



 $F(3.4, 87.4) = 1.14, p = .34, \eta_{\rm p}^2 = 1.04$

Figure 2: Mean fixation durations for the test candidates who shared 0, 1, 2, or 3 cue with invited learning candidates (and 3, 2, 1, and 0 values with the rejected learning candidates, respectively) for the rule and the similarity condition. Error bars represent standard errors.

Conclusions

When using *similarity*, but not when using a *rule*, participants looked back to the locations where similar training exemplars had appeared. These results suggest that using similarity affords the retrieval of previously learned exemplars, whereas using a rule does not.

Eye movements can provide new insights into the *memory* processes underlying *judgment and decision* making.

Rule

Similarity





- anymore. Cognition, 76, 269-295.