How to learn the deictic shift through observation?

Franziska Krause, Katharina J. Rohlfing

Emergentist Semantics Group, CITEC, Bielefeld University

BACKGROUND

Toddlers often reverse deictic symbols in their second year of life, for example talking about *You* when actually addressing themselves or vice versa. In order to understand to which entity a deictic symbol refers, toddlers need to realize that pronouns have a **Bidirectional Character**. This means that the same symbol refers to the self but also to the addressee when speech roles are changed in dialogue, the so-called **Deictic Shifting** **[1]**. Consequently, children need to switch roles in dialogue and also address the symbol to the communication partner instead of merely to themselves – on an action level this is known as **Role Reversal Imitation** **[2]**.

First, children acquire their first symbols in a two-party situation **(Dyad)**. But from the middle of the second year on toddlers are able to learn symbols in observational contexts **(Triad)**. This bystander's perspective presumably allows a holistic view on deictic symbols, which could be advantageous for understanding deictic shifting.

AIM

We compare the influence of triadic and dyadic learning contexts on deictic shifting in 18-20-month old children.

1.) We hypothesize that the triadic context is beneficial for childrens' ability of role reversal imitation.

2.) Pronouns may have an additional effect due to their potential of emphasizing the referential end point.

METHOD

ELEMENT	DESCRIPTION
Learning context	• dyad vs. triad • direct vs. observational • one vs. two experimenters
Actions	• eight simple actions with and without objects • differing in reference (*I*-actions vs. *You*-actions)
Pronouns	• novel pronouns vs. no pronouns • two novel pronouns accompanying *I*-actions and *You*-actions
Reference	• body parts (self vs. addressee)
Feedback	• following correct role reversal and role reversal failure • verbal and non-verbal

Design

- 2 x 2 experimental
- 2 learning contexts (Dyad, Triad)
- 2 levels of pronoun-use (no pronoun, pronoun)
- between-subjects (n = 9 in each condition)

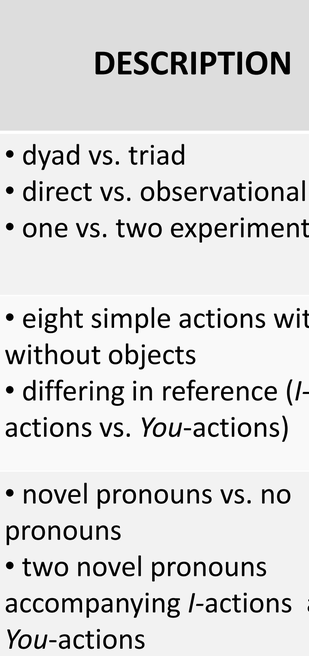
Participants

- 18-20-month-olds

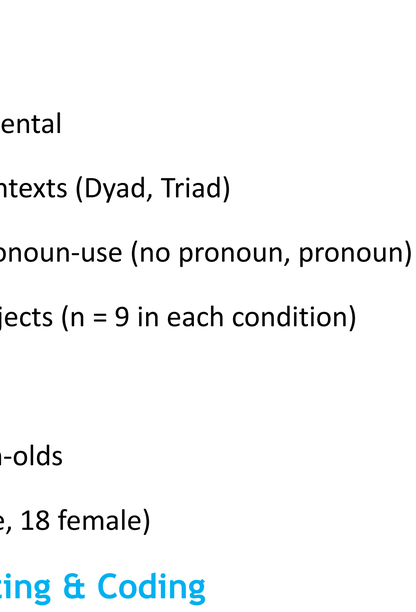
(n = 36, 18 male, 18 female)

Data Collecting & Coding

- amount of role reversal imitation across trials
- data coding using ELAN
- independently by two raters
- childrens' productive vocabulary of pronouns with a standardized German questionnaire



Demonstration of role reversal
YOU-Actions



Demonstration of role reversal failure
YOU-& I-Actions

RESULTS

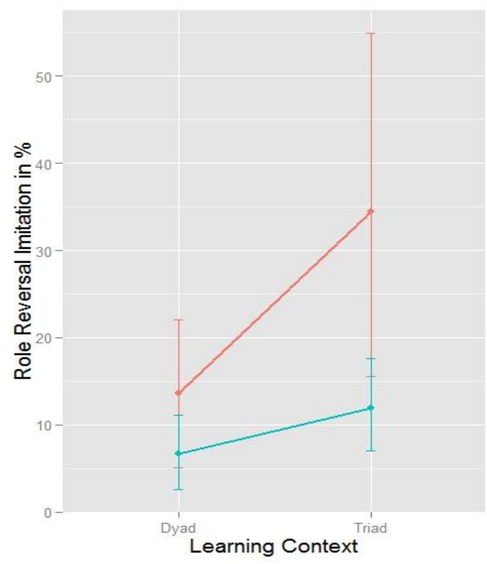


Fig. 1

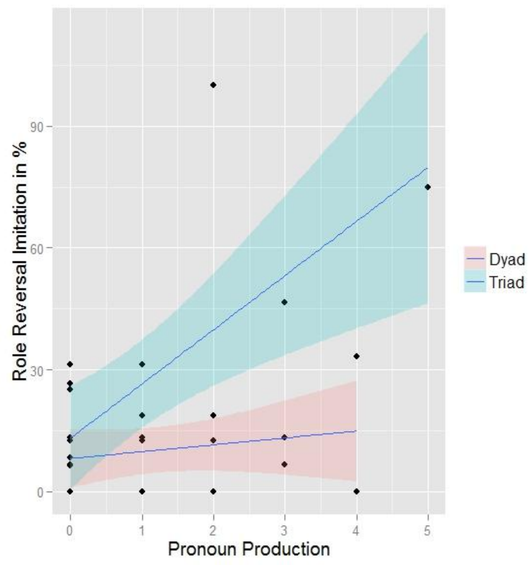


Fig. 2

There was a significant main effect of pronoun-use with $F(1, 32) = 5.51$, $p = .025$, $\omega^2 = .102$, suggesting that children imitated more correctly when no pronouns were used. Additionally we found a main effect of learning context, $F(1, 32) = 4.30$, $p = .046$, $\omega^2 = .075$. Role reversal imitation was significantly more frequent in the triad than it was in the dyad. Interaction between learning context and pronoun-use was non-significant, $F(1, 32) = 1.51$, $p = .228$, $\omega^2 = .011$ **(fig. 1)**.

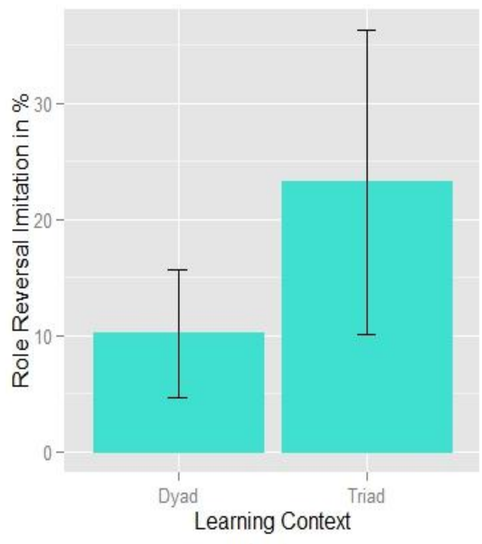


Fig. 3

Furthermore we computed if the amount of pronouns in children's productive lexicon had an effect on role reversal imitation. Pronoun production did not differ significantly across conditions with $F(3, 30) = 1.21$, $p = .323$. The covariate, pronoun production, was significantly related to role reversal imitation, $F(1, 29) = 7.05$., $p < .05$, $r = 0.44$ **(fig. 2)**. There was still a significant main effect of learning context (triad) after controlling for pronoun production, $F(1, 29) = 6.41$, $p = .017$, partial $\eta^2 = .18$ **(fig. 3)**, but no effect of pronoun use, $F(1, 29) = 2.57$, $p = .12$.

DISCUSSION

In the experimental conditions children were confronted with novel scenarios: learning contexts unfamiliar from daily routine and pseudo pronouns. In the triad children shifted roles more frequently and thus demonstrated role reversal imitation more often than in the dyad. Learning through observation offers a holistic view on deictic shifting, in which symbols are presented in an unambigious way. As a communication partner of a dyad symbols are always valued in relation to oneself. By contrast, not being part of an interaction means not being referred to as well, so that children may step outside their egocentric view and are able to take the third person's perspective **[3]** or contribute from an allocentric perspective in the triad **[4]**.

After controlling for children's productive pronoun vocabulary the main effect of pronoun-use diminshed to non-significant, whereas the effect of learning context enlarged. Initially, it seemed that novel pronouns function as a distractor from the referential end point rather than a support for learning deictic shifting as originally assumed. Children may have focused more on the new word and formed the supposition of learning a novel word as opposed to where to perform an action. Thus using real pronouns instead could produce an inverse outcome.

Finally, having a slightly bigger pronoun vocabulary influenced role reversal imitation positively as well. A more stable representation of personal deixis affects the grasp of deictic shifting in our experiment.

REFERENCES

[1] Dale, P. S. & Crain-Thoreson, C. (1993). Pronoun reversal: who, when, and why? *Journal of Child Language*, *20* (3), 573-589.
[2] Carpenter, M., Tomasello, M. & Striano, T. (2005). Role reversal imitation and language in typically developing infants and children with autism. *Infancy, 8*, 253-278..
[3] Pepperberg, I. M. & Sherman, D. V. (2007). Training behavior by imitation: From parrots to people…to robots?. In C. L. Nehaniv & K. Dautenhahn, *Imitation and social learning in robots, humans and animals* (S. 383-405). Cambridge University Press.
[4] Rakoczy, H., Gräfenhain, M., Clüver, A., Schulze Dalhoff A. C. & Sternkopf, A. (2014). Young children's agent-neutral representations of action roles. *Journal of Experimental Child Psychology, 128*, 201-209.

contact: franziska.krause@uni-bielefeld.de