

Memory for expectation-violating concepts: The effects of agency and cultural familiarity

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Introduction

Previous research has shown that ideas which violate our expectations, or schema-inconsistent concepts, enjoy privileged status in terms of memorability in our cognition. In our study, memory for concepts that violate category-level (cultural) expectations versus domain-level (ontological) expectations was examined. Concepts that violate cultural expectations were remembered to a greater extent compared to concepts that violate ontological expectations and to intuitive concepts in both immediate recall and delayed recognition tests. Importantly, concepts related to agents showed a memory advantage over concepts not pertaining to agents, but this was true only for (both categories of) expectation-violating concepts. Our results imply that intuitive, everyday concepts are equally attractive and memorable regardless of the presence or absence of agency. However, concepts that violate our expectations (cultural or ontological) are more memorable if they pertain to agents (humans and animals) than non-agents (plants or objects/artifacts). We conclude that cultural ideas which combine expectation violations and the involvement of an agent are especially memorable and thus have an enhanced probability of being successfully propagated.

Method

Immediate recall and delayed recognition

- ❖ 75 subjects (32 male and 43 female students)
- ❖ Stimuli: 48 concepts (4 in each concept category and ontological category)
- ❖ CONCEPTS:
 - ❖ **EVC: cultural expectation violating** (e.g., blind driver)
 - ❖ **MCI: minimally-counterintuitive** (e.g., speaking cat)
 - ❖ **INT: intuitive** (e.g., drinking dog)
- ❖ Each stimulus was presented individually for 1500ms, with a 500ms “break“ (ISI) between the individual concepts
- ❖ 2 initial learning phases: each consisted of
 - ❖ Learning phase
 - ❖ Distractor phase
 - ❖ Recall phase
- ❖ Delayed recognition (conducted 1 month after completion of the study)

Results

IMMEDIATE RECALL

A 3 x 2 x 2 (concept category x agency x learning phase) repeated measures ANOVA showed a main effect of concept category: $F(2,138)=41.30, p<.001, r=.37$; and also a main effect of agency: $F(1,69)=10.01, p<.01, r=.13$. For the immediate recall, results revealed that memory for EVC concepts ($M=6.21, SE=0.28$) was superior to both MCI ($M=3.28, SD=0.28, t(69)=8.71, p<.001$), and INT concepts ($M=4.11, SE=0.23, t(69)=5.95, p<.001$). A significant difference was between INT and MCI concepts observed, $t(70)=-2.87, p<.01$. The recall for individual concepts in terms of agency is displayed in figure below.

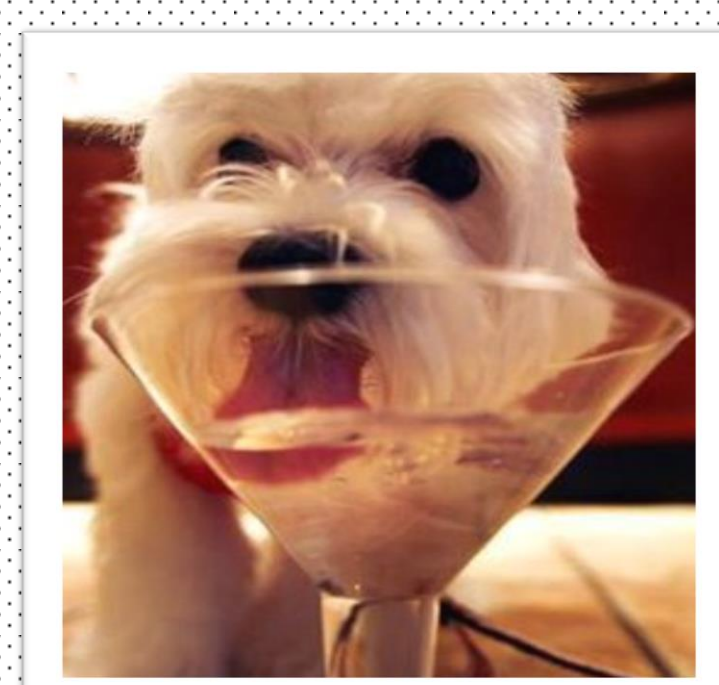
DELAYED RECOGNITION

3 x 2 (concept category x agency) repeated-measures analysis of variance showed that in terms of recognition, a significant main effect of concept category: $F(2,142)=33.15, p<.001, r=.46$; a significant main effect of agency: $F(1,71)=33.86, p<.001, r=.32$; and a significant interaction of concept category and agency: $F(2,142)=10.99, p<.001, r=.13$. T-tests using Bonferroni correction showed significant differences between the recall of EVC and MCI ($t(71)=4.78, p<.001$), EVC and INT ($t(71)=7.72, p<.001$), and MCI and INT ($t(71)=3.56, p<.01$). The recognition of EVC concepts ($M=8.24, SE=0.47$) was superior to MCI concepts ($M=6.71, SE=0.47$) and INT concepts ($M=5.56, SE=0.37$). The recognition for individual concepts in terms of agency is displayed in figure below.

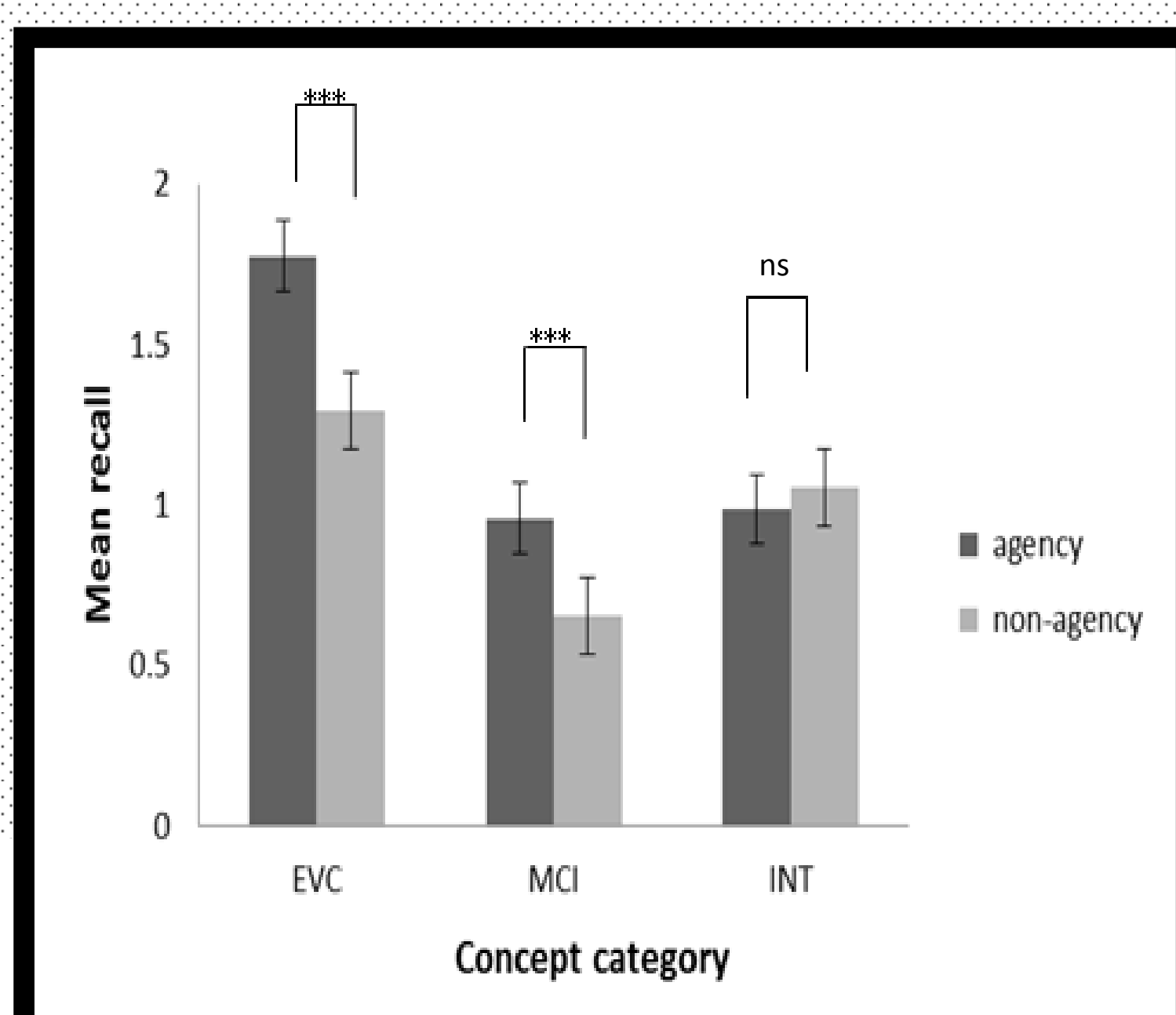
Conclusion

Our study shows that ideas violating attributes to which we are more conditioned to (i.e., culturally familiar, and thus more likely to occur) are more attractive to our cognitive architecture compared with ideas that violate ontological expectations (i.e. those that cannot occur in real life- MCI). This finding might have important evolutionary implications regarding the role and importance of cultural conditioning in human cognition. Moreover, we found that intuitive, everyday ideas are treated by our cognitive systems as equally attractive and attention-grabbing regardless of agency (whether it is a human or a plant). However, ideas that violate our expectations (either intuitive or cultural) in a mild fashion are more memorable if they pertain to agents (humans and animals) than to non-agents (plants or objects/artifacts). (Importantly, this is the case even for objects and plants that acquire agent-like qualities – i.e. minimally counterintuitive concepts).

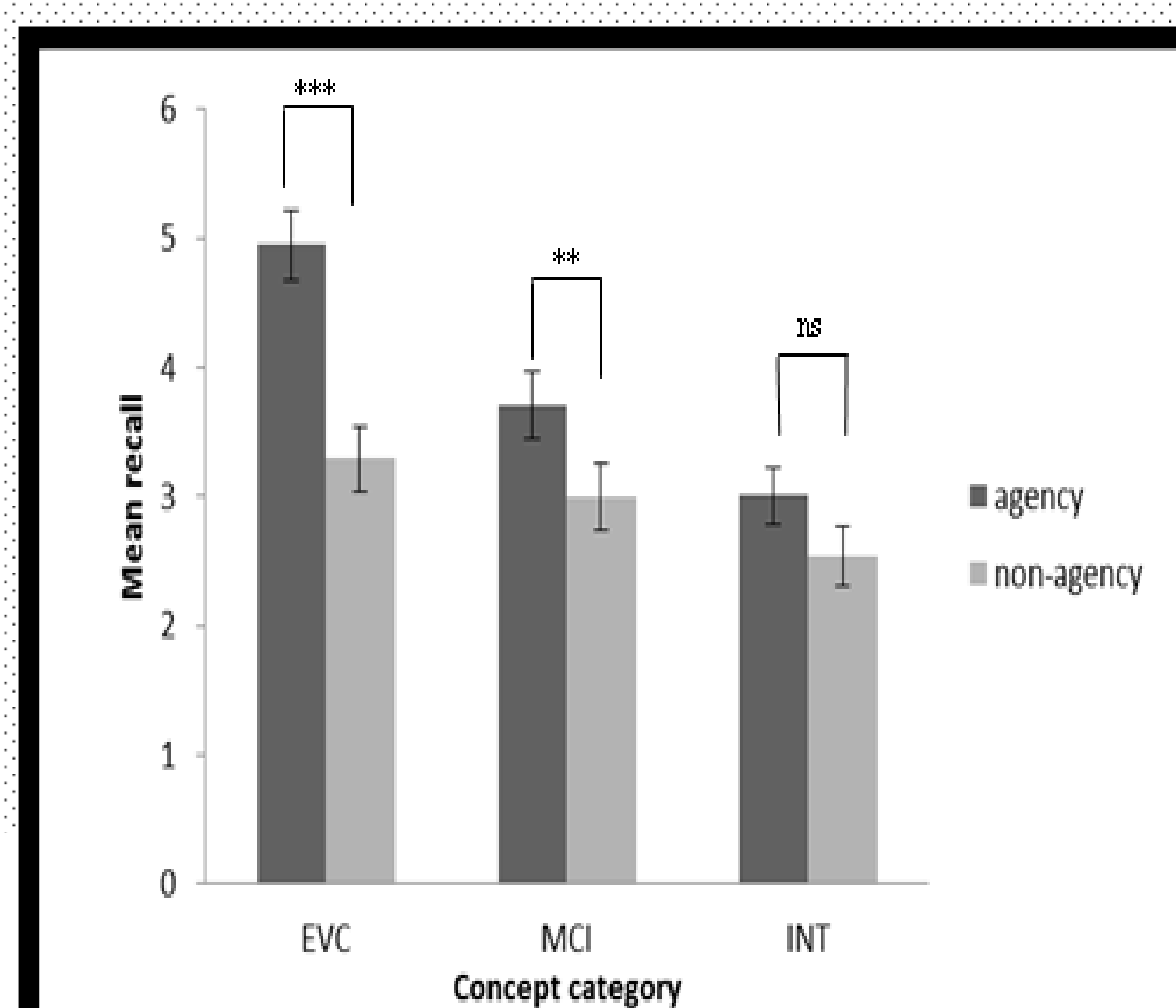
Overall, our results reveal some of the complexities of semantic memory, in particular some of several of parameters that affect the successful encoding of concepts. Two such parameters are expectation-violation and agency. In particular, the combination of those two conditions puts concepts in an optimal position for attracting attention and making ideas cognitively appealing and potentially better suited for cultural transmission.



IMMEDIATE RECALL



DELAYED RECOGNITION



Note: *** $p<.05$, ** $p<.01$, ns - non-significant