

When is declarative memory necessary for audience design? Evidence from amnesia.

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In conversation, speakers tailor language based on the knowledge that is and is not shared with their partner, a process termed audience design¹. While one view suggests that access to episodic memory of shared experience is critical to audience design², individuals with amnesia, who have profound declarative (episodic) memory impairment, design referential expressions based on the current partner's knowledge^{3,4}. In a study of 3-party conversation⁵, amnesic patients played a game with one partner, establishing labels for abstract "tangram" images (Fig1). Then a new partner joined them, and the patient described the images, one-at-a-time, alternating between addressing the old partner and the new partner. The amnesic patients designed significantly longer, more descriptive expressions when addressing the new vs. old partner, similar to healthy comparison participants. These findings suggest that audience design does not require access to the episodic record. Why were patients successful, despite being unable to explicitly recall the past shared experience? One explanation is that the partner with whom they played the game seemed more familiar. If so, it suggests only the most rudimentary of audience design processes can unfold in the presence of severe episodic memory impairment. Here, we control for familiarity – the patient shares some knowledge with one partner, and *different* knowledge with the other partner – and ask if audience design emerges in amnesia nonetheless. If episodic memory is necessary to keep track of who knows what, patients should fail to design utterances in a partner-specific manner. However, if the non-declarative memory systems are capable of representing multiple partners' knowledge, patients should produce longer expressions when the addressee is unfamiliar with the current images.

Method: 3 Amnesic and 4 Healthy comparison participants (Ps) completed a referential communication task with two partners (E1 and E2). First, P described a series of animal tangrams (Fig1) for E1 who arranged them into the described order while E2 waited in another room. P and E1 repeated the sorting task 5x. Next, E1 left and E2 took her place. Then, P and E2 performed another sorting task with people tangrams 5x. Thus, E1 knew the image labels for animal tangrams and E2 knew the labels for people tangrams. Next, E1 and E2 both entered the room for test trials. On each test trial, P, E1, and E2 saw 4 tangrams on separate booklets. On P's booklet, the target image and intended addressee (E1 or E2) were indicated. P described the target to one of the partners, randomly alternating between E1 and E2. Targets were animal and people tangrams. At the end, we tested Ps' memory; they were shown one tangram at a time and asked which partner (E1 vs. E2) they had seen the tangram with. Analysis focused on the number of words Ps used to describe each image during the test. If partner-specific audience design is spared, Ps should produce longer expressions when the image is partner-novel (animal–E2; people–E1) vs. familiar image (animal–E1, people–E2).

Results: At test, Ps in both groups (Amnesia & Comparison) produced longer expressions for partner-novel vs. partner-familiar images ($z=2.72$, $p<.05$; Fig2). Neither the effect of group ($z=1.30$, $p>.05$) nor the group*partner knowledge interaction ($z=-0.42$, $p>.05$) was significant. Accuracy on the memory test was 91.7% for healthy comparisons (above chance of 50%, $t=5.0$, $p<.05$), but only 54.2% for individuals with amnesia (not above chance, $t=0.5$, $p>.05$).

Conclusion: These results show that individuals with severe declarative memory impairment flexibly adjust expressions depending on the current addressee's knowledge state, like healthy adults. This sparing of audience design was juxtaposed against an inability to explicitly recall who they had shared the past experience with. The fact that individuals with amnesia flexibly alternate between the two potential addressees at test suggests that not only were these labels partner-specific but in addition, they were flexibly used in conversation. These findings are consistent with the multiple-memory systems view of the role of common ground in conversation⁶.

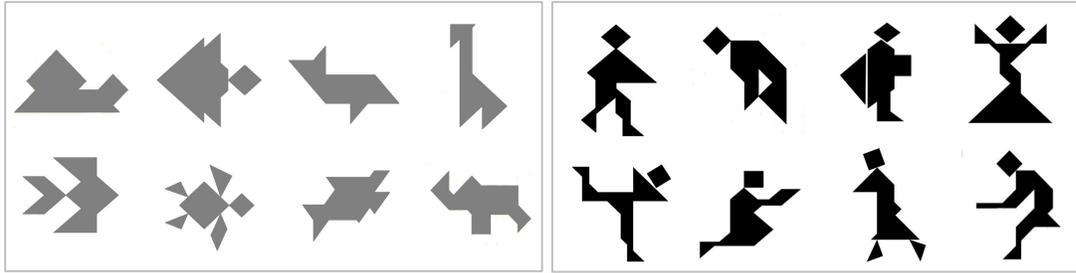


Figure 1. Example stimuli: Animal tangram (left) and People tangram (right). For the top-left image, a typical description for a knowledgeable partner would be “the turtle that’s crawling”. For a naïve partner a typical description would be “a turtle with a long neck walking right”.

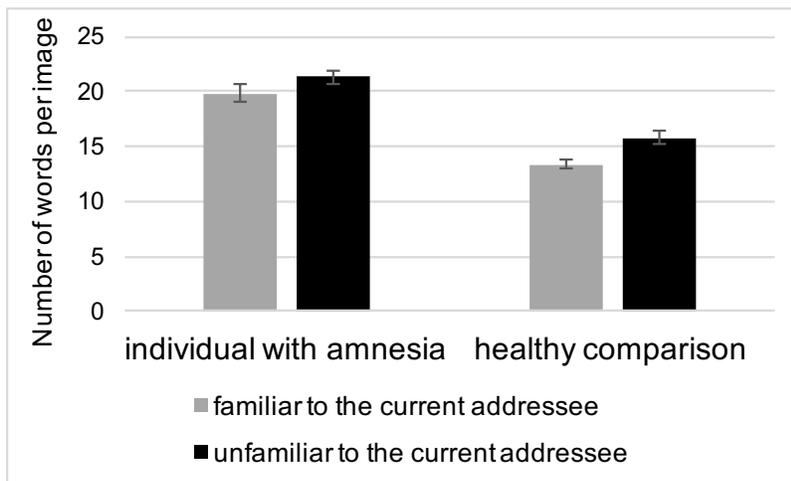


Figure 2. Average number of words used by participants to describe each image on test trials.

Reference

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