Agent and Patient Categories in English-Speaking Adults and Children and Homesigners

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Languages around the world have systematic ways of syntactically distinguishing the agent of an event (the doer) from the patient (the affected one) [1-3]. A central theoretical question is the degree to which these categories stem from our conceptualization of events and the degree to which they arise from linguistic experience [4]. Two types of studies have explored this question. Implicit perceptual tasks find evidence that adults, children, and infants encode agents and patients differently [5-7]. While these findings show that people respond differently, on average, to agents and patients in contact events, they do not address how systematic this distinction is (does the slower reaction time reflect 100% correct categorization or categorization on a small subset of trials) or the degree to which it can be generalized. To date, categorization tasks have been conducted only with adult English-speakers. Performance was surprisingly poor: 25-40% of participants failed to induce these categories [8]. Here we use an overt non-linguistic categorization task to explore agent-patient concepts in English-speaking adults and children, as well as homesigners (deaf people raised in hearing families who do not have access to an external language and instead create their own). If these concepts only become available by acquiring an external language, adults and children should perform well and homesigners at chance [9]. However, if this ability stems from conceptual knowledge, rather than external linguistic input, all groups should perform well [4-6]. On the other hand, if these concepts are difficult to access in a categorization task [8], we should see poor performance in all groups.

Methods: Our task differs from previous tasks in three critical ways: we use animated events not pictures, we motivate conceptual analysis of the events by using an imitation task (agents and patients, as categories, exist in other minds), and we provide sufficient data for participants (P's) to identify the relevant category by using modelling and feedback. P's learned both the agent and patient concepts, in separate blocks with the order counterbalanced. Each block had three phases. 1) In the follow-me phase, the Ps watch an event (e.g., chef kicks prince), then a virtual experimenter chooses the relevant character (e.g., the chef in the agent condition), the event repeats and the P is invited to select a character ("Now it's your turn!"), copying what they had seen from the experimenter (e.g., choosing the chef). As the follow-me phase progresses the P's event becomes increasingly different from the experimenter's (e.g., characters changing) so that successful imitation has to rely on the role. 2) In the feedback phase, P's see an event and select a character without the experimenter's example and receive feedback on their selection. All events in the follow-me and feedback phases are contact events. 3) In the test phase, Ps apply the rule they have learned to new actions (new contact and new cause motion actions, assessing generalization) and receive no feedback.

Results: (E1) Adults (N=90) performed almost perfectly in the test phase (M = 95%) and clearly distinguished agents and patients in novel events (Z = -30.41, p < .001, Fig. 1), Performance on cause-motion trials was above chance (M= 95%, Z= 9.66, p<.001), indicating that they were able to generalize across event types. **(E2)** Children (N=20, *Mage* = 4;11, *Range* = 4;6–5;5) reliably distinguish agents and patients on the test trials (M= 80%, Z = 6.30, p < .001). Performance on caused-motion trials was above chance, indicating broad generalization (M= 72%, Z = 4.11, p < .001). **(E3)** Homesigners (N= 7, 1 did not meet inclusion criteria for the patient condition) distinguished agents and patients in the novel events introduced in the test phase (Z = 2.03, p = .04, 64% correct). Performance on caused-motion trials was not above chance with the current small sample (M = 56%, Z= .54, p = .59). Homesigners had more difficulty learning to select the patient than the agent, perhaps because the category is less available to them or because patients are less salient. **Conclusions:** Adult and child English-speakers can make a sharp categorical distinction between agents and patients in a categorization task and will readily extend what they learn from one class of events to another. Homesigners also make this distinction and extend it to new actions, suggesting that the concepts of agent and patient do not arise from the child's analysis of linguistic input but instead reflect event conceptualization.

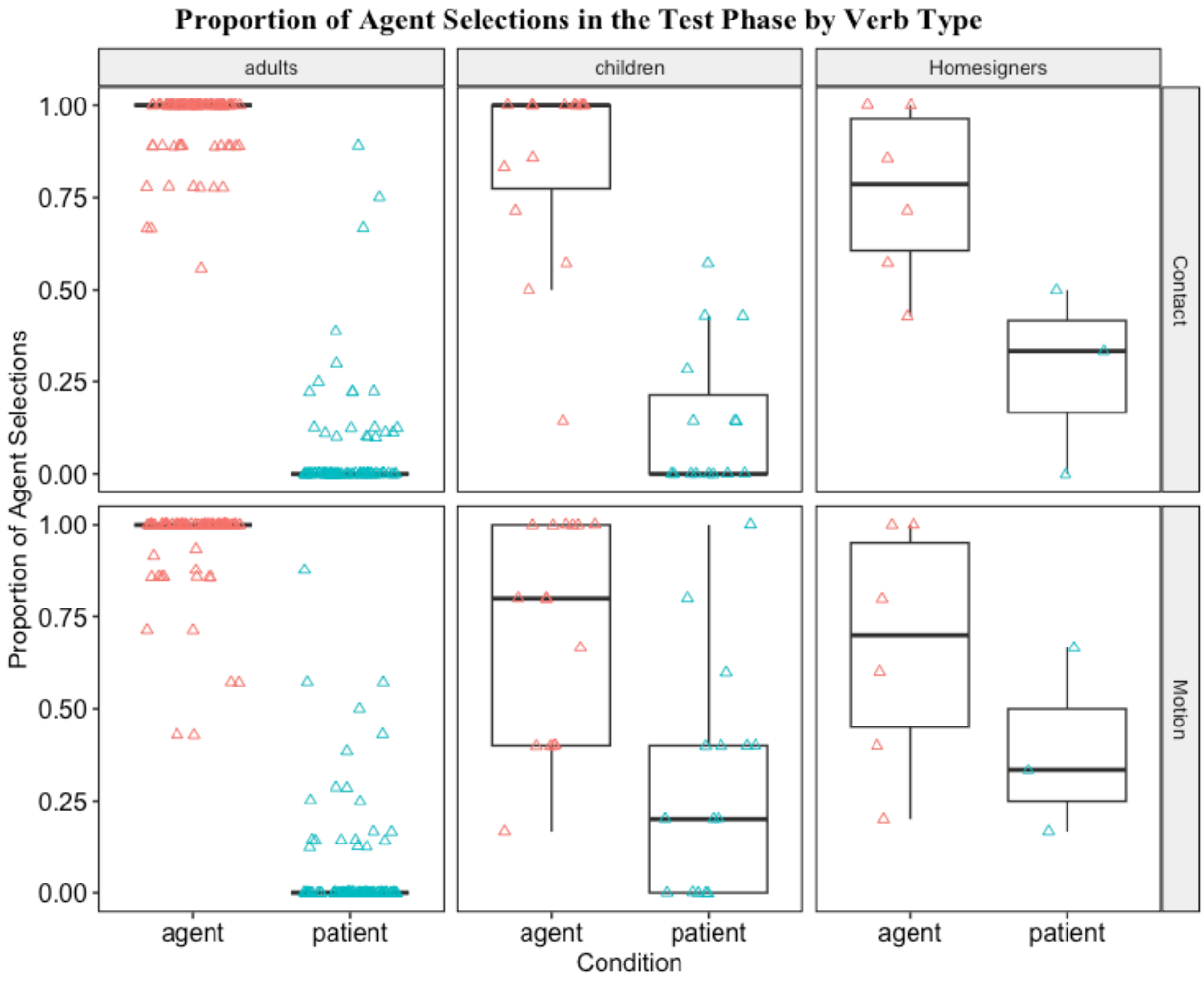

Fig1 Proportion of agent selections across all three experiments (E1-E3). Performance in the test phase is graphed. Performance with the contact verbs is on the top and performance with the motion verbs is on the bottom. Triangles symbolize individual participants.

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