Published in final edited form as:
First Lang. 2008 November ; 28(4): 431–442. doi:10.1177/0142723708092413.

Young children's yes bias: How does it relate to verbal ability, inhibitory control, and theory of mind?

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Abstract

The aim of the present study was to investigate how young children reduce a yes bias, the tendency to answer 'yes' to yes-no questions. Specifically, we examined three possible factors: verbal ability, inhibitory control and theory of mind. Results revealed that verbal ability and inhibitory control were strongly associated with a yes bias even after controlling for age. Regression analyses revealed that these two factors significantly predicted a yes bias. Theory of mind was not significantly correlated with a yes bias. The results indicate that young children may have to inhibit a dominant 'yes' response when they are supposed to respond 'no'. The development of verbal skills may reduce young children's yes biases.

Keywords

Cognitive development; inhibitory control; preschool children; theory of mind; verbal ability; yes bias

Once children begin to speak during the first or second years of life, they can communicate with adults around them verbally. However, if young children's talking or communication is biased, adults may misunderstand them. One such bias is the tendency to answer 'yes' when they are posed yes-no questions by adults. This tendency, the 'yes bias', occurs in spite of knowing that the correct answer in a particular instance is 'no'. The bias could be problematic for adults who communicate with infants or children in general and for developmental psychologists in particular, because developmental researchers often use yes-no questions to evaluate children's cognitive or social abilities.

There is growing evidence of the existence of a yes bias in young children. Steffensen (1978) showed that 2-year-olds had a strong yes bias in their responses to their parents' yes-no questions. Peterson, Dowden & Tobin (1999) reported that preschool children were more likely to answer 'yes' than 'no' in simulated forensic interviews when they received yes-no questions. On the other hand, Brady, Poole, Warren & Jones (1999) found no response biases toward various yes-no questions for children between 3 and 7 years of age.

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Recently, Fritzley & Lee (2003) conducted a study to clarify the inconsistencies of the existing literature regarding a yes bias. In their study, 2- to 5-year-old children were asked comprehensible and incomprehensible yes-no questions concerning familiar and unfamiliar objects. The results revealed that 2-year-old children displayed a strong yes bias, 3-year-olds displayed a yes bias in some experiments, and 4- and 5-year-olds basically exhibited no response biases. Fritzley & Lee (2003) suggested that contradictory findings in previous studies may be due to differences in experimental design (e.g., the subject matter about which children are questioned, the age range of children, and so on). Thus they concluded that younger children may have a strong yes bias. More recently, Okanda & Itakura (2007, 2008) replicated the findings in Asian countries, showing that even 4-year-old children in Japan and Vietnam had a yes bias. The results suggested that a yes bias in young children could be a universal phenomenon.

Although there is mounting empirical evidence of a yes bias, few studies have addressed explanatory factors. One plausible factor is verbal ability. Fritzley & Lee (2003) showed that development of verbal knowledge may affect children's response tendency toward yes-no questions. In their experiments, children were more likely to answer 'yes' when given questions about unfamiliar objects than familiar objects. Also, Fritzley & Lee (2003) suggested that pragmatic development or development of conversational understanding may also make children overcome response biases. Given this, the present study examined whether children's verbal ability could predict their yes bias.

Two other possible factors were examined. One is inhibitory control ability. Inhibitory control is defined as the capacity to inhibit thought processes or actions that are not relevant to goals or tasks at hand. This ability is one of the most rapidly developing cognitive abilities in the preschool years (Carlson, 2005). Two previous studies suggested that inhibitory control could be related to a yes bias. First, Scullin & Bonner (2006) suggested that having well-developed inhibitory control skills help a child to avoid saying the first thing that comes to his or her mind when asked a question by an interviewer. Second, Okanda & Itakura (2007) showed that young children may show a yes bias when given questions by their own mothers at home, and suggested that affirmation including a yes response could be a dominant response and children would not able to inhibit the dominant response. Moreover, it appears that young children need to inhibit a dominant yes response under some circumstances, because they may provide misleading information to adults around them (e.g., caregivers, nursery staff) if they always answer yes. Developed inhibitory control ability may lead to a weaker yes bias.

The other factor which may affect a yes bias is theory of mind. Theory of mind refers to the ability of children to take into consideration multiple perspectives and be aware that they or other individuals can have false beliefs. Extensive research indicates that theory of mind improves markedly during the preschool years (Wellman, Cross & Watson, 2001). We assumed that children's yes bias might be explained by less-developed theory of mind for two reasons. First, the age at which young children understand another person's false belief (i.e., 4- to 5-year-olds) is consistent with the age at which young children reduce the yes bias (i.e., 4- to 5-year-olds; Fritzley & Lee, 2003; Okanda & Itakura, 2008). This suggests that children who could understand others' false beliefs may not show a yes bias. Second, a possible relation between a yes bias and theory of mind follows from literature on suggestibility effect (Thomsen & Berntsen, 2005; Welch-Ross, 1999; Welch-Ross, Diecidue & Miller, 1997; but see also, Quas & Schaaf, 2002). This work indicates that children with theory of mind can understand that an adult questioner can have false beliefs of events or objects and resist the questioner's suggestions when the person makes strange or incorrect suggestions about the events or objects. In the case of a yes bias, theoretically, younger children who have immature theory of mind may fail to resist an adult questioner and answer 'yes' to yes-no questions because they cannot understand that the questioner may have a false belief. On the other hand, children with

developed theory of mind can understand that a questioner has a false belief, and answer 'no' when the questioner asks strange questions.

The present study tested directly whether verbal ability, inhibitory control and theory of mind may be associated with a yes bias. If scores of the verbal ability test, the inhibitory control task and the theory of mind tasks were negatively correlated with scores on a yes-bias test, this would provide evidence that verbal ability, inhibitory control and theory of mind might affect the reduction in a yes bias in young children.

METHOD

Participants

A total of 40 preschool children (M = 49.3 months, SD = 7.1, range = 37–66 months; 19 boys and 21 girls) were recruited from nursery schools in Kyoto. Five additional children were tested but not included in the final sample because they failed to complete the study. Most participants came from middle-class backgrounds. Informed consent was obtained from all parents.

Procedure

A within-subjects design was used. All children participated in the experiment at their nursery schools. Children were tested individually for about 30 minutes. Because we were interested in consistency in individual differences across situations, tasks were administered in a fixed order (for a rationale, see Carlson & Moses, 2001). The order of the tasks was a yes-bias test (Fritzley & Lee, 2003), the dimensional change card sort task (inhibitory control task; Zelazo, Frye & Rapus, 1996), the location false belief task (theory of mind task; Wimmer & Perner, 1983), the content false belief task (theory of mind task; Perner, Leekam & Wimmer, 1987) and the PVT test for Japanese children (verbal ability task; Ueno, Utsuo & Iinaga, 1991).

Measures

Yes-bias test—We followed the procedure and materials used by Okanda & Itakura (2008). An experimenter presented children with one of six objects (blue cup, red apple, book, coffee filter, shoehorn, CPU) and asked them four questions concerning properties or functions for each object (see Appendix for the complete list of questions). To answer the questions correctly, children did not have to know the name of the objects. For two of four questions of each object, the correct answer was 'yes' (yes questions) and for the other two questions, the correct answer was 'no' (no questions). Thus, the children were given 12 yes questions and 12 no questions. The objects were presented in a counterbalanced order. The orders of questions for each object were also counterbalanced.

Scoring followed the procedures described by the previous studies (Fritzley & Lee, 2003; Okanda & Itakura, 2007). A response bias score was calculated for each child to examine whether children had a response bias. First, a yes score and a no score were obtained. The yes score was obtained by assigning a score of 1 to any 'yes' response to a yes question and a score of –1 to any 'no' response to a yes question. The no score was obtained by assigning a score of 1 to any 'no' response to a no question and a score of –1 to any 'yes' response to a no question. The yes score was then divided by the total number of yes questions to which children gave either yes or no responses to derive a proportional yes score. The same was performed to derive a proportional no score. Next, the proportional no score was subtracted from the proportional yes score, so a maximum response bias score was 1 and a minimum was –1. The response bias score for children who had no response bias should be zero. A positive response bias score (e.g., 0.5) meant a yes bias.

Reliability coding for these and all other tasks was conducted by a second coder on a randomly selected 30% of the sample (n = 12). Coding reliability (Cohen's kappa) was 0.97.

Inhibitory control task (DCCS task)—Following the procedure by Zelazo et al. (1996) and Moriguchi & Itakura (2008), the experimenter showed children cards with a red cup and a blue star on them, and a box with a picture of a red star on it and a box with a picture of a blue cup on it. In the first phase, children were instructed to sort the cards according to one dimension (e.g., in the shape game, 'This is a shape game. All the cups go here and all the stars go there'). Children were given six trials, and at the beginning of each trial the experimenter told children the rules of the game, randomly selected a sorting card and asked them to sort cards ('Where does this go in the shape game?'). Children were given a feedback on every trial ('yes'/'no'). The experimenter withdrew the sorting card on each trial. When they had completed six trials, children were asked to stop playing the first game and told to switch to a new game ('Now we are going to switch and play a new game.'). If children sorted the cards according to the shape dimension in the first phase, they were next asked to sort cards according to the color dimension (e.g., 'The new game is a color game. The color game is different from the shape game. In the color game, all the red ones go here and all the blue ones go there.'). Children were then given six trials that were identical to those in the first phase except for the dimension (e.g., color). In the second phase, children were not told whether he/she sorted the cards correctly. Scoring was based on how many trials children could sort the cards according to the second dimension in the second phase (range 0–6). There was perfect agreement between coders on this measure.

Theory of mind task

Location false belief task: Following the procedure developed by Wimmer & Perner's (1983) standard unexpected location false belief task, children were given a picture story about a boy looking for his chocolate which had been unexpectedly moved to a new location by his sister. After the story-telling, the experimenter asked a false belief question ('Where will he go first?'), a reality question ('Where is the chocolate really?') and a memory question ('Where did the boy hide the chocolate?'). Children were scored as passing when they could answer all the questions correctly (range 0–1). There was perfect agreement between coders on this measure.

Content false belief task: Following the procedures developed by Perner et al. (1987) and Gopnik & Astington (1988), the experimenter presented a Band-Aid box and asked children what they thought was inside. After it was revealed that the box actually contained a battery, the experimenter closed the lid and asked children about their own former false belief ('When you first saw this box, before we opened it, what did you think was inside?'), the belief of their friend ('Here comes your friend. He has never looked inside this box before. What does he think is inside?'), and the reality control question ('What is really inside?'). Children were scored for their knowledge of their own former belief and their friend's current false belief (range 0–2). There was perfect agreement between coders on this measure.

Verbal ability measure—Children were given a Japanese version of the Peabody Picture Vocabulary Test (PPVT; Dunn & Dunn, 1981) standardized and revised by Ueno et al. (1991). In the test, children were asked to select from a set of four pictures the one best illustrating the meaning of an orally presented word. Children's verbal age was calculated depending on the score in the test (for details of scoring, see Dunn & Dunn, 1981).

RESULTS

We first describe the results pertaining to the yes bias, followed by the major analyses of the relations among measures. Descriptive results of each task are presented in Table 1. Scores on the location false belief task and content false belief task were positively correlated, $r(40) = 0.49$, $p < 0.002$ (Pearson's correlation). Because the tasks appeared to be tapping a common underlying construct, a theory of mind score was aggregated for each participant, Cronbach's $\alpha = 0.62$. The theory of mind scores were used for further analyses.

As shown in Table 1, children showed positive response bias scores in a yes-bias test. To examine whether the mean response bias scores were significantly positive, a one-sample *t*-test was conducted to compare the mean response bias scores to a score of zero (i.e., no response bias). The children's mean bias scores were significantly above zero, $t(39) = 4.191$, $p < 0.001$. The result suggested that the children had a positive yes bias. These findings were consistent with the earlier report that Japanese 3- and 4-year-old children displayed a yes bias (Okanda & Itakura, 2008).

Correlations

Table 2 depicts the zero-order Pearson correlations between the variables. As shown in the table, children's age was significantly correlated with the inhibitory control scores, the theory of mind scores and the verbal age ($r(40) = 0.39$, $p < 0.02$; $r(40) = 0.43$, $p < 0.01$; $r(40) = 0.48$, $p < 0.01$, respectively), but not with the yes bias scores ($r(40) = -0.20$, $p > 0.10$). We found significant negative correlations between the yes bias scores and the inhibitory control scores and between the yes bias scores and the verbal age ($r(40) = -0.43$, $p < 0.01$; $r(40) = -0.47$, $p < 0.01$ respectively), but not between the yes bias scores and the theory of mind scores ($r(40) = -0.13$, $p > 0.10$). The significant correlations were observed even after the age effects were partialled out (inhibitory control scores, $r(37) = -0.39$, $p < 0.02$; verbal age, $r(37) = -0.43$, $p < 0.01$).

Regression analyses

To assess further the unique contributions of inhibitory control, theory of mind and verbal ability to a yes bias, we carried out a hierarchical regression analysis. We entered age at Step 1, and then entered the inhibitory control scores, the theory of mind score, and the verbal age at Step 2 as predictors of the yes-bias scores. As with the correlational analysis, age was not a significant predictor ($p > 0.10$). At Step 2, we found that the inhibitory control scores and the verbal age were significant predictors of the yes-bias scores (Table 3). Theory of mind was not a significant predictor ($p > 0.10$).

DISCUSSION

The present study examined individual differences in the yes bias and the relationship to verbal ability, inhibitory control and theory of mind. There were three main findings. First, children in the present study showed positive yes-bias scores. Second, verbal ability and inhibitory control predicted yes bias, irrespective of children's chronological age. Third, theory of mind did not predict yes bias.

Verbal ability and a yes bias

We found that children's verbal ability could significantly predict a yes bias. Children who had a relatively high verbal ability tended not to display a yes bias whereas children whose verbal ability was relatively low were likely to show a yes bias. The interpretation regarding the relationship between verbal ability and a yes bias is that children who performed well in the PVT test may have more developed language skills, such as pragmatic skills, and those

skills may lead to lower yes bias scores. In fact, there is evidence that the PVT test correlates significantly with more general language skills (Carvajal, Parks, Logan & Page, 1992; Hodapp, 1993). Also, Fritzley & Lee (2003) suggested that pragmatic development or development of conversational understanding may make children reduce response biases.

One might argue that children who have a high verbal ability, compared with children who have a relatively low verbal ability, can understand question formats rather than the objects or their properties in questions. However, extensive research suggests that all children older than 2 years of age are able to understand a simple questioning format 'Is this X?', which was used in the present study (Bloom & Lahey, 1978; Brown, 1973; Okanda & Itakura, 2008; Schuman, Bala & Lee, 1999). Given the evidence, the relation between verbal ability and a yes bias may not be due to the extent of understanding of question formats.

Inhibitory control and a yes bias

The results showed that inhibitory control significantly predicted a yes bias. The results were consistent with the previous suggestions that children respond yes toward yes-no questions because they might fail to inhibit a dominant yes response even when they are supposed to respond 'no' (Okanda & Itakura, 2007; Scullin & Bonner, 2006). The reason why a yes response may be dominant is still unclear, but we assumed that parents' questions to their infants can be biased towards the ones in which the parents expect their infants to answer 'yes' (e.g., 'Do you want to eat the chocolate?'), and infants would be more likely to produce a 'yes' response than a 'no' response. As a result, infants might learn to answer 'yes' when given yes-no questions.

To our knowledge, the present study might be the first to show directly that inhibitory control may be correlated to children's responses to questions by adults. The results might lead to the proposal that inhibitory skills may be associated with communicative development. Our finding is consistent with previous studies which showed the developmental role of inhibitory control. The studies suggested that the development of inhibitory control is related to the development of other cognitive abilities, such as social cognition, emotion regulation and social interaction (Blair, 2002; Dempster, 1992; Eisenberg et al., 1995; Hughes, Dunn & White, 1998). Along with the previous studies, our study may contribute to our understanding of the development of inhibitory control ability and its relation to other cognitive abilities.

Theory of mind and a yes bias

We did not find any significant relation between the theory of mind scores and the yes-bias scores. In spite of whether children understood that an adult interviewer could have a false belief of objects in questions, younger children tended to answer 'yes' to yes-no questions.

The lack of the relation between theory of mind and a yes bias might be due to the fact that children did not have to consider an experimenter's false belief in the yes-bias test. In our yes-bias test, children were given questions about objects' functions and properties, and required to answer the questions relatively quickly. Thus, even when children understood that a person could have a false belief, they might not have considered whether an experimenter had the false belief of objects' functions and properties and reflected the experimenter's mental states in their responses.

Individual differences in a yes bias

In sum, our results showed that children's inhibitory control and verbal ability predicted the children's yes bias. That is, children who have not developed inhibitory control are likely to display a yes bias. However, if two children's inhibitory control is equally developed, one who has high verbal ability might show a weaker yes bias than the other one who has low verbal

ability. We have to test on a larger sample the validity of the explanation using various inhibitory control tasks or various yes-bias tests about objects or events. Furthermore, we cannot deny the possibility that other factors might be correlated with a yes bias. Therefore, we have to investigate whether other cognitive abilities would predict a yes bias in preschool children and modify the explanation if necessary. Those investigations may help us to address why young children show a yes bias and which factors may affect the reduction in a yes bias.

It should be noted that the present study was a correlational study, and we cannot address whether children reduce a yes bias because they have developed inhibitory control skills and verbal ability. Further researches are needed to address the exact nature of the relation using other methodology, such as longitudinal approaches. The present article was the first step to achieve the conceptual understanding of a yes bias.

Our results do not mean that school-aged children, adolescents or adults do not have a yes bias. In fact, Krosnick & Fabrigar (in press) showed that adults tend to answer ‘yes’ to yes-no questions in some circumstances. We assume that a yes bias among school-aged children or adults may be due to more social factors, such as relationship between individuals, rather than cognitive factors. For example, adolescents or adults may answer ‘yes’ to yes-no questions even if they are aware that a questioner asks a strange question or makes a clearly wrong statement, because the questioner is your boss or your girlfriend’s (or boyfriend’s) parent. Probably, their yes bias would be different from that of preschoolers in many aspects. The investigation of the developmental change of a yes bias might contribute to our understanding of the development of communication and socialization.

Acknowledgments

The research reported here was supported by a grant from JSPS (No: 13610087, 16500161) to Shoji Itakura, and by the 21st Century COE Program (D-2 to Kyoto University), MEXT, Japan. The authors thank Derek Layton for comments on an earlier version of this paper

References

Blair C. School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children’s functioning at school entry. American Psychologist 2002;57:111–127. [PubMed: 11899554]

Bloom, L.; Lahey, M. Language development and language disorder. New York: Wiley; 1978.

Brady MS, Poole DA, Warren AR, Jones HR. Young children’s responses to yes-no questions: Patterns and problems. Applied Developmental Science 1999;3:47–57.

Brown, R. A first language: The early stages. Cambridge, MA: Harvard University Press; 1973.

Carlson SM. Developmentally sensitive measures of executive function in preschool children. Developmental Neuropsychology 2005;28:595–616. [PubMed: 16144429]

Carlson SM, Moses LJ. Individual differences in inhibitory control and children’s theory of mind. Child Development 2001;72:1032–1053. [PubMed: 11480933]

Carvajal HH, Parks JP, Logan RA, Page GL. Comparisons of the IQ and vocabulary scores on Wechsler Preschool and Primary Scale Intelligence–Revised and Peabody Picture Vocabulary Test–Revised. Psychology in the Schools 1992;29:22–24.

Dempster FN. The rise and fall of the inhibitory mechanism: Toward a unified theory of cognitive development and aging. Developmental Review 1992;12:45–75.

Dunn, LM.; Dunn, LM. Peabody Picture Vocabulary Test–Revised. Circle Pines, MN: American Guidance Service; 1981.

Eisenberg N, Fabes RA, Murphy M, Maszk P, Smith M, Karbon M. The role of emotionality and regulation in children’s social functioning. Child Development 1995;66:1239–1261. [PubMed: 7555214]

Fritzley VH, Lee K. Do young children always say yes to yes-no question? A metadevelopmental study of the affirmation bias. Child Development 2003;74:1297–1313. [PubMed: 14552399]

Gopnik A, Astington JW. Children's understanding of representational change and its relation to the understanding of false belief and the appearance-reality distinction. Child Development 1988;59:26–37. [PubMed: 3342716]

Hodapp AF. Correlation between Stanford-Binet IV and PPVT-R scores for young children. Psychological Reports 1993;73:1152–1154.

Hughes C, Dunn J, White A. Trick or treat?: Uneven understanding of mind and emotion and executive dysfunction in "hard to manage" preschoolers. Journal of Child Psychology and Psychiatry 1998;39:981–994. [PubMed: 9804031]

Krosnick, JA.; Fabrigar, LR. Cognitive, motivational, and social processes in question answering. In: Krosnick, JA.; Fabrigar, IR., editors. Designing good questionnaires: Insights from cognitive and social psychology. New York: Oxford University Press; (in press)

Moriguchi Y, Itakura S. Young children's difficulty with inhibitory control in a social context. Japanese Psychological Research 2008;50:87–92.

Okanda M, Itakura S. Do Japanese children say 'yes' to their mothers? A naturalistic study of response bias in parent-toddler conversations. First Language 2007;27:421–429.

Okanda M, Itakura S. Children in Asian cultures say yes to yes-no questions: Common and cultural differences between Vietnamese and Japanese children. International Journal of Behavioral Development 2008;32:131–136.

Perner J, Leekam SR, Wimmer H. Three-year-olds' difficulty understanding false belief: Representational limitation, lack of knowledge or pragmatic misunderstanding? British Journal of Developmental Psychology 1987;5:125–137.

Peterson C, Dowden C, Tobin J. Interviewing preschoolers: Comparisons of yes/no and wh-questions. Law and Human Behavior 1999;23:539–555. [PubMed: 10487148]

Quas JA, Schaaf JM. Children's memories of experienced and non experienced events following repeated interviews. Journal of Experimental Child Psychology 2002;83:304–338. [PubMed: 12470963]

Schuman J, Bala N, Lee K. Developmentally appropriate questions for child witnesses. Queen's Law Journal 1999;23:251–302.

Scullin MH, Bonner K. Theory of mind, inhibitory control, and preschool-age children's suggestibility in different interviewing contexts. Journal of Experimental Child Psychology 2006;93:120–138. [PubMed: 16236306]

Steffensen MS. Satisfying inquisitive adults: Some simple methods of answering yes-no questions. Journal of Child Language 1978;5:221–236.

Thomsen Y, Berntsen D. Knowing that I didn't know: Preschoolers' understanding of their own false belief is a predictor of assents to fictitious events. Applied Cognitive Psychology 2005;19:507–527.

Ueno, K.; Utsuo, T.; Iinaga, K. Picture vocabulary test – Revised. Tokyo: Nihon Bunka Kagakusha; 1991. (in Japanese)

Welch-Ross MK. Preschoolers' understanding of mind: Implications for suggestibility. Cognitive Development 1999;14:101–131.

Welch-Ross MK, Diecidue K, Miller SA. Young children's understanding of conflicting mental representation predicts suggestibility. Developmental Psychology 1997;33:43–53. [PubMed: 9050389]

Wellman HM, Cross D, Watson J. Meta-analysis of theory-of-mind development: The truth about false belief. Child Development 2001;72:655–684. [PubMed: 11405571]

Wimmer H, Perner J. Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. Cognition 1983;13:103–128. [PubMed: 6681741]

Zelazo PD, Frye D, Rapus T. An age-related dissociation between knowing rules and using them. Cognitive Development 1996;11:37–63.

Table 1

Descriptive statistics (mean and, in brackets, standard deviation) of each variable

Variable	M (SD)
Age in months	49.29 (7.11)
Verbal ability	48.85 (10.38)
Yes bias	0.16 (0.24)
Inhibitory control	3.08 (2.87)
Theory of mind	
Location false belief	0.38 (0.49)
Content false belief	0.85 (0.77)
Composite score	1.23 (1.10)

Table 2

Raw correlations between variables

Variable	2	3	4	5	6	7
1. Age in months	0.39*	−0.20	0.43**	0.42**	0.41**	0.48**
2. Verbal ability		−0.47	0.33*	0.34*	0.26	0.34*
3. Yes bias			−0.43**	−0.06	−0.15	−0.13
4. Inhibitory control				0.24	0.34*	0.35*
Theory of mind						
5. Location false belief					0.49**	0.79**
6. Content false belief						0.92**
7. Composite score						

Note. $N = 40$;

* $p < 0.05$ (two-tailed);

** $p < 0.01$ (two-tailed)

Table 3

Hierarchical regression analysis for variables predicting yes bias scores

	B	SE B	β
Step 1			
Age in months	−0.01	0.01	−0.20
Step 2			
Age in months	0.002	0.01	0.07
Verbal ability	−0.01	0.004	−0.41*
Inhibitory control	−0.03	0.01	−0.36*
Theory of mind (composite scores)	0.02	0.04	0.10

Note. $R^2 = 0.04$ for Step 1;

$\Delta R^2 = 0.28$ for Step 2 (ps < 0.01);

* $p < 0.05$

Appendix

Objects used and test questions (Okanda & Itakura, 2008)

Objects	Questions	Objects	Questions
Blue cup	Is this blue?	Coffee filter (plastic)	Is this for making coffee?
	Is this for drinking?		Is this empty?
	Is this made of glass?		Is this for making cake?
	Is there water in this?		Is this made of paper?
Red apple	Is this hard?	Shoehorn	Is this for wearing shoes?
	Is this for eating?		Is this found in the entrance?
	Is this rotten?		Is this for wearing on the head?
	Is this green?		Is this soft?
Book	Is this full of pictures?	CPU	Is this square?
	Is this for reading?		Is this for using computer?
	Is this tiny?		Is this made of wood?
	Is this round?		Is this circle?