Source-Goal asymmetry in motion events:
Sources are robustly encoded in memory but overlooked at test

There is a widely-attested asymmetry between Sources and Goals in people's description and memory of motion events. When describing an event such as a squirrel going from a mailbox to a trash can, people mention the Goal ("to the trash can") more often than the Source ("from a mailbox") and are also better at detecting Goal changes in same-different tests.[1,2,3,4] These findings are often taken as evidence for a homology between linguistic and conceptual representations: the unmentioned event component is less likely to be conceptually salient. However, we show that the Goal/Source memory asymmetry disappears when memory is probed with a forced-choice task. Thus Sources are present in event memory, but may not be attended to in same-different tasks.

In Experiment 1, 80 native English speakers first described video clips depicting motion events (each 5sec) in the same pseudo-random order. In critical events, an agent moved from a Source to a Goal (Fig1A), while fillers didn't include Goal/Source paths (e.g., a ghost moves around the moon). Sources and Goals were left-right counterbalanced and counterbalanced across lists such that Sources in one list were Goals in another. A memory test immediately followed the description task. On each critical test trial, participants saw a variant of the video with either a Source or a Goal change (Fig1B). They indicated whether each video was "exactly the same" as what they saw earlier. As expected, participants were more likely to mention the Goal in their linguistic description (β=1.091, SE=0.085, $p<0.001$) and were more likely to detect Goal than Source changes at the memory test (β=0.412, SE=0.118, $p<0.001$) (Fig2 Top).

Experiment 2 was the same as Experiment 1 except that, in the memory test, participants chose which video they had seen from 4 options: the target, a foil that only differed in the Source, a foil that only differed in the Goal and a foil that differed in both (Fig1C). Foil images were the ones used in Experiment 1. For each trial, whether the event chosen by the participant contained the correct Goal and/or the correct Source was respectively coded. Linguistic description results were identical to Experiment 1 (Fig2). However, the memory results differed. First, as expected, participants were much more likely to be correct in Experiment 2(M=67%) than in Experiment 1(M=33%). Importantly, participants no longer showed the Goal bias, but were in fact more likely to choose the correct Source than Goal (β=-0.267, SE=0.106, $p=0.012$).

The implications of the study are twofold. First, the memory Goal bias in the same-different task cannot be due to lack of Source encoding but to an on-line attentional bias during the test: in the forced-choice task, where contrasts in both Source and Goal are presented at the same time, the bias disappears. Second, the presence of the linguistic asymmetry in the absence of memory asymmetry in Experiment 2 suggests that what is encoded linguistically does not exhaust what is represented at the conceptual level and calls for a finer-grained homology between language production and event encoding in memory.

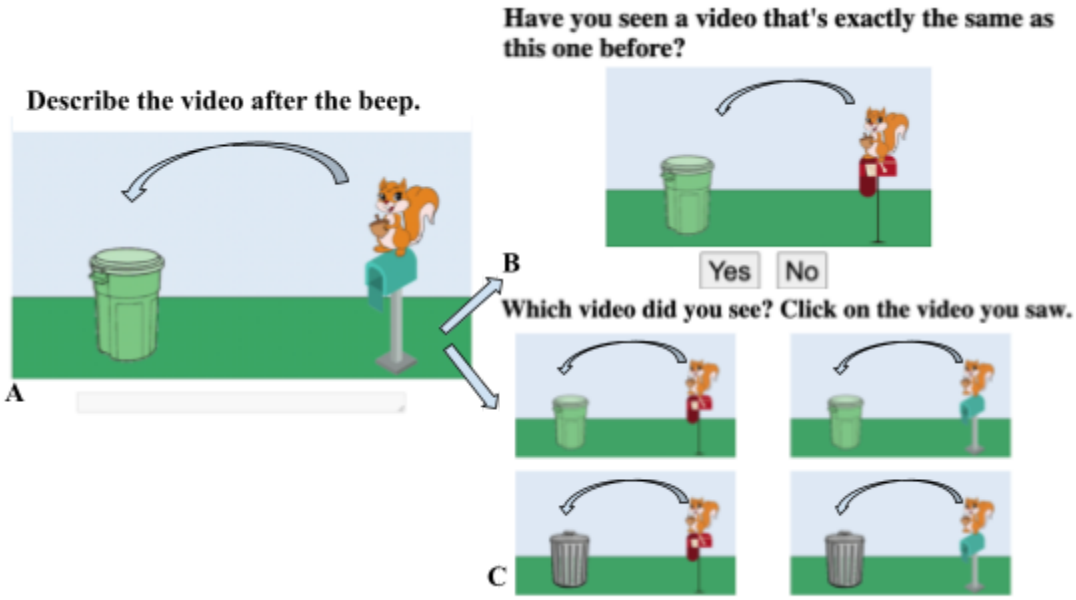

Fig1 A) A Sample Description Trial. B) A Sample Memory Test Trial in Exp1 (Source Change). C) A Sample Memory Test Trial in Exp2. Arrows represent the path of motion in the original video clips. Subjects did not see arrows and instead saw the videos.

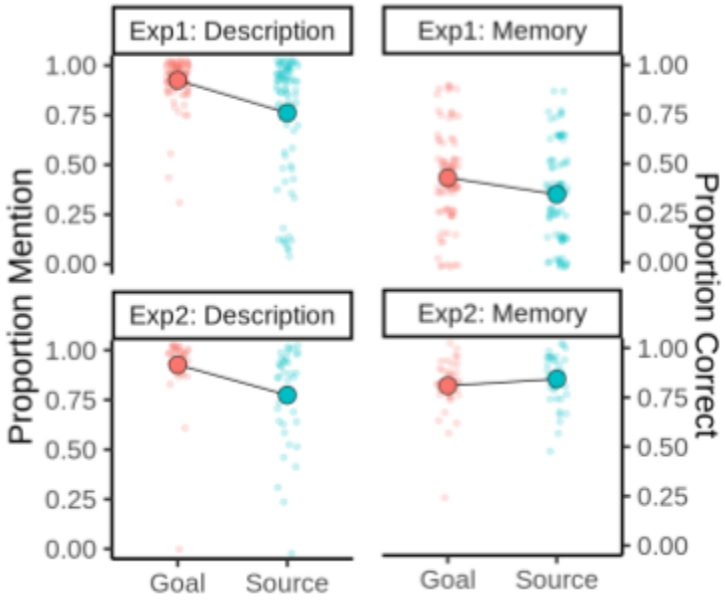

Fig2 Participants' mean proportion of mentioning Goal/Source in their linguistic description and mean proportion of correct Goal/Source response at memory test in Exp1 and Exp2. In the memory test in Exp1, correct response refers to successfully detecting the change of Goal/Source. In the memory test in Exp2, correct response refers to selecting the event that contains the correct Goal/Source.

References:

1. Regier & Zheng, 2007. *Cognitive Science.*
2. Papafragou, 2010. *Cognitive Science*.
3. Lakusta & Landau, 2012. *Cognitive Science*.
4. Do, Papafragou & Trueswell, 2020. *Cognition*.