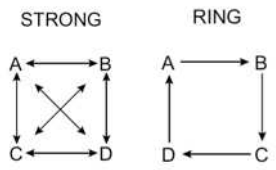
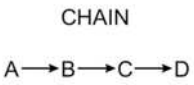
AN EXPERIMENTAL INVESTIGATION OF RECIPROCITY:
WHAT INFLUENCES THE STRENGTH OF 'EACH OTHER'?

Reciprocity is central to human interaction (Majid etal.'11); it is not surprising that languages have different means of expressing reciprocity, e.g. 'each other.' However, specifying the meaning of 'each other' is challenging (e.g., Dalrymple etal.'98). A sentence like '*The children pinched each other'* can have a **strong** reciprocal meaning where each child pinched every other child (figure), but can also be used in a weaker '**ring***'* configuration where each child pinches *someone* and is pinched by *someone*. Reciprocals also occur in even weaker situations, e.g. '**chain**' configurations ('*The children followed each other into the room'*). (Figs: Majid etal.'11). Conceptually (ex.1), the strong configuration is more reciprocal than the ring, which is more reciprocal than the chain (where A is only an agent, D is only a patient).





We investigated **what influences whether people construct a stronger or weaker interpretation.** Sabato/Winter (2012) hypothesized that lexical meaning, world knowledge and context all interact (cf.Dalrymple etal.'98, Kerem etal.'09). We investigated experimentally whether the **conceptual structure of verbs influences the strength of the reciprocal interpretation that comprehenders construct (Aim#1)**. Do verbs whose conceptual structure is prototypically asymmetrical (e.g. *follow*) trigger weaker reciprocal interpretations than neutral verbs (e.g. *lick*)? Following is *prototypically asymmetrical*: If X follows Y, *typically* Y does not follow X (Dalrymple, Sabato/Winter on a-cyclic graphs). In contrast, licking is *neutral*: If X licks Y, Y may or may not lick X. If people's interpretation of reciprocals is sensitive to this, *asymmetrical verbs (ex.2a) should trigger weaker reciprocal interpretations than neutral verbs (ex.2b).*

Our second aim was to see **if the strength of the reciprocal interpretations that people construct correlates with individual differences in empathy (Aim#2).** Higher empathy levels may be correlated with stronger reciprocal interpretations and a dispreference for configurations where someone is 'left out' (e.g. in chain, A and D are not fully engaged).

EXPERIMENT: Participants (n=23) **arranged sets of toy animals according** to sentences read aloud by a lab assistant (ex.2). Targets used asymmetrical (*chase/pursue/follow)* or neutral verbs (*lick/bite/smell*), and consisted of 3 or 4 animals (12 trials). (We also had trials with 2 animals, and other types and numbers of objects.) Afterwards, people completed the Interpersonal Reactivity Index (IRI, Davis'80/'83) which measures empathy. Arrangements were videotaped and double-coded.

RESULTS: We find **effects of verb semantics**: Neutral verbs trigger more ($p<.01$) 'strong' arrangements than asymmetrical verbs (neut=9% vs. asym=0%); asymmetrical verbs trigger more weakly-reciprocal 'chain' arrangements (neut=7% vs. asym=35%, $p<.01$). 'Ring' arrangement rates do not differ significantly. **INDIVIDUAL DIFFERENCES:** There is a positive correlation ($p<.035$) between IRI scores and individuals' preference for ring over chain: *More empathetic people show a stronger preference for ring over chain configurations—i.e. tend to interpret reciprocals so that every animal is both performing and receiving the action (no one is 'left out').*

Our results suggest that theories of reciprocal interpretation should (i) include information about verbs' conceptual structure, and (ii) acknowledge individual differences: Interpretation of reciprocals may be correlated with non-linguistic cognitive empathy traits, with more empathetic people tending to opt for stronger interpretations.

[word count: 500]

Examples:

(1) Strength of reciprocal relation: [stronger] Strong >> Ring >> Chain [weaker]

(2a) asymmetrical verbs: The lizards are following / chasing / pursuing each other.
(2b) neutral verbs: The lizards are licking / biting / smelling each other.

Selected references:

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