An Ecological Account of Language Acquisition: exploring theoretical and methodological implications

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Link to gif on Tenor

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Language acquisition research

How does the human infant develop the ability to use the language(s) spoken/signed in their environment?

Problems in language acquisition* research

Chomsky‘s and Quine‘s problems

Poverty of stimulus

The input is deficient (underspecified & contains ungrammatical utterance) so acquisition of grammar must be impossible only from experience

Referential ambiguity/indeterminacy

How can the child arrive at meaning-form correspondences under conditions of referential ambiguity?

Cf. Reed (1995)

***Acquisition of grammar**

Problems in language acquisition* research

The ecological approach to language development: a radical solution to Chomsky‘s and Quine‘s problems

The child‘s environment is populated (culturally structured and variable)

Action and social interaction model the structure of the environment
cf. Interaction frames in Bruner (1983, 1985)

The child engages in relationships with their environment

Cf. Reed (1995)

***Becoming a member of the linguistic community**

Language in an integrated ecological approach

~~Language as a cognitive module/individual computational skill~~

Language as a tool for coordinating action and cognition

Language emerges from co-action in the physical and cultural environment (language is use)

Language as a system of constraints What about symbols?

(cf. Pattee & Raczaszek-Leonardi, 2012; Rączaszek-Leonardi et al., 2018)

Symbols in an integrated ecological approach

~~Symbols as meaning-carriers transformable by syntactic rules~~

Symbols are reliant on a dynamical system whose dynamics they constrain

Symbols gain meaning through repeated and effective functionality in social interactions

Symbols are arbitrary and conventional linguistic signs that relate to other linguistic signs

The meaning-relation is dependent on complex semiotic infrastructure, not on a form-meaning mapping.

(cf. Pattee & Raczaszek-Leonardi, 2012; Rączaszek-Leonardi et al., 2018; Rączaszek-Leonardi, 2016; Deacon, 2011)

The problem in language acquisition research*

~~The child acquires grammar (rules)~~

How does an infant become a user of conventional language used in their linguistic community?

*Given that language is " a system of constraints, which emerges in co-action in a particular physical and culturel environment and which has the power to control individual cognition and interindividual coordination"

(Rączaszek-Leonardi et al., 2018)

The symbol-*un*grounding problem

~~Symbol-grounding problem: how do infants learn *that* linguistic symbols mean? (cf. Harnard, 1990)~~

Ungrounding Problem:

"how do concrete physical events or objects, embedded causally in dynamical interactions, may ever become abstract and symbolic"

(Rączaszek-Leonardi et al., 2018, p. 40; Rączaszek-Leonardi and Deacon, 2018)

Development of symbolic cognition

Shaping early interaction dynamics Language controls interaction in the earliest multimodal interactivity between the infant and the caregiver, language-like interaction

language *means* before symbolic cognition indexical and iconic use of language is meaningful: it constrains social interaction, e. g. peak-a-boo games

Emergence of symbols: ungrounding linguistic signs from the immediate environment enables interactional control in novel situations, systematicity (relations to other signs) liberates their function from the immediate context

(Rączaszek-Leonardi et al., 2018, p. 44ff.; Rączaszek-Leonardi and Deacon, 2018)

Microanalytic analysis of interaction sequences

Goal: show how processes of conventionalization, abstraction and systematicity drive the emergence of symbolic cognition

Method: Qualitative & quantitative paradigms for microanalysis of infant-caretaker interactions

Data: corpora of multimodal longitudinal video recordings

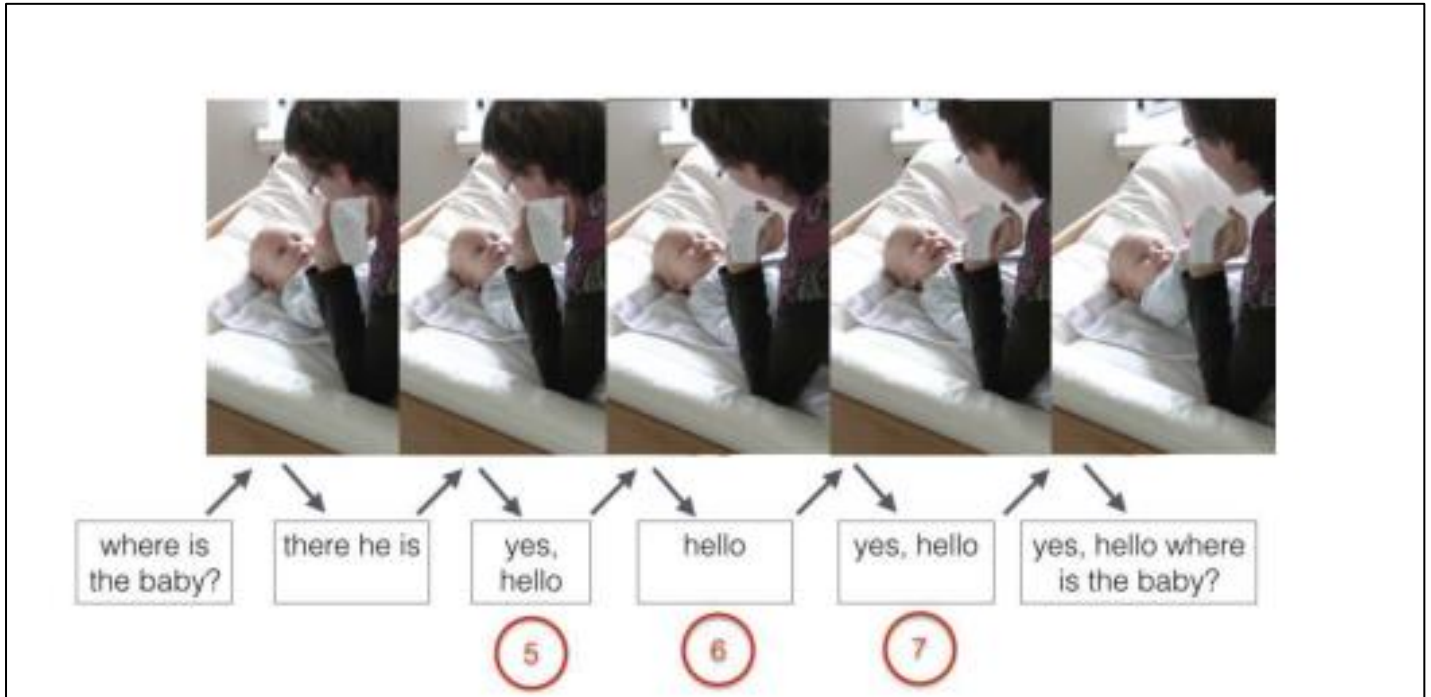
(Rączaszek-Leonardi et al., 2018, pp. 58-67; Rączaszek-Leonardi and Deacon, 2018)

Microanalytic analysis of interaction sequences

1 ((mother blows into infant's face))

2 M: ja:: hallo ((breathes in and blows))
yes hello
3 M: ja hallo wer ist denn da?
yes hello who is there?

Picture 1: interaction sequence



Picture 2: peak-a-boo sequence

(pictures taken from Rączaszek-Leonardi et al., 2018, pp. 53-54)

Implications for future research

Research into language development should consider that language in presymbolic infants functions indexically or iconically, while already showing properties of abstraction and generalization

Methodological challenges include the lack of dense multimodal corpora and the high costs of annotating and analysing such data

Use of **semi-automatic tools** will enable future research projects

(cf. Roy et al., under review)

Summary

- The Integrated ecological approach proposes a theory for ecologically valid development of symbolic use of language in human infants
- Language is used to control interaction long before symbolic cognition emerges.
- Symbolic use of language enables control in novel situations because ist meaning is (partially) decoupled from the interactional context
- Empirical work requires dense multimodal longitudinal corpora of video recordings and detailed annotations for purpose of microanalyses

Questions – Discussion – Feedback

Don‘t forget to unmute when it‘s your turn to ask a question

Don‘t forget to mute when you are done asking your question

Didn‘t get to ask your question? Want to give feedback?
Get in touch via or @LeonieTwente

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