

Do Zookeepers Fix “Boo-Boos” Too? Children’s Evaluation of Expertise Boundaries in a Natural Science Center Context

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Introduction

- Beginning in early childhood, children recognize both experts and parents as sources of information (Kruglanski et al., 2005). By age 4, children recognize expertise (e.g., Lutz & Keil, 2002) but continue to prefer parents as sources of information in some circumstances (e.g., Raviv, Bar-Tal, Raviv, & Houminer, 1990).
- During middle to late childhood, children’s perceptions of their parents as an “epistemic authority” decrease (Bar-Tal, Raviv, Raviv, & Brosh, 1991). In addition, children refine their understanding of experts’ limitations and the boundaries between what one expert knows relative to someone with expertise in a different domain (e.g., Danovitch & Keil, 2004; Keil, Stein, Web, Billings, & Rozenblit, 2008).
- Perceptions of knowledge may be particularly important in naturalistic learning situations, where children may receive information from both experts and parents. On one hand, a science center setting may highlight clear boundaries between the knowledge of experts and that of most parents. On the other hand, this contrast between potential informants in a science center may increase children’s overgeneralization of an expert’s knowledge relative to a parent’s knowledge.

In the current study, 4- to 8-year-olds received information about an unfamiliar animal from a zookeeper informant and a maternal informant. Then, we examined children’s inferences about the additional knowledge of these informants.

Method

- 70 4- to 8-year-olds (26 4- to 5-year-olds, 44 6- to 8-year-olds) were recruited at the Greensboro Science Center or from a database of local volunteers.
- Participants were introduced to a zookeeper informant and a maternal informant (i.e., not their own parents) at the exhibit of an unfamiliar animal (i.e., tamandua, an anteater relative). See Figure 1. Participants heard facts about the animal from each informant in succession.
- Participants answered 17 forced-choice knowledge boundary judgment questions about several topics unrelated to the animal. There were three subsets of questions related to:
 - A zookeeper’s expertise (4 questions)
 - A mother’s knowledge (4 questions)
 - General knowledge that both informants could know (9 questions)
- Participants could select “zookeeper,” “mom,” or “both” for each question. Participants received a score of 1 if they selected the expected informant (e.g., “zookeeper” for zookeeper-related items) and a score of 0 for all other answer choices (e.g., “mom” or “both” for zookeeper-related items). These scores were summed for each subset to produce three scores.

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Figure 1. Zookeeper and maternal informants, and example of a tamandua.



Figure 2. Children’s informant selection by age for the zookeeper knowledge set.

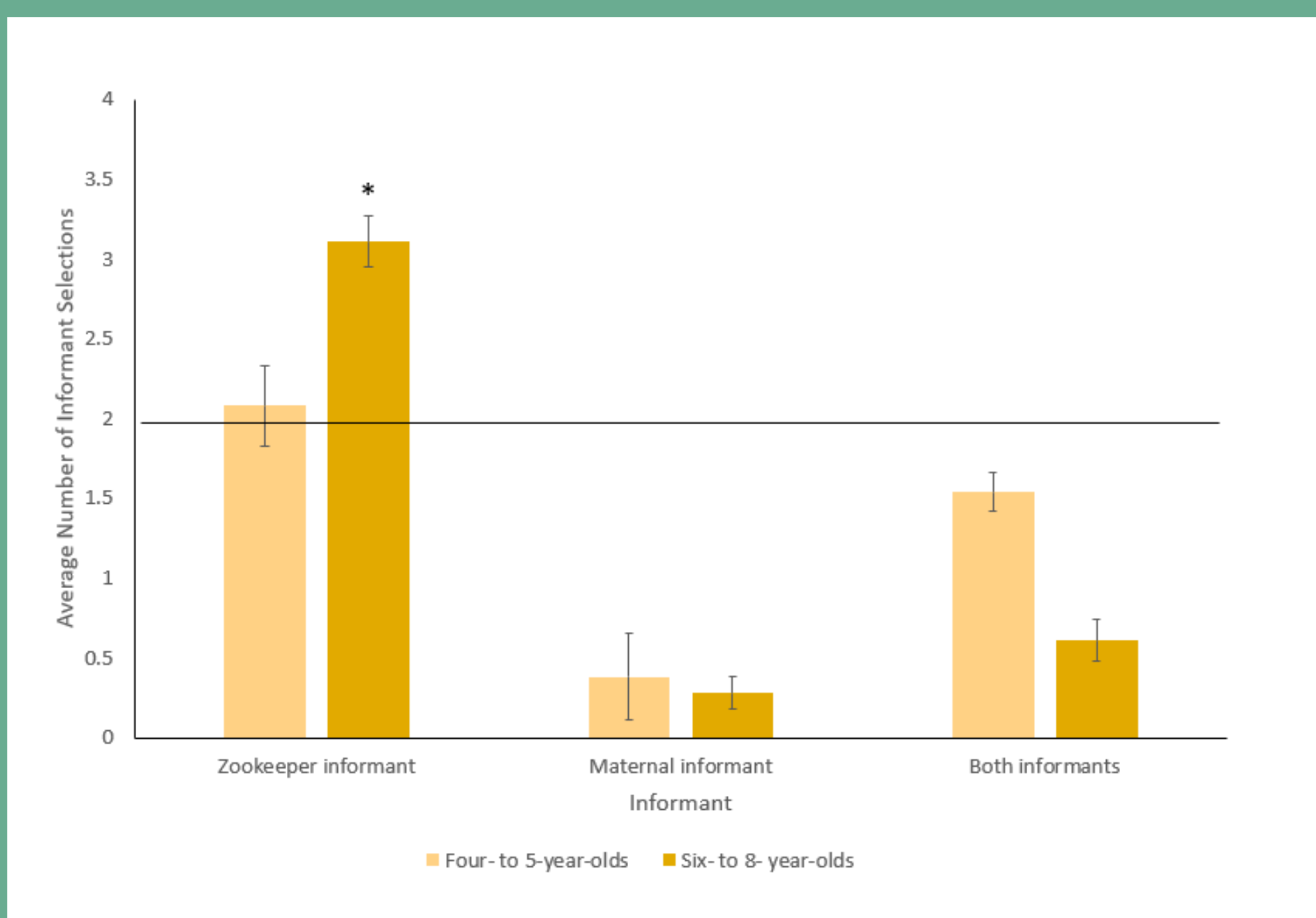


Figure 3. Children’s informant selection by age for the mother knowledge set.

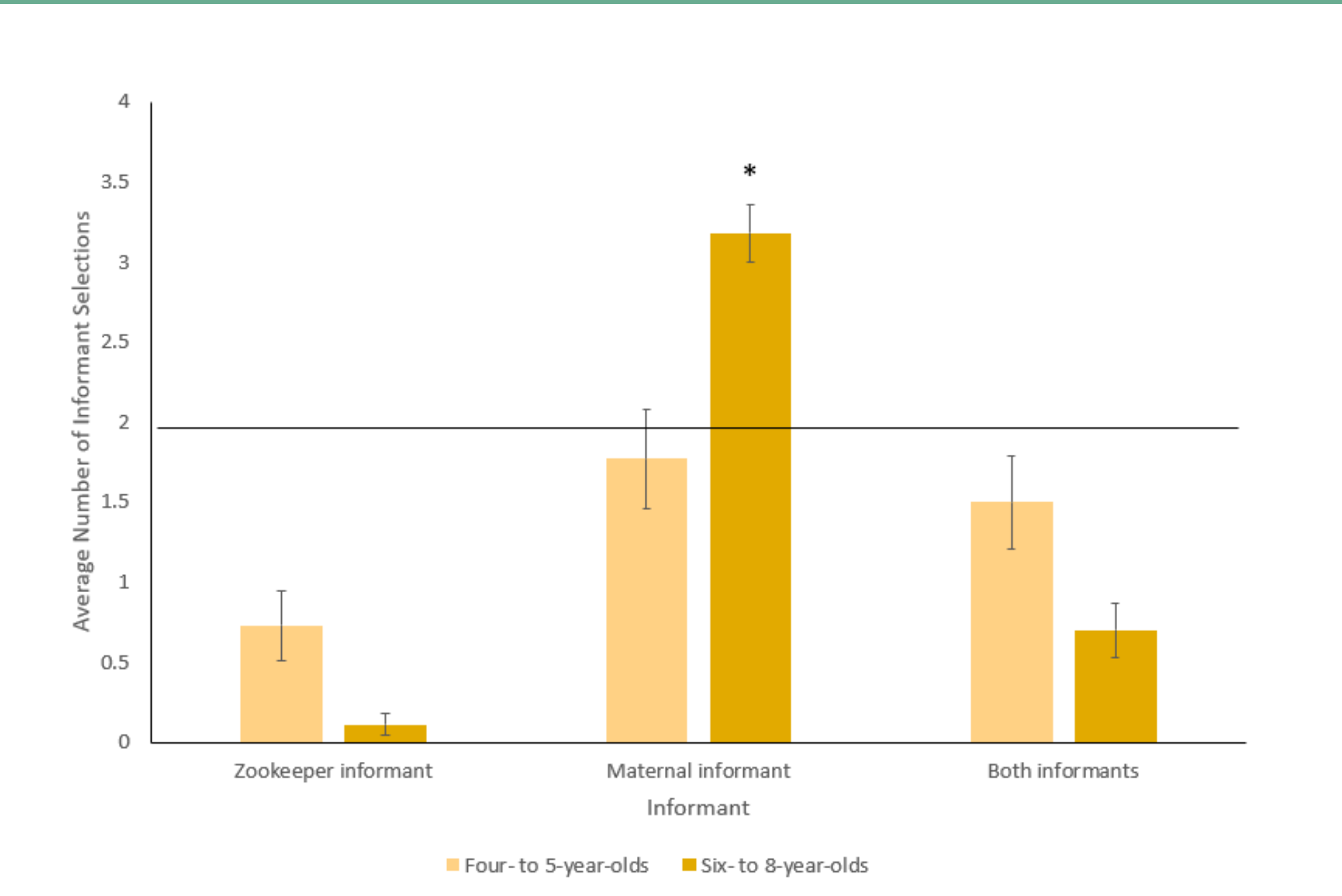
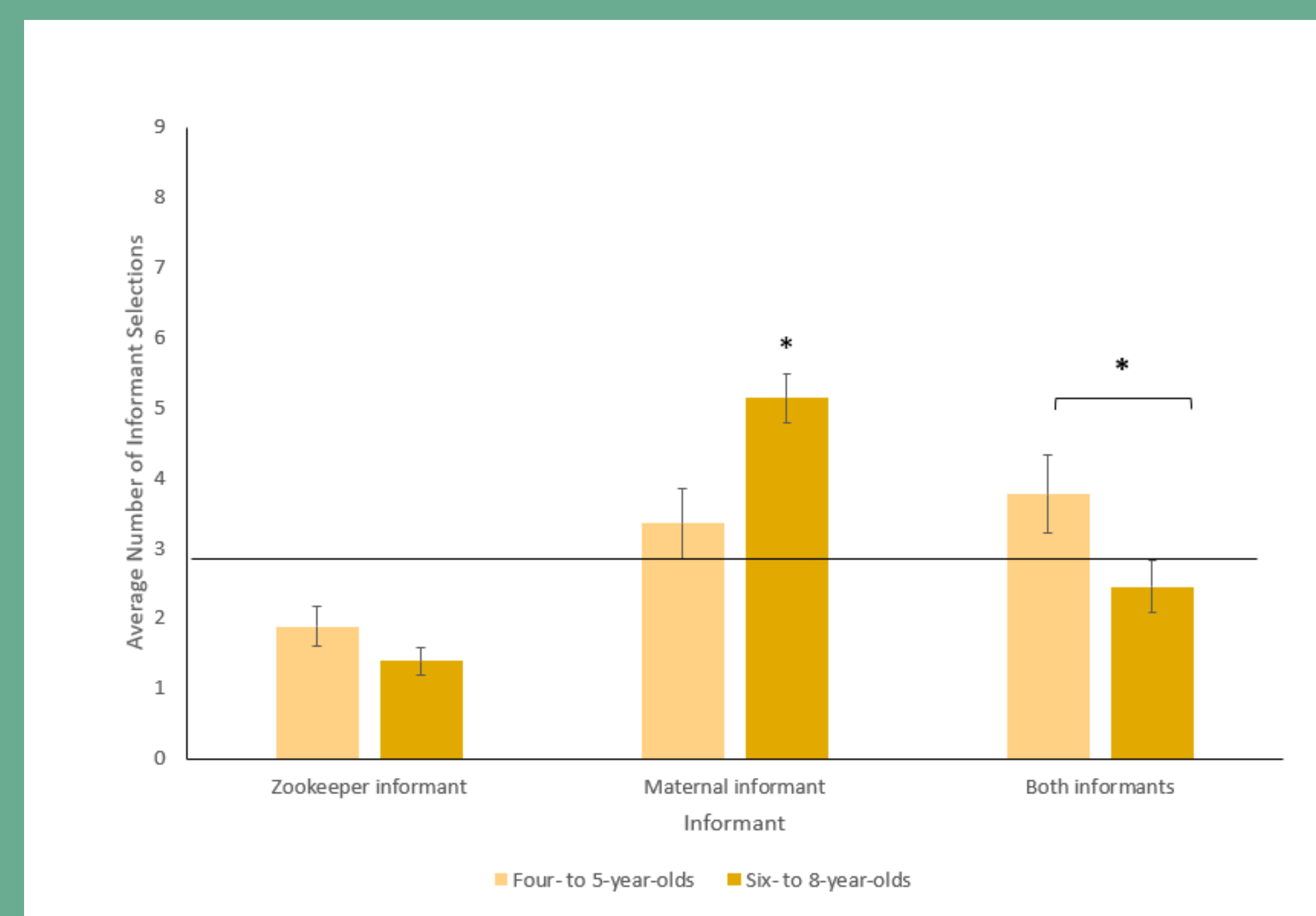


Figure 4. Children’s informant selection by age for the general knowledge set.



Results

- A one-way ANOVA was used to compare the effect of age group on each of the generalization of knowledge scores (i.e., “zookeeper,” “mother,” and “both” knowledge areas).
- T-tests against chance (2 out of 4 or 3 out of 9) were used to examine whether children selected an informant (or both informants) systematically in each set.
- “Zookeeper” set:**
 - Older children ($M = 3.11, SD = 1.03$) selected the zookeeper as knowledgeable more often than younger children ($M = 2.08, SD = 1.18$), $F(1, 68) = 13.84, p < .001, \eta_p^2 = .17$ (Figure 1).
 - Older children selected the zookeeper at a rate significantly different from chance, $t(43) = 7.11, p < 0.001, d = 1.04$; younger children were unsystematic, $t(25) = 0.31, p = 0.76$.
- “Mother” set:**
 - Older children ($M = 3.18, SD = 1.15$) selected the maternal informant as knowledgeable more often than younger children ($M = 1.77, SD = 1.53$), $F(1, 68) = 18.30, p < .001, \eta_p^2 = .21$ (Figure 3).
 - Older children selected the maternal informant at a rate significantly different from chance, $t(43) = 6.61, p < 0.001, d = .99$; younger children were unsystematic, $t(25) = -0.76, p = 0.46$.
- “General knowledge” set:**
 - Younger children ($M = 3.77, SD = 2.95$) selected “both” informants as knowledgeable more often than older children ($M = 2.45, SD = 2.42$), $F(1, 68) = 4.24, p = .04, \eta_p^2 = .06$ (Figure 4).
 - Neither older nor younger children selected the expected answer of “both” at a rate significantly different from chance: older, $t(43) = -1.49, p = 0.14$; younger, $t(25) = 1.39, p = 0.18$.
 - Older children selected the maternal informant systematically, $t(43) = 6.11, p < .001, d = .92$, and systematically refrained from selecting the zookeeper, $t(43) = -8.36, p < .001, d = 1.26$ (Figure 4).
 - Younger children also systematically refrained from selecting the zookeeper $t(25) = -3.92, p < .001, d = .77$, but younger children did not select the maternal figure at a rate significantly different from chance, $t(25) = 0.69, p = .50$.

Discussion

- Taken together, these findings align with previous research in which children’s sensitivity to the boundaries of knowledge continues to develop across middle childhood (Keil et al., 2008). Despite preschoolers’ early sensitivity to expertise (e.g., Koenig & Jaswal, 2011), 4- to 5-year-olds in this study did not systematically associate zookeeper-related topics with what a zookeeper knows.
- Surprisingly, older children endorsed the maternal informant over the option to endorse “both” informants for general knowledge items. Although children in this study did not receive testimony from their own mothers, this finding extends previous research in which 3- to 5-year-olds prefer to trust a parent (Boseovski & Thurman, 2014; Corriveau et al., 2009) and suggests that children as old as 8 may also endorse a familiar caregiver as knowledgeable despite these older children’s sensitivity to expertise (Keil et al., 2008).
- These findings suggest that children may struggle to integrate information about social roles and to recognize that people can hold multiple category memberships that may influence what people know (e.g., an expert could hold the role of “parent,” Rosch, 1999).
- Additional research will need to address how educators can leverage children’s positive view of parents to boost retention of science learning in naturalistic contexts.