British Journal of Developmental Psychology (2006), 24, 603–613

The British Psychological Society
www.bpsjournals.co.uk

Level 1 perspective-taking at 24 months of age

Henrike Moll* and Michael Tomasello*
Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

The current study sought to determine the age at which children first engage in Level 1 visual perspective-taking, in which they understand that the content of what another person sees in a situation may sometimes differ from what they see. An adult entered the room searching for an object. One candidate object was out in the open, whereas another was visible for the child but behind an occluder from the adult's perspective. When asked to help the adult find the sought-for object, 24-month-old children, but not 18-month-old children, handed him the occluded object (whereas in a control condition they showed no preference for the occluded toy). We argue that the performance of the 24-month-olds requires Level 1 visual perspective-taking skills and that this is the youngest age at which these skills have been demonstrated.

Much of the research on children's visual perspective-taking has been conceptualized within Flavell's (1974, 1977, 1992) distinction between Level 1 and Level 2. Children are at Level 1 when they understand that the content of *what* they see may differ from the content of what another sees in the same situation (what we see is different). They are at Level 2 when they understand that they and another person may see the same thing simultaneously from different perspectives (*how* we see it is different).

The vast majority of work has been done on Level 2. The classic Level 2 task is Piaget's three-mountain problem in which the child views a realistic scale model containing three toy mountains and then has to choose a photograph corresponding to what another person sees when looking at it from a different angle (Piaget & Inhelder, 1956). Children typically do well in this task – that is, in more child-friendly versions of it – at around 4–5 years of age (Flavell, Everett, Croft, & Flavell, 1981; Light & Nix, 1983; Masangkay *et al.*, 1974).

Much less attention has been paid to Level 1 tasks and to the question when Level 1 skills develop. In one well-known verbal task the child looks at one side of a card with a picture of a cat while an adult looks at the other side of the card, which the child knows contains a dog. The child is then asked what they see and what the other person sees (Masangkay *et al.*, 1974). Level 1 tasks that require no verbal response include hiding objects from an adult or moving occluders so that the adult either can or cannot see an

* *Correspondence should be addressed to Henrike Moll or Michael Tomasello, Department of Psychology, Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany (e-mail: moll@eva.mpg.de or tomas@eva.mpg.de).*

DOI:10.1348/026151005X55370

object (Flavell, Shipstead, & Croft, 1978; McGuigan & Doherty, 2002). Children typically do well in these Level 1 tasks when they are 2.5 years of age, but in the majority of studies younger children have not been tested. And so the question arises when children are first able to understand that what they see and what someone else sees in the same situation may differ.

Recently, research using the gaze following paradigm suggests that children may understand some things about the visual experience of others at a much younger age than in the classic Level 1 tasks. Thus, infants begin to follow the gaze direction of others to targets during the first year of life (Corkum & Moore, 1995, 1998; D'Entremont, Hains, & Muir, 1997), and by 12 months they identify the target of another person's gaze precisely, despite distracting objects in their line of sight (Butterworth & Cochran, 1980; Butterworth & Jarrett, 1991). More importantly, at 12–15 months of age they also show evidence of an understanding that (i) an adult's line of regard is blocked by a screen, unless it is transparent or has a window in it (Caron, Kiel, Dayton, & Butler, 2002; Dunphy-Lelii & Wellman, 2004); (ii) an adult will not be able to see a target while wearing a blindfold or having the eyes closed (Brooks & Meltzoff, 2002; Caron, Butler, & Brooks, 2002); and (iii) an adult is seeing something that they are not when looking to locations behind them or behind barriers (Deák, Flom, & Pick, 2000; Moll & Tomasello, 2004).

Some researchers interpret these findings as evidence for Level 1 perspective-taking. But all of these studies use simple gaze following as a response measure, a paradigm in which the child must simply try to fixate visually what an adult is already fixating. However, we think that the understanding of perspectives requires more than this. As Perner and colleagues have argued, a perspective is either 'a restriction on *which* things can be seen' or 'a restriction on *how* certain things appear' (Perner, Brandl, & Garnham, 2003, p. 356). That is to say, a perspective is necessarily a perspective on *something*, and thus an understanding of perspectives involves at the very least a specification of *what* is seen from a perspective, which is not one's own (in Perner *et al.*'s [2003, p. 358] terminology: the 'target' or 'object of representation' of someone's perspective).

On the other hand, the classic Level 1 tasks require children to respond verbally, which would make testing with younger children or infants problematic. For example, in the classic task by Masangkay and colleagues (1974), the child must say that she sees a cat on her side of the card, whereas the adult sitting across from her sees a dog on the other side of the card. At the same time, there is no perceptual overlap between what the child and the adult see. While the child herself sees one thing (a cat), the experimenter sees something completely different (a dog). The fact that both pictures are printed on the same cardboard card does not change that: it is only the substrate for the pictures. A more challenging task would involve some 'common perceptual ground'. In the strict sense, in order to call a task a perspective problem at all, there needs to be perfect overlap in what the two observers are looking at; that is, the target or the object of representation needs to be the same (Perner *et al.*, 2003). But this would be what has been conceived of as Level 2 perspective-taking (Flavell, 1974, 1977, 1992): an understanding that another person sees the same object or scenery in a different way. Level 1 perspective-taking then might be best investigated in situations with some common perceptual ground between the observers: while some elements in the visual array are perceptible from both viewpoints, others are hidden from one perspective but not the other.

In the current study (i.e. the main study), we presented children with a Level 1 task that fits with this 'partial overlap' criterion. An experimenter and the child played with two toys and then the experimenter left the room. In the critical condition, he came back into the room searching, saying something like 'Where's the toy? I can't find it! Can you help me?' As he visually scanned around the room the two toys were located such that he could only see one of them: one was out in the open so both could see it, whereas the other was on the child's side of a toy bucket so that only she could see it. The adult looked at the locations of both toys equally while searching (i.e. in the case of the hidden toy he looked at the occluding bucket – X-ray vision directly at the occluded toy). The fact that the adult looked right at the toy out in the open and still continued to search suggested that this was not the toy he was seeking, but rather he was seeking some other toy – perhaps the one behind the bucket since that was the only other one he had played with previously – and he could not currently see it. The child's task was to hand him the toy he was seeking.

It is important to note that this task still does not require Level 2 skills; the child does not need to know that the same object can be viewed from two different visual perspectives: for example, that a picture can appear 'right-side-up' versus 'upside-down', depending on the perceiver's point of view. In our task the challenge for the child is to know which part of the visual scenery is visible for the adult and which part is occluded for him – what Perner and colleagues (2003) call 'a restriction on which things can be seen' (p. 356).

Pilot studies

Prior to the main study, two pilot studies were conducted. The aim of both of these studies was to determine whether infants know to which of two novel objects an experimenter is referring in the following situation: the child, who sits on her parent's lap in front of a table, plays with an experimenter (E2) with two novel toys. After 60 seconds, E2 places each of the toys in square plastic containers (16 × 16 × 16 cm). In the first pilot study, the containers were placed next to each other. Each of them had one open side, which faced the child. One of them was made of transparent Plexiglas®, the other was made of black, opaque plastic. Then a different experimenter (E1) entered the room from the side opposite the child, thus looking at the back of the boxes. From his perspective, only the toy in the Plexiglas® box was visible, while the other was occluded by the back side of the opaque box. E1, looking in the middle of the two boxes, exclaimed excitedly: 'Oh great, look! Look there! Can you give that to me?' and approached the child holding out his hand. The hypothesis was that if the children understood what one can and cannot see from the experimenter's perspective, then they should hand him the visible toy significantly more often than the hidden toy, knowing that the person can only refer to what he can see. However, children showed a side bias: they preferentially chose the toy from the box that was placed on the right. In order to eliminate the side bias, we conducted a second study in which the boxes were placed on top of one another instead of next to one another. But children still did not choose the visible toy reliably.

In looking at the children's reactions in these studies it seemed to us that they were sometimes confused: he is asking for something but looking right at me and not telling me what he wants – when he perfectly well could point to the toy in the clear box if that is what he wanted. It is thus possible that asking generically for a toy under these conditions creates an odd, or at least ambiguous, pragmatic situation; children might even have

decided in some cases that since E is not designating what he wants they should share with him the one he cannot see. We thus decided to change to a search paradigm in which the adult entered the room searching for a specific toy and asked the child for help. We were hoping to invoke the clearer logic: (i) he is searching for something; (ii) since he passed over the one out in the open, he cannot want that one; (iii) but rather he must be searching for the one over here by the barrier that he cannot see.

Main study

For the main study, we made the following changes to the pilot procedures. First, we placed the toys further apart, in order to confront the child with a choice between two more distant and distinct locations – again with one object out in the open and another on the child's side of a small opaque barrier. Second, instead of requesting a toy from the child, we had E search for a toy and ask the child for help – in which case the correct choice is the toy the experimenter cannot see.

Method

Participants

Participants were 72 children from a middle-sized German city, obtained from a database of children whose parents had volunteered to participate in studies of child development. There were two age groups: 36 children (21 girls, 15 boys) were 24 months old ($M = 24;03$, range = 23;16–25;04) and 36 children (20 girls, 16 boys) were 18 months old ($M = 18;03$, range = 17;09–18;21). Another 23 children who participated dropped out of the study because of fussiness (eight), experimenter error (one), interfering parental behaviour (three), or because the participant did not meet the criterion of handing E1 one of two toys at least in one of the trials (eight 18-, three 24-month-olds).

Materials and design

The following materials were used in this study. First, a black bucket standing upside down was used as an occluder (42 cm high, diameter: 35 cm). Second, there were seven pairs of objects of small novel toys, with the members of a given pair being highly similar (e.g. differing only in colour). One of these pairs was always used within a warm-up procedure before the experiment, and the other six pairs were distributed randomly across the six experimental trials. Finally, a hand puppet was used to place the toys for each trial.

Children were tested individually in one session of about 15–20 minutes. All children were accompanied by a parent, who was present throughout the experiment. Half of the children at each age were assigned randomly to either the experimental or the control condition. Each child received a total number of six trials. There were two possible positions for the bucket occluder: it could block the vision to a toy which was located more to the right or more to the left of the child. For each child, the position of the bucket was alternated after every trial. The bucket's initial position, on Trial 1, was counterbalanced across children within age groups.

Observational procedure

The study took place in a quiet testing room (4.30 × 4.30 m) within a child laboratory. Before the experiment started, the two experimenters (E1 and E2) played with the child in a waiting room until they seemed sufficiently acclimatized. Then the experimenters, the parent, and the child entered the testing room. The parent sat on a chair in the part

of the room opposite the door and was instructed to remain quiet throughout the experiment. Before the real experiment started and while E1 was out of the room, E2 demonstrated in a single event to the child, how the situation is perceived from the door – which equals the primary experimenter's visual perspective in the test trials – when one toy is occluded by the bucket and the other is visible. E2 placed a pair of novel objects on their marked positions on the carpet. From the child's perspective, one of them was now hidden behind the bucket, while the other was out in the open. While the child was watching, E2 took the hidden toy and rolled it to the side so that it became visible for the child, and then put it back behind the bucket. Then, the child was told to go across the room to their parent, E1 entered, and the experiment started.

For the experiment, E2 randomly took out the first pair of novel toys from a box. He handed them to E1, who then played with the child with these toys for approximately 50 seconds until E2 gave him a signal. E1 then said good-bye to the child and left the room. While he was outside, E2 used a puppet to place the two toys of the first pair on the marked positions on the carpet. The toys were now located to the right and left in front of the child at an equal distance of approximately 120–130 cm away. Depending on the schedule, the toy on the child's left or on her right was now located directly in front of the bucket – from the child's perspective. At this point, the child stood directly in front her parent, who was instructed to hold back the child until E1 returned. After putting away the puppet, E2 told the child that E1 would come back soon, and that she should help E1. E1 then entered the room again, thus starting the experimental manipulation. Figure 1 shows schematically the experimental layout in the moment of E1's return into the room.

In the experimental condition, E1 alternated his gaze between the bucket and the visible toy, sustaining his gaze at each of these locations for about 2 seconds. With a facial expression of dissatisfaction, he exclaimed to the child 'Where is the other toy? Where is it? I cannot find it!' and then 'Can you give it to me?' He repeated his gaze alternation between the bucket and the visible toy, and expressed searching behaviour also by lifting the arms up near the shoulders. The distance between E1 and the toys was approximately 190 cm and between him and the child approximately 3m. In the control condition, the procedure was identical except that E1 did not show any searching behaviour. Instead, as he alternated his gaze between the bucket and the toy out in the

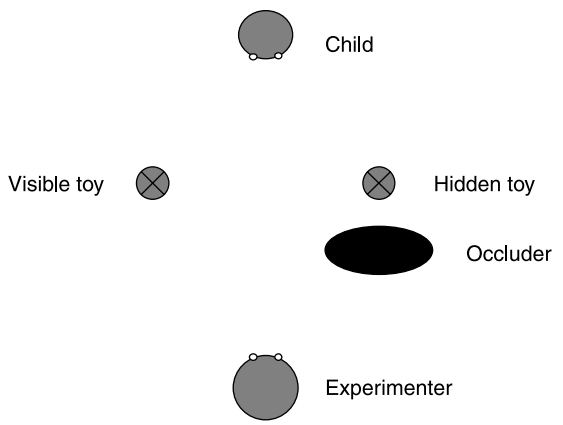

Figure 1. Aerial view of the experimental layout.

open (exactly as in the experimental condition), he simply exclaimed 'Oh, can you give me the toy?'

In both the experimental and control conditions, the trial finished when the child showed a task-relevant behaviour or when it became clear that the child would not respond. In both conditions, the procedure was repeated in the following five trials with a new pair of objects. In Trials 2 through 6, the puppet first moved the bucket to its new position and then placed the objects at the fixed positions on the carpet.

Coding and scoring procedure

Coding was done based on a live judgment by the primary experimenter between the trials. In a few cases in which there was some ambiguity, coding took place after the experiment based on the video-recordings. For each trial, it was judged whether the child handed none, one, or both of the objects simultaneously. 'No handing' was coded when the child showed some behaviour not directed towards the toys or when they grabbed one or both of the toys for herself. 'Handing one object' was coded if the child either clearly put one toy in E1's hand or rolled it over to him or put it in front of his feet. Within this category, it was further specified whether the corresponding toy was the one which was out in the open and thus visible for E1 (visible toy) or not (hidden toy). 'Handing both simultaneously' was coded in case the child picked up both toys successively and then handed them to E1 simultaneously. A child's score was calculated as the number of trials in which she handed the hidden toy (target) divided by the total number of trials in which she handed one toy to the experimenter (handing both toys or no toy excluded). Analyses were thus done on the mean proportion of successful trials out of all trials in which one object was handed over.

Inter-observer reliability was assessed based on a sample of 15 of the 72 children (21%), with an equal number of both ages and conditions. Scoring was done by an independent research assistant, who was ignorant with respect to condition (E1 was blocked out of the videotapes). The observers' judgments matched in 100% of the trials. Cohen's kappa was thus $\kappa = 1$.

Results

Table 1 presents the distribution of individual proportions of handing the target for age and conditions separately. We conducted a three-way ANOVA with age, condition, and order as between-subjects factors. Because no significant effect for order was found, a subsequent two-way ANOVA with only age and condition as factors was executed.

Table 1. Number of individual proportions of handing the target for age groups and conditions

		Individual proportions				
Age (months)	Condition	$<.25$	$=.25$ and $<.50$	.50	$>.50$ and $=.75$	$>.75$
18	Experimental	7	4	2	3	2
	Control	4	7	4	2	1
24	Experimental	0	3	2	8	5
	Control	5	6	2	4	1

Figure 2 presents the mean proportion of handing the target in the two conditions for 18- and 24-month-olds separately. In the control condition, the mean scores

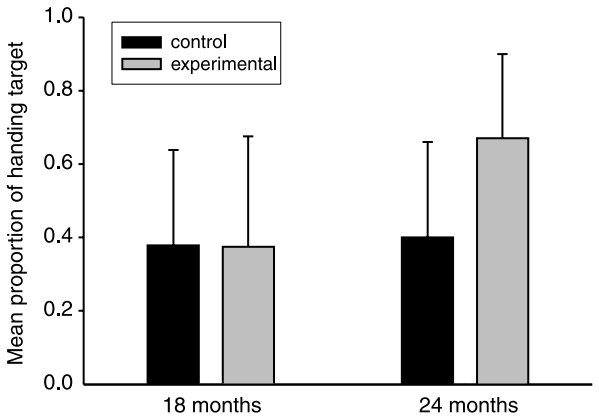

Figure 2. Mean proportions (+*SD*) of 18- and 24-month-olds for handing the target in the experimental and control condition.
Note. The mean proportion refers to the proportion of success of all valid trials (trials in which one object was handed).

(with standard deviations in parentheses) for the 18- and 24-month-olds are 0.38 (.26) and 0.40 (0.26), respectively. In the experimental condition, the mean is 0.38 (0.30) for the 18- and 0.67 (0.23) for the 24-month-olds. First, there was an effect of age. The 24-month-olds handed the target toy more often than the 18-month-olds, $F(1, 68) = 6.66$, $p = .01$. More importantly, there was also an effect of condition: children handed the target more often in the experimental than in the control condition, $F(1, 68) = 4.81$, $p = .03$. But this effect derives from the older age group only. That is, the interaction between age and condition was significant, $F(1, 68) = 5.00$, $p = .03$, with pairwise comparisons (Fisher's LSD procedure) showing that the 24-month-olds, $p = .003$, but not the 18-month-olds, $p = .98$, handed E1 the target more often in the experimental than in the control condition. The interaction also revealed that the 24-month-olds handed the target more often than the 18-month-olds in the experimental, $p = .001$, but not in the control condition, $p = .81$.

As a second analysis, we conducted two one-sample t tests to analyse further whether the means of the two ages in the experimental condition differ from the mean proportion expected by chance (= 0.50). The results of this analysis confirm those obtained by the ANOVA: the difference between the mean in the experimental condition and the value expected by chance is significant for the 24-month-olds, $t(17) = 3.24$, $p = .005$, but not for the 18-month-olds, $t(17) = -1.76$, $p = .097$. Note that the tendency towards significance for the 18-month-olds exists because their value is *below* chance. Thus, only the older children handed over the target in the experimental condition more often than would be expected by chance.

Discussion

The results of the current study were very clear. Twenty-four-month-old children, but not 18-month-old children, knew what another person could and could not see when that differed from what they saw. More specifically, 24-month-old children understood that when an adult asked for help in searching for a specific object, he was not searching for the object that both of them could see but for the one that only she, the child, could

see. We believe that this is properly characterized as Level 1 perspective-taking, whose ontogenetic development has not yet been studied extensively. And this is the youngest age at which it has been unequivocally demonstrated. Interestingly, children displayed some tendency (though not statistically significant) to fetch the unobstructed object for the adult – a bias only the 24-month-olds could 'suppress' in the experimental condition. One speculation is that this object attracted children because it was located on the 'route' which yielded a clear line of sight across the room for themselves. Another possibility would be that children have some implicit understanding that a requested object is usually visually accessible for the person who utters the request, which would imply some implicit Level 1 ability. However, because of our crucial finding for the experimental condition, we do not think that the 18-month-olds possess this ability.

Our view is that this is a more appropriate Level 1 perspective-taking task than others that have been used. First, it involves more than just gaze following. In our view, gaze following as a response measure is not as appropriate for investigating Level 1 perspective-taking because in this paradigm infants need not specify or individuate what the perspective of the other person contains. We might refer to children's behaviour in these tasks as demonstrating an understanding *that* someone else sees something that oneself does not see – what precisely that something is being, at that moment, indeterminate. In contrast, the current task requires the child not just to follow gaze, but to make an active behavioural choice, that is, to decide which of two objects that she can see is the one the adult is searching for (and to retrieve it for him). This required the child to know that one of the objects she could see the adult could not see.

Second, the current study also involves a shared perceptual ground between the child and the adult. In this regard, it differs from the classic Level 1 tasks, in which the child and the adult's perceptual inputs do not overlap at all. Instead, our task involves two elements (two toys), one of which is perceptually shared and one of which is only visible from the child's perspective. Importantly, children needed to solve the task without reliance on any differential behavioural cues like gazing or pointing that might serve to identify the target for the child, because the experimenter looks to both locations equally. In this regard, it is unlike the task developed by Repacholi and Gopnik (1997), in which an experimenter expresses a liking towards one item (broccoli) and disgust towards another item (crackers) and then in the test asks the child (who has the opposite food preference) ambiguously for food. The experimenter in that study clearly marks the items with strong emotional expressions. It is questionable whether the food task requires perspective-taking at all, because as Perner, Zauner, and Sprung (2005) have pointed out, an objective judgment like 'broccoli is good in her mouth, and crackers are good in mine' would lead to correct responses as well. Clearly, it is interesting that infants from around 18 months of age interpret the adult's request correctly in this situation. Possibly though, food is a special category and infants might learn from fairly early on that food taste differs among people.

As another point, one has to consider that the 2-year-olds in our study were just starting to master our task, thus showing the very beginnings of Level 1 ability – which probably will develop further within the months to follow, so that by 2.5 years other tasks with different task demands are mastered as well.

The next higher level is Level 2, which is achieved when children acknowledge different ways of seeing one and the same thing (e.g. in the turtle task, the turtle is 'right-side up' versus 'upside down'). As other researchers have pointed out, Level 2 perspective-taking tasks have much in common with other classic theory of mind tasks, and indeed, children master them at around the same time as the alternative naming

task, appearance-reality tasks, and false-belief tasks (Flavell, Green, & Flavell, 1989; Perner, 2000; Perner, Stummer, Sprung, & Doherty, 2002). Despite the differences between those tasks (e.g. the fact that some of them are about confronting truth-incompatible views while others are not), what they all have in common is an understanding that one and the same thing or situation can come under different perspectives or descriptions simultaneously, and so can be construed differently depending on the point of view – whether this be a conceptual or a visual point of view.

Instead of requiring any substantive language, like the classic Level 1 tasks (e.g. Masangkay *et al.*, 1974), our task was embedded within the well-known interactive routine of searching for objects. Infants themselves search for objects from before their first birthday (Piaget, 1952), and they understand others' searching activities by 18 months of age. For example, in Tomasello, Strosberg, and Akhtar (1996), 18-month-old infants could determine by the adult's reaction whether an object he picked up and inspected was the one he was searching for (he smiled and stopped searching) or not (he frowned and kept searching). In addition to a basic understanding of searching behaviour, our task then required that the child within this search routine know which parts of the scene in front of her the adult could and could not see from his perspective. Interestingly, in the pilot studies children of the same age were unable to perform the perspective-taking task, the main difference being that the experimenter excitedly requested a toy instead of searching for one. We believe that the ambiguity of the request created a pragmatically odd situation and obviously the pragmatics of the experimental setting is a key ingredient in the success of the current study.

In our view, then, the current task represents Level 1 perspective-taking properly construed – using a non-verbal but conceptually very demanding task. If that is the case, then the current study has demonstrated some Level 1 perspective-taking skills at 24, but not 18 months of age. The results encourage us to look further for other interactive contexts in which children's Level 2 skills might be assessed, in the hope that we might find an earlier age for skills of this type as well. An interesting question for future research would be whether the behaviour of some non-human primates in similar yet different tasks (i.e. those in which they must determine which pieces of food others can and cannot see in a competitive paradigm; Hare, Call, Agnetta, & Tomasello, 2000), requires the same social cognitive understanding as that displayed by 24-month-old children in the current task.

Acknowledgements

The project was supported by a grant from the Studienstiftung des deutschen Volkes. The authors wish to thank Susanne Grassmann and Elena Rossi for their assistance in data collection. Thanks also to Felix Warneken for his helpful thoughts. Finally, we owe special thanks to the parents and infants who took their time to participate in this research project.

References

Brooks, R., & Meltzoff, A. N. (2002). The importance of eyes: How infants interpret adult looking behavior. *Developmental Psychology*, *38*(6), 958–966.

Butterworth, G., & Cochran, E. (1980). Towards a mechanism of joint visual attention in human infancy. *International Journal of Behavioral Development*, *3*, 253–272.

Butterworth, G., & Jarrett, N. (1991). What minds have in common is space: Spatial mechanisms serving joint visual attention in infancy. *British Journal of Developmental Psychology*, *9*, 55–72.

Caron, A. J., Butler, S. C., & Brooks, R. (2002). Gaze following at 12 and 14 months: Do the eyes matter? *British Journal of Developmental Psychology*, *20*, 225–239.

Caron, A. J., Kiel, E. J., Dayton, M., & Butler, S. C. (2002). Comprehension of the referential intent of looking and pointing between 12 and 15 months. *Journal of Cognition and Development*, *3*(4), 445–464.

Corkum, V., & Moore, C. (1995). Development of joint visual attention in infants. In C. Moore & P. J. Dunham (Eds.), *Joint attention: Its origins and role in development* (pp. 61–83). Hillsdale, NJ: Erlbaum.

Corkum, V., & Moore, C. (1998). The origins of joint visual attention in infants. *Developmental Psychology*, *34*(1), 28–38.

Deák, G. O., Flom, R. A., & Pick, A. D. (2000). Effects of gesture and target on 12- and 18-month-olds' joint visual attention to objects in front of or behind them. *Developmental Psychology*, *36*(4), 511–523.

D'Entremont, B., Hains, S. M. J., & Muir, D. W. (1997). A demonstration of gaze following in 3- to 6-month-olds. *Infant Behavior and Development*, *20*(4), 569–572.

Dunphy-Lelii, S., & Wellman, H. M. (2004). Infants' understanding of occlusion of others' line-of-sight: Implications for an emerging theory of mind. *European Journal of Developmental Psychology*, *1*(1), 49–66.

Flavell, J. (1974). The development of inferences about others. In T. Mischel (Ed.), *Understanding other persons* (pp. 66–116). Oxford: Blackwell.

Flavell, J. H. (1977). The development of knowledge about visual perception. *The Nebraska Symposion on Motivation* (Vol. 25, pp. 43–76). Lincoln, NE: University of Nebraska Press.

Flavell, J. H. (1992). Perspectives on perspective-taking. In H. Beilin & P. B. Pufall (Eds.), *Piaget's theory: Prospects and possibilities. The Jean Piaget symposium series* (Vol. 14, pp. 107–139). Hillsdale, NJ: Erlbaum.

Flavell, J. H., Everett, B. A., Croft, K., & Flavell, E. R. (1981). Young children's knowledge about visual perception: Further evidence for the Level 1–Level 2 distinction. *Developmental Psychology*, *17*(1), 99–103.

Flavell, J. H., Green, F. L., & Flavell, E. R. (1989). Young children's ability to differentiate appearance-reality and Level 2 perspectives in the tactile modality. *Child Development*, *60*, 201–213.

Flavell, J. H., Shipstead, S. G., & Croft, K. (1978). Young children's knowledge about visual perception: Hiding objects from others. *Child Development*, *49*, 1208–1211.

Hare, B., Call, J., Agnetta, B., & Tomasello, M. (2000). Chimpanzees know what conspecifics do and do not see. *Animal Behaviour*, *59*, 771–785.

Light, P., & Nix, C. (1983). Own view versus good view in a perspective-taking task. *Child Development*, *54*(2), 480–483.

Masangkay, Z. S., McCluskey, K. A., McIntyre, C. W., Sims-Knight, J., Vaughn, B. E., & Flavell, J. H. (1974). The early development of inferences about the visual precepts of others. *Child Development*, *45*, 357–366.

McGuigan, N., & Doherty, M. J. (2002). The relation between hiding skill and judgment of eye direction in preschool children. *Developmental Psychology*, *38*(3), 418–427.

Moll, H., & Tomasello, M. (2004). 12- and 18-month-old infants follow gaze to spaces behind barriers. *Developmental Science*, *7*(1), F1–F9.

Perner, J. (2000). RUM, PUM, and the perspectival relativity of sortals. In J. W. Astington (Ed.), *Minds in the making: Essays in honor of David R. Olson* (pp. 212–232). Malden, MA: Blackwell.

Perner, J., Brandl, J., & Garnham, A. (2003). What is a perspective problem? Developmental issues in understanding belief and dual identity. *Facta Philosophica*, *5*, 355–378.

Perner, J., Stummer, S., Sprung, M., & Doherty, M. (2002). Theory of mind finds its Piagetian perspective: Why alternative naming comes with understanding belief. *Cognitive Development*, *17*(3–4), 1451–1472.

Perner, J., Zauner, P., & Sprung, M. (2005). What does that have to do with point of view? The case of conflicting desires and want in German. In J. W. Astington & J. Baird (Eds.), *Why language matters for theory of mind* (pp. 220–244). New York: Oxford University Press.

Piaget, J. (1952). *The origins of intelligence in children*. Oxford: International Universities Press.

Piaget, J., & Inhelder, B. (1956). *The child's conception of space*. London: Routledge.

Repacholi, B., & Gopnik, A. (1997). Early reasoning about desires: Evidence from 14- and 18-month-olds. *Developmental Psychology*, *33*(1), 12–21.

Tomasello, M., Strosberg, R., & Akhtar, N. (1996). Eighteen-month-old children learn words in non-ostensive contexts. *Journal of Child Language*, *23*(1), 157–176.

Received 15 June 2004; revised version received 18 May 2005