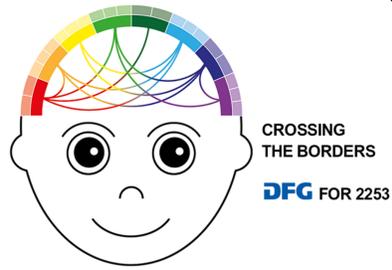# Metacognition of Own Ignorance and Mental State Vocabulary
In 27- and 39- month old children

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Background

The third year of life is considered a transitional period between an implicit and explicit understanding of theory of mind. Children have been shown to start talking about others' and their own knowledge and ignorance around the age of 2 years (Harris et al., 2014). Furthermore they exhibit more signs of uncertainty when asked to name an unknown object compared to a known object (Bartz et al., 2016). Following these signs of uncertainty explicit labels such as 'I don't know' seem to follow around 25-36 months of age. But empirical evidence for developmental links among mental state language, the early development of epistemic state representation (ESR) and perspective taking is sparse. This study investigates developmental change and intertask correlations among a battery of ESR tasks.

Goals

The goal was to investigate uncertainty monitoring, perspective taking and epistemic state language production and understanding in 27- and 39-month-olds. Especially, if perspective taking and uncertainty monitoring influence each other, how age moderates their relation.

Participants

37 27-month olds (19 female) and 34 39-month-olds (16 female) participated in the study. For the MSLQ and ELFRA the mean performance was 50.0% (SD=17.6%) and 63.0% (SD=19.9%) for the 27-month-olds and 73.2% (SD = 12.1%) in the MSLQ for the 39-month-olds respectively.

Tasks	N (27 month-olds)	N (39 month-olds)
Know-Want Task	37	29
Perception Task	32	32
Knowledge Task	27	34
Object Naming Task	34	30
MSLQ (Mental-State Language Questionnaire)	31	27
ELFRA (Language Questionnaire)	36	Not done

Discussion

In sum, at the age of 27 months, few children begin to monitor their own ignorance and understand first and third person epistemic perspectives at a very basic level. 39 month olds showed higher levels of performance but were far from ceiling in both implicit and explicit tasks. No intertask correlations emerged, except for one correlation with general language ability. In conclusion, awareness of one's own and others' epistemic states develops slowly in the third and fourth years of life, and is linked with progress in language acquisition.

Literatur

Bartz, D., Rowe, M., & Harris, P. L. (2016). *"Um": Young children's efforts to name objects they do not recognize.* Harvard Graduate School of Education. Paper in preparation.
Harris, P. L., Ronfard, S., & Bartz, D. (2016). Young children's developing conception of knowledge and ignorance: work in progress. *European Journal of Developmental Psychology*, 1-12.
Gonzales, C. R., Fabricius, W., Pesch, A., Swift-Honer, J., Woolley, B. (2015). The Role of Introspection in Children's Theory of Mind Development. CDS 2015 Poster.

Tasks

Know-Want Task

Tests for children's understanding of know and want in the form of a hiding game. The first experimenter hides two objects in four boxes while a second experimenter is away. Once she comes back, the second experimenter addresses the child with a knowledge or desire statement, e.g. "I know where the ball is, but I do not know where the chair is.", "I want the ball, I don't want the chair". The order of the negation was varied, resulting in two trials for "know". The child is asked to choose a box based on the statement. Performance was coded with 1 for the correct box (unknown location) and 0 for an incorrect box (known location/empty box).

Self Version
Child
Person Sees
Experimenter
Child

Toy Occluded
Experimenter
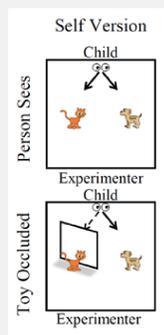
Knowledge-Perception Task (Gonzales et al., 2015)

Self-version
Child
Person Looks
Experimenter
Child

Boxes Closed
(1) (2)
Experimenter

Perception: children are asked to report on whether they can see an animal that is in open sight and another which is hidden behind an occluder (P-Self). This is repeated while asking for the perspective of a puppet (P-Other).

Knowledge: children are asked to report on whether they know the content of a box they looked inside and another they did not (K-Self). Repeated with the perspective of a puppet (K-Other). 2 trials per condition with 1 point if correct.
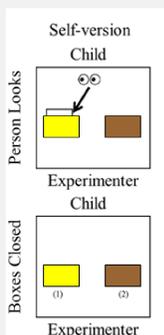
Object-Naming Task (Bartz, Rowe, & Harris, 2016)

A task testing children's awareness of their own ignorance. Children are shown real and fake objects and asked to name them. Indications of uncertainty such as saying "I do not know", shaking the head, saying "no" or "hmph" are coded. Based on the complexity of the utterance 3, 2 or 1 point were given. Therefore getting full points in all 6 trials would result in a performance of 18 points. The scores were then calculated in percentages.
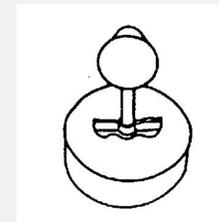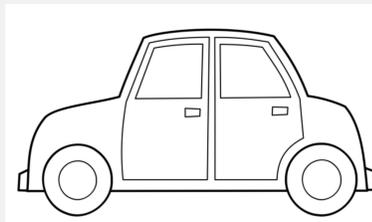
Results

39 month-olds outperformed the younger group with the exception of the Know-Want Task. Out of 34 27 month-olds that did all the tasks 13 passed at least one task and 4 passed more than one; Out of 27 39 month-olds that did all the tasks 10 passed at least one task and 15 passed more than one. A significant correlation ($r = .54$; $p = 0.002$) was found between quality of uncertainty sign in the object-naming task (27m) and the Syntax part of the ELFRA parental language questionnaire. For the graph only children that received full points on the tasks are shown. The performance in the knowledge-perception task and the object-naming task fit the result pattern found by Gonzales et al. (2015) and Bartz et al. (2016) respectively.

Children's performance in %

Legend: 27-month-olds, 39-month-olds

Categories: Know Competence, NotKnow Competence, Know+NotKnow Competence, Perception-Self, Perception-Other, Perception, Knowledge-Self, Knowledge-Other, Knowledge, FakeWords with UncertaintySigns, Quality of UncertaintySign, MSLQ