

Participant structure in event perception: Towards the acquisition of implicitly 3-place predicates

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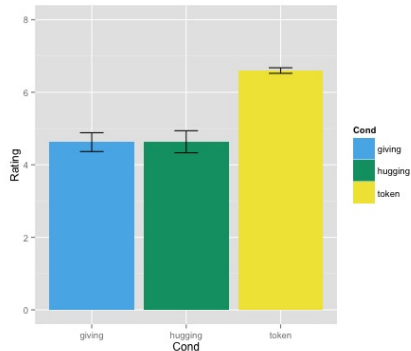
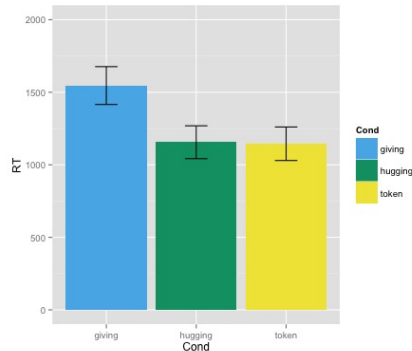
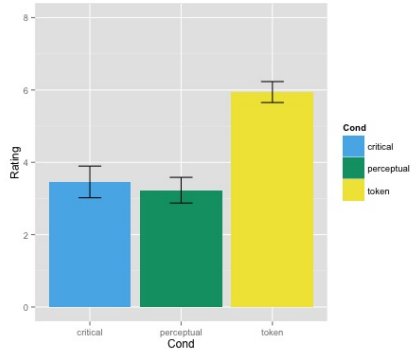
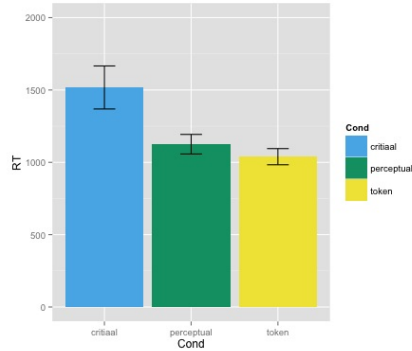
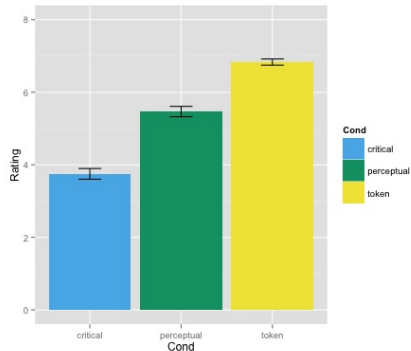
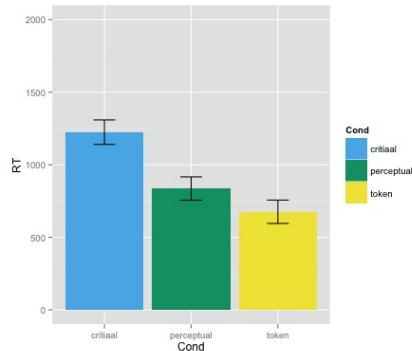
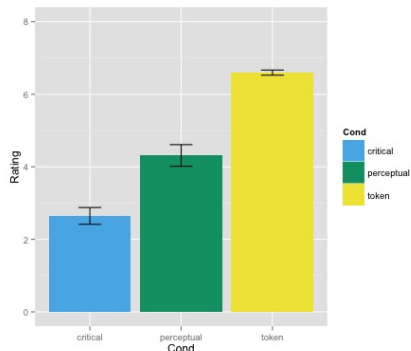
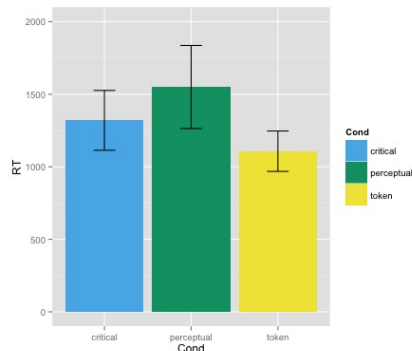
A clause often seems to have fewer argument NPs than there are participant roles in the event concept expressed by its verb [F82]. For example, *Anne robbed Betty* lacks an argument for what was robbed, seemingly a participant role for *rob* [G95]. Likewise, *Anne jimmied the box* has no argument for the implied lever. And yet, on one prominent theory of verb learning [G90,F10], children are guided by Participant-to-Argument Match (PAM), the assumption that n -argument sentences express n -participant event concepts. We aim to test this theory in cases where a 2-argument clause seems to express a 3-participant concept, a challenge to PAM not previously studied. Such a test requires stimuli that learners are likely to view under a 3-participant concept, independently of language. On the assumption that adults' event representations will be a good starting point for such a project, we set out to test a number of contrasts with adults.

Our goals were: (i) to establish an appropriate method for assessing participant-structure representation in adults, considering events that plausibly have n participants and can be described with n -argument sentences; and (ii) to apply this method with events plausibly having n participants, but which can be described using sentences with m arguments, m equal to $n - 1$. Exp.1 addressed (i). We measured adults' similarity judgments and reaction times (RTs) on GIVE ($n = 3$) versus HUG ($n = 2$). [G03] showed that 10 m.o. infants, when habituated to scenes in which individual A gives individual B a toy, dishabituated to scenes in which the toy was absent, but did not dishabituate to scenes where the toy was removed when habituated to scenes in which A hugged B while holding it. We found that adults' similarity judgments for these contrasts did not differ, but the "giving" contrast elicited longer RTs ($p = 0.07$; Figs.1,2). We thus take this method to provide a correlate of infant interest in "important" differences in event structure.

Exps.2-4 addressed (ii). Recent corpus-based and experimental work suggests that some verbs describe event concepts with Instrument [K08] (*jimmy*) and Source participants [C04] (*steal*), despite the fact that these participants are often not expressed as arguments of verbs. Introspection suggests that the same is possible for Themes (*bean*). We considered contrasts in which plausibly 3 participant events are expressible by sentences with only 2 arguments. Exp.2 contrasted OPEN (*A opened the box*, 2 arguments/participants) v. JIMMY (*A jimmied the box*, 2 arguments, extra participant: the lever); Exp.3, PICK-UP (*A picked up the toy*, 2 arguments/participants) v. STEAL (*A stole the toy*, 2 arguments, extra participant: the victim); and Exp.4, TOUCH (*A touched B*, 2 arguments/participants) v. BEAN (*A beaned B*, 2 arguments, extra participant: the projectile). Each experiment tested comparisons of the following sorts: 'critical', scenes hypothetically differing in participant structure; 'perceptual', scenes hypothetically differing in ways irrelevant to event representation; and 'token', scenes drawn from among the 3 videos of each type recorded.

Given space, we only report significant results here. In Exp.2, 'critical' compared "opening" with "jimmying", and 'perceptual' compared "opening (from the left)" with "opening (from the right)" (Figs.3,4). Participants took longer to judge 'critical' than 'perceptual' comparisons ($p = 0.06$). In Exp.3, 'critical' compared "picking up" with "stealing", and 'perceptual' compared "picking up (from the left)" with "picking up (from the right)" (Figs.5,6). Participants took longer to judge 'critical' than 'perceptual' comparisons ($p = 0.04$), and rated 'critical' as less similar than 'perceptual' ($p = 0.02$). In Exp.4, 'critical' compared "touching" with "beaning", and 'perceptual' compared "beaning (from far distance)" with "beaning (from short distance)" (Figs.7,8). Participants took the same time to judge 'critical' and 'perceptual' comparisons, but rated 'critical' comparisons less similar than 'perceptual' ($p = 0.001$).

These findings may pose a problem for PAM. Scenes may be viewed under 3-participant concepts despite being describable by 2-argument sentences. Our findings suggest that adults assign a different participant role status to the same entity in different types of events—a toy (Exp.1), a lever (Exp.2), another person (Exp.3), and a projectile (Exp.4). If our experiments measure the same perceived differences in participant structure in adults as [G03] found with infants, this suggests that infant responses to events like those of Exps.2-4 will be informative for testing PAM. In particular, they predict that PAM won't work as an effective learning heuristic in such cases. This work also raises questions. Our subjects were given an explicit rating task, yet we didn't find systematic differences in their ratings. This suggests that judgments in this task are not based solely on whether two scenes are viewed under the same event concept.

Fig.1: GIVE/HUG Ratings**Fig.2:** GIVE/HUG RTs**Fig.3:** JIMMY/OPEN Ratings**Fig.4:** JIMMY/OPEN RTs**Fig.5:** STEAL/PICK-UP Ratings**Fig.6:** STEAL/PICK-UP RTs**Fig.7:** BEAN/TOUCH Ratings**Fig.8:** BEAN/TOUCH RTs

References. [C04] Conklin, Koenig & Mauner, 2004. The role of specificity in the lexical encoding of participants. *Brain and Language*, 90. [G90] Gleitman, 1990. The structural sources of verb meanings. *Language Acquisition*, 1(1). [F82] Fillmore, 1982. Frame semantics. In *Linguistics in the morning calm: Selected papers from SICOL-1981*. [F10] Fisher, Gentner, Scott & Yuan, 2010. Syntactic bootstrapping. *Wiley Interdisciplinary Reviews: Cognitive Science*, 1(2). [G95] Goldberg, 1995. *Constructions: A construction grammar approach to argument structure*. [G03] Gordon, 2003. The origin of argument structure in infant event representations. In *Proceedings of the 28th annual BUCLD*. [K08] Koenig, Mauner, Bienvenue & Conklin, 2008. What with? The anatomy of a (proto)-role. *Journal of Semantics*, 25.