

Effect of Expertise on Recall and Recognition

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Abstract

Research has shown that experts have a memory advantage over novices, but only for domain specific stimuli (Bedard and Chi, 1992). Paradoxically, expertise has also been found to have memory costs (Castel, McCabe, Roediger, and Heitman, 2007). Recall is the retrieval of information in the absence of a cue. Long and Prat's (2002) Dual Process Theory makes a distinction in recognition between recollection and familiarity. We hypothesized that we would find significant memory benefits with recall and the recollection component of recognition. In addition, we hypothesized that experts would have significant memory costs in both recall and recollection. We expected to find no expertise effect for familiarity. We did find the hypothesized effect of expertise on recall in the more difficult domain. We did not find costs for either condition. Interestingly, this expertise effect for recall was only found with more difficult material, suggesting that difficulty may play an important mediating role. Further research is needed to systematically explore the effect of difficulty.

Expertise Benefits and Costs

The more content subjects have mastered in a particular domain, the more they are able to remember (Bedard & Chi, 1992). This is known as the expertise effect. Chi (1978) demonstrated that experts were better able than novices to recall the configuration of chess pieces on a board, but only if set up in the context of actual game play. Paradoxically, Castel, McCabe, Roediger and Heitman (2007) demonstrated that expertise also has its costs; e.g. it can lead to false recall of non-presented domain-relevant information.

Recall and Recognition

While benefits and costs of the expertise effect have been consistently found with recall (e.g. Cavallini, 2009; Castel et al., 2007), this has been less consistent with recognition (e.g. Long & Prat, 2002; Arkes, 1984).

Dual Process Theory

Recognition, as defined by Baddeley, Eysenck, and Anderson (2009), is the ability to decide whether or not one has previously come across a specific stimulus. Long & Prat (2002) suggested that the Dual Process Theory of Recognition would help resolve the inconsistency in previous data. According to Dual Process theory, recognition is composed of two distinct components, recollection and familiarity. Recollection entails retrieval, both of the contexts associated with the target item and the target item itself. Familiarity entails the feeling of similarity evoked by a test item to the target item. Familiarity is more general and diffuse.

The current study seeks to systematically examine expertise costs and benefits in both recall and recognition, using both the Star Trek domain from Long and Prat (2002) and the National Football League domain from Rawson and Van Overschelde (2008).

Hypotheses

1. Experts will have memory benefits for recall and the recollection component of recognition.
2. Experts will have memory costs for recall and the recollection component of recognition.
3. Experts will have no benefits or costs for the familiarity component of recognition.

Are You an Expert?

NFL Questions

1. How many points does a team get for kicking a field goal?
2. In what city do the Jets play?
3. For what team was Mike Ditka head coach?
4. Who is the all-time leading rusher in the NFL?

Star Trek Characters?

1. Hikaru Sulu
2. John Sheridan
3. Kahn Noonien Singh
4. Ellen Ripley

Method

Participants

- Sixty-nine undergraduates

Materials

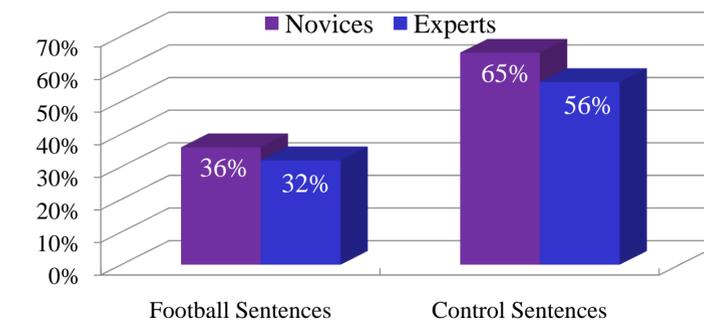
- 7 sentences about Star Trek characters
- 7 sentences about football team names
- 7 control sentences about body parts
- Star Trek Expertise Test (Long & Prat, 2002)
- Football Expertise Test (Rawson & Overschelde, 2008)
- Recognition test (Tulving, 1985) consisting of 21 words
 - 7 presented domain-related
 - 7 non-presented, domain related
 - 7 non-presented, domain unrelated

Procedure

Participants were randomly assigned to either Star Trek or Football condition. All sentences were presented via PowerPoint. Following presentation, given a 10 min distracter task, recall test, recognition test and expertise test.

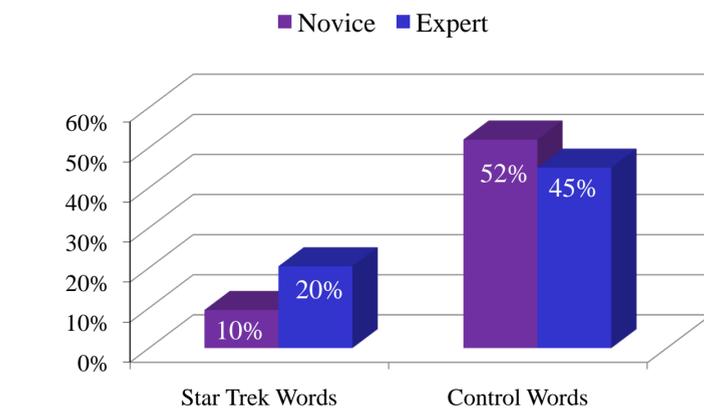
Recall with Football

Inconsistent with our hypothesis, experts did not recall more football domain-specific words than novices; ($t(31) = .65, p = .52$).



Recall with Star Trek

As we predicted, experts did recall more Star Trek domain-specific words than novices, ($t(32) = 2.31, p = .027$).



Discussion

Expertise Effect Benefits

The Star Trek condition of the current study supports Rawson & Overschelde's (2008) theory that experts will have better domain-specific recall than novices. However, we found no expertise benefits with the recollection component of recognition in either the Star Trek or Football condition.

Expertise Effect Costs

The current study did not find expertise costs with either Star Trek or NFL related stimuli. Unlike Arkes (1985), who used stimuli that encouraged subjects to make inferences that went beyond information actually presented, our design simply provided the opportunity for experts to over-include category items that were not presented. It is likely that this more simple type of memory cost is not influenced by expertise.

Difficulty Hypothesis

Interestingly, the condition in which we did find expertise benefits for recall (Star Trek) was significantly more difficult for our sample (as indicated by expertise scores) than the condition in which we found no expertise benefits (football). It is possible that expertise is more likely to confer memory benefits with difficult material. Future research should systematically explore how difficulty levels moderate the expertise effect.

Conclusion

It is unclear from previous literature whether the expertise effect is limited to recall, or extends to recognition, and if so, whether this would include both benefits and costs. The results of the current study support those that have found that the expertise effect is more likely to manifest as benefits with recall. Logically it does seem that this should extend in some form to recollection, however demonstrating this may require more sensitive measures and stimuli than were used in this study.