Do Children Start Out Thinking They Don't Know Their Own Minds?

PETER MITCHELL, ULRICH TEUCHER, MARK BENNETT, FENJA ZIEGLER AND REBECCA WYTON

Abstract: Various researchers have suggested that below 7 years of age children do not recognize that they are the authority on knowledge about themselves, a suggestion that seems counter-intuitive because it raises the possibility that children do not appreciate their privileged first-person access to their own minds. Unlike previous research, children in the current investigation quantified knowledge and even 5-year-olds tended to assign relatively more to themselves than to an adult (Studies 1 and 2). Indeed, children's estimations were different from ratings made by their mothers: Their mothers sometimes rated themselves as knowing more about their child than they rated their child as knowing (Study 2). While previous research seemed to suggest that children shift from viewing their mother to viewing themselves as the authority on knowledge about them (the children), these new findings surprisingly suggest the opposite.

1. Introduction

> Self insight is a precious commodity that people believe they possess to a far greater degree than they really do (Dunning, 2006, p. 603).

It is a commonly held view that people have privileged access to their own inner states. We have opportunity to observe ourselves more than we have opportunity to observe any other person; and we know ourselves differently than we know other people. Although our knowledge of ourselves can be inferred from observing our own behaviour and from various assumptions or preconceptions, we also enjoy the privilege of first-person subjective access. Accordingly, we experience our own pain, sensations, beliefs and dreams in a way that another person does not and cannot. So, although some mental life goes on outside awareness (Wilson, 2002), we are perhaps the principal authority on self-knowledge in many cases.

It was perhaps surprising, then, when Rosenberg (1979) seemed to suggest that children start out thinking that they do not know their own minds. Rosenberg's suggestion arose from a study in which he asked children questions such as,

The research reported in this article was supported by the Economic and Social Research Council, UK (grant number, RES-000-23-0386).

Address for correspondence: School of Psychology, University of Nottingham, University Park, Nottingham NG7 2RD, UK.
Email: peter.mitchell@nottingham.ac.uk

Mind & Language, Vol. 24, No. 3 June 2009, pp. 328–346.
© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

Uncorrected Proofs

'If I asked you and your mother how good you were, and you said one thing and she said another, who would be right—you or your mother?'
'Who knows you best deep down, your mother (father) or you?'

In response to the first question, only 25 to 33 percent of 8- to 11-year-olds judged that they were right and not their mother; with regard to the second question, still only 48 percent of 8- to 11-year-olds judged that they knew themselves better 'deep down' than their parents. According to Rosenberg, the answers revealed that children externalize the self at the social surface of observable behaviour, leading children to perceive themselves as 'open books,' transparent to their apparently omniscient parents. Only in adolescence would they move from the social exterior into the deeper recesses of the psychological interior. The answers were proof for Rosenberg that children and even some adolescents had 'remarkable respect' if not outright 'awe' for adult knowledge (see also Markus, 1983).

One way to interpret this finding would be to consider that children might first become acquainted with mental states from dialogue with adults. Inspired by Wittgenstein's private language argument, Montgomery (1997) argues that because internal states, such as thoughts, cannot be sensed directly by other people, talk about mental states would have to be based on the behavioural counterparts of those states. Indeed, children's earliest use of mentalistic terms usually links with observable behaviour (Shatz, 1994). Further, parents effectively tell their young children what they (the children) remember of past events and more generally how the child thought and felt (Fivush and Nelson, 2004; 2006). Children might thus start out supposing that internal states can be accessed by their mothers.

Rosenberg's claims were questioned by Burton and Mitchell (2003), who explored children's judgments with a procedure that distinguished between different types of self-knowledge, interior and exterior (Shoeneman, 1981). Interior self-knowledge was defined as that which another person might not know unless you told them (e.g. what your secrets are, what's wrong when you are crying, when you feel hungry), while exterior self-knowledge was defined as things that another person might be able to work out even if you did not tell them (e.g. how good you are at sums, how fast you can run, how helpful you are). When asked who knows best about these things (you or your mother), children answered differently depending on whether the question was *interior* or *exterior* from about the age of 6 years. From about 7 years, children tended to cite themselves more than they cited their mother when the question was about interior self-knowledge. These findings contradicted Rosenberg's claim that children perceive their parents to be the authority on knowledge about them (the children). A notable exception to this developmental pattern is found in autism, where it seems that even as teenagers or adults, individuals with autism show no sign of recognizing the epistemic value of having first-person subjective access to their own inner states (Mitchell and O'Keefe, 2008).

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

Despite successfully demonstrating that children aged 6 and 7 years are somewhat attuned to their privileged access at least to interior self-knowledge, Burton and Mitchell's (2003) findings still raise the possibility that children start out thinking they are not the principal authority on knowledge about themselves: Children aged 6 years and below were more likely to cite their mother (or teacher) than themselves as knowing best or most even about interior self-knowledge. In short, Burton and Mitchell's results, like Rosenberg's before them, raise the possibility that children start out thinking they don't know their own minds—at least not as well as certain other people.

One might reasonably ask whether children's responses in this kind of research reflect their misunderstanding of the questions rather than any under-developed grasp of epistemic authority (e.g. Siegal, 1997). However, children's responses to control questions revealed that they did not defer to adult epistemic authority in an indiscriminate way. Despite crediting their mother with knowing best in relation to matters of knowledge about themselves, children asserted that they knew best in an appropriate way on matters of fact. Moreover, they did not credit any adult with having knowledge about themselves; for example, they denied that a stranger knew best about when they were thinking (Burton and Mitchell, 2003). It is thus rather difficult to explain the overall pattern in children's responses as a failure to understand what was being asked.

Nevertheless, asking children who knows best seems to imply that it is taken that Mother knows at least something, an implication that is not necessarily valid. Second, perhaps children are aware of the saying, 'Mother knows best,' and cite their mother for that reason alone. This would not explain why Burton and Mitchell (2003) found that children tended to cite an adult when the comparison adult was their teacher or when the question asked, 'Who knows most' or why they cited themselves on matters of fact. Still, it is reasonable to enquire how children respond to a differently worded question.

In the research being introduced here, we asked children how well they knew when, for example, they were thinking and how well their mother knew. Hence, children were not asked explicitly who knew best, rather this would have been implicit in the rating they assigned to themselves relative to the rating they assigned to their mother. Children might feel liberated to assign more knowledge to themselves if they were no longer thinking explicitly in contrastive terms of who knew best.

If, notwithstanding, children persisted in assigning more knowledge to their mother than to themselves, it would demand an explanation: Why, specifically in the domain of self-knowledge, would children say that they know relatively little? One possibility is that children are not underestimating how much they know, rather perhaps they are actually surprisingly prescient in recognizing that they have but a fledgling grasp of their self insights. They might appreciate, for example, that even though their mother lacks privileged access to the child's inner states, the mother nevertheless has compensating abilities and wisdom that allows her to make

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

accurate inferences based on subtle external signs (cf. Rai and Mitchell, 2004). If so, then asking mothers how much they know about their child might prove to be highly illuminating. For example, children might judge that they know less about themselves than their mother knows about them, and their mother might actually concur. In that case, it would hardly seem appropriate to conclude that children *underestimate* how well they know themselves, as Rosenberg (1979) seemed to do; rather, it would be more appropriate to conclude that children are probably accurate in judging that they do not know as much about themselves as their mother knows.

In the study that follows, we asked children to quantify how much they know about themselves on matters of interior self-knowledge. It would be striking if they judged effectively that the adult is the authority on the child's self-knowledge. In the second study, we also interviewed children's mothers with the aim of investigating whether children identifying the mother as being the authority on knowledge about the child, contrasts with the mothers identifying the children as being the authority on their own (the children's) self-knowledge. If so, then it would be necessary to explain why children start out thinking they don't know their own mind even though this is not a view shared with their mother.

2. Study 1

Borrowing an idea from Ruffman, Garnham, Import and Connolly (2001), children were invited to rate how well they knew things about themselves by stacking a column of counters up to a maximum of 10. Seven of the questions asked about aspects of interior self-knowledge, as defined by Burton and Mitchell (2003; Shoeneman, 1981). A further question asked about exterior self-knowledge, where it would actually be appropriate to cite a relevant adult as knowing more. Piloting revealed that the counter procedure worked well with children aged 5 and 7 years but that children aged 9, 11 and 13 years were more comfortable simply stating a number out of 10. The primary purpose of the study was to investigate whether children rated themselves as having more or less knowledge than a relevant adult, and whether there was a developmental trend towards assigning relatively more knowledge to self with increasing age, with the aim of assessing the robustness of the controversial claim that children might think they do not know their own minds.

2.1 Method

2.1.1 Participants. One hundred and thirty eight children were recruited, with written parental consent, from seven state-funded schools in Nottinghamshire, UK. All schools involved in the study were located in predominantly white, low to middle income communities. The sample consisted of 29 5-year-olds (mean = 5 years 3 months, SD = 3.3 months, range = 4 years 11 months—5 years 10 months, 19 males, 10 females), 28 7-year-olds (mean = 8 years 0 months, SD =

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

5.4 months, range = 6 years 10 months—8 years 6 months, 15 males, 13 females), 30 9-year-olds (mean = 9 years 4 months, SD = 6.3 months, range = 8 years 2 months—10 years 0 months, 15 males, 15 females), 30 11-year-olds (mean = 11 years 2 months, SD = 3.5 months, range = 10 years 8 months—11 years 8 months, 13 males, 17 females) and 21 13-year-olds (mean = 13 years 4 months, SD = 3.9 months, range = 12 years 7 months—13 years 8 months, 11 males, 10 females).

2.1.2 Stimuli. The stimuli consisted of eight self-knowledge questions about feeling hungry, angry, about school activities, about what kind of person you are (self), about feeling sick, happy, about dreaming and about thinking. Half the participants were presented with the questions in that order and the other half received the questions in a different order: Sick, happy, dreaming, thinking, hungry, angry, school activities and self. As the appendix shows, children were asked a series of questions on each topic, and their answers to focal questions provided data that were suitable for quantitative analysis. For each topic, children were asked to rate how well they knew about that particular topic, and how well they thought an adult subject (Mom/Dad/teacher) knew.

Children were asked to quantify, out of 10, how well they knew about each particular topic and how well they thought an adult subject (Parent/Teacher) knew. Four questions (sick, hungry, dreaming, and self) were presented with Mom/Dad as the adult subject and four (happy, angry, school and thinking) were presented with Teacher as the adult subject. The school activities control question asked children how well they knew what they would be doing in school the following week and how well their teacher knew about this. The question allowed opportunity for participants to appropriately assign more knowledge to the adult subject (teacher) than to the child subject.

2.1.3 Design and Procedure. All children were interviewed individually in a quiet area of the school. Each was introduced to the study and given an explanation of how they were to rate their answers to the questions. The rating was out of ten with the understanding that a score of 0 was appropriate if they felt they knew nothing at all, and a score of 10 was appropriate if they felt they knew very well. Younger children (5- and 7-year-olds) stacked counters in a Perspex tube to indicate how well they knew. These tubes were about 4 inches high, cut half open along their sides and erected at a slight angle on a 4 × 4 inch Perspex base. Inserting 10 counters filled the tube to the top. The counters were taken from a popular children's game and spray-painted such that there were 10 counters of one colour for ratings of self and 10 of another colour for an adult (Mom/Dad/Teacher). Older participants (9-, 11- and 13-year-olds) simply stated their rating out of ten for each question. Otherwise the procedure was identical for each age group.

A warm up question on the topic of cooking allowed practise in using the scale: Children were asked who cooked in their family and then were asked to rate (out of ten) how well their mother, father, sister, brother (as applicable) and they

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

themselves cooked. Each child was then presented with the eight self-knowledge questions. The order of rating self and adult was counterbalanced so that half the participants were asked to give a rating for self first and half were asked to give a rating for adult first.

E.g. Out of ten, how well do you know when you feel happy?
Out of ten, how well does your mom/dad know when you feel happy?

Children were assured that there were no right or wrong answers for the ratings they gave for any of the questions. Each child was interviewed for about 35 minutes.

2.2 Results

A pooled variance *t*-test applied to the ratings participants made on how well the adult subject knew something (0–10) did not detect any difference according to subject of the question (Parent/Teacher). In the following analyses, Mom/Dad/Teacher were coded as 'adult'.

With respect to the control question about school, children aged 5–11 years typically assigned around five more counters (or points) to their teachers than to themselves. The finding suggests that among these participants, there was ample willingness to credit more knowledge to an adult than to themselves when appropriate. Participants aged 13 years, in contrast, assigned a similar number of points to the child and to the adult. This is probably because the oldest group attended secondary school, in which children have different teachers for different subjects and take responsibility for knowing their time-table. The important finding, though, is that the younger groups rated the adults' knowledge more highly than the child's knowledge. If children of the same age rated the child's knowledge more highly than the adult's on the focal questions, this would stand in contrast to their pattern of answers to the school activities control question.

With respect to responses to the 7 focal questions, generally participants seemed to use the scale in an appropriate manner. Combined over the subject of the question, 5-, 7-, 9-, 11-, and 13-year-olds had respective means of 7.22 (SD = 1.50), 6.64 (SD = 1.29), 7.57 (SD = 0.93), 7.65 (SD = 0.90) and 6.93 (SD = 0.99). To simplify the analysis of principal interest, a 'self-authority' score was calculated. This is the participant's rating for the adult subject subtracted from his or her rating for the child subject. A positive value indicates that participants rated the child subject as knowing more than the adult subject. Specifically, does the self-authority score increase with age, as we might have expected from the findings of previous research? Secondly, is the self-authority score different across the range of self-knowledge questions? It might be useful to know on which self-knowledge topics children strongly perceive themselves to be an authority. In order to test whether participants rated themselves as possessing more (or less) knowledge than adults, we shall use one-sample *t* tests. If participants assigned more knowledge to

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

FIVE	SEVEN	NINE	ELEVEN	THIRTEEN
Angry*	Think*	Angry*	Angry*	Dream*
4.00 (4.33)	4.14 (3.35)	3.63 (3.75)	4.27 (2.95)	3.71 (2.87)
Think*	Angry*	Hungry*	Dream*	Hungry*
3.66 (5.05)	3.82 (2.78)	2.93 (3.10)	2.83 (4.10)	3.67 (2.71)
Dream*	Happy*	Think*	Hungry*	Angry*
3.07 (4.98)	2.68 (2.72)	2.43 (3.57)	2.43 (2.28)	3.38 (2.56)
Hungry*	Hungry*	Dream*	Think*	Think*
2.10 (4.80)	2.18 (3.13)	2.37 (3.34)	2.40 (2.21)	2.71 (3.20)
Happy	Dream*	Happy*	Happy*	Happy*
0.14 (3.68)	1.93 (1.92)	1.97 (1.79)	2.30 (1.70)	1.52 (1.17)
Sick	Self	Sick*	Sick*	Sick*
−0.72 (4.23)	0.07 (1.46)	0.80 (2.09)	1.60 (2.51)	1.19 (1.44)
Self*	Sick	Self	Self	Self
−1.55 (4.02)	0.00 (3.38)	0.40 (1.54)	0.33 (1.99)	0.48 (1.54)

Table 1 *Average child self-authority scores (and standard deviations) in rank order for each age group in Study 1. Asterisks denote a significant one sample t-test result ($p < .05$), indicating a difference between ratings assigned to the child and adult subject.*

themselves than to the adult subject, then means would be significantly above zero. If participants assigned more knowledge to the adult subject than to themselves, then means would be significantly below zero.

After confirming that the data met assumptions of normality, a 7 (question) x 5 (age) ANOVA, the first factor being repeated measures, was conducted on the child self-authority scores. There was no significant main effect of age but there was a significant main effect of question, $F(6,798) = 31.33$, $p < .001$, $f = .44$, and a small but significant interaction between age and question, $F(24,798) = 1.83$, $p = .009$, $f = .23$. To help interpret the interaction, Table 1 presents the self-authority means for each question in rank order for each age group. The rank ordering is different for each age group, which probably explains the significant interaction.

One sample *t*-tests conducted on the average self-authority scores for each question in each age group revealed an increasing number of significant positive self-authority scores with age. Two exceptions occurred (*sick* and *self*—5-year-olds), when children assigned more knowledge to the adult subject than to themselves, and in one case (*self*) this was significant.

2.3 Discussion

Children tended to assign more knowledge to themselves than to an adult, and such a trend was present in all age groups. Indeed, a lack of significant effect associated with age provides no grounds for concluding that the trend was any stronger in older than in younger children.

The youngest group of children systematically assigned more knowledge to their parent than to themselves in response to the question about *self*. Generally,

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

participants in all age groups assigned relatively less knowledge to themselves in connection with this question compared with the other questions. When asked to explain their rating, many children referred to the fact that their mother had known them as a baby, while they themselves could not remember what they were like when very young. Hence they seemed to think that their mother had better insights into their character than they did on account of their mother having known them when they were in a physically and psychologically less primitive state.

Arguably, it is quite reasonable for anyone to suppose that others are more objective (due to absence of ego involvement) and therefore perhaps better qualified to pass judgment on one's character. If children's ratings were made on the basis of this insight, then we might find in Study 2, where parents were also interviewed, that they too identified themselves as knowing a relatively large amount on the topic of their child's *self* relative to other topics about their child.

3. Study 2

In the Introduction we justified the intention to interview children's mothers in the interest of exploring the possibility that parents credit their children with more knowledge about themselves than the children recognize. The findings of Study 1 surprisingly revealed that children seem to recognize themselves as the authority on self-knowledge when giving quantified responses. Therefore, Study 2 no longer has the purpose originally assigned to it. Nevertheless, it is still legitimate to enquire whether children's estimations correspond with those of their parents. Indeed, Study 2 presents an opportunity to investigate whether children effectively disagree with their parents in the opposite way than originally anticipated. While children assign relatively more knowledge to themselves than they believe their parents have about them (the children), perhaps parents will assign somewhat less knowledge to their children than they assign to themselves. In other words, parents might be in disagreement with their children in effectively denying that the children know more about themselves than they (the parents) know. If so, this would be a considerable irony for it would raise the possibility that children are not underestimating how much they know about themselves, as suggested by Rosenberg (1979), but *overestimate* how much they know.

3.1 Method

3.1.1 Participants. Ninety children were recruited, with written parental consent, from three state-funded schools and in response to advertisements targeted at parents across the Nottinghamshire region in the UK. None of the children had participated in Study 1. All schools involved in the study were located in predominantly white, low to middle income communities. The sample of children consisted of 30 5-year-olds (mean = 5 years 8 months, SD = 5.0 months, range =

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

5 years 1 month—6 years 4 months, 14 males, 16 females), 30 7-year-olds (mean = 7 years 1 month, SD = 4.5 months, range = 6 years 6 months—8 yrs 0 months, 15 males, 13 females) and 30 9-year-olds (mean = 8 years 11 months, SD = 6.6 months, range = 8 years 6 months—9 years 9 months, 15 males, 15 females). The mothers of all these children were also interviewed. Two mothers were interviewed regarding both their 5 year old twins, four mothers regarding both their 5 and 7 year old children, five mothers regarding both their 5 and 9 year old children, four mothers regarding their 7 and 9 year old children and one mother regarding her 5, 7 and 9 year old children.

3.1.2 Stimuli. Six focal self-knowledge questions asked mothers and children about how well the child and mother knew when the child felt sick, happy, tired, was thinking, about what kind of person they are (self) and about what the child was going to have for tea (dinner). As in Study 1, children were asked to give ratings for themselves and for their mother. In addition, mothers were also asked to rate how well they knew and how well they thought their child knew for each topic. Questions were presented in the same way to mothers and to children.

The control question asked children and their mothers how well they knew about what the child was going to eat for tea (dinner) that evening. The control question provided opportunity for both children and mothers to assign more knowledge to the mother than to the child, as it is expected that Mom would usually know more than the child about what they are going to eat for tea.

3.1.3 Design and Procedure. The rating system was the same as in Study 1. All participants entered their ratings for self and parent into Excel run on a Dell laptop computer with a 14-inch screen, which appeared as a bar chart for each question, with one bar representing how well the child knows and another representing how well the mother knows. This gave a visual representation of the ratings, similar to the counter procedure used in Study 1, but was not overly childish and therefore could be used by all participants.

Questions were arranged in the sequence *sick, happy, tired, thinking, self* and *control,* and the order (i.e. the starting question) rotated across participants. In addition, the order of rating child and mother was counterbalanced so that half the participants were asked to rate the child first and half were asked to rate the mother first.

Children and mothers were interviewed separately either in a quiet area of the child's school or in their own home. Participants were first introduced to the procedure on how they were to rate their answer to each question. In a warm-up question children were asked to state their own and their mother's favourite television programme and then rated how well they knew about these programmes and how well their mother knew about them. Mothers were asked the corresponding warm-up questions.

Each participant was then presented with the six self-knowledge questions. Children were informed of the topic and asked to rate, out of ten, how well they knew and how well their mother knew:

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

E.g. Out of ten, how well do you know when you feel happy?
Out of ten, how well does your mom know when you feel happy?

Mothers were similarly asked to rate, out of ten, how well they knew and how well their child knew about each topic:

E.g. Out of ten, how well do you know when your child feels happy?
Out of ten, how well does your child know when they feel happy?

Participants responded either by stating a number verbally, by pressing the relevant number on the computer keyboard, or both. If participants only responded verbally, the experimenter pressed the appropriate key to activate the Excel bar. Participants were assured that there were no right or wrong answers for the ratings they gave for any of the questions. Each participant was typically interviewed for about 30 minutes.

3.2 Results

The main point of interest was to compare child participants' ratings of child self-authority to ratings given by their parents but first the results of preliminary analyses are presented. The control question concerned what the child was going to eat for tea (dinner). Based on average ratings in all three child participant groups, as well as parent participants, at least two more points were assigned to the parent subject than to the child subject. Participants used the rating scale similarly to those in the previous study. Among child participants (youngest to oldest), the means (and SDs) were 7.36 (1.15), 7.56, (1.26) and 8.48 (0.82). The means (and SDs) for the three groups of parents ranked according to the age of their children (youngest to oldest) was 8.10 (0.75), 8.04 (0.60) and 8.33 (0.75).

In order to compare children's ratings with their parents' ratings, a child self-authority score was calculated as rated by children and as rated by parents. In both cases, the rating for the parent subject was subtracted from the rating for the child subject. We know from the child participants' ratings in Study 1 that child self-authority scores tended to be positive, that is, child participants generally assigned more knowledge to themselves than to their parents or teacher. If parents were in agreement with their children then we would expect them to rate child self-authority positively and a hypothetical graphical representation of the data would appear as in Figure 1.

Having confirmed that the data met assumptions of normality, we proceeded to find out if the data conformed to the hypothetical pattern, by conducting a 5 (question) x 2 (person who gave the rating—child or parent) x 3 (age of child) ANOVA, with the first factor being repeated measures. There was a significant main effect of person, $F(1,174) = 28.71$, $p < .001$, $f = .41$, whereby child participants rated child self-authority significantly higher than parents rated child self-authority. There was a small but highly significant main effect of question, $F(4,696) = 6.35$,

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

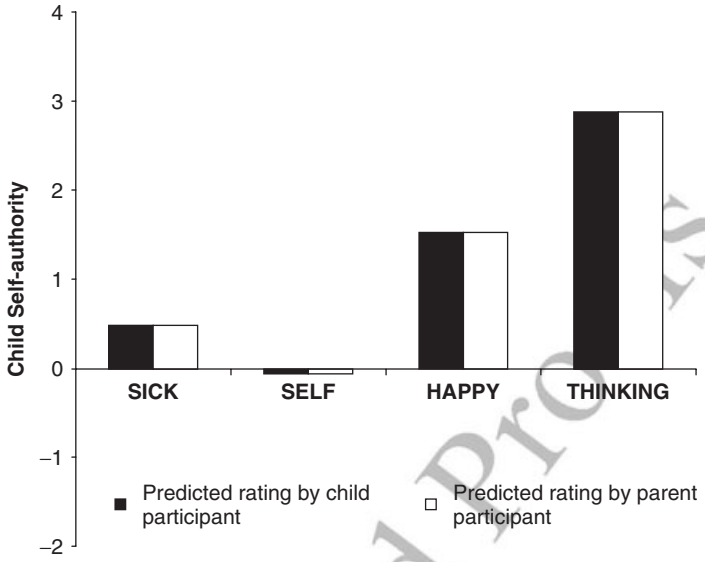

Figure 1 *Child self-authority predicted from Study 1, as rated by children, and as predicted for ratings by parents. A prediction based on the question tired is missing because such a question was not posed in Study 1*

$p < .001$, $f = .19$, a small but significant interaction between question and person, $F(4,696) = 3.54$, p = .007, $f = .14$, and a small but significant 3-way interaction, $F(8,696) = 2.63$, $p = .008$, $f = .17$. All other effects were nonsignificant. To help interpret the 3-way interaction, we analysed the effects of person and question in each age group independently.

Beginning with data from 5-year-olds and their parents, a 5(question) x 2 (person who gave the rating—child or parent) ANOVA, with the first factor being repeated measures, was conducted on the child self-authority scores. A significant main effect of person resulted from higher child self-authority scores as rated by child participants than as rated by their parents, $F(1,58) = 11.05$, $p = .002$, $f = 0.44$. There was no significant main effect of question but there was a significant interaction between question and person, $F(4,232) = 4.68$, $p = .001$, $f = .28$. Independent samples t-tests revealed significantly higher child self-authority scores as rated by children than their parents for the questions of *self*, $t(58) = 3.67$, $p = .001$, and *tired*, $t(58) = 4.10$, $p < .001$, but there were no significant contrasts for the remaining questions, which probably explains the significant interaction (see Figure 2).

One-sample t-tests showed that 5-year-olds rated themselves as knowing significantly more than their parents only for the question of *tired*, $t(29) = 2.22$, $p = .03$. Parents, in contrast, rated themselves as knowing significantly more than their child for the questions *sick*, $t(29) = 2.25$, $p = .03$, *self*, $t(29) = 6.65$, $p < .001$, and *tired*, $t(29) = 4.75$, $p < .00)$.

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

Uncorrected Proofs

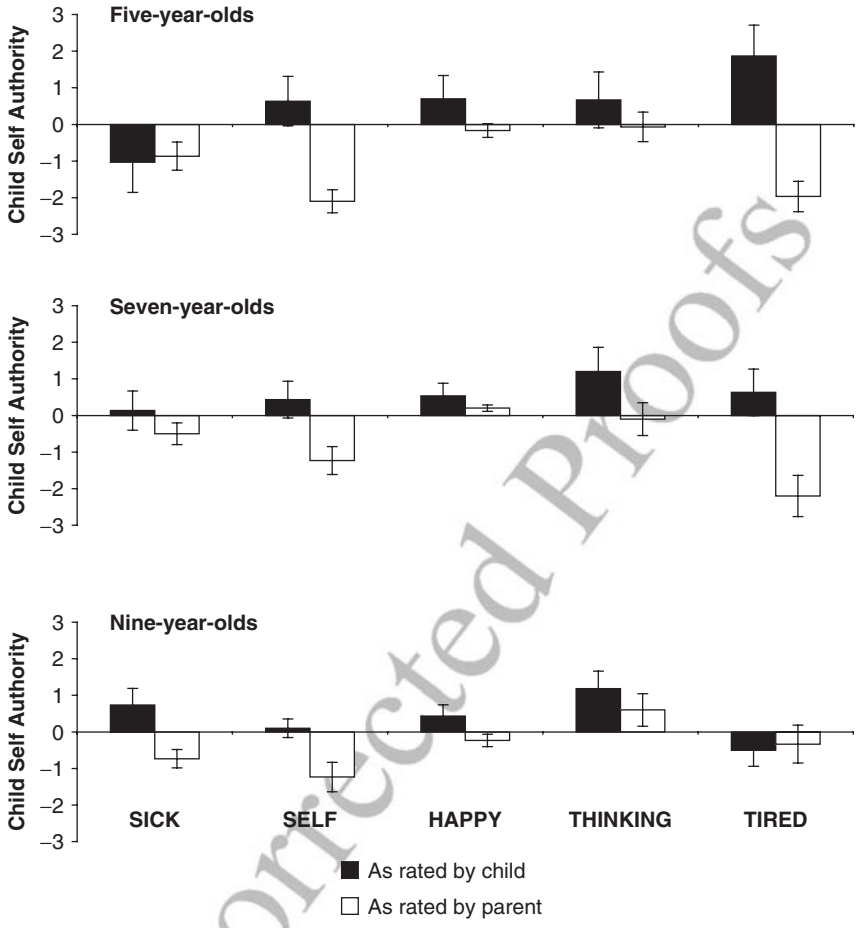

Figure 2 *Child self-authority as rated by children and parents for each age group in Study 2. A positive child self-authority score indicates that the rating for the child subject was higher than the rating for parent subject. A score of zero indicated that the rating assigned to the child subject equalled that assigned to the parent subject. A negative rating indicates that the rating for the parent subject was higher than the rating for the child subject*

Uncorrected Proofs

Moving on to the 7-year-olds, a 5(question) x 2(person who gave the rating—child or parent) ANOVA, with the first factor being repeated measures, was conducted on the child self-authority scores. Once again, a significant main effect of person resulted from higher child self-authority scores as rated by child participants than as rated by their parents, $F(1,58) = 9.91$, $p = .003$, $f = .41$. The other main effect and the interaction term were both nonsignificant. One-sample t-tests did not identify 7-year-olds rating themselves as knowing significantly more than their parent for any of the five questions. Parents, in contrast, rated themselves as knowing

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

significantly more than their child for the question of *self*, $t(29) = 3.22$, $p = .003$, *happy*, $t(29) = 2.26$, $p = .03$, and *tired*, $t(29) = 3.90$, $p = .001$ (see Figure 2).

Finally, child self-authority scores for 9-year-olds were analyzed by a 5(question) x 2(person who gave the rating—child or parent) ANOVA, with the first factor being repeated measures. Once again, a main effect revealed that child self-authority scores as rated by child participants were significantly higher than when rated by their parents, $F(1,58) = 8.85$, $p < .004$, $f = .39$. There was also a main effect of question, $F(4,232) = 4.43$, $p = .002$, $f = .28$, but the interaction term was non-significant. To help interpret the significant main effect of question we conducted pooled-variance t-tests, which revealed a significant difference in the ratings between *sick* and *think*, $t(29) = -2.05$, $p = .05$, *self* and *happy*, $t(29) = -2.67$, $p = .01$, *self* and *think*, $t(29) = -4.25$, $p < .001$, *happy* and *think*, $t(29) = -2.26$, $p = .01$, and *think* and *tired*, $t(29) = 3.75$, $p = .001$. One-sample t-tests revealed that children rated themselves as knowing significantly more than their parent only for the question *thinking*, $t(29) = 2.49$, $p = .02$). Parents however, rated themselves as knowing significantly more than their child for the question *sick*, $t(29) = 2.89$, $p = .007$), and *self*, $t(29) = 3.06$, $p = .005$ (see Figure 2).

3.3 Discussion

There was a notable and systematic discrepancy between self-authority scores arising from children's ratings and self-authority scores arising from parents' ratings. Specifically, the self-authority scores from children tended to be higher than those from parents. In other words, children tended to credit themselves as having lots of knowledge relative to their parents, while parents either assigned similar levels of knowledge to themselves as to their children or they tended to assign more knowledge to themselves than to their children. Despite the three-way interaction, such a trend emerged for all three age groups, though it might have been stronger for the two younger groups of children. In the light of this finding it does not seem appropriate to conclude that children underestimate how much they know about themselves and defer instead to their parents; it seems more appropriate, if anything, to suggest that children might *overestimate* how much they know and *underestimate* how much their parents know. At least that seems to be the message conveyed by the contrast between children's and parents' rating of how much they each know about the child's inner states.

4. General Discussion

The findings from the two studies are quite different than predicted. First, even the youngest children tended to assign more knowledge to themselves than to a relevant adult, at least in relation to some of their (the children's) inner states. While the finding makes good intuitive sense, it contradicts a view held for several decades following the seminal work of Morris Rosenberg (1979). Second, children's ratings

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

of how much they know and how much their mothers know differed systematically from comparable ratings made by mothers. Children sometimes assigned relatively more knowledge to themselves than to their mothers, and mothers effectively disagreed by assigning either the same amount of knowledge to themselves as to their children or, in some cases, they assigned more knowledge to themselves than to their children. Parents thus lean towards thinking they know relatively more about their children's inner states than they think their children know.

There are at least two factors that could be involved in children assigning copious amounts of knowledge to themselves. First, unlike previous research, children were not asked to decide in a contrastive way whether they *or* their mother knows best. Children in the current research made mutually exclusive judgments on how well they knew and how well their mother knew. The explicitly contrastive judgment that was required in previous research may have led children to defer to adult authority. When the contrast between the knowledge states of two people was made implicitly, as in the current research, children might have been less inhibited in crediting themselves with relatively large amounts of knowledge. Second, children in the previous research might have adhered to the well known maxim that 'mother always knows best', and inclusion of the word *best* in the question could have influenced children's replies. Evidently, the results of the current study belie previous claims that young children inevitably credit relevant adults with more knowledge than themselves about the children's inner states.

Ironically, the findings of Study 2 raise the possibility that young children overestimate how much they know about themselves: This was suggested by comparing children's ratings with ratings made by their mothers. The finding turns Rosenberg's claim on its head, for he famously said that young children effectively underestimate how much they think they know about themselves and overestimate how much they think their parents know. Of course, the current research was not designed to test how much children actually know about themselves; notwithstanding, it seems people do have a general characteristic of *overestimating* rather than *underestimating* what they know about themselves (Dunning, 2006). Many studies involving children as participants support that view. For instance, Markman (1977) found that children aged around 6 years tended to overestimate their ability to comprehend and subsequently execute a magic trick when in actual fact they did not fully understand; Robinson and Whittaker (1987) found that children of similar age tend to overestimate their ability to interpret an ambiguous referential utterance; work on metamemory development suggests that children overestimate their ability to remember things (Flavell and Wellman, 1977); and Mitchell and Robinson (1990) found that children of similar age tend to overestimate their ability to identify an unfamiliar cartoon character from a set of alternatives merely after hearing the target character's name. The possibility that children overestimate how much they know about themselves would sit comfortably with the more general findings of children's overestimation of knowledge.

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

If young children overestimate what they know about themselves relative to what significant others know about them, do they develop towards a more modest estimation of what they know about themselves? In Study 2, the developmental trend from 5 to 9 years of age was towards parity between children's estimations and those of their mothers; in other words, children's estimations of what they thought they knew and what they thought their mother knew began to approximate to the relative estimations made by mothers.

In saying that young children might have overestimated how much they know about themselves the implication, at least in Study 2, was that children were, relatively speaking, underestimating how much their parents knew. Apart from being in stark contrast to Rosenberg's conclusion, this finding is also at odds with a phenomenon observed in young adult participants known as the 'illusion of transparency' (Gilovich, Stavitsky and Medvec, 1998). For example, when telling lies, adults tend to overestimate the likelihood that the lie will be detected by a listener. Indeed, adults generally systematically err on the side of thinking that their inner states can be detected by others. It is not that adults think their inner states are an open book to other people; rather they seem to overestimate how easy it is for people to detect their inner states. This phenomenon lends support to claims made several decades ago by David Elkind (1967) on the topic of *adolescent egocentrism*. Elkind speculated that adolescence and early adulthood is a time when one's inner states assume such salience that the individual lapses into thinking that they can be detected by other people. Elkind argued that this deserves to be called *egocentric* on the grounds that the adolescent egocentrically presumes his or her idiosyncratic preoccupations are shared by all.

In the context of Rosenberg's conclusions, it would be a considerable irony if it turned out not only that young children effectively underestimate what their mother knows about their inner states but also then develop to a point where they eventually overestimate what other people know about them, as in the illusion of transparency. In another sense, though, it would not be surprising if understanding how the mind works developed over middle childhood (e.g. Hulme, Mitchell and Wood, 2003; Mitchell, Robinson, Isaacs and Nye, 1996; *pace* Perner and Davies, 1991), and part of that development could incorporate a growing understanding that people are effective in making inferences (e.g. Rai and Mitchell, 2006; Sodian and Wimmer, 1987). Perhaps the illusion of transparency owes something to a sharpening awareness that people are effective in making inferences about oneself.

Moving on, inviting participants to rate out of ten how well they know something presents a methodological benefit in allowing comparison across different kinds of inner states. While the research was designed primarily to investigate the character and scope of children's assessments of how well they know themselves, it is intuitively interesting to find that children rate that they know more relative to their parents about some states—more so than for other states. Notably, children strongly identified themselves as the authority on knowing when they are thinking, when they are dreaming and when they are angry. For example, perhaps children

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

recognize that they are able to contain and indeed hide the full extent of their feelings of anger, a skill which is presumably an important component of socialization.

With respect to children's tendency to identify themselves as an authority on knowing when they are thinking, perhaps this is illuminated by recognizing that thinking is a representational state. Non-representational states, as a point of contrast, usually have conspicuous behavioural correlates (e.g. grimacing in the case of pain, yawning in the case of tiredness or boredom). Non-representational states thus have some qualities of exterior self-knowledge, while representational states, like thinking, have fewer qualities of exterior self-knowledge. In so far as children are attuned to the interior-exterior distinction, they may thus be more inclined to recognize themselves as the authority on knowing when they are thinking, more so, say, than knowing when they feel scared.

On the other side of the coin, both studies consistently revealed that children were least confident when assessing how well they knew what they are like, what kind of person they are (self). Rosenberg and also Burton and Mitchell (2003) similarly found that when more general self-knowledge questions were asked, children tended to defer to adults as the authority. Interestingly, the findings of Study 2 suggest that even though this is the case, parents still identified themselves as knowing more about their children than the children themselves estimated. This finding is consistent with the possibility that children indeed know less about themselves on a global level and that they actually recognize that this is the case. Perhaps children feel more comfortable identifying themselves as the authority in relation to specific things such as when they are thinking and when they are angry because they think that the internal signs of these states are easy for them to detect but hard for others to detect. Perhaps they feel not so sure what kind of signs inform them globally about what kind of person they are (self). Indeed, it might be reasonable at any point in development to judge that significant others are better qualified to pass judgment on general aspects of one's character, and ratings from parents as well as children (Study 2) seemed to support that view.

(PM, FZ, RW) School of Psychology
University of Nottingham, UK
(UT)Department of Psychology
University of Saskatchewan, Canada
(MB)Department of Psychology
University of Dundee, UK

Uncorrected Proofs

References

Burton, S. and Mitchell, P. 2003: Judging who knows best about yourself: developmental change in citing the self across middle childhood. *Child Development*, 74, 426–444.

Dunning, D. 2006: Stranger to ourselves? *The Psychologist*, 19, 600–603.

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

Elkind, D. 1967: Egocentrism in adolescence. *Child Development*, 38, 1025–1034.

Fivush, R. and Nelson, K. 2004: Culture and language in the emergence of autobiographical memory. *Psychological Science*, 15, 573–577.

Fivush, R. and Nelson, K. 2006: Parent-child reminiscing locates the self in the past. *British Journal of Developmental Psychology*, 24, 235–251.

Flavell, J.H. and Wellman, H.M. 1977: Metamemory. In R.V. Kail and J.W. Hagen (eds), *Perspectives on the Development of Memory and Cognition*. Hillsdale, NJ: Erlbaum, 3–33.

Gilovich, T., Stavitsky, K. and Medvec, V.H. 1998: The illusion of transparency: biased assessments of others' ability to read one's emotional states. *Journal of Personality and Social Psychology*, 75, 332–346.

Hulme, S., Mitchell, P. and Wood, D. 2003: Six-year-olds' difficulties handling intensional contexts. *Cognition*, 87, 73–99.

Markman, E.M. 1977: Realizing you don't understand: a preliminary investigation. *Child Development*, 48, 986–992.

Markus, H. 1983: Self-Knowledge: an expanded view. *Journal of Personality*, 51, 543–565.

Mitchell, P. and O'Keefe, K. 2008: Do individuals with autism spectrum disorder think they know their own minds? *Journal of Autism and Developmental Disorders*, 38, 1574–1580.

Mitchell, P. and Robinson, E.J. 1990: What determines the accuracy of children's judgments of their own knowledge? *Journal of Experimental Child Psychology*, 50, 81–101.

Mitchell, P., Robinson, E.J., Isaacs, J.E. and Nye, R.M. 1996: Contamination in reasoning about false belief: an instance of realist bias in adults but not children. *Cognition*, 59, 1–21.

Montgomery, D.E. 1997: Wittgenstein's private language argument and children's understanding of the mind. *Developmental Review*, 17, 291–320.

Perner, J. and Davies, G. 1991: Understanding the mind as an active information processor: do young children have a 'Copy theory of mind'? *Cognition*, 39, 51–69.

Rai, R. and Mitchell, P. 2004: Five-year-olds' difficulty with false belief when the sought entity is a person. *Journal of Experimental Child Psychology*, 89, 112–126.

Rai, R. and Mitchell, P. 2006: Children's ability to impute inferentially-based knowledge. *Child Development*, 77, 803–821.

Robinson, E.J. and Whittaker, S.J. 1987: Children's conceptions of relations between messages, meanings and reality. *British Journal of Developmental Psychology*, 5, 81–90.

Rosenberg, M. 1979: *Conceiving the Self*. USA: Basic Books.

Ruffman, T., Garnham, W., Import, A., and Connolly, D. 2001: Does eye direction indicate implicit sensitivity to false belief? Charting transitions in knowledge. *Journal of Experimental Child Psychology*, 80, 201–224.

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

Uncorrected Proofs

Shoeneman, T.J. 1981: Reports of the sources of self-knowledge. *Journal of Personality*, 49, 284–294.

Shatz, M. 1994: Theory of mind and the development of socio-linguistic intelligence in early childhood. In C. Lewis and P. Mitchell (eds), *Children's Early Understanding of Mind*. Hove: Psychology Press, 311–329.

Siegal, M. 1997: *Knowing Children* 2nd edn. Hove: Psychology Press.

Sodian, B. and Wimmer, H. 1987: Children's understanding of inference as a source of knowledge. *Child Development*, 58, 424–433.

Wilson, E.O. 2002: *Strangers to Ourselves: Discovering the Adaptive Unconscious*. Cambridge, MA: Belknap-Harvard University Press.

Appendix

Sample of questions presented to children in Study 1 with test questions asterisked

Angry

a Sometime people are angry. Are you angry sometimes? Sometimes?

b What happens when you are angry?

c What does it feel like when you are angry?

f Now, what about your teacher? Does your teacher know when you are angry?

g* Out of ten, how well does your teacher know when you are angry?

e* Now, what about you? Out of ten, how well do you know when you are angry?

h OK. Now tell me more about your teacher. How does your teacher know when you are angry?

i Is this the only way how your teacher might know when you are angry? Or are there also other ways?

j Now, I see that you gave your teacher (x) and yourself (y). Why is it (a little/much) (harder/easier) for your teacher than for you to know when you are angry?

k (*If the child answers by saying that the teacher knows less well because s/he is not always there or is distracted by other children, ask the following question*):
If your teacher was (always around/not distracted) when you are angry, would the teacher then know better?
How well would the teacher know (out of ten)?

Sample of questions presented to mothers in Study 2 with test questions asterisked

Self

a. One of the questions we will ask your child is about what kind of person they think they are and what they are like.

b*. Out of ten, how well does your child know what kind of person they are and what they are like?

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd

c*. Also out of ten, how well do you know what kind of person your child is, what they are like?

d. How do you know what your child is like and what kind of person they are?

e. Now, I see you gave yourself (x) and your child (y). Why is it a little/much harder/easier for you than for your child to know what kind of person they are?

f. Can you try and explain your reasoning behind the scores you gave to you and your child?

g. When we ask your child these same questions about how much they know themselves and how much you know about what kind of person they are, how do you think they will answer?

h. (If they say child would answer differently) whose judgment would be correct?

k. Now can you tell me more about this: Why would you/your child be correct?

l. Who knows most about what kind of person your child is—you or your child?

Uncorrected Proofs

© 2009 The Authors
Journal compilation © 2009 Blackwell Publishing Ltd