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Theory-of-Mind Development in Brazilian Low-Income Children

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Abstract

Despite all advances of theory-of-mind research in recent years, our current understanding of this phenomenon in children from different socioeconomic backgrounds living in developing countries is still limited. The present study aimed to investigate the developmental pattern toward theory-of-mind in 121 Brazilian preschool children (3-, 4-, and 5-year-olds) from low SES working-class families. Participants were administered three tasks assessing different aspects of theory of mind: adapted versions of a verbal and a non-verbal false belief tasks, the Luria hand-game, and the Deceptive Box game. Children from all three-age groups succeeded in the test of inhibitory control (the Luria hand-game). In the unexpected false belief task, the majority of 4-year-old children (65.9 %) passed the non-verbal test and the second verbal test (72.7%); however, in the Deceptive box task, only half of 5-year-old children gave correct responses to both types of question (52.8% to self- and 50% to other-attribution questions). These results suggest a possible difference in the developmental sequence toward theory-of-mind in Brazilian low-income children that needs to be further investigated. Future cross-cultural studies should be particularly attentive to the characteristics of children's family environments, in particular, family context and functioning when investigating social cognitive development in poor children.

Keywords: cross-cultural research, poor children, preschool age, social class, theory of mind

1. Introduction

The acquisition of a theory of mind is an important step in children's developing understanding of the social world as it leads to several competences: being able to attribute mental states to oneself and others; recognizing that one's own mental states may differ from another's; understanding that these mental states may sometimes misrepresent or contradict reality; and, importantly, being able to predict how these mental states motivate human behavior (cf. Carlson, Koenig, & Harms, 2013; Liszkowski, 2013; Low & Perner, 2012; Sokol, Müller, Carpendale, Young, & Iarocci, 2010).

Potential deficits or delays in theory of mind may be associated with difficulties in the domain of social interactions and communication, as this is particularly the case for autistic children (Baron-Cohen, Leslie, & Frith, 1985; Frith & Frith, 2012; Zwickel, White, Coniston, Senju, & Frith, 2011). However, two other populations with delays in theory-of-mind development have been receiving special attention from researchers in the field: maltreated (Cicchetti, Rogosch, Maughan, Toth, &

Bruce, 2003; Luke & Banerjee, 2012) and deaf children (de Villiers & de Villiers, 2003, 2012; Peterson & Siegal, 1998). The mechanisms responsible for such delays in these two groups, however, seem to be different from the ones present in autism. It has been argued that language about the mind, or more specifically, talk about the mind plays an important role in theory-of-mind development (Astington & Baird, 2005).

In the case of parents of maltreated children, Cicchetti *et al*. (2003) argue that they are less likely to address their children's internal experience due to their restricted sensitivity and reduced levels of empathy towards their children. Consequently, these children may also be deprived of early communication promoting the development of theory of mind. With regard to deaf children of hearing parents, there is evidence that they are deprived of talk about mental states early in development (Peterson & Siegal, 1998) because they get little language input overall, particularly if they are being orally trained. Moreover, the few words they may acquire most likely refer to concrete things.

The results of these studies are intriguing, especially because they lead to the question of whether socio-economic status and culture also contribute to differences in children's developing social understanding (e.g., Lewis *et al*., 2009; Shahaeian, Peterson, Slaughter, & Wellman, 2011). One possibility is that different cultures or social groups may foster a type of parent-child interaction that is not conducive to theory-of-mind development (Hughes *et al*., 2005). For example, Cutting and Dunn (1999) investigated the effect of family background on theory-of-mind development and found that mothers with more education had children who performed better on false belief tests. Holmes, Black and Miller (1996) also found evidence that children from lower SES families lag behind children from higher SES families in false belief tasks. Likewise, Cole and Mitchell's (1998) results suggest that SES can predict children's understanding of deception.

With regard to cultural differences, there is evidence of delays in false belief understanding in children from countries like Peru (Vinden, 1996) and Japan (Naito & Koyama, 2006). More recently, Shahaeian *et al*. (2011) found differences in the sequence of steps in theory-of-mind development between children from Australia and from Iran. In the same direction, Callaghan *et al*. (2011) found similarities as well as differences regarding early social cognition in three different cultures: Canada, Peru and India. In a set of eight studies, they found that children from these three cultural groups were very similar in basic social-cognitive skills (e.g., imitation, gaze following, joint attention, communicative pointing), but Canadian children performed better than Indian and Peruvian children in tasks involving comprehension of pretense or use of symbols. According to the authors, this pattern of results is not surprising given that children in Canada experience social interactions involving pretend play and use of symbols at a much higher rate than children from the other two groups.

With regard to later social cognitive development, one could ask, however, whether these differences can also be explained by linguistic effects. For example, Shatz, Diesendruck, Martinez-Beck, and Akar (2003) had linguistic differences cut across culture differences. They were able to group four languages (Puerto Rican Spanish, Turkish, Brazilian Portuguese and English) using the criterion of having or not having a verb to express "false-belief," with the result that Puerto Rican Spanish and Turkish were grouped together and contrasted with the second group, Brazilian Portuguese and English.

Shatz *et al*.'s findings (2003) suggest that there is an effect of lexical explicitness on children's false belief performance but it is a "local" effect. Having the explicit term for false belief was correlated with improved performance only when the task questions included the explicit term. In spite of the lack of an overall language effect on false belief understanding, Shatz et al.'s results (2003) revealed a positive effect of SES on Puerto Rican and U.S. children's performance on the false belief tasks. One possible interpretation of these results, however, is that maternal speech mediates the effect of SES on theory-of-mind development (cf. Pavarini, de Hollanda Souza, &

Hawk, 2013). Furthermore, this interpretation resonates with findings from National Institute of Child Health and Human Development Early Child Care Research Network (2005) report which indicates that the quality of the home environment and maternal sensitivity mediates the effects of poverty on cognitive skills.

One could argue, for example, that Brazilian children are likely to present delays in theory-of-mind development mainly due to the effects of poverty. The Brazilian literature on theory-of-mind development, however, presents mixed results. For example, in one study, Roazzi and Santana (1999) tested 4- and 5-year-old Brazilian children from middle-class families in an adapted version of a false-belief task. The task consisted of presenting the child with three dolls that were introduced to the child as students in a school and a fourth doll who represented the teacher. One of the three student dolls had a tomato head and was called "Tomatinha" (little tomato), another had a carrot head and was called "Cenourinha" (little carrot); the third one had a banana head and was called "Bananinha" (little banana). "Tomatinha" always brought tomatoes for lunch; "Cenourinha" always brought carrots and "Bananinha" always had bananas. A confederate left the room with the three dolls while the experimenter suggested that they replace "Bananinha's" lunch with bubble gum. Then the child was asked three questions: (a) What does (the confederate) think "Bananinha" has in her lunch box? (b) What does "Bananinha" think is in her lunch box? (c) What does "Bananinha" have in her lunch box?

Roazzi and Santana (1999) found that only 32% of the 4-year-olds in their study passed this false-belief task whereas 98% of the 5-year-olds were successful. More recently, however, Roazzi and Santana (2008) tested 5- and 6-year-old children from low SES families in a similar task that assessed first order false belief as well as second order false belief attribution. Compared to their previous findings, 5-year-olds in this more recent study had more difficulty overall in the first-order false belief questions, which seems to suggest an effect of socioeconomic status on children's performance. In other words, these results could be taken to suggest that Brazilian children are delayed in the development of false-belief understanding.

In fact, results from a previous study seem to contradict Roazzi and Santana's findings (1999, 2008). Dias (1993) tested false belief understanding in orphanage children as well as children from low and middle SES families living in the northeast region of Brazil using adaptations of three false belief tasks: the "Sally-Ann task," the "unexpected content" task and the "sticker-finding game". Although participants had scores below chance at ages 4 and 5, children from low and middle SES were performing above chance at the three tasks at all three ages (4, 5 and 6). These results suggest that Brazilian children do not differ from U.S. and European children in their performance in false belief tasks (Baron-Cohen *et al*., 1985; Gopnik & Astington, 1988; Wimmer & Perner, 1983).

If one considers the evidence on the links between theory of mind and social competence (Hughes & Leekam, 2004), it might also be expected that Brazilian preschoolers would not only encounter difficulties with different components of theory of mind, but also be less socially competent than preschoolers from other countries. However, Bigras and Dessen (2002) and LaFreniere *et al*. (2002) present evidence suggesting important similarities between children from Brazil and from seven other countries, especially with regard to gender differences (girls displaying less anger-aggression behaviors and more social competence than boys). These results are rather interesting since the Brazilian sample was recruited in public preschools which, as noted by Bigras and Dessen (2002), still fail to provide a rich environment for their students due to lack of investment and resources.

Clearly, more studies are needed if one wants to reach a conclusion regarding Brazilian children's developmental pattern towards theory of mind. Do children from low- and middle-class families who attend public preschools in Brazil lag behind preschoolers in more developed countries? Or is it possible that, despite the socioeconomic differences, their pattern of development is equivalent? The present study aims to contribute to the field by testing Brazilian low-income

preschoolers in two theory-of-mind tasks (an explicit false-belief task and a content false-belief task) as well as in a test of inhibitory control: the Luria hand-game (Hughes, 1996).

2. Method

2.1. Participants

One hundred and twenty-one children participated in this study. They were divided in three groups: 41 3-year-olds (*M*= 3;6, range= 3;0 – 3;11), 44 4- year-olds (*M* =4;6, range= 4;0 – 4;11), and 36 5-year-olds (*M* = 5;6, range= 5;0 – 5;11). There were 48 girls and 73 boys, 47% of the children were first born, 31% were second born, 11% were third born, and 2.5% fourth born (information on birth order for 10 children was not provided). All of the children attended public schools located in Brasília, the capital city of Brazil, and vicinities, and were from low SES working-class families.

2.2. Materials and Procedures

Three different procedures were used in the current study: an adapted version of the verbal and non-verbal false belief tasks created by Call and Tomasello (1999); the Luria hand-game as described by Hughes (1996); and the Deceptive Box game (Perner, Leekam, & Wimmer, 1987). During the first procedure, a puppet was used to replace one of the two adults involved in the original tasks, therefore, this procedure will be called the Puppet test from now on.

Puppet Test. Materials consisted of: a puppet, two identical opaque containers (15,6 cm x 10,5 cm x 7,5 cm), a marker (a small rock) to indicate where the puppet thought a toy was hidden, a plastic box (21 cm x 41 cm) used as a barrier to prevent children from seeing where the toy was being hidden during some trials, and a variety of toys (children chose one to be hidden).

Children were taken to a silent room in their preschool and they were asked if they wanted to play a hiding-finding game with the toy they had previously chosen. The procedure consisted of pre-test trials, control test trials, as well as a nonverbal and a verbal version of the explicit false-belief task. During pretest, the experimenter (the hider) sat behind the plastic box (the barrier) and the child sat on the opposite side. The hider then told the child that she would hide her toy in one of two opaque containers and the child's job was to try to find it. The puppet (communicator) sat behind the hider and therefore could see where the toy was being hidden. At the appropriate time, the experimenter placed the containers on top of the plastic box and the puppet placed the small rock on top of the box containing the toy. Children were then asked: "Where's the toy?" Pretest was administered until the child provided correct responses on three consecutive trials. The goal of the pretest trials was to familiarize the child with the role of the communicator and show how she could help him/her to find the sticker.

The control trials consisted of three different tests (two trials for each test): (a) the visible displacement test; (b) the invisible displacement test and (c) the ignore communicator test. Successful performance on these three trials was necessary before administering the false belief tasks. During the visible displacement test, the puppet placed the marker on the container holding the toy and left the room. The experimenter then moved the toy from one container to the other in full view of the child. During the invisible displacement test, instead of moving the toy, the experimenter simply switched the location of the containers. During the ignore communicator test, the experimenter moved the toy (not the container) while the puppet was out, but it marked the container only after its return, thus the child had to ignore the information provided by the puppet since it was known to be false.

Finally, each child was administered three versions (tests) of the false belief task that involved changing the location of an object: two verbal tests and a nonverbal test. In the verbal tests, the experimenter hid the toy and presented the containers to the child as the puppet left the scene. Then,

in front of the child, the experimenter moved the sticker from the original box to the second box in full view of the child and told him/her they were going to play a trick on the puppet. The child was then asked which container the puppet would mark when he returned. The puppet returned and placed the marker on the wrong container and the child had to say what the real location of the toy was. During the nonverbal test, the experimenter switched the location of the containers and smiled (after the puppet left). Therefore, the child remained ignorant of the real location of the toy. The puppet then returned and marked the container at the location where the toy had been originally hidden. The child was requested to indicate where the toy really was. In order to succeed in both versions, the child had to understand that the puppet had false beliefs about the location of the toy.

The Luria Hand-Game. This game was conducted exactly as in Hughes' study (1996). Children were asked to play a hand-game. The experimenter made gestures with his (her) hand and asked the child to perform the same movement (making a fist or pointing a finger). During the first phase of the test, the child was supposed to imitate the experimenter's gestures. In order to succeed, the child had to imitate correctly three pointing gestures and three fists. During the conflict (test) phase, the child was asked to make a different gesture. For example, if the experimenter made a fist, the child was supposed to point a finger and vice-versa. There were eight test trials during the first (imitation) phase and ten during the conflict (test) phase. In order to be considered successful in the conflict task, the child needed to provide six consecutive correct responses.

The Deceptive Box. In this variant of the false belief task, each child was presented with a familiar box of chocolates (Perner *et al*., 1987). The box, however, did not contain chocolate, but rather, three pencils. The child was shown the contents of the box and was then asked three questions: (a) What did you think was inside the box? (b) I will show this box to another child in a few minutes. What will he/she think is inside the box? (c) Can you remember what is inside the box?

3. Results

All participants attained the criterion of three consecutive correct pre-test trials, therefore, all of them learned to use the marker in the task of finding the sticker. Ninety-seven children (80.16%) provided the correct responses on the first three trials. Three-year-old children attained criterion in an average of 3.44 trials (*SE*= .14); 4-year-olds attained criterion in an average of 3.32 trials (*SE*= .12), whereas 5-year-olds in an average of 3.14 (*SE*= .07).

Eighteen children were dropped from the study during the control test phase of the study. One 3-year-old and one 4-year-old were dropped from the study for failing both trials of the visible displacement test; seven 3-year-olds, six 4-year-olds and two 5-year-olds were dropped for failing both trials of the invisible displacement test; finally, one 3-year-old was dropped for failing both trials of the ignore communicator test. One-sample t-tests revealed that all remaining participants passed the three control tests when compared to chance with the exception of the 3-year-olds in the invisible displacement test, t (40) = .65, $p > 0.05$. A one-way repeated measures ANOVA revealed an effect of age, F (2, 118) = 7.4, p = 0.001, as well as an effect of task, F (2, 118) = 30.77, $p <$ 0.001, but no interaction between age and task. Planned comparisons showed that 5-year-olds had better performance than the 3-year-olds, p = 0.001, but the difference between the 5- and the 4-year-olds was only marginally significant, p = 0.6. With regards to the false belief tasks, both the visible displacement and the ignore communicator tests were easier than the invisible displacement test, *ps* < 0.001, but no difference was found between the visible displacement and the ignore communicator test.

3.1. False-Belief Tests

Consistent with the results from Call and Tomasello (1999), an association between age and performance (success or failure) was found for the nonverbal test, $\chi^2(2) = 11.48$, $p < .05$, and the

second verbal test, $\chi^2(2) = 18.41$, $p < .001$; however, the same association was not found for the first verbal test, $\chi^2(2) = 0.36$, p = n.s. As can be seen in Figure 1, there is a significant increase across age in the number of children who succeed in both the non-verbal test and the second verbal test, but there seems to be no improvement with age in children's performance in the first verbal test. Unlike the participants in the Call and Tomasello study (1999), however, the majority of 4-year-olds (65.9%) did pass the non-verbal test and the second verbal test (72.7%).

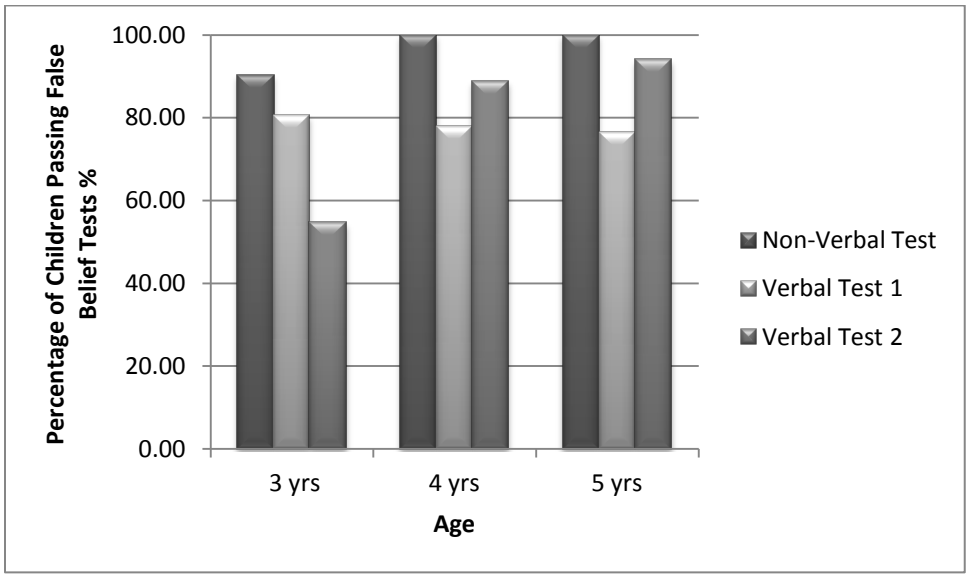

Figure 1. Percentage of children passing the three false-belief tasks (non-verbal test, verbal test 1, verbal test 2)

3.2. The Luria Hand-Game

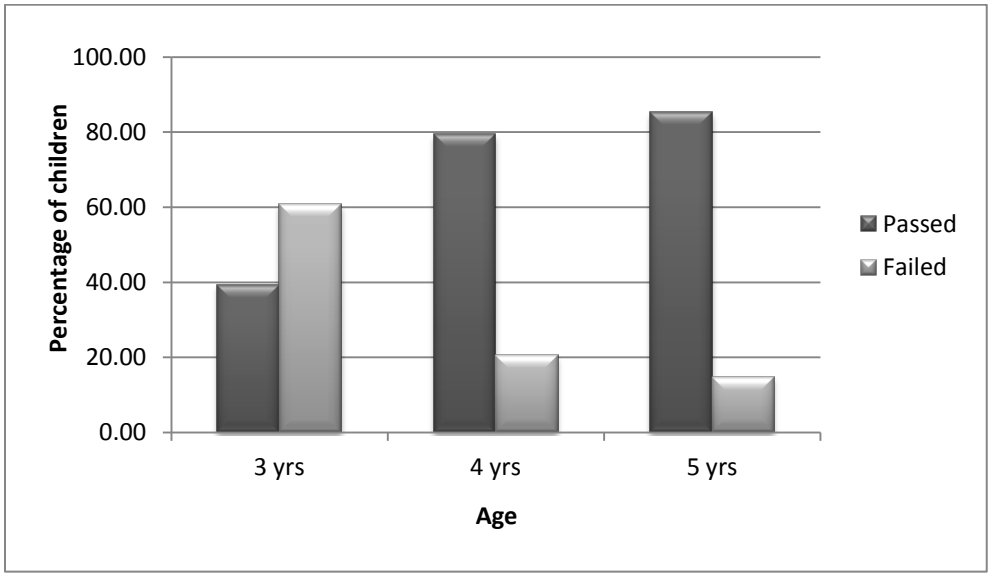

Figure 2. Proportion of children who achieved criterion and who did not achieve criterion on conflict condition

A total of 89 children participated in this task. Eight 3-year-olds, four 4-year-olds and two 5-year-olds did not participate because they were tired or unmotivated for the task. Since the majority of children succeeded in the imitation task (five 3-year-olds and only one 4-year-old did not succeed), as in Hughes´ study (1996), the focus of analysis will be on the results from the conflict condition only. Children who did not succeed in the imitation task were excluded from the analysis.

A significant association between age and performance in the conflict condition (success or failure) was found, $\chi^2(2) = 18.36$, $p < .001$. As can be seen in Figure 2, the majority of 3-year-old children failed the conflict condition (60.7 %), whereas the vast majority of 4- and 5-year olds passed the test, 79.5% and 85.3%, respectively.

3.3. Deceptive Box

There is a clear association between age and task performance, $\chi^2(2) = 10.31$, $p < .05$ for both the self-attribution test and the other-attribution test, $\chi^2(2) = 13.42$, $p = .001$. Only 17.1% of 3-year-olds (7 participants) gave correct answers to the self-attribution question and 9.8% (4 participants) to the other-attribution question. In fact, even among the oldest age group participating in the present study (5 to 6-year-olds), only half of them gave correct responses to both types of question (52.8% to self- and 50% to other-attribution questions).

The majority of 3-year-olds gave correct responses to the memory control question (73.2%); however, very few of them gave correct responses to the self- and other-attributions (17.1% and 9.8%, respectively), which suggests that their poor performance in the task was not affected by an inability to remember the sequence of events in the task (see Table 1).

Table 1. Percentage of children in each age group who gave correct responses to the three questions (self-attribution, other-attribution and memory control)

	Age		
	3 yrs	4 yrs	5 yrs
Self attribution	17.1	25	52.8
Other attribution	9.8	25	50
Memory Control	73.2	84.1	94.4

4. Discussion

Despite the increasing interest in possible effects of culture and family background on theory of mind, the number of studies investigating this developmental process in developing countries is still limited. Importantly, several misconceptions or stereotypes generally arise when there is not sufficient data to point in any direction. For example, it has been noted that disproportionate attention from researchers has been paid to children who live in the streets of Brazil or children who live in extreme poverty, and far less attention has been devoted to the vast majority of children in this country who do not share the same reality (Tudge *et al*., 2006). Moreover, little attention has been paid to the different realities of Brazilian families (e.g. Torres & Dessen, 2008), particularly to the pattern of social communication found in poor families.

Although the first Brazilian study on theory-of-mind development was published twenty years ago (Dias, 1993), it is only recently that developmental psychologists in this country have found renewed interest in the topic (cf. Sperb & Maluf, 2008; Roazzi & Sperb, 2013). Due to the yet

limited number of studies, it remains unclear whether social and cultural background has any impact on Brazilian children´s performance on theory-of-mind tasks. Dias' study (1993), for example, revealed no delays in low- and middle-class children (but a significant delay in orphanage children), whereas a more recent study by Roazzi and Santana (2008) suggests a delay in theory-of-mind development in children from low SES families. More broadly, what remains problematic in studies investigating effects of culture on theory of mind is the variability of methods and controls used to test children in different countries. Differences in performance could be interpreted as a result of cultural effects, but could be as easily interpreted as an effect of language ability or social background. As Doherty (2009) puts well, "it is difficult to know whether participants in previous studies would have differed in theory of mind performance had they been compared with matched children from Western societies" (p. 174).

The results from the present study seem to add another interesting element to this discussion by revealing that children may present different levels of performance in different types of task. Three patterns of results were observed. Firstly, children from all three age groups (3-, 4- and 5-year-olds) succeeded in the Luria hand-game which suggests that they do not present any deficits or delays in inhibitory control, an executive function found to be correlated with or to predict performance in false belief tasks (Carlson & Moses, 2001; Hughes, 1998).

Secondly, in accordance with the results from Call and Tomasello (1999), children`s performance in the false belief task (unexpected transfer) improved with age, with the exception of the first verbal test. Unlike children in the original study, the majority of 4-year-olds (65.9 %) passed the non-verbal test and the second verbal test (72.7%). It is still puzzling, however, why performance in the first verbal test did not improve with age or why it was more difficult than the second test. One possibility is that children had to process a significant amount of information during the entire procedure and they had to be particularly attentive to the changes between the non-verbal version and the verbal version of the task in order to succeed. On the other hand, children in Call and Tomasello's study (1999) encountered no difficulties in switching from one version to the other. In fact, one of their major findings was that performance on the verbal and nonverbal tests were highly correlated.

Finally, and contrary to the results of the unexpected transfer task, children`s performance in the unexpected content task was clearly much worse than that found with English children in the original study (Perner *et al*., 1987). Moreover, there was clear indication that children's failure in the task was not related to a memory difficulty.

What could explain the difference between these children's performance in the two theory-of-mind tasks? One could argue that the developmental pattern toward a theory of mind in low SES Brazilian children may not correspond to the expected pattern, that is, their life experiences may help performance in an unexpected transfer task, but not in an unexpected content task. As the results from the Wellman, Cross and Watson's (2001) meta-analysis study suggest, however, several variables may affect performance or age of success, for example, the level of explicitness of the false belief, whether children understand or not the underlying motive of the unexpected transfer/content, or even the country of origin of participants. However, the type of task is not a factor found to influence false belief performance.

Another plausible explanation is related to the differences in the preparation phase of the two tasks. During the Call and Tomasello procedure (1999), children had ample opportunity to get familiarized with the events and the type of questioning. Children were exposed to at least three trials during the pretest phase and six trials during the control phase. For our adapted version of the Perner *et al*.'s task (1987), children had no chance to get familiarized with the task. They participated in only one trial.

Given the robust evidence that social background is correlated with delays in theory-of-mind development (e.g., Cutting & Dunn, 1999; Holmes *et al*., 1996; Hughes *et al*., 2005), one should expect that this group of poor children from Brazil should present a lower level of performance in false belief tasks. What the results of the present study suggest, however, is that children´s performance in false-belief tasks may not necessarily reveal their true state or level of social understanding, mainly because their performance depends on how much experience or familiarity with the problem they have. Given adequate preparation or experience during the experiment, even children who may be deprived of adequate "talk about the mind" at home, as it seems to be the case of children from lower SES families (e.g., Cutting & Dunn, 1999), may perform successfully.

Nonetheless, one important limitation of the present study is the lack of a control group. In fact, recent evidence suggests significant differences between low SES and middle-class Brazilian children in vocabulary and theory of mind, with children from middle-class backgrounds showing better scores in both measures (Souza, Koenig & Lopes, 2013). It is possible that the pattern of theory-of-mind development found in high SES children is not as varied and task-dependent as the one found in our participants, and yet more similar to the one found in North American and European middle-class children. It is also important to note that, despite recent economic growth, Brazil still has one of the most unequal income distributions in the world. And low SES children in this country are still clearly disadvantaged with regard to the type of environment they find in the public schools they attend (e.g., problems in infrastructure; high proportion of students per teacher in each classroom; poor library conditions, etc.). Therefore, future studies should use other variants of the false belief task, as well as have participants from both socioeconomic backgrounds in order to reach any conclusion about the pattern in theory-of-mind development in Brazilian children.

Moreover, effects of socio-economic status on child development are undisputable, so the main focus now should be on how these effects can be minimized. Based on the evidence collected so far, it seems that the next logical step is to find ways to provide children at risk with the type of experience conducive or necessary to theory-of-mind development. Additionally, it is important that future studies, especially those interested in possible cultural differences, collect more information about children's initial experiences and interactions in the context of their families, as was done by Callaghan *et al*. (2011). Learning more about how families in different cultural contexts function and about the types of interactions children experience early in their lives will be essential in the planning of future interventions with children at risk.

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References

[1] Astington, J. W., & Baird, J. A. (Eds.). (2005). *Why language matters for theory of mind.* New York: Oxford University Press.

[2] Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a "theory of mind"? *Cognition, 21*(1), 37-46.

[3] Bigras, M., & Dessen, M. A. (2002). Social competence and behavior evaluation in Brazilian preschoolers. *Early Education & Development, 13*(2), 139-151.

[4] Call, J., & Tomasello, M. (1999). A nonverbal false belief task: The performance of children and great apes. *Child Development, 70*(2), 381-395.

[5] Callaghan, T., Moll, H., Rakoczy, H., Warneken, F., Liszkowski, U., Behne, T., & Tomasello, M. (2011). Early social cognition in three cultural contexts. *Monographs of the Society for Research in Child Development, 76*(2), 1-142.

[6] Carlson, S. M., Koenig, M. A., & Harms, M. B. (2013). Theory of mind. *Wiley Interdisciplinary Reviews: Cognitive Science*, *4*(4), 391-402.

[7] Carlson, S. M., & Moses, L. J. (2001). Individual differences in inhibitory control and children's theory of mind. *Child Development, 72*(4), 1032-1053.

[8] Cicchetti, D., Rogosch, F. A., Maughan, A., Toth, S. L., & Bruce, J. (2003). False belief understanding in maltreated children. *Development and Psychopathology*, *15*(4), 1067-1091.

[9] Cole, K., & Mitchell, P. (1998). Family background in relation to deceptive ability and understanding of the mind. *Social Development, 7*(2), 181-197.

[10] Cutting, A. L., & Dunn, J. (1999). Theory of mind, emotion understanding, language, and family background: Individual differences and interrelations. *Child Development*, *70*(4), 853-865.

[11] de Villiers, J. G., &. de Villiers, P. A. (2003). Language for thought: Coming to understand false beliefs. In D. Gentner & S. Goldin-Meadow (Eds.), *Language in Mind* (pp. 335-384). Cambridge, MA: MIT Press.

[12] de Villiers, P. A., & de Villiers, J. G. (2012). Deception dissociates from false belief reasoning in deaf children: Implications for the implicit versus explicit theory of mind distinction. *British Journal of Developmental Psychology*, *30*(1), 188–209. doi:10.1111/j.2044-835X.2011.02072.x

[13] Dias, M. G. B. B. (1993). O desenvolvimento do conhecimento da criança sobre a mente. [The development of children's knowledge about the mind]. *Psicologia: Teoria e Pesquisa, 9*(3), 587-600.

[14] Doherty, M. J. (2009). *Theory of mind: How children understand others' thoughts and feelings*. New York: Psychology Press.

[15] Frith, C. D., & Frith, U. (2012). Mechanisms of social cognition. *Annual Review of Psychology*, *63*(1), 287–313. doi:10.1146/annurev-psych-120710-100449

[16] Gopnik, A., & Astington, J. W. (1988). Children's understanding of representational change and its relation to the understanding of false belief and the appearance-reality distinction. *Child Development*, *59*(1), 26-37.

[17] Holmes, H. A., Black, C., & Miller, S. A. (1996). A cross-task comparison of false-belief understanding in a head start population. *Journal of Experimental Child Psychology*, *63*(2), 263-285.

[18] Hughes, C. (1996). Control of action and thought: Normal development and dysfunction in autism: A research note. *Journal of Child Psychology and Psychiatry*, *37*(2), 229-236.

[19] Hughes, C. (1998). Finding your marbles: Does preschoolers' strategic behavior predict later understanding of the mind? *Developmental Psychology, 34*(6), 1326-1339.

[20] Hughes, C., Jaffee, S. R., Happé, F., Taylor, A., Caspi, A., & Moffitt, T. E. (2005). Origins of individual differences in theory of mind: From nature to nurture? *Child Development*, *76*(2), 356-370.

[21] Hughes, C., & Leekam, S. (2004). What are the links between theory of mind and social relations? Review, reflections and new directions for studies of typical and atypical development. *Social Development, 13*(4), 590-619.

[22] LaFreniere, P., Masataka, N., Butovskaya, M., Chen, Q., Dessen, M. A., Atwanger, K., . . . Frigerio, A. (2002). Cross-cultural analysis of social competence and behavior problems in preschoolers. *Early Education & Development, 13*(2), 201-219.

[23] Lewis, C., Koyasu, M., Oh, S., Ogawa, A., Short, B., & Huang, Z. (2009). Culture, executive function, and social understanding. *New directions for child and adolescent development, 2009*(123), 69–85.

[24] Liszkowski, U. (2013). Using theory of mind. *Child Development Perspectives*, *7*(2), 104-109. doi: 10.1111/cdep.12025

[25] Low, J., & Perner, J. (2012). Implicit and explicit theory of mind: State of the art. *British Journal of Developmental Psychology, 30*(1), 1–13. doi: 10.1111/j.2044-835X.2011.02074.x

[26] Luke, N., & Banerjee, R. (2012). Maltreated children's social understanding and empathy: A Preliminary exploration of foster carers' perspectives. *Journal of Child and Family Studies*, *21*(2), 237–246. doi:10.1007/s10826-011-9468-x

[27] Naito, M., & Koyama, K. (2006). The development of false-belief understanding in Japanese children: delay or difference? *International Journal of Behavioral Development, 30*(4), 290-304.

[28] National Institute of Child Health and Human Development Early Child Care Research Network. (2005). Duration and developmental timing of poverty and children's cognitive and social development from birth through third grade. *Child Development, 76*(4), 795-810.

[29] Pavarini, G., de Hollanda Souza, D., & Hawk, C. K. (2013). Parental practices and theory of mind development. *Journal of Child and Family Studies*, *22*(6), 844-853.

[30] Perner, J., Leekam, S. R., & Wimmer, H. (1987). Three-year-olds' difficulty with false belief: The case for a conceptual deficit. *British Journal of Developmental Psychology, 5*(2), 125-137.

[31] Peterson, C. C., & Siegal, M. (1998). Changing focus on the representational mind: Deaf, autistic and normal children's concepts of false photos, false drawings and false beliefs. *British Journal of Developmental Psychology*, *16*(3), 301-320.

[32] Roazzi, A., & Santana, S. M. (1999). Teoria da mente: Efeito da idade, do sexo e do uso de *atores* animados e inanimados na inferência de estados mentais. [Theory of mind: The effect of age, sex and the use of animate and inanimate "actors" in inferring mental states]. *Psicologia: Teoria e Pesquisa, 12*(2), 307-330.

[33] Roazzi, A., & Santana, S. M. (2008). Teoria da mente e estados mentais de primeira e segunda ordem. [Theory of mind and first- and second-order mental states]. *Psicologia: Reflexão e Crítica, 21*(3), 437-445.

[34] Roazzi, A., & Sperb, T. M. (Eds.). (2013). *O desenvolvimento de competências sociocognitivas: Novas perspectivas*. [*Developing sociocognitive skills: New Perspectives*]. São Paulo: Editora Vetor.

[35] Shahaeian, A., Peterson, C. C., Slaughter, V., & Wellman, H. M. (2011). Culture and the sequence of steps in theory of mind development. *Developmental Psychology*, *47*(5), 1239–1247. doi:10.1037/a0023899

[36] Shatz, M., Diesendruck, G., Martinez-Beck, I., & Akar, D. (2003). The influence of language and socioeconomic status on children's understanding of false belief. *Developmental Psychology, 39*(4), 717-729.

[37] Sokol, B. W., Müller, U., Carpendale, J. I. M., Young, A. R.., & Iarocci, G. (Eds.). (2010). *Self- and social-regulation: Social interaction and the development of social understanding and executive functions*. New York: Oxford University Press.

[38] Souza, D. H., Koenig, M. A. & Lopes, R. (2013, October, 19). *Selective trust and theory of mind in Brazilian children: effects of culture and socioeconomic background.* Poster Session III presented at the 8th Biennial Meeting of the Cognitive Development Society (CDS 2013). Memphis, TN.

[39] Sperb, T. M., & Maluf, M. R. (Eds.). (2008). *Desenvolvimento sociognitivo: estudos brasileiros sobre "teoria da mente"*. [*Sociocognitive development: Brazilian studies on theory of mind*]. São Paulo: Editora Vetor.

[40] Torres, C. V., & Dessen, M. A. (2008). Brazilian culture, family, and its ethnic-cultural variety. *Arizona Journal of Hispanic Cultural Studies*, *12*, 189-202.

[41] Tudge, J. R. H., Doucet, F., Odero, D., Sperb, T. M., Piccinini, C. A., & Lopes, R. S. (2006). A window into different cultural worlds: Young children's everyday activities in the United States, Brazil, and Kenya. *Child Development*, *77*(5), 1446-1469.

[42] Vinden, P. G. (1996). Junin Quechua children's understanding of the mind. *Child Development*, *67*(4), 1707-1716.

[43] Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development, 72*(3), 655-684.

[44] Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition, 13*(1), 103-128.

[45] Zwickel, J., White, S. J., Coniston, D., Senju, A., & Frith, U. (2011). Exploring the building blocks of social cognition: spontaneous agency perception and visual perspective taking in autism. *Social Cognitive and Affective Neuroscience*, *6*(5), 564–571. doi:10.1093/scan/nsq088

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