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Imaginary companions and young children's responses to ambiguous auditory stimuli: implications for typical and atypical development

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Background: Previous research has reported a link between imaginary companions (ICs) in middle childhood and the perception of verbal material in ambiguous auditory stimuli. These findings have been interpreted in terms of commonalities in the cognitive processes underlying children's engagement with ICs and adults' reporting of imaginary verbal experiences such as auditory verbal hallucinations. The aim of the present study was to examine these relations using improved methodology and a younger sample of children for whom engagement with ICs would be expected to be particularly salient. **Method:** Data on young children's (age range: 4–8 years) reporting of ICs were gathered in two studies (total $N = 80$). Responses to ambiguous auditory stimuli were investigated using the new Jumbled Speech task, which measures participants' likelihood of perceiving words in meaningless but speech-like auditory stimuli. **Results:** Reporting hearing words in the Jumbled Speech task was associated with having a parentally corroborated IC. Hearing words on the task and having an IC were unrelated to age, gender, verbal ability, and understanding of the stream of consciousness. **Conclusions:** Findings are consistent with the hypothesis that engaging with ICs is one aspect of a general susceptibility to imaginary verbal experiences. We consider the implications for the assumption of continuity in psychopathological experiences between childhood and adulthood. **Keywords:** Imaginary companions, hallucinations, childhood, theory of mind, stream of consciousness.
Abbreviations: ICs: imaginary companions; IVEs: imaginary verbal experiences; ToM: theory of mind; SoC: stream of consciousness; AVH: auditory verbal hallucinations.

One of the most striking features of young children's fantasy lives is their engagement with imaginary companions (ICs). Depending on the criteria by which they are classified, between 28 and 65% of young school-age children report ICs (Singer & Singer, 1990; Taylor, 1999). Despite stereotypes (supported in some respects by methodologically flawed early studies) of such children as being emotionally disturbed, withdrawn, and shy (Taylor, 1999), recent research has shown ICs to be associated with positive developmental outcomes. For example, Taylor and Carlson (1997) found that the presence of an IC related to superior performance on a battery of theory of mind (ToM) tasks. Hoff (2005) reported that 10-year-olds with ICs scored more highly on two measures of creativity than their peers without ICs. Typically, ICs begin to drop out of children's imaginative lives in middle childhood, although Taylor, Carlson, Maring, Gerow, and Charley (2004) reported continued engagement with ICs among children aged 7, and ICs are also reported in adolescence (Seiffge-Krenke, 2001).

Despite the fact that ICs are generally treated as a distinctive and exclusive feature of childhood, some researchers have considered how the experience might relate to experiences occurring in adulthood. Firstly, it has been noted that the creation of imaginary playmates may provide a foretaste of imaginative and creative abilities in adulthood (e.g., Myers, 1979; Singer & Singer, 1990). Secondly, some researchers (e.g., Pearson et al., 2001) have observed that engaging verbally with an IC bears similarities with symptoms of psychopathology such as auditory verbal hallucinations (AVHs). Although usually associated with disorders such as schizophrenia, recent research has shown that AVHs can be part of normal as well as atypical experience (e.g., Ohayon, 2000).

The possibility that engaging with ICs constitutes a hallucination-like experience was explicitly considered by Jaynes (1976). Criteria for an experience to count as a hallucination include its occurrence in the absence of any appropriate stimulus, its having the full force of a perception caused by a real event or object, and its resistance to voluntary control (Slade & Bentall, 1988). Engaging with an IC would seem to fulfil at least two of these criteria: the phenomenon

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occurs in the absence of any appropriate triggering object or event, and has the full force of a true percept. As regards the third criterion, although most children with ICs maintain a degree of control over their interactions with their companions, it is questionable whether their appearance is entirely the result of children's voluntary actions (Taylor, 1999). A related question is whether children genuinely believe their ICs to be real. Although young children often appear to have a weak grasp of the relation between appearance and reality (Flavell, Flavell, & Green, 1983), in many conditions children's reasoning about fantasy and reality shows no fundamental differences to adults' (Woolley, 1997). As Taylor (1999) notes, children's understanding of the imaginary basis of their ICs is a complex issue which is likely to be dependent upon many factors.

Perhaps a more fruitful approach to this question is to consider whether children consider their ICs' activities to be internally or externally generated. This may in turn relate to children's meta-cognitive understanding of their own thought processes. In Vygotsky's (1934/1987) theory of the development of verbal thought, the preschool years are a time of rapid internalisation of external speech (as evidenced by the frequent occurrence of partially-internalised, self-directed utterances, known as private speech). One implication of this theory is that the young child's mental world will be populated by voices in dialogic interplay in the process of internalisation. In other words, healthy children will experience the voices of their social partners even when those partners are absent, because the internalisation of such voices is one of the foremost cognitive tasks of the preschool and early school years. Young children's generally weak understanding of the thinking process (e.g., Flavell, Green, & Flavell, 1993), combined with their immature source-monitoring capacities (e.g., Roberts, 2002), makes it plausible that they will attribute verbal mental experiences to the speech of others, rather than to their own flow of inner speech.

To suggest that imaginary verbal experiences may be a normal feature of childhood is not to deny that pathological forms of the experience can occur in young people (e.g., Burke, Del Beccaro, McCauley, & Clark, 1985; Altman, Collins, & Mundy, 1997). Rather than going so far as to suggest that ICs in themselves indicate hallucination-proneness (Pearson et al., 2001), there is a need for developmentally sensitive research into the phenomenon of imaginary verbal experiences, and particularly its relations with other cognitive milestones in early childhood. One approach would be to obtain qualitative (e.g., interview) data on children's experiences. An alternative would be to attempt to elicit these experiences in an experimental setting. If engaging with ICs represents one aspect of children's general susceptibility to imaginary verbal experiences, is it possible to elicit these experiences in other contexts?

Eliciting imaginary verbal experiences

This was the approach taken by Feelgood and Rantzen (1994), who drew on Bentall's (1990) suggestion that AVHs in adult patients might stem from a deficit in distinguishing between real and imagined events. Building on previous demonstrations that hallucinating patients are more likely to report AVHs in the presence of an ambiguous auditory stimulus (e.g., Young, Bentall, Slade, & Dewey, 1987), Feelgood and Rantzen reported an association between healthy participants' scores on a self-report measure of susceptibility to hallucinations and their tendency to report imaginary verbal experiences (IVEs) when played a recording of white noise in the laboratory.

Despite this success in the elicitation of IVEs in adults, it was only recently that a comparable attempt was made to elicit such experiences in children. Pearson et al. (2001) attempted to extend Feelgood and Rantzen's findings to a sample of healthy 9- to 11-year-olds. Children were group-tested in a classroom context. The procedure involved playing a 3-minute recording of an ambiguous auditory stimulus, and asking children to write down any words they heard. Following Feelgood and Rantzen's methodology, any word that was reported by 10% of the sample was removed from the analysis as an illusion. Children who had a current IC reported hearing more words than those who had never had such a companion. The authors concluded that hallucinatory experiences can be considered a normal aspect of development.

Pearson et al.'s inventive study nevertheless suffered from a number of methodological shortcomings. Firstly, they made the questionable assumption that engaging with an IC in early adolescence is comparable to adults' self-reports of hallucinations. Secondly, the group-testing context of their study introduced unacceptable demand characteristics, particularly the social pressure to conform to the remainder of the group. Thirdly, preparation of the auditory stimulus involved a rigid 1-s segmentation with no attention to word boundaries, which would have resulted in a very jerky stimulus unlike human speech. Fourthly, Pearson et al. relied on self-report of ICs with no attempt to provide parental corroboration. Obtaining such corroboration is now standard practice in research on ICs (Taylor, 1999).

A final methodological shortcoming is that Pearson et al.'s participants were of an age (9 to 11 years) that may have been less than optimally appropriate for measuring concurrent ICs. Although continued engagement with ICs has been documented beyond middle childhood, retrospective reports from adults suggest that ICs generally figure less strongly in children's imaginative lives beyond about age 10 (Taylor, 1999). In support of this view, only 9.5% of Pearson et al.'s participants reported a current IC, a

much lower proportion than reported in studies with younger children (e.g., Taylor et al., 2004).

The aim of the present research was to investigate relations between ICs and IVEs in preschool and young school-age children, for whom engagement with ICs might be expected to be a more salient feature of their fantasy world. The opportunity was also taken to make a number of improvements on Pearson et al.'s methodology. We predicted that children reporting a parentally-corroborated IC would be more likely to report hearing words when played a recognisably human but linguistically meaningless recording of a human voice. Given our expectations that IVEs might be associated with relatively weak meta-cognitive capacities (see above), we additionally included a measure of children's understanding of typical human thought processes. Associations with age, gender, and receptive verbal ability were also investigated.

Study One

Method

Participants. Participants were 32 children (21 girls) from three preschools on a university campus in Sydney, Australia. Children ranged in age from 44 to 67 months ($M = 54.9$, $SD = 6.2$). All participants had English as their first language. Ethical approval was obtained from the relevant university ethics committee. Written informed parental consent was obtained and all children assented to their participation.

Overview of procedures. Children were seen in a quiet part of the preschool on three occasions, each approximately one week apart. In the first session they completed the Imaginary Companions Interview and Stream of Consciousness task. In the second session they completed the Peabody Picture Vocabulary Test III (PPVT-III; Dunn & Dunn, 1997), and in the final session the Jumbled Speech task. A female experimenter administered all procedures.

Imaginary Companions Interview. Each child was given the interview described by Taylor and Carlson (1997). The interview was introduced as follows: *Now, I'm going to ask you some questions about friends. Some friends are real, like the kids who live on your street, the ones you play with. And some friends are pretend friends. Pretend friends are the ones that are make-believe, that you pretend are real. Do you have a pretend friend?* If the answer was positive, the child was asked further questions about the friend's name, whether the friend was a toy or completely pretend, the friend's gender, age, and physical appearance, the child's likes and dislikes about the friend, and where the friend lived and slept. All responses were audio-taped for later coding.

Corroboration of child reports was obtained from a parental questionnaire that was returned with consent forms. The order and content of questions matched those in the child interview. Children were only considered to have an IC if their report was corroborated by the parental questionnaire. Parents have been shown to be reasonably accurate sources of information on children's ICs (Gleason, 2004). Owing to the temporal instability of children's reports of ICs and the fact that children frequently have multiple ICs (Taylor, 1999), it was not necessary for parents to supply precise details on the identity of the IC. Given the young age of the participants, parentally corroborated reports of past (i.e., non-current ICs) were included.

The Jumbled Speech task. The stimuli for the Jumbled Speech task were prepared from a recording of a 10-year-old female volunteer reading a passage of non-fictional prose. The recording was made using a AKG C414B-ULS large-diaphragm condenser microphone feeding into a Mackie MS1402-VLZ mixer and a Tascam DA-40 DAT recorder. The recording was randomly segmented at silence boundaries in order to avoid unspeech-like clicks and beats, and to preserve typical prosodic patterns. These segments were then reversed and recompiled into a new continuous reversed discourse. The resulting audio file was then randomly segmented into ten 7-s extracts, which were transferred onto a CD.

Participants were seated at a table with audio playback equipment and the task was explained as follows: *Right, [name], would you like to play a game with me? You're going to hear someone talking, but their voice will sound a bit funny. What you have to do is to tell me if you hear the voice saying any words. Don't worry if you can't hear anything – some children do and some children don't. Are you ready?* The ten clips were then played. After each clip, the child was asked: *Did you hear any words? What words did you hear?* The experimenter recorded any words reported by the participant on a coding sheet.

Stream of Consciousness task. The Stream of Consciousness (SoC; Flavell et al., 1993) task is an assessment of children's understanding that ongoing ideation continues in the absence of any obvious external cues. The task was administered by two experimenters, E1 and E2. Two schematic faces, depicting an individual whose mind was empty of thoughts (an empty thought bubble) and one who was currently thinking (a thought bubble containing three asterisks), were used as response stimuli. After assessing children's understanding of the response stimuli, E1 asked participants to make judgements about E2's current mental state in four conditions: waiting, looking, waiting, and problem-solving. In the waiting trials, E2 was seen sitting quietly without engagement in any overt activity. In the looking trial, E2 was seen looking at some pictures on the classroom wall. In the problem-solving trial, E2 was seen musing over a half-finished jigsaw puzzle. A score of 1 was awarded for choosing the thought bubble depicting thinking, and 0 for the empty thought bubble. A maximum total score of 4 was therefore possible.

Verbal ability. Verbal ability was assessed using the PPVT-III, which has been standardised for use with Australian participants. Four children did not complete

the assessment. The mean standardised score for the remaining sample was $M = 106.1$ ($SD = 11.9$).

Results

Descriptive statistics and preliminary analyses. Nineteen children reported an IC, of whom 15 (9 girls) had their report corroborated by a parent. Sixty percent of the corroborated IC reports concerned an invisible (i.e., completely pretend) friend, with the remainder referring to personified objects. Parental data on the invisible/personified object distinction matched child reports in each case. (Note that, owing to sample size limitations, the invisible/personified object distinction is not considered further in the following analyses.) One report was of a non-current IC (dating from 18 months previously) while the remainder were current. Table 1 shows descriptive statistics for the main variables in relation to children's reporting of an IC. Reporting an IC was not related to gender, χ^2 (1) = .39, n.s., age, $t(30) = .91$, n.s., nor verbal ability, $t(26) = 1.61$, n.s.

Jumbled Speech task. Three children refused to complete the Jumbled Speech task. Of the 29 children who completed it, 12 (7 girls) reported hearing words in the auditory stimulus. Table 1 shows descriptive statistics for the main variables in relation to whether children reported hearing words on the Jumbled Speech task. Reporting hearing words was not related to gender, χ^2 (1) = .47, n.s., age, $t(27) = 1.39$, n.s., nor verbal ability, $t(23) = 1.17$, n.s.

Figure 1 shows the numbers of children who reported hearing words on the Jumbled Speech task as a function of whether they had a parentally corroborated IC. Reporting an IC was positively related to the propensity to report hearing words on the Jumbled Speech task, χ^2 (1) = 5.86, $p < .05$, w = .45 (medium effect; Cohen, 1988).

Of the 12 children who reported hearing words, the reports of all but three contained recognisable English words and phrases. The number of phrases reported ranged from 1 to 10 ($M = 5$, $SD = 3.16$), and none were excluded as illusions. Of the three children who did not report recognisable English words and phrases, two had an IC and one did not. One of the former two participants reported hearing meaningless utterances such as *blah blah blah*, and the other reported hearing Chinese words. The latter reported having heard a mix of unspecified English and Chinese words.

Table 1 Descriptive statistics for main variables in relation to reporting ICs and hearing words on Jumbled Speech task (Study One)

	ICs		Jumbled Speech task	
	Yes	No	Heard words	No words
Age				
M	55.93	53.94	57.08	53.94
SD	5.75	6.50	5.27	6.47
Verbal ability				
M	110.17	103.06	103.80	109.20
SD	10.62	12.21	11.87	10.89
SoC Score				
M	2.13	2.33	2.43	2.27
SD	.64	.65	.79	.47

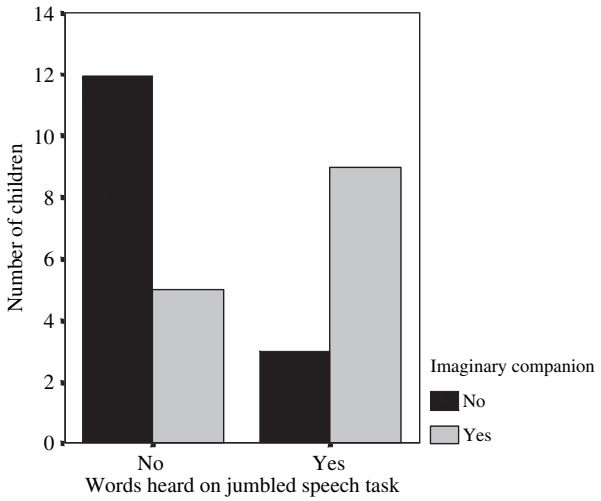

Figure 1 Numbers of children hearing words on Jumbled Speech task, in relation to parentally corroborated ICs (Study One)

Stream of Consciousness task. Four children failed to complete the SoC task. Of the remaining participants, eight failed to show sufficient understanding of the response stimuli and were excluded from the analysis. The mean SoC score was $M = 2.25$, $SD = .64$. Preliminary inspection of descriptive statistics showed acceptable levels of kurtosis and skewness. SoC score was not related to gender, $t(18) = 1.58$, n.s., age, $r(18) = .25$, n.s., nor verbal ability (age-partialled), $r(15) = -.07$, n.s.

Reporting an IC did not relate to SoC score, $t(18) = .71$, n.s. SoC score was also unrelated to children's likelihood of reporting hearing words in the Jumbled Speech task, $t(16) = -.53$, n.s. (see Table 1).

Discussion

The main aim of Study One was to investigate relations between ICs and IVEs in preschool and young school-age children. In support of our first hypothesis, children with a parentally corroborated IC were more likely to report hearing words in the Jumbled Speech task. Our second hypothesis, that the propensity to hear words would relate to children's understanding of the stream of ongoing ideation, was not supported. No group differences in gender, age, or verbal ability were found between those who reported an IC and those who did not, nor between those who heard words on the Jumbled Speech task and those who did not.

Study Two

The findings of Study One suggest that Pearson et al.'s (2001) results generalise to a much younger sample of children. A possible limitation of Study One was that, at a mean age of around 4;6, the children were too young fully to understand the demands of the SoC task, as evidenced by the high

failure rate for the control questions. The aim of Study Two was accordingly to replicate these findings with a larger sample of older children.

Method

Participants. Participants were 48 children (27 girls) from three primary schools in northern England. Children ranged in age from 50 to 104 months ($M = 74.9$, $SD = 16.2$). All participants had English as their first language. Ethical scrutiny and consent procedures were as in Study One.

Overview of procedures. Children were seen by a female experimenter on two separate occasions approximately one week apart. In the first session, children were assessed for verbal ability and given the Imaginary Companions Interview. In the second session, the Jumbled Speech task was administered along with the SoC task. Procedures for the Imaginary Companions Interview, the Jumbled Speech task, and the SoC task were identical to Study One.

Verbal ability was assessed through the BPVS II (Dunn, Dunn, Whetton, & Burley, 1997) which is standardised for use with British children. The mean standardised BPVS score for the sample was $M = 106.8$ ($SD = 11.0$).

Results

Descriptive statistics and preliminary analyses. Twenty-two children (14 girls) reported an IC, all of whom had their report corroborated by a parent. Ninety percent of corroborated IC reports concerned an invisible (i.e., completely pretend) friend, with the remainder referring to personified objects. Parental data on the invisible/personified object distinction matched child reports in each case. All reports were of current ICs except in one case where the IC dated to three years previously, and two further cases where the IC dated to an unspecified time in the past. Table 2 shows descriptive statistics for the main variables in relation to children's reporting of an IC. Reporting an IC was not related to gender, χ^2 (1) = .90, n.s., age, $t(46) = .86$, n.s., nor verbal ability, $t(46) = .22$, n.s.

Jumbled Speech task. Thirty-three children (21 girls) reported hearing words in the auditory stimulus. Table 2 shows descriptive statistics for the main variables in relation to whether children reported hearing words on the Jumbled Speech task. Reporting hearing words was not related to gender, χ^2 (1) = 2.34, n.s., age, $t(46) = 1.47$, n.s., nor verbal ability, $t(46) = 1.26$, n.s.

Figure 2 shows the numbers of children who reported hearing words on the Jumbled Speech task as a function of whether they had a parentally corroborated IC. Reporting an IC was marginally significantly positively related to children's propensity to report hearing words on the Jumbled Speech task, χ^2 (1) = 3.23, $p = .07$. This represents an effect size of w = .26, which approaches Cohen's (1988) criterion for a medium effect.

All reports included recognisable English words and phrases. Two words were reported by 10% or more of the sample and so were removed from the analysis as illusions. Reporting an IC did not relate to number of words heard: for children with an IC, $M = 3.14$ ($SD = 3.4$); for children without an IC, $M = 2.96$ ($SD = 4.1$), $t(46) = .16$, n.s.

Stream of Consciousness task. All children showed satisfactory understanding of the response stimuli. The mean SoC score was $M = 2.33$, $SD = .66$. Preliminary inspection of descriptive statistics showed an acceptable level of kurtosis but unsatisfactory skewness, which was reduced to an acceptable level by square-root transformation. SoC score was not related to gender, $t(46) = 1.34$, n.s., age, $r(46) = .07$, n.s., nor verbal ability (age-partialled), $r(45) = .03$, n.s.

Table 2 Descriptive statistics for main variables in relation to reporting ICs and hearing words on Jumbled Speech task (Study Two)

	ICs		Jumbled Speech task	
	Yes	No	Heard words	No words
Age				
M	77.09	73.04	77.18	69.87
SD	16.84	15.64	16.94	13.43
Verbal ability				
M	106.41	107.12	105.45	109.73
SD	9.30	12.37	11.03	10.55
SoC Score				
M	2.45	2.23	2.39	2.20
SD	.80	.51	.75	.41

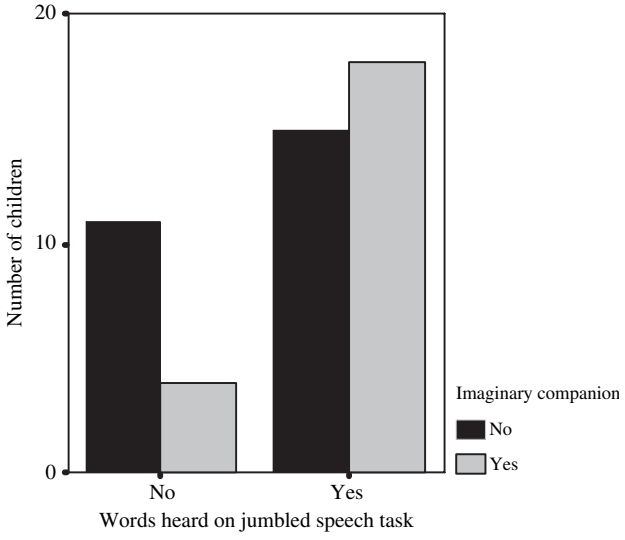

Figure 2 Numbers of children hearing words on Jumbled Speech task, in relation to parentally corroborated ICs (Study Two)

Reporting an IC did not relate to SoC score, $t(46) = 1.04$, n.s.. SoC score was also unrelated to children's likelihood of reporting hearing words in the Jumbled Speech task, $t(46) = .82$, n.s. (see Table 2).

Pooling data from Studies One and Two. In order to increase statistical power for the main relations under investigation, data from the two studies were pooled. Reporting an IC was positively related to propensity to report hearing words on the Jumbled Speech task, $\chi^2 (1) = 7.62$, $p < .01$, w = .31 (medium effect; Cohen, 1988). The association was also significant on a point biserial correlation, partialling out age and verbal ability, $r(69) = .31$, $p < .01$. Children who reported hearing words on the Jumbled Speech task were significantly older, $t(75) = 2.89$, $p = .005$. No other group differences (for either IC status or Jumbled Speech task performance) were observed.

General discussion

The studies reported here had two main aims: to investigate the relation between ICs and IVEs in much younger children than those studied by Pearson et al. (2001), and to establish whether children reporting IVEs would show weaker understanding of the stream of ongoing ideation that typifies human thought.

Our first hypothesis was supported. In Study One, children who reported an IC were significantly more likely to report hearing words on the Jumbled Speech task. In Study Two, this relation was marginally significant. With pooled data, reporting hearing words on the Jumbled Speech task was related to having a parentally corroborated IC, even when age and verbal ability were controlled for. Our data therefore suggest that the relation between possession of an IC and susceptibility to hearing speech in an ambiguous auditory stimulus obtains in much younger children than those studied by Pearson et al. (2001). Furthermore, this relation did not appear to be mediated by age or verbal ability.

Our second hypothesis was not supported. In neither study was children's SoC performance related to their propensity to report hearing words on the Jumbled Speech task. Children's possession of an IC was also unrelated to SoC performance.

In evaluating the significance of our main finding, we begin by considering the methodological status of the Jumbled Speech task. At least two possible challenges to the validity of this task can be envisaged. Firstly, one might ask whether it is a measure of anything other than children's suggestibility; specifically, whether children might be reporting hearing words because they thought that was what the experimenter wanted to hear. Certainly this was a potential problem for the findings of Pearson et al. (2001), whose participants completed the assessment in an open classroom, with all the possibilities for peer influence that that entailed. We took care to remove this potential confound by ensuring that children were assessed individually, and yet it remains possible that children who reported hearing speech were simply more susceptible to the suggestions of the experimenter. The only satisfactory way of settling this point would be to take independent measures of suggestibility (such as those reported by Finnila, Mahlberg, Santtila, Sandnabba, & Niemi, 2003, and Roebers & Schneider, 2005). In the meantime, it is worth noting that the only background variable associated with performance on the Jumbled Speech task was age, with older children being more likely to report hearing words. If our participants were simply being influenced by the suggestions of the experimenter, one would expect to see *younger* (and presumably more suggestible; Portwood & Reppucci, 1996) children being more likely to report hearing words. It is also noteworthy that, while children's responses to the IC interview had the potential to be affected by the experimenter's suggestions, we only recorded the presence of an IC if these reports were independently corroborated.

A second methodological concern is whether reporting hearing voices in an ambiguous auditory stimulus is really any measure of susceptibility to *spontaneous* imaginary verbal experiences. Unfortunately, meaningful assessments of young children's susceptibility to such experiences remain beyond the reach of current interviewing methodologies. A goal for future research might be to attempt to adapt interview schedules used with adults and adolescents for use with much younger children. Until then, we note that tasks like the Jumbled Speech task have proved reliable in distinguishing between voice-hearing and non-voice-hearing psychiatric patients (Young et al., 1987) and healthy adults (Feelgood & Rantzen, 1994). It is therefore plausible that tasks of this kind may be capable of detecting, in early childhood, those same source-monitoring atypicalities that may underlie the experiences of voice-hearing adults.

Our prediction of an association between reporting an IC and susceptibility to hearing words on the Jumbled Speech task emerged from the reasoning that a relatively weak meta-cognitive understanding would lead children to attribute verbal mental experiences to the speech of another person. In contrast to this hypothesis, we found that children who heard words on the task did not differ in SoC performance from those who did not. Only further research with a wider range of age-appropriate assessments of children's understanding of thinking will be able to settle this interesting question. Such studies might also consider how the present findings relate to different kinds of IC experience. For example, limitations of our sample size meant that we did not distinguish between invisible companions and personified objects, a distinction which has been

shown to relate to slightly different developmental outcomes (Gleason, 2002). Future studies might also investigate children's understanding of the internal/external origin of their experiences, for example, by asking children in the Jumbled Speech task whether another individual would be able to hear the words heard. Investigating such measures in light of children's claims about their own ICs' visibility and audibility to others (Taylor, 1999), and their source-monitoring abilities as revealed through other tasks, would be a further interesting challenge for future research.

Our finding of no relation between SoC performance and IC status would at first glance appear to contradict Taylor and Carlson's (1997) finding of a relation between ICs and ToM performance. The most obvious reason why we might have failed to replicate this finding is that the SoC task is not a classic ToM task. Rather than assessing understanding of how beliefs, desires, and other mental states can be used to predict and explain behaviour, the SoC task addresses a phenomenological question of what it is like to be a thinking agent. The view that the SoC task taps into related but different cognitive capacities to those assessed by standard false-belief tasks is supported by the findings of Meins et al. (2003), who reported no correlation between SoC performance at 55 months and a composite measure of ToM performance at 45 and 48 months. In other respects, our findings are directly comparable with those of Meins et al. (2003), who reported a mean SoC score of 2.10 for their sample (cf. 2.25 in Study One here).

Finally, we turn to the developmental significance of IVEs. We have argued that there are at least two reasons why such experiences may be a typical feature of young children's mental lives: the internalisation of social discourse, and engagement with ICs. One question that our study has not been able to address is whether these two processes are causally related. Pearson (1998) noted that children's construction of ICs may result from children's attempts to make their own hallucination-like experiences more socially acceptable. We have suggested that the primary cause of such experiences may be the internalisation of speech described by Vygotsky (1934/1987). This would lead to the testable prediction that children's construction of ICs might relate to their use of self-regulatory private speech, which is typically seen as providing a window onto the process of internalisation. Future studies might consider whether individual children's engagement with ICs follows the same developmental trajectory as the appearance and waning of such speech in middle childhood.

Whatever the outcome of such studies, one conclusion that appears warranted by the present study is that claims for continuity in the clinical significance of IVEs between childhood and adulthood should be treated with caution. That is, what may be a healthy feature of childhood may only have pathological significance if it persists into adulthood. Only careful longitudinal research will allow us fully to explore the developmental significance of these experiences in childhood, adolescence, and adulthood.

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