

## INTRODUCTION

- Rationale:**
- Parental mental state talk (MST) is developmentally linked to children's theory of mind (ToM, see: meta-analysis: Devine & Hughes, 2016;  $r = .29$ ).
  - The predictive links between MST and ToM can be explained by the content of MST (e.g. desire terms at 2 and cognitive terms from 3 to 5, see: Taumoepeau & Ruffman, 2008; Tompkins, 2015) and/or the level of clarifications (e.g. simple use of the terms vs clarifications, see: Slaughter, Peterson, & Mackintosh, 2007).
  - The main function of ToM, measured with false belief understanding (FBU), is to predict behaviors of others. The ability to register other's perceptual access developmentally precedes FBU (see: Fabricius, Boyer, Weimer, & Carroll, 2010; Moll & Meltzoff, 2011).
  - Perceptual MST and especially Perceptual Clarifications (PC) may affect FBU, both 1<sup>st</sup> and 2<sup>nd</sup> order

- Aims:**
- Do parents tend to use PC of the behavior of others while telling stories to their 4-year-old children?
  - Is a parent's perceptual MST related to a child's FBU at the ages of 4 and 5.5?
  - Do parents who use PC have children with higher FBU at 4 and 5.5?

## METHOD

**Participants:** At Time 1, 119 parents (97 mothers) told stories to their 4-year-old Polish-speaking children. 7 children did not complete the ToM tasks, so the final group included 112 children ( $M = 48.40$ ,  $SD = 0.39$  months, 55 girls) and their parents (91 mothers). 85 of the same children were tested at Time 2, thus at age 5.5 ( $M = 67.32$ ,  $SD = .1$ , 45 girls).

**Parents' Task:** "Please read this story with your child as you usually do at home" (wordless "Baby Birds" stimulus picture story, see: Gagarina et al., 2015)

**Coding:** Parents' spontaneous MST were assigned to 8 categories: Simple Desire Terms (SDT), Desire Clarifications (DC), Simple Emotion Terms (SET), Emotional Clarifications (EC), Simple Cognition Terms (SCT) and Cognition Clarifications (CC), Simple Perception Terms (SPT), Perceptual Clarifications (PC).

Table 1

Parents' MST: examples of utterances (originally in Polish language)

Content/level of clarification	Simple use of the term	Clarifications
Desire	The cat wanted to eat the bird	The cat was climbing, because he wanted to eat them
Emotion	Mummy was afraid of the cat	They were crying because they were sad due to mummy's leaving
Cognition	They didn't know that someone was coming	He thought he would climb very fast and eat the bird
Perception	Here, the dog is watching it	He saw that the cat had been harming birds and grabbed the bully and pulled him from the tree

Note: Kappa between 2 raters were between .72-1.

### Children's Tasks: First order false-belief tasks at 4 (Time 1)

Q: When Mathew went home [in the story: not knowing about the displacement of the biscuit] where did he think the biscuit was?



First-order false-belief task (Lazardis, 2013)

[In the story: the cat is in the bushes], but Barbara thinks her cat is in the garage.  
Q: So where will Barbara look for the cat?



First-order explicit false-belief task (Wellman & Liu, 2004)

### Second-order belief tasks at 5.5 (Time 2)

[In the story: John does not know that Mary knows the true/actual destination of the ice-cream van]  
Q: Where does John think Mary went to buy an ice-cream?



Second-order belief task (Sullivan et al. 1994)

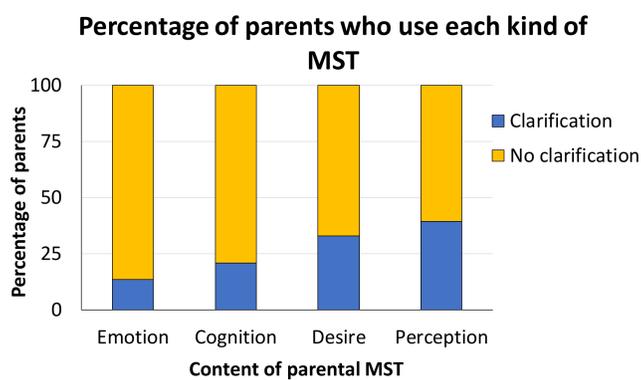
[In the story: Mom does not know that Peter revealed his true/actual birthday surprise/present]  
Q: What does Mom say to Grandma [about Peter's beliefs]?



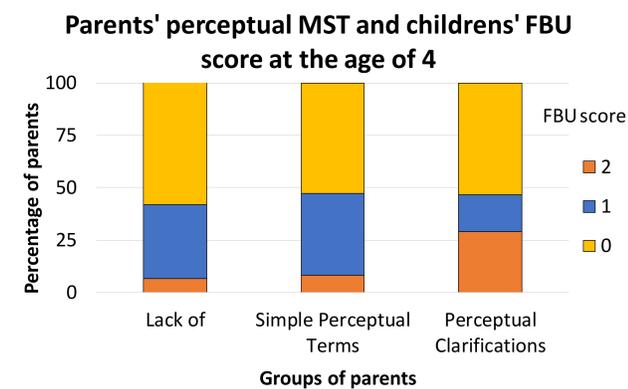
Second-order belief task (Sullivan et al. 1994)

## RESULTS

### 4-year-olds

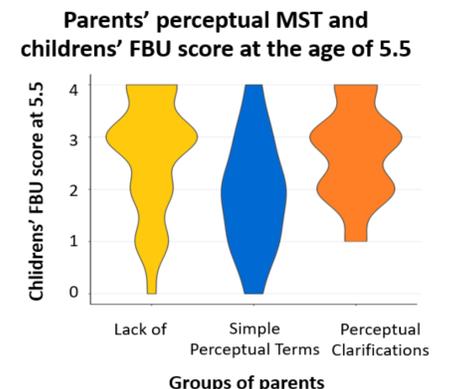


Significantly more parents use PC than EC ( $p < .001$ ) and CC ( $p < .01$ ); the number of parents using PC and DC was not significantly different (McNemar's tests with Bonferroni-Holm adjustment).



Children whose parents use PC achieved higher 1<sup>st</sup> order FBU than randomly expected ( $\chi^2(4, N = 112) = 11.38, p < .05, V = .14, z = 3.0, p = .002, \text{adjusted } \alpha = .006$ ).

### 5.5-year-olds



Children of parents who provided PC or did not use perceptual MST had higher 2<sup>nd</sup> order FBU than those who were told only SPT ( $F(2, 82) = 4.52, p < .05, \eta^2 = 0.1$ ).

## DISCUSSION:

Perceptual MST is frequently used by parents when explaining or clarifying others' behavior to their 4-year-old children; this may help them to register the relation between perceptual access and belief-based behaviors. It supports the idea that visual perspective taking developmentally precedes ToM ability (Moll & Meltzoff, 2011). Perceptual clarifications in parental MST at age 4 helps children to understand both 1<sup>st</sup> and 2<sup>nd</sup> order false beliefs at ages 4 and age 5.5, respectively. The scaffolding effect of focusing on perceptual access in ToM development is in accordance with Ruffman's minimalism approach to ToM development (see: Ruffman, 2014; Ruffman & Taumoepeau, 2017).

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