A Transitional Period in the Development of the Appearance–Reality Distinction

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In this study we tested two related hypotheses about 5-year-olds' competencies concerning the appearance–reality distinction: (a) although they clearly have developed some understanding of the distinction by this age, they are not as sensitive to it as adults are, and consequently require more prompting to access and use it; (b) they are more apt than adults to construe an object currently viewed under illusory conditions non-hierarchically and successively as A (how it presently appears) now and R (how it really is) at other times, rather than hierarchically and simultaneously as A in appearance now *and* R in reality now. Five-year-olds and adults watched the experimenter change the apparent shape, colour, and size of different objects; for example, she caused a straight stick to look bent by displaying it behind a prism. Consistent with the first hypothesis, the children were more apt than the adults to say, prior to any mention of appearance vs. reality, that the displayed stick "is" bent and "is" a different shape from before. Consistent with the second hypothesis, they were also likelier to think that "right now, for real" the stick "is" bent, even after having previously given correct answers to appearance questions and to similar reality questions that did not contain the "right now" phrase. These results suggest that there is a transitional period in the development of the appearance–reality distinction that begins around 5 years of age.

INTRODUCTION

The development of children's knowledge of the appearance–reality distinction is important to study for at least three reasons (Flavell, 1986). First, the distinction is ecologically significant: it assumes many forms, arises in many situations, and can have serious consequences for our lives. Second, it seems likely that every normal human being acquires it; its acquisition probably constitutes a universal development for our species. Finally, its acquisition is part of the larger development of the child's

knowledge about the mind: to understand the distinction necessitates some understanding that people have mental representations or experiences of things that can differ from the way the things actually are (Flavell, 1988).

Recent research has provided some information about the descriptive course of this key development; for reviews of this research see Flavell (1986; 1988) and Flavell, Green, and Flavell (1986). Investigators have tested children as young as 2½–3 years of age for knowledge of the distinction, using simple tasks of the following kind (hereinafter called "standard tasks"). The experimenter begins by briefly pretraining the children on the meaning of the distinction and associated terminology, using (for example) a Charlie Brown puppet inside a ghost costume. She explains and demonstrates that Charlie Brown "*looks like* a ghost to your eyes right now" but is "*really and truly* Charlie Brown" and that "sometimes things look like one thing to your eyes when they are really and truly something else." Next she shows them, for instance, a white stimulus and then moves it behind a blue filter that makes it look blue, or shows them a straight stick and then moves it behind a prism that makes it look bent. An appearance and a reality question then follow in random or counterbalanced order: (a) "When you look at this X with your eyes right now, does it *look* blue (bent) or does it *look* white (straight)?", (b) "What colour (shape) is this X *really and truly*? Is it *really and truly* white (straight) or *really and truly* blue (bent)?"

With some rare and not yet fully understood exceptions (Flavell, Green, & Flavell, 1989; Flavell, Green, Wahl, & Flavell, 1987; Siegal, Share, & Robinson (Note 1)), 3-year-olds have been found to perform poorly on appearance–reality tasks. On standard tasks involving object properties they usually err by reporting the apparent, phenomenal property (blue, bent) in response to both questions, thus mistaking appearance for reality. Four bodies of evidence strongly suggest that their difficulties with the distinction are genuine and deep-seated conceptual ones (Flavell, 1986; 1988; Flavell et al., 1986). First, Chinese (People's Republic of China) 3-year-olds perform exactly like American 3-year-olds on these tasks, despite differences in language and culture (Flavell, Zhang, Zou, Dong, & Qi, 1983). Second, attempts to make the tasks easier for 3-year-olds have been largely ineffective (Flavell et al., 1986). Third, efforts to teach them the distinction have not succeeded (Braine & Shanks, 1965b; Flavell et al., 1986; Taylor & Hort (Note 2)). Fourth, 3-year-olds perform similarly poorly on tasks requiring Level 2 visual perspective-taking ability and understanding of false belief tasks which, like appearance–reality tasks, are believed to require some understanding of mental representation (Flavell, 1988; Gopnik & Astington, 1988); performance on these three types of tasks is significantly correlated at this age.

In marked contrast to 3-year-olds, young adolescents (11–12-year-olds), and especially adults, give evidence of possessing a substantial body of richly structured, readily accessible, and highly explicit knowledge in this area (Flavell et al., 1986). They seem to possess abstract and general schemas for appearances, realities, and possible relations between the two. These schemas enable them to identify and distinguish among different types of appearance–reality discrepancies (e.g., "good," convincing fakes vs. "poor," unconvincing ones), and also to reproduce, change, and create appearances and appearance–reality discrepancies on demand. Their knowledge is readily accessible and highly explicit in the sense both of being very easily elicited by task instructions and stimuli and being readily available to conscious reflection and verbal expression. In sum, they seem to possess "metaconceptual," easily verbalised knowledge about appearance–reality phenomena, knowledge that they readily retrieve and use when needed.

What of developments between early preschool age and adolescence/ adulthood? The only available research information concerns children of 5–7 years of age. Children of this age appear to have acquired some but not all competencies in this domain. They clearly have acquired the capacity to perform well on the standard appearance–reality tasks that give most 3-year-olds so much trouble. When the appearance–reality distinction is made very salient by brief pretraining and the sequential presentation of clearly contrasting appearance and reality questions, as it is on standard tasks, 5–7-year-olds usually answer both questions correctly (Flavell, Flavell, & Green, 1983; Flavell et al., 1986). Similarly, Braine and Shanks (1965a, 1965b) found that by age 5 children could easily learn to distinguish real from apparent size and shape when given feedback as to which they should respond to, whereas 3-year-olds seemed incapable of learning the distinction. Children of this age can also distinguish between real and apparent (feigned) emotions (Harris & Gross, 1988). Also consistent with this direct evidence of some genuine capacity to understand the distinction is evidence that 5–7-year-olds can easily manage simple Level 2 perspective-taking and false-belief tasks—tasks which theory suggests require similar knowledge about the mind.

At the same time, the evidence also suggests that their knowledge of the appearance–reality distinction is less rich, abstract, verbally explicit, and easily elicited by task instructions and stimuli than is the knowledge of older subjects. Flavell et al. (1986) found that their ability to identify on request stimuli exhibiting discrepancies or equivalences between appearance and reality was relatively hard to access; they tended not to understand what was wanted in such tasks unless the instructions were made very explicit and the task very easy. They seemed to find it difficult to talk about appearances, realities, and appearance–reality relations, even minimally.

For example, they often failed to use discriminating expressions like "looks like" and "really is" spontaneously, thereby failing to specifically identify appearances as appearances and realities as realities; spontaneous use of appearance words ("looks," "looks like") was particularly rare. They often failed to refer to appearances, realities, and appearance–reality relations when asked to explain why or in what way a particular stimulus illustrated an appearance–reality discrepancy or equivalence. They also often failed to do so when asked to administer the same sorts of standard appearance–reality tasks that they themselves had previously found easy to solve, when in the subject role, even after the experimenter had carefully explained and repeatedly demonstrated how these tasks should be adminis- tered. Flavell et al. (1986) concluded that many children of this age simply find it difficult to reflect on notions of "looks like," "really and truly," "looks different from the way it really and truly is," and so on in the abstract, metaconceptual way that adolescents and adults can.

Braine and Shanks (1965b) also found that children of this age did not spontaneously distinguish between real and apparent size. Shown displays in which the objectively smaller of two objects was made to look the larger of the two via an illusion, subjects of this age tended to point to the larger- looking object when asked both an appearance question ("Which one looks bigger?") and a reality question ("Which one is really, really bigger?"). As mentioned previously, only when given a few trials with corrective feedback did they respond differently to the two questions. They also construed "Which is bigger?" as a question about apparent rather than real size until given corrective feedback. Russell and Haworth (1988) also found that children of this age tended "to give phenomenist readings of neutral questions about object properties (e.g. 'What colour are these things?') in illusory contexts" (p. 155). Thus, several studies suggest that ideation about the appearance–reality distinction may not come to con- sciousness as easily and spontaneously in 5–7-year-olds as in older sub- jects. Put differently, they are less sensitive to the distinction; the distinc- tion is less accessible for reflection and use in their case. These differences between 5–7-year-olds and adolescents/adults seem consistent with Piage- tian and most other conceptions of how cognitive development typically proceeds (Flavell, 1985; Siegler, 1986; Sternberg & Powell, 1983).

The purpose of the present investigation was to test for the possible presence in 5-year-old children of two cognitive immaturities concerning the appearance–reality distinction, one of them previously studied and one new. The one previously studied is the lesser sensitivity or accessibility to the distinction just described. The new one concerns a possible difference between the way 5-year-olds and adults interpret illusory transformations of apparent properties. Suppose, for example, an experimenter were to show subjects of both ages a straight stick and then, with the subjects

watching, put a prism in front of it, causing it to look bent. Suppose further that the 5-year-olds as well as the adults were to correctly answer the experimenter's subsequent appearance and reality questions, as the research evidence suggests they might. In responding that the stick is "really and truly" straight, most of the adults would presumably mean to imply that it is objectively straight all the time: (a) before the interposition of the prism, (b) after its removal, and (c) even right now, during its interposition. We hypothesise that many of the 5-year-olds would mean to imply (a) and (b), but not (c). That is, we believe they would tend to associate the experimenter's "look like" with the stick's present state (bent) and his or her "really and truly" with its previous and subsequent states (straight). We believe the adults would tend to construe the situation hierarchically, on two levels simultaneously. For them, the stick both looks bent (one level) and really is straight (another level)—both of these being true simultaneously, right now. In contrast, we believe the children would tend to construe the situation sequentially and on a single, undifferentiated level. For them, it "is" bent now, not straight (with "is" meaning neither appearance nor reality specifically), whereas it was straight before and will be straight again when the prism is removed. Thus, the adults would tend to conceive of the stick as simultaneously bent in appearance right now and straight in reality right now (as well as at other times), whereas the children would tend to think of it only sequentially, as bent now and straight at other times.

We do not believe the children would be confused about the gross physical facts in this situation. That is, they would know full well that no one had physically bent the stick, for instance.[1] We also do not believe that they would be actually incapable of construing the stimulus as being simultaneously, at this moment, characterisable in two different, contradictory-seeming ways. For example, they might well be able to say that the stick simultaneously looks bent now and feels straight now, if they were actually holding it in their hands while viewing it through the prism.

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[1]Of course they would not know the actual process by which the prism causes the stick to look bent. It is possible that better physics-type knowledge of how our illusion-making optical devices cause illusory perceptions would help them simultaneously and hierarchically represent appearance and reality on property tasks such as the bent-stick one. We are inclined to doubt it, however, given the meagre scientific knowledge of these processes most adults probably possess. This argument would also not explain the difficulties 5-year-olds have on certain object-identity tasks in which the illusory appearance is engendered by processes that children understand very well—namely, the putting on of costumes and other disguises (see Discussion). Nevertheless, it is possible that the presence of an easily understood mechanism for creating the illusory appearance could facilitate simultaneous dual representation on some tasks, e.g. as when the use of an insulated glove causes a cold ice cube to not feel cold in one's hand (Flavell, Green, & Flavell, 1989).

Similarly, they perform well on simple appearance–reality tasks in which the stimulus is a fake object, e.g. a sponge (reality) that permanently looks like a rock (appearance) (e.g. Flavell, Flavell, & Green, 1983). It is hard to see how they could do that if they wholly lacked this capacity. Rather, we believe that 5-year-olds, like 3-year-olds, find it more natural to construe any given stimulus at any given moment on a single plane only, e.g. as "being" (in the undifferentiated sense) *either* bent *or* straight, but not in any sense *both*; consequently, they will tend to construe it that way unless the task situation obliges them to do otherwise. Russell and Haworth (1988) have also obtained data on children of this age that supports this interpretation (see also Russell, 1988).

The two cognitive immaturities seem closely related and may feed one another. That is, a relative insensitivity to the appearance–reality distinction may help engender a single, undifferentiated "is" type encoding of stimulus properties and this tendency toward single encoding may, in turn, interfere with retrieval of the distinction.

As a preliminary test of this hypothesised tendency, we did a pilot study in which we presented 15 5-year-olds with illusory colour and shape displays and asked them two different reality questions (on different displays): (a) "*Really and truly*, is this (e.g. straw) *really and truly* straight or *really and truly* bent?"—thus, the standard reality question; (b) "How about right now? *Right now* is this (e.g. stick) *really and truly* bent or *really and truly* straight?" The children gave approximately twice as many incorrect answers to the "right now" reality questions as they did to the standard reality questions. Consistent with the hypothesis, in justifying their answers they seldom talked about how a stimulus "looked" but often about how it "is," e.g. "When you lift that (filter) up it (the stimulus) will be red and when you put it down it will be black." One purpose of the present study was to provide a more adequate test of this hypothesis.

In this study, 5-year-olds and undergraduate college students were given two sets of tasks in fixed order, Set 1 first and Set 2 second. (A smaller group of non-student adults was tested subsequently.) In Set 1, subjects were shown illusory colour, shape, and size transformations. For each transformation in turn, they were asked a fixed sequence of four questions, followed by the same sequence again but with a different stimulus and with the wording of three of the questions slightly altered. In the case of size, for example, the initial stimulus was a straight stick placed behind a prism, and the initial sequence of questions was: (1) "Is the stick straight?"; (2) "Is the stick a different shape than it was before?"; (3) "Do you see a bent stick?"; (4) "*Right now, for real*, is the stick bent?" This same sequence of questions was then repeated with "bent" substituted for "straight" and vice-versa in questions 1, 3, and 4, and with a straight drinking straw substituted for the stick.

Set 2 consisted, first, of a colour, a shape, and a size appearance–reality task of the standard type; that is, each task contained an appearance question and a reality question (both two-choice) worded like those given in the second paragraph of this article. Following these three standard tasks, subjects were asked a simple "right now" reality question about each of three new illusory displays of the same kind, e.g. "*Right now, for real, is the paint brush bent or straight?*"

In summary, each subject was initially given six Set 1 tasks, two for each of three properties, consisting of four questions. Six Set 2 tasks immediately followed: first, three standard, two-question appearance–reality tasks, and then, three one-question "*Right now, for real*" tasks.

There were two predictions. First, because the appearance–reality distinction is less readily accessible to them, 5-year-olds should be more likely than the adults to attend only to the apparent, phenomenal property when responding to the "is," "different," and "see" questions of the first set of tasks. That is, because there was no pretraining and no appearance questions to make the appearance–reality distinction highly salient for them, they should be inclined to say, for example, that the stick is bent and is a different shape from what it was before, and that they see a bent stick. Second, because they tend whenever possible to construe a stimulus non-hierarchically as "being" only one thing at any one time, they should also be likelier than adults to give appearance answers to the "now" reality questions in both sets of tasks. We further expected that most of the 5-year-olds would perform well on the standard appearance–reality tasks in the second set, attesting to some definite ability in this area. However, we also expected that even those who did perform as well as the adults on these standard tasks would give more appearance answers than the adults on all the other questions in the two sets of tasks; such a response pattern would be strong evidence for a transitional developmental period between very early childhood and adolescence/adulthood.

METHOD

Subjects

The subjects for the main study were 24 nursery school children (12 of each sex) and 24 college undergraduates; a sample of 12 non-student adults was tested subsequently. The children ranged in age from 5 years to 5 years 10 months with a mean of 5 years 4 months, and mostly came from upper middle-class families. All subjects were tested by the same female experimenter.

Procedure

Set 1. In an effort to induce subjects to think more carefully before answering and to heighten interest in this set of three tasks, each yes-no question was printed on a separate card, with subjects indicating their answer verbally as well as by putting the card in a "Yes box" or a "No box." The adults were told that these tasks had been given to 5-year-olds. They were asked to answer as adults, not to try to think like 5-year-olds, and were also asked not to spend too much time philosophising about their answers. Subjects were first shown one of the task stimuli in its non-illusory state and asked a two-choice question about the relevant property: for example, "Is this (thin crayon) a fat crayon or a thin crayon?" Then the subject watched an illusory transformation of that property (in this example, the crayon was made to look fat by being placed behind a bottle of clear oil) and the aforementioned four questions were asked in fixed order. In this example, the questions would be: (1) "Is the crayon thin?"; (2) "Is the crayon a different size than it was before?"; (3) "Do you see a fat crayon?"; and (4) *"Right now, for real*, is the crayon fat?" The questions were worded so that consistent reality-oriented responding would require both "yes" and "no" answers. After a brief, unrelated filler task, they were then asked the same questions again about a thin battery that looked fat, but with "fat" substituted for "thin" and vice versa in the first, third, and fourth questions. Thus, each of the three types of tasks (colour, shape, size) had two very similar tasks comprising similar stimulus displays and different forms of the same questions. Task type and task orders were counterbalanced across subjects. The task materials were: (1) *colour*—a red toy car that appeared black under a green filter and a white fork that appeared green under a green filter; (2) *shape*—a stick and a straw that appeared bent when seen through a prism; (3) *size*—a crayon and an AA battery that appeared fat when seen through a bottle of oil.

Set 2. Immediately following these six tasks, subjects were alerted to the appearance–reality distinction by being told that they would now see some other things and that the experimenter was "going to ask two different questions, one about what they *look like* and one about how they are *really and truly*." Subjects were then given three standard appearance–reality tasks involving the same three properties as in Set 1, and in the same order. The three displays were: (1) *colour*—a cut-out of a white butterfly that looked red behind a red filter; (2) *shape*—a straight paint brush that looked bent when viewed through a prism; (3) *size*—a thin pen that looked fat when seen through a bottle of oil. The questions were also standard: (a) *appearance*—"When you look at the (e.g.) butterfly, does it *look* red or does it *look* white?"; (b) *reality*—*"For real*, is the butterfly

really and truly white or *really and truly* red?" The order of the two questions was counterbalanced and the order of choices within questions was unsystematically varied. Following this, the experimenter said she would now ask a different question about a few things, "about how things are *really and truly, right now*." She then presented three new illusory colour, shape, and size displays, similar to the previous ones, and asked of each: *"Right now, for real*, is the (e.g.) pencil straight or bent?" Again, the order of choices within each question was unsystematically varied.

RESULTS

We began by identifying the modal response pattern of the adult subjects to the Set 1 questions and the Set 2 "right now" questions. As expected, the undergraduates usually said that the object: "is" its real colour, shape, or size; "is" not a different colour, shape, or size from before; and "right now, for real" "is" its real colour, shape, or size. We had also expected that they would usually say they "see" a real-property object rather than an apparent-property one, e.g. a straight stick rather than a bent one. We thought they might reason that what they actually *saw* was a straight stick, although seen *as* a bent stick, or *as looking like* a bent stick (Dretske, 1969). However, our intuitions were wrong: Whereas they did usually give the object's real property in response to the other questions, they usually responded with its apparent property when answering the "see" questions. Although this response was unexpected, it does suggest that the adults spontaneously distinguished between perceptual appearance (what the subject "sees") and objective reality (what the object "is"). We therefore took a phenomenist answer to the "see" question, and a realist answer to the other three Set 1 questions plus the Set 2 *"right now, for real"* questions, to be the "correct" (adult) pattern for purposes of subsequent analysis. Figure 1 shows the percentage of the college adults' answers to each of these five questions that were "correct" in this sense. There was some tendency for college students who did not begin with this adult pattern to acquire it as they gained experience with the Set 1 tasks. Of the ten students who did not show exactly this pattern on their first Set 1 subtask, seven were closer to it on their last subtask, none farther from it, and three unchanged. The children did not show any such improvement over subtasks.

We performed a 2 × 4 × 3 (Age × Question × Property) analysis of variance on the number of correct answers. The analysis showed significant main effects for age, $F(1,46) = 48.18, P < 0.001$, and question, $F(3,138) = 14.89, P < 0.001$, and a significant age × question interaction, $F(3,138) = 5.28, P < 0.001$. Interestingly, there was no tendency for subjects to respond more "correctly" on one property than another: $F(2,92) = 0.15, P$

■ COLLEGE ADULTS (n = 24)   ▦ 5 YEAR OLDS, GOOD AR (n = 17)

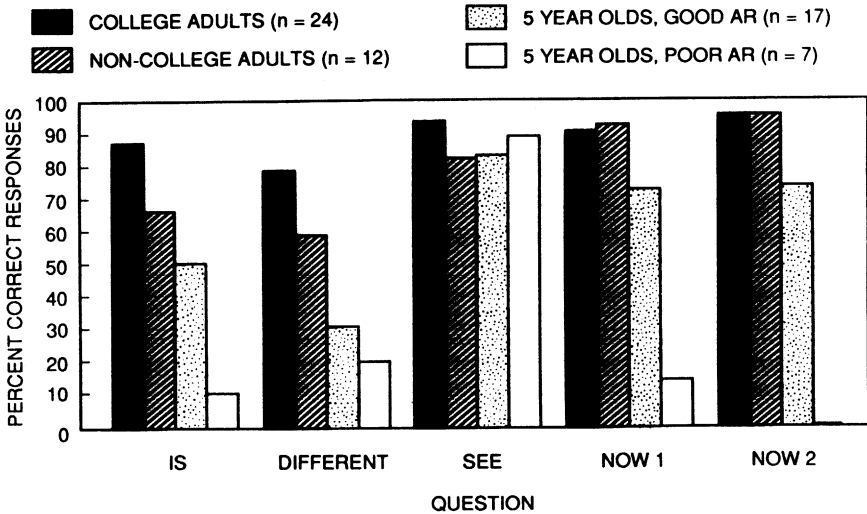▨ NON-COLLEGE ADULTS (n = 12)   □ 5 YEAR OLDS, POOR AR (n = 7)

FIG. 1.   Percent correct responses to the IS, DIFFERENT, SEE, and NOW 1 questions of Set 1 and the NOW 2 questions of Set 2 of college adults, non-college adults, 5-year-olds who performed well on Set 2 standard appearance–reality tasks, and 5-year-olds who performed poorly on them.

< 0.86. For example, they did not think that objects "are" whatever colour (but not size and shape) they presently appear to be, as a specialist in colour vision or a philosopher enamoured of Locke's distinction between primary and secondary qualities might. Subsequent t tests revealed that the undergraduates gave significantly ($P < 0.001$) more correct responses than the 5-year-olds to all but the "see" questions (see Fig. 1). The significant age differences on the "is" and "different" questions confirm the first of the study's two predictions, namely, that 5-year-olds are likelier than adults to respond phenomenally when the appearance–reality distinction has not been explicitly called to their attention. Similarly, the significant age differences on the "right now" questions confirm the second, related prediction that they are more prone than adults to construe stimuli non-hierarchically as "being" only one thing at any one moment and, consequently, are likelier to think that "right now," even "for real," a stimulus "is" whatever colour, shape, or size it presently appears to be.

All of the 24 college students performed perfectly on all three appearance–reality tasks in Set 2. Of the 24 5-year-olds, 17 performed perfectly and 7 poorly (6 of these 7 were correct on no tasks, 1 on only one). The analysis of variance described in the previous paragraph was used to compare the 17 "good AR" children to the 7 "poor AR" ones, and also to compare the 17 "good AR" children to the college students (see

Fig. 1). The results of both analyses were the same as the previous one: in each case significant main effects for group and question ($P < 0.001$), significant interactions between group and question ($P < 0.01$), and significant group differences by t tests ($P < 0.05$) on all but the "see" questions (see Fig. 1). Thus, the seven 5-year-olds who behaved like 3-year-olds in not distinguishing appearance and reality on the standard appearance–reality tasks were also significantly less likely than the other 5-year-olds to distinguish them spontaneously on the other tasks. More interesting, whereas the other 17 children performed as well on the appearance–reality tasks as the undergraduates did (i.e. perfectly), they were significantly less often correct than the undergraduates on the "is," "different," and "now" questions. This constitutes strong evidence for the hypothesised developmental period in the development of competence regarding the appearance–reality distinction.

After the foregoing analyses were completed, we decided to check the generality of the adult response pattern by administering the tasks to 12 non-students. Most of these non-college adults were secretaries. The sample ranged in age from 21 to 65 years (mean age = 40 years), and in education from high school graduate to Master's degree. Like the under-gradutes, all of them responded fully correctly on all three appearance–reality tasks. Their responses to the other tasks are shown in Fig. 1. There were non-significant (by t tests) trends for the non-college adults to respond more phenomenally than the college adults to the "is" and "different" questions, but less phenomenally than the "good AR" children (see Fig. 1). On the other hand, they were exactly like the college adults— and therefore significantly different from both subgroups of 5-year-olds— in their strong tendency to give reality answers to both sets of "now" questions. These data constitute suggestive evidence for at least moderate generality of the adult response pattern across adult samples.

The non-college adults were also similar to the college adults and different from the children in one other respect. We computed the percentage of times subjects spontaneously used the differentiating expressions "looks" when answering appearance questions and "really and truly" (or just "really" or "truly") when answering reality questions on the standard appearance–reality tasks. The three groups were similar in their spontaneous use of "really and truly": 65%, 67%, and 61% for college adults, non-college adults, and 5-year-olds, respectively. In contrast, the corresponding percentage for spontaneous use of "looks" were 85%, 83%, and 29%. The 29% is consistent with findings from our pilot study and from previous research that children of this age tend not to employ "looks" or "looks like" spontaneously when referring to illusory displays (Flavell et al., 1986; see also Russell & Haworth, 1988). It is also consistent with our hypothesis that they tend not to think of appearances as appearances, but

rather as present realities. Because they tend to equate "looks" and "is," they find it natural to use the more common term "is" when describing appearances.

DISCUSSION

The results of this study and previous investigations suggest that there is a transitional period in the development of the appearance–reality distinction that begins somewhere around age 5 years. Unlike most 3-year-olds, most 5-year-olds clearly show some genuine ability to think about the distinction. This ability permits them to solve simple, standard appearance–reality tasks, ones in which the distinction is explicitly laid out and forcibly brought to their attention. Despite this important developmental accomplishment, 5-year-olds still differ from adolescents and adults in several important respects. This study gives evidence of two such differences.

First, 5-year-olds are less sensitive or alert to the distinction than adults are and do not as readily access and use it spontaneously—without strong prompting by the task situation. To illustrate, when a thin battery was shown to look fat while viewed through a bottle of oil but no other prompting of the distinction was given, 5-year-olds were likelier than adults to agree with statements that the battery "is" fat and "is" a different size from before.   .

Second, and probably related to the first difference, they differ from adults in tending to construe stimuli non-hierarchically as just "being" (with no distinction made between "apparently being" and "really being") whatever the stimuli appear to be at the time specified; they are less given than adults to construe them hierarchically as simultaneously looking like thus and so but really being such and such. Consequently, even after having been alerted to the distinction and after having correctly answered appearance and reality questions, they were still more apt than the adults to give affirmative answers to questions like *"Right now, for real*, is the battery fat?" They seemed to think that the battery was thin "for real" (meaning "whenever not viewed through the bottle of oil"), but fat "right now, for real" (meaning, "at this moment, when viewed through the bottle.") In addition, and also consistent with previous findings (our pilot data; Flavell et al., 1986; Russell & Haworth, 1988), 5-year-olds were less likely than adults to employ spontaneously the differentiating term "look" when answering appearance questions; this also suggests a tendency not to distinguish "look" from "is now."

One task for future research would be to determine the earliest age at which subjects respond like adults to "is," "different," and "now" questions. At present, we know roughly when the transition period begins but

can only guess at when it ends. On the one hand, Russell and Haworth (1988) found that 7-year-olds were less phenomenistic on their tasks than 4-year-olds. On the other hand, Flavell et al. (1986) still found some differences between adolescents and adults on their tasks. We also do not know whether there are additional transition periods of any consequence.

Another question for future research is whether 5-year-olds would also tend to err on "right now, for real" type reality questions that concerned an apparent change in an object's *identity* as well as an apparent change in one of its *properties*. There are two bodies of evidence which suggest that they might. First, Keil has done several studies with kindergarten children using tasks in which one person or animal temporarily assumes the appearance of another by means of a disguise. In one of these studies (Keil, personal communication), the reality question included the word "now": for example, "Is he Jack still or is he Bill now?" In others (Keil, forthcoming), it did not: for example, "Is it a horse or a zebra?" Kindergarten children tended to answer questions containing "now" incorrectly and questions not containing "now" correctly. Similarly, Trautner (Note 3) found that children of 4–5 years tended to respond incorrectly to gender constancy questions that included the word "now": for instance, "If that woman puts on these clothes (men's), is she now for real a man or a woman?" In contrast, Martin and Halverson (1983) obtained near-ceiling performance from 5½-year-olds in response to gender constancy questions that did not contain "now": for instance, "If you wore (opposite sex of subject) clothes, would you for real be a girl or for real be a boy?" These comparisons are only suggestive at best, inasmuch as they are based on different studies involving different objectives and procedures. Clearly, a direct test is needed.

It might be objected that the observed differences between children and adults in this study reflect age differences in processes other than sensitivity to the appearance–reality distinction. For example, perhaps children are more prone than adults to assume that the experimenter would not have changed the object's appearance if she did not want them to report its new appearance in response to her questions. Or perhaps they are likelier to respond phenomenally because they are generally more impulsive and unreflective, a cognitive style that would certainly lead to appearance answers on our tasks. Or perhaps it is a matter of insufficient lexical development: "is," "different," "for real," and "right now" might not yet have for them all the shades of meaning and privileges of occurrence they have for adults, and for reasons unrelated to their appearance–reality cognition.

It is certainly possible that one or more of these factors could have contributed to the response differences found. However, we doubt if they constitute the whole explanation. First, the present results are very consistent with previous ones, despite differences in assessment procedures

(Braine & Shanks, 1965a; 1965b; Flavell et al., 1986; Russell & Haworth, 1988). For example, Russell and Haworth's (1988) results using a procedure different from ours led them to much the same conclusion: "Although 5-year-olds may be able to answer appearance-versus-reality questions when they are made as explicit as they are in Flavell's studies, when the property question is neutral the influence of cognitive salience returns" (p. 168). Second, it would be hard to predict (as opposed to postdict) some of our results by appeal to such factors. For example, in Set 2 subjects were first sensitised to the distinction by being given standard appearance–reality tasks and were then asked questions of the form *"Right now, for real*, is the paint brush bent or straight?" The adults spontaneously focused on the "for real" and reported the object's real property. The children spontaneously focused on the "right now" (even though "for real" had benefit of recency) and reported the object's apparent property. Although it is possible to advance various explanations for this difference in focus after the fact, we still find most plausible the one which led us to predict the difference in the first place: That 5-year-olds are wont to construe an illusory stimulus as comprising only one (relevant) property at any given moment, whereas adults tend to apprehend it as comprising two contrasting properties simultaneously, one apparent and one real. Finally, the 5-year-olds' tendency not to use "looks" spontaneously in this and previous studies (Flavell et al., 1986) is hard to predict by appeal to such factors. We believe they did not use it much simply because they tended not to think of the stimuli as "looking" thus and so, with an implied contrast between how they looked at that moment and how they actually were at that same moment. For other counter-arguments against alternative explanations of 5-year-olds' behaviour in appearance–reality situations, see Russell and Haworth (1988).

If the developmental story we have been telling were true, what implications might it have for the everyday cognition and behaviour of young children (cf. Flavell et al., 1986, Pp. 63–65)? First, given evidence only of how something presently appears or seems, their lesser sensitivity or access to the distinction should make them less attuned than adults are to the ever-present possibility that its reality might be otherwise. This developmental difference may partly explain the common tendency to characterise young children as credulous, suggestible, and overly trusting. More so than for their elders, perhaps, if a thing seems bad to them it "is" bad, including frightening but harmless things. Conversely, if something seems good to them it "is" good, including pleasant-seeming but dangerous objects, substances, and people. Increasing sensitivity to the appearance–reality distinction may also constitute an insufficient but necessary or facilitative condition for many other cognitive and metacognitive acquisitions. Examples include the recognition that quantities are really conserved under

certain transformations that make them appear to be changed (Braine & Shanks, 1965a; 1965b); that the same is true for a person's self-identity, gender identity, and personality; that people may actually be harbouring different thoughts, motives, intentions, and emotions from those that they appear to be; that people can intentionally lie to or unintentionally mislead other people; and that one can have the feeling that one is adequately comprehending, communicating, learning, remembering, etc., without really doing so.

Second, even given convincing evidence that something really is different from what it seems or appears to be, their tendency to confuse "looks" and "is now" may make it difficult for them to accept that this something is also really different at the moment when they are experiencing the full force of its compelling appearance. It may be even harder for them than for us (and it can certainly be very hard for us) to maintain their previous conviction that a presently scary or unpleasant-looking person or object is really innocuous, or that a presently attractive one is really harmful. They may have agreed previously that it is "really" innocuous or "really" harmful, but still might find it hard to represent it as "really" so "right now," when it so compellingly "is" the opposite.

This development story may have similar implications for children's pretend play and fantasy activities.[2] Although young children may normally know at some level that these activities are "just pretend" and not "for real" (Leslie, 1988), they may be less consciously aware than older children and adults of the non-real status of these activities at the moment they are engaged in them (DiLalla & Watson, 1988). Thus, young children may not usually consciously think of what they are doing as "pretending" to do X rather than really doing X, any more than they think of the stick in our task as "looking" bent rather than really being bent. Pretence may simply seem or feel more real-like and less pretend-like to them than it does to their elders, even though they may be capable of recognising that it is only make believe. If true, this proposed developmental change in the phenomenology of the pretend play experience might partly explain the characteristic decline in the frequency of pretend play after age 6 years or so (Fein, 1979), a developmental change that has never received a satisfactory explanation. Except when it involves aversive content (e.g. scary objects), pretend play is probably more enjoyable the more completely and unequivocally real it seems to the player. As children grow older and acquire the appearance–reality abilities discussed in this article, it may become harder for them to suppress an awareness that what they are doing is only pretence. This more intrusive awareness of the activity's mere-pretence status may in turn make it less enjoyable for them to do. More

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[2]We are indebted to an anonymous reviewer for suggesting this line of argument.

generally, older children and adults often seem to require more external supports for their pretence and fantasy activities (authentic-looking play props, highly realistic movies with convincing actors, etc.), perhaps because it is harder for them to suppress awareness of what is really happening without these supports.

In an important chapter entitled "Children's understanding of the nonobvious," Wellman and Gelman (1987) argue that the traditional view of young children "as focused on the perceptual, concrete, and manifest" (p. 99) is dead wrong. In support of this provocative thesis they cite, among other evidence, their own research findings that young children attribute covert mental entities to people and take into account non-obvious and inferred properties in their categorisation of objects. We find this evidence convincing and believe that their thesis is basically correct; young children certainly can and do make more inferences about the covert and nonobvious than developmental psychologists once thought. However, we think they exaggerate the extent to which young children tend spontaneously to "look beyond a level of phenomenal appearance to an underlying deeper reality" (p. 127) and "allow for more than one representation of a situation—one representation that captures more surface appearance but another that reaches deeper theoretical levels" (p. 129). We believe, instead, that this study and other research on young children's appearance–reality and perspective-taking competencies suggest a slightly more traditional picture, at least for these competencies. That is, although indeed often able to encode either the superficial or the deep, either this perspective or that, they are less disposed and able than their elders to consciously represent both at once and to explicitly compare and contrast them. Probably because their concepts of subjectivity, mental representation, and perspectives have only recently begun to form, they are not as spontaneously conscious as they will be later that they are subjects continually perceiving and representing objects from some perspective, and that competing representations from the same or other perspectives may also be valid at the very same time (cf. Russell, 1988). We believe that the awareness that one is a cognitive subject, perceiving and interpreting the world from a particular perspective, is simply a rarer event in the child's conscious experience than in the adult's.

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