The Development of Children's Knowledge About the Appearance–Reality Distinction

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ABSTRACT: Recent research on the acquisition of knowledge about the important and pervasive appearance–reality distinction suggests the following course of development. Many 3-year-olds seem to possess little or no understanding of the distinction. They fail very easy-looking tests of this understanding and are unresponsive to training. At this age level, skill in solving simple appearance–reality tasks is highly correlated with skill in solving simple visual perspective-taking tasks. This and other findings are consistent with the hypothesis that what helps children finally grasp the distinction is an increased cognizance of the fact that people are sentient subjects who have mental representations of objects and events. It does so by allowing them to understand that the selfsame stimulus can be mentally represented in two different, seemingly contradictory ways: (a) in the appearance–reality case, how it appears to the self versus how it really is; and (b) in the perspective-taking case, how it presently appears to self versus other. In contrast to young preschoolers, children of 6 to 7 years manage simple appearance–reality tasks with ease. However, they have great difficulty reflecting on and talking about such appearance–reality notions as "looks like," "really and truly," and especially, "looks different from the way it really and truly is." Finally, children of 11 to 12 years, and to an even greater degree college students, give evidence of possessing a substantial body of rich, readily available, and explicit knowledge in this area.

Suppose someone shows a three-year-old and a six-year-old a red toy car covered by a green filter that makes the car look black, hands the car to the children to inspect, puts it behind the filter again, and asks, "What color is this car? Is it red or is it black?" (Flavell, Green, & Flavell, 1985; cf. Braine & Shanks, 1965a, 1965b). The three-year-old is likely to say "black," the six-year-old, "red." The questioner is also apt to get the same answers even if he or she first carefully explains and demonstrates the intended difference in meaning, for illusory displays, between "looks like to your eyes right now" and "really and truly is," and then asks what color it "*really* and *truly* is." At issue in such simple tasks is the distinction between how things presently appear to the senses and how or what they really and enduringly are, that is, the familiar distinction between appearance and reality. The six-year-old is clearly in possession of some knowledge about this distinction and quickly senses what the task is about. The three-year-old, who is much less knowledgeable about the distinction, does not.

For the past half-dozen years my co-workers and I have been using these and other methods to chart the developmental course of knowledge acquisition in this area. That is, we have been trying to find out what children of different ages do and do not know about the appearance–reality distinction and related phenomena. In this article I summarize what we have done and what we think we have learned (Flavell, Flavell, & Green, 1983; Flavell et al., 1985; Flavell, Zhang, Zou, Dong, & Qi, 1983; Taylor & Flavell, 1984). The summary is organized around the main questions that have guided our thinking and research in this area.

Why Is This Development Important To Study?

First, the distinction between appearance and reality is ecologically significant. It assumes many forms, arises in many situations, and can have serious consequences for our lives. The relation between appearance and reality figures importantly in everyday perceptual, conceptual, emotional, and social activity—in misperceptions, misexpectations, misunderstandings, false beliefs, deception, play, fantasy, and so forth. It is also a major preoccupation of philosophers, scientists, and other scholars; of artists, politicians, and other public performers; and of the thinking public that tries to evaluate what they say and do. It is, in sum, "the distinction which probably provides the intellectual basis for the fundamental epistemological construct common to science, 'folk' philosophy, religion, and myth, of a real world 'underlying' and 'explaining' the phenomenal one" (Braine & Shanks, 1965a, pp. 241–242).

Second, the acquisition of at least some explicit knowledge about the appearance–reality distinction is probably a universal developmental outcome in our species. This knowledge seems so necessary to everyday intellectual and social life that one can hardly imagine a society in which normal people would not acquire it. To

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cite an example that has actually been researched, a number of investigators have been interested in the child's command of the distinction as a possible developmental prerequisite for, and perhaps even mediator of, Piagetian conservations (e.g., Braine & Shanks, 1965a, 1965b; Murray, 1968).

Third, knowledge about the distinction seems to presuppose the explicit knowledge that human beings are sentient, cognizing *subjects* (cf. Chandler & Boyce, 1982; Selman, 1980) whose mental representations of objects and events can differ, both within the same person and between persons. In the within-person case, for example, I may be aware both that something appears to be A and that it really is B. I could also be aware that it might appear to be C under special viewing conditions, or that I pretended or fantasized that it was D yesterday. I may know that these are all possible ways that I can *represent* the very same thing (i.e., perceive it, encode it, know it, interpret it, construe it, or think about it—although inadequate, the term "represent" will have to do). In the between-persons case, I may be aware that you might represent the same thing differently than I do, because our perceptual, conceptual, or affective perspectives on it might differ. If this analysis is correct, knowledge about the appearance–reality distinction is but one instance of our more general knowledge that the selfsame object or event can be represented (apprehended, experienced, etc.) in different ways by the same person and by different people. In this analysis, then, its development is worth studying because it is part of the larger development of our conscious knowledge about our own and other minds and, thus, of metacognition (e.g., Brown, Bransford, Ferrara, & Campione, 1983; Flavell, 1985; Wellman, 1985) and of social cognition (e.g., Flavell, 1985; Shantz, 1983). I will return to this line of reasoning in another section of the article.

How Can Young Children's Knowledge About the Appearance–Reality Distinction Be Tested?

The development of appearance–reality knowledge in preschool children has been investigated by Braine and Shanks (1965a, 1965b), Daehler (1970), DeVries (1969), Elkind (1966), King (1971), Langer and Strauss (1972), Murray (1965, 1968), Tronick and Hershenson (1979) and, most recently and systematically, by our research group. In most of our studies we have used variations of the following procedure to assess young children's ability to think about appearance and reality (Flavell, Flavell, & Green, 1983). First, we pretrain the children briefly on the meaning of the distinction and associated terminology by showing them (for example) a Charlie Brown puppet inside a ghost costume. We explain and demonstrate 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." We then present a variety of illusory stimuli in a nondeceptive fashion and ask about their appearance and their reality. For instance, we first show the children a very realistic looking fake rock made out of a soft sponge-like material and then let them discover its identity by manipulating it. We next ask, in random order: (a) "What is this *really* and *truly?* Is it *really* and *truly* a sponge or is it *really* and *truly* a rock?" (b) "When you look at this with your eyes right now, does it *look like* a rock or does it *look like* a sponge?" Or we show the children a white stimulus, move it behind a blue filter, and similarly ask about its real and apparent color. (Of course its "real color" is now blue, but only people who know something about color perception realize this.) Similar procedures are used to assess sensitivity to the distinction between real and apparent size, shape, events, and object presence.

How Do Young Children Perform on Simple Appearance–Reality Tasks?

Our studies have consistently shown that three- to four-year-old children presented with tasks of this sort usually either answer both questions correctly, suggesting some ability to differentiate appearance and reality representations, or else give the same answer (reporting either the appearance or the reality) to both questions, suggesting some conceptual difficulty with the distinction. Incorrect answers to both questions occur only infrequently, suggesting that even the children who err are not responding randomly. There is a marked improvement with age during early childhood in the ability to solve these appearance–reality tasks: Only a few three-year-olds get them right consistently, whereas almost all six- to seven-year-olds do (Flavell et al., 1985).

Some illusory stimuli tend to elicit appearance answers to both questions (called a *phenomenism* error pattern), whereas others tend to elicit reality answers to both (*intellectual realism* pattern). The intellectual realism pattern is the more surprising one, because it contradicts the widely held view that young children respond only to what is most striking and noticeable in their immediate perceptual field (Flavell, 1977, pp. 79–80; for a review of other research on intellectual realism, see Pillow & Flavell, 1985). If the task is to distinguish between the real and apparent properties of color, size, and shape, phenomen-

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ism errors predominate. Thus, if an object that is really white or small or straight is temporarily made to look blue, big, or bent by means of filters or lenses, young children are very likely to say the object really *is* blue, big, or bent. If, instead, the task is to indicate what object(s) or event is present, really versus apparently, intellectual realism errors are likelier to predominate. For example, the fake rock is incorrectly said to look like a sponge rather than a rock; a tiny picture of a cup is incorrectly said to look like a cup rather than a spot when viewed from afar; an array consisting of a small object completely occluded by a large one is incorrectly said to look like it contains both objects rather than only the visible one; an experimenter who appears from the child's viewing position to be reading a large book, but who is known by the child really to be drawing a picture inside it, is incorrectly said to look like she is drawing rather than reading (Flavell, Flavell, & Green, 1983). Indeed, Taylor and Flavell (1984) found that significantly more phenomenism errors occurred when illusory stimuli were described to children in terms of their properties (e.g., "white" vs. "orange" liquid) than when the same stimuli were described to the same children in terms of identities ("milk" vs. "Koolaid"). We do not know yet exactly why the appearance usually seems to be more cognitively salient for young children in these property tasks and (less dependably) the reality more salient in the object/event identity tasks, although we have proposed some possible explanations (Flavell, Flavell, & Green, 1983).

How Can We Find Out Whether Young Children's Difficulties With This Distinction Are Real or Only Apparent?

Much of our research has focused on the appearance–reality knowledge and related skills that three-year-olds possess and lack, because the early emergence of knowledge in any domain is of particular interest. (We have not yet found effective ways to test for possible cognitive precursors in children younger than three, but we hope to eventually.) As just mentioned, the evidence is now clear that many three-year-olds perform poorly even on what seem like very simple and straightforward appearance–reality tasks. Exactly how this poor performance should be interpreted is an important issue. Perhaps these tasks are valid and sensitive measures of young children's basic competence in this area, and their poor performance on them simply means that they really lack such competence. On the other hand, it is more than possible that the tasks we have been using significantly underestimate three-year-olds' capabilities. If there is one lesson to be learned from the recent history of the field of cognitive development, it is that the cognitive capabilities of young children are often seriously underestimated by the tasks developmentalists initially devise to assess those capabilities (e.g., Flavell, 1985; Flavell & Markman, 1983, pp. viii–x; Gelman, 1979). It is quite possible, therefore, that children age three or even younger really do understand the distinction. It is even imaginable that humans are in some sense born with a sensitivity to the distinction. What could one do to try to find out whether three-year-olds really lack competence in this area or only appear to?

Try Cross-Cultural Replication

We repeated as exactly as possible one of our early experiments (Flavell, Flavell, & Green, 1983, Experiment 2) in a different language and culture, namely, using Mandarin in the People's Republic of China (Flavell, Zhang, Zou, Dong, & Qi, 1983). The American children were three- to five-year-olds from Stanford University's laboratory preschool. The Chinese children were three- to five-year-olds from Beijing (Peking) Normal University's laboratory preschool. Pretraining and testing procedures, and the illusory stimuli, were the same for the two samples. We worked closely with Chinese colleagues on the translation of instructions and key terms and in the pilot testing. Error patterns, age changes, and even absolute levels of performance at each age level proved to be remarkably similar in the two subject samples. These results suggest that previously observed difficulties with our tasks cannot be due solely to some sort of simple and developmentally inconsequential misunderstanding by young American children of the English expressions "really and truly" and "looks like to your eyes right now." Rather, they suggest, as such cross-cultural replications usually do (e.g., of Piagetian phenomena), that our tasks may in fact be assessing a real and robust conceptual acquisition.

Try Making the Tasks Easier

In three recent studies (Flavell et al., 1985) we compared the difficulty for three-year-olds of "standard" and "easy" appearance–reality tasks. Standard tasks were the object-identity (fake objects) and color (objects placed behind colored filters) ones used in our previous investigations. Easy tasks were created by thinking of possible obstacles to good performance posed by the standard ones and devising tasks that eliminated or reduced these obstacles. We tried to invent tasks that still demanded some genuine if minimal knowledge of the appearance–reality distinction but that, by virtue of being stripped of certain knowledge-irrelevant processing demands, came closer than the standard ones to demanding *only* that knowledge. In short, we tried to create more sensitive assessment procedures in hopes of coaxing out nascent, hard-to-elicit appearance–reality competence.

We constructed five putatively easy color tasks using this method.

1. A small part of the target object was left uncovered when the color filter was placed over it. Consequently, visible evidence of the object's real color was still available to the children when the appearance and reality questions were asked; they did not have to remember what its real color was.

2. A liquid (milk) whose real color (white) is well known to young children was caused by use of a filter to temporarily appear to be a color (red) that they would never see in reality. We thought this might help the chil-

dren both keep the real color in mind and recognize the bizarre apparent color to be a mere appearance.

3. The device that changed the object's apparent color was a familiar one known by children to have just that function (sun glasses rather than a filter). In addition, its effect on the children's momentary color experience (appearance) rather than on the object's enduring surface color (reality) was highlighted by placing it next to the children's eyes rather than next to the object.

4. The device was itself an object that possessed its own real color (a blue filter cut into the shape of a large fish) distinct from that of the object whose apparent color it changed (a small white fish that temporarily became blue-looking by chancing to "swim" behind the large one). This setup might help young children distinguish between the little fish's real color and its accidental apparent color, which really "belongs" to the big fish.

5. It is possible that the repeated juxtaposition of two different questions, one about appearance and one about reality, confuses or overtaxes three-year-olds; they might do better if simply asked what color the object behind the filter "is." Therefore, at the very beginning of the testing session, prior to any talk about appearances and realities, we asked the single "is" question about a toy car's color described in the opening sentence of this article.

The same strategy was used to create three easier object-identity tasks.

1. After a brief conversation about dressing up for Halloween in masks and costumes, the children were questioned about the real and apparent identity of one of the experimenters after she had conspicuously put on a mask disguise. We assumed that young children would be more knowledgeable about this sort of appearance–reality discrepancy through Halloween and play experiences than with those presented by the fake objects and filters used in standard tasks.

2. The apparent identity of each object was conveyed by its sound and its real identity by its visual appearance. To illustrate, a small can (real identity) sounded like a cow (apparent identity) when turned over; the children were then asked if it sounded like a can or like a cow, and whether it really and truly was a can or a cow. We thought that appearance and reality might be easier for young children to attend to separately, and keep straight, if the two were presented via different sense modalities. In an attempt to make the task easier still, at the moment the reality question was asked the reality was perceptible (the can was still visible), but the appearance was not (the can was not still making mooing sounds)—the opposite of what happens in all standard tasks.

3. Task 3 was the same as 2, except that the nonvisual modality used was smell rather than sound. For example, one of the objects used was a cloth (real identity) that smelled like a lemon (apparent identity).

These efforts to bring to light underlying appearance–reality competence by using easier, seemingly less demanding probes for this competence were surprisingly unsuccessful. Of the five easy color tasks, only Task 1 elicited better performance than did the standard color and object-identity tasks. Children performed significantly better on the three easy object-identity tasks than on the standard object-identity tasks, but not better than on the standard color ones. Moreover, their absolute level of performance on these three tasks was not very high. Thus, the results of these studies do not support the view that the typical young preschooler can differentially represent and think about appearances and realities if only the eliciting conditions are made sufficiently facilitative and "child-friendly."

Try Teaching Appearance–Reality Knowledge

Finally we (Flavell, Green, & Flavell, 1985) have recently tried to probe for hidden competence by assessing children's response to training: in effect, to use training as a diagnostic tool (Flavell, 1985, pp. 277–278). We selected a group of 16 three-year-olds who performed very poorly on color and object-identity (fake object) pretests, trained them intensively for five to seven minutes on the meaning of real versus apparent color, and then readministered the same pretests. In this training we demonstrated, explained, defined terms, helped the child demonstrate, and gave corrective feedback on the theme that the real, true color of an object stays the same despite repeated, temporary changes in its apparent color due to the interposition of different color filters. Although we fully expected that this training would be helpful, in fact it was not. Only one of the 16 children performed well on the posttest, and he did so only on the color tasks, showing no transfer to the object identity tasks. Braine and Shanks (1965a) had likewise been largely unsuccessful in training three-year-olds on the distinction between real and apparent size, although they used a less conceptually oriented training procedure. These results present a striking contrast to the results of the scores of studies that have tried to train conservation and other Piagetian concepts (Kuhn, 1984). Many of these studies have at least succeeded in inducing young nonconservers to behave like conservers; what remains controversial is the extent to which that trained conservation behavior reflects a real gain in genuine understanding. In contrast, the children in our study and in Braine and Shanks' (1965a) study could not be induced even to *behave* like children who understand the appearance–reality distinction. It seems reasonable to conclude, therefore, that they really did not understand it.

In summary, we have used three different research strategies to find out whether young children's difficulties with the appearance–reality distinction are real or only apparent. The results of this research strongly suggest that these difficulties are very real indeed.

What Relevant Competencies Do Young Children Possess and Lack?

We can identify some relevant-seeming competencies that young children who fail simple appearance–reality tasks have already acquired. Although not sufficient in themselves to ensure understanding of the appearance–reality

distinction, these competencies might be either necessary or helpful to its acquisition. By the age of three, children have become quite proficient at creating discrepancies between real and pretend identities (Bretherton, 1984; Rubin, Fein, & Vandenberg, 1983). As examples, they can pretend that a toy block is a car or make believe that they themselves are animals. Consistent with these skills in symbolic play, Estes and Wellman (H. M. Wellman, personal communication, 1984) and we (Flavell et al., 1985) have shown that most three-year-olds can consistently identify nonfake objects as being "real" and fake ones as being "not real" or "pretend," even without pretraining. We also presented three-year-olds with standard color appearance–reality task situations: that is, first show an object, then place it behind a filter that changes the object's apparent color. However, we then asked the children, not the usual appearance and reality questions, but simply whether the object will look A (its apparent color) or R (its real color) when the filter is removed. We found that many three-year-olds who performed well on this task nevertheless performed poorly on the standard color appearance–reality task. These results cannot be taken to imply that three-year-olds always maintain the object's original color in focal attention when answering reality questions, nor that they represent the object as being that color while it is behind the filter. However, these results do suggest that young children's abilities to (a) realize that the experimenter is talking about the object's color rather than the filter's color, (b) remember what color the object was before the filter was put over it, and (c) understand that it will look that same color again when the filter is removed are not sufficient to ensure good performance on color appearance–reality tasks, although they are no doubt necessary. There are undoubtedly other competencies not yet identified that also play this sort of developmental role of being necessary and facilitative but not sufficient.

What developing competencies might actually be sufficient or nearly sufficient to enable young children to grasp the appearance–reality distinction? We really do not know, but we have a hypothesis. The hypothesis is derived from the third-mentioned reason why we think this development is important to study, as described earlier in this article.

Consider the conceptual demands of appearance–reality tasks. In reality, an object cannot simultaneously be, for instance, both all blue and all white, or both a rock and a sponge. Nevertheless, to solve these tasks we have to attribute such mutually incompatible and contradictory properties and identities to the same object at the same moment in time. As adults, we easily resolve the seeming contradiction by identifying one representation of its property or identity with its present appearance and the other with its reality. We identify the one with what we see and the other with what we know. This resolution is easy for us because we are well aware that people are sentient, cognizing subjects who have internal representations of external things and can represent singular things in multiple ways. Although we are aware that external objects themselves cannot simultaneously be two different things at once, we are also aware that we can represent them as simultaneously looking like the one thing ("that's what it looks like") and really being the other ("that's what it really is").

In contrast, everything we know about metacognitive and social-cognitive development (e.g., Brown et al., 1983; Flavell, 1985; Shantz, 1983) suggests that young children are less cognizant of these facts about subjectivity and mental representation than older children and adults are. This is not to claim that they are wholly incognizant of these facts (see Shatz, Wellman, & Silber, 1983, and Wellman, 1985, for evidence of some early knowledge of this kind) but only to claim that they are less cognizant of them. Therefore, they might not be aware of the ongoing role of subjectivity and representational activity as they inspect the target object. Instead, they may try only to decide what single thing the object "is," as an entity out there in the world. That the object can be represented as having more than one "is," inside our heads, may be a possibility that does not, or perhaps even cannot, occur to them. (Note that identifying a fake rock as a "pretend rock," which we have just said that young children can do, does *not* require representing that object as having more than one "is"—as looking like a rock but really being a sponge.) As they become increasingly cognizant of these facts in the course of development, according to this hypothesis, the distinction between appearance and reality should become increasingly meaningful to them.

Although this hypothesis has not yet been tested directly (we are still trying to formulate it clearly), there are two pieces of evidence that are at least consistent with it. One is the fact, mentioned above, that children who err on our tasks usually do so by giving the same answer to both the appearance and the reality questions, even though the two questions sound quite different and we stress the fact during both pretraining and testing that we are asking them two different questions. It it as if, despite all efforts to help them do otherwise, they decide what the object identity or property "is" and just say it twice.

The other piece of evidence is our recent finding (Flavell et al., 1985), obtained in two separate studies using three-year-old subjects, of high positive correlations (.67 to .87) between the ability to distinguish between appearance for the self and reality (appearance–reality ability) and the ability to distinguish between appearance for the self and appearance for another person (visual perspective-taking ability). We take this finding to be supportive of our hypothesis because both tasks require the previously discussed awareness that the same object can be simultaneously represented in two different ways: appearance and reality in the appearance–reality task and two different appearances to two differently situated observers in the perspective-taking task. In the more elaborate of the two studies, 40 three-year-olds were tested in two sessions. In one session they were given five color and five shape appearance–reality tasks (standard type); in the other they saw the same 10 task displays but were

asked perspective-taking questions about them. Appropriate pretraining was given at the beginning of each session. To illustrate, one of the five shape displays consisted of a bent straw that looked straight to the child who viewed it through a bottle of liquid but bent to the experimenter who, seated opposite, did not view it through the distorting bottle. As in all our studies, the child initially saw the straw without the distorting device, in its real shape. In the appearance–reality session, the three-year-olds were asked whether the straw looked bent or straight to them and whether it was really and truly bent or straight. In the perspective-taking session, they were asked whether it looked bent or straight to them and whether it looked bent or straight to the experimenter. The correlations between appearance–reality and perspective-taking scores were .67 for the color displays and .72 for the shape displays. These correlations are as high as those between color and shape appearance–reality scores (.73) and those between color and shape perspective-taking scores (.69), despite the fact that the appearance–reality and perspective-taking abilities were assessed in different experimental sessions separated by several days.

In summary, I have suggested some cognitive competencies that may variously be facilitative, necessary, or sufficient for a beginning understanding of the appearance–reality distinction. One competency hypothesized to be sufficient or nearly sufficient is an increased cognizance of subjectivity and mental representation; this competency may allow children to construe an illusory stimulus as simultaneously possessing two seemingly incompatible properties or identities—one identified with its appearance and the other with its reality. Although the hypothesis has not yet been tested directly, there exist some data that make it seem plausible.

What Is the Subsequent Course of Development in This Area?

According to the hypothesis proposed in the previous section, as children become increasingly cognizant of subjectivity and mental representation, both simple appearance–reality tasks and simple perspective-taking tasks should begin to make sense to them and become easily soluble. Whether this explanation of development proves to be the correct one, there is considerable evidence that tasks of both kinds do become increasingly easy to manage as youngsters approach the middle childhood years. For example, children of four and five years are much more competent at simple visual perspective-taking tasks than children of three (Flavell, Flavell, Green, & Wilcox, 1980, 1981). There is even empirical support for the more general claim that "around the ages of 4 to 6 years the ability to represent the relationship between two or more persons' epistemic states emerges and becomes firmly established" (Wimmer & Perner, 1983, p. 104). Likewise, performance on standard appearance–reality tasks improves significantly between three and five years in both American and Chinese (People's Republic of China) children (Flavell, Flavell, & Green, 1983; Flavell, Zhang et al., 1983). Finally, we have recently found that six- to seven-year-olds perform almost errorlessly on simple tasks of both types (Flavell et al., 1985). Unlike the majority of three-year-olds, six- to seven-year-olds can consistently report realities when realities are requested and appearances when appearances are requested, whether the appearances are from their own or another person's viewing position. Consistent with these results with real and apparent object identities and object properties, Harris, Donnelly, Guz, and Pitt-Watson (1985) have recently found that children of this age are also capable of understanding the distinction between real and apparent emotion.

However, our investigations (Flavell et al., 1985) also show that development is by no means complete at this age. Using groups of six- to seven-year-olds, we administered two types of more demanding tests of the ability to think and talk about appearances, realities, and appearance–reality relations: identification tasks and administration tasks. In identification tasks, they were presented with a wide variety of stimuli and were asked to identify those that exhibited discrepancies or nondiscrepancies between appearance and reality and to explain their selections. In two studies, for example, they were shown a series of 23 pairs of stimuli. Within each pair, the stimuli differed from one another in degree of discrepancy between appearance and reality or in other ways relevant to the distinction. The subjects' job was to choose the member(s) of each pair, if any, that best exemplified an appearance–reality discrepancy and to explain their choice. In one of these studies, for instance, subjects were initially pretrained and given corrective feedback on what they were to look for. In addition, each new stimulus pair was introduced with the instruction: "Remember, we are trying to find things that don't look like what they really and truly are. Here are two things. Which one is better for the kind of things we are trying to find—this one, or this one, or are they both just about as good for the kinds of things we are trying to find?" The following items illustrate the variety of stimulus pairs used: (a) a real piece of candy and a magnet that looked like a piece of candy; (b) a bottle of cologne that looked like a tennis ball when its green base was not visible; the bottle was held so that the telltale base either was or was not visible; (c) a realistic-looking fake rock and a fake-looking fake water faucet; (d) two real flowers, one of them (an antherium) fake-looking. In the administration tasks, six- to seven-year-olds were asked to administer standard appearance–reality tasks, after having had experience taking them and following brief training on how they should be given.

The data from the identification tasks showed that the ability to identify on request stimuli exhibiting appearance–reality discrepancies and nondiscrepancies is still fragile and task dependent at the beginning of middle childhood. On one particularly easy-looking identification task, six- to seven-year-olds did perform well but on three others, including the 23-pairs task described above, identification performance was surprisingly poor. Furthermore, they seemed to find it even more difficult to talk about appearances, realities, and appearance–reality relations. They often failed to refer to them even when asked

to explain their correct stimulus choices, that is, stimuli correctly chosen as best exhibiting an appearance–reality disparity. The same difficulty was evident in the administration task data. That is, six- to seven-year-olds also tended not to mention appearances, realities, and relations between them when asked to administer the very sorts of standard appearance–reality tasks they, as subjects, found so easy to solve—even after the experimenter had explained and repeatedly demonstrated the administration procedure.

We believe that these difficulties in nonverbal identification and verbal labeling reflect genuine conceptual difficulties. Many children of this age simply seem unable to think about such notions as "looks like," "really and truly," and "looks different from the way it really and truly is" in an abstract, metaconceptual way. Although they are able to identify concrete examples of the first and second notions quite easily and of the third with considerably more difficulty, they seem to lack the knowledge and ability to reflect on and talk about, indeed, often even briefly mention, the notions themselves.

We also administered an identification task involving the 23 pairs of stimuli to 11- to 12-year-olds and college students (Flavell, Green, & Flavell, 1985). The data gave evidence of considerable knowledge development in this area subsequent to early middle childhood. They suggest that 11- to 12-year-olds, and to an even greater extent college students, have acquired a substantial body of knowledge that is both richly structured and highly accessible.

As to rich structure, older subjects seem to possess abstract and general schemas for appearances, realities, and possible relations between the two. For example, they may make abstract, general statements such as "This doesn't look like what it really is" when confronted with an appearance–reality discrepancy. These schemas permit them to identify as possible instances of the abstract category, "appearance different from reality," many different types of appearance–reality discrepancies, including unusual and marginal ones. They can similarly identify instances of the category, "appearance same as reality," and can discriminate these from instances of the former category. They can also recognize subtle distinctions among appearance–reality task displays. In particular, they are able to identify and differentiate, with respect to these two categories, among realistic-looking nonfake objects, realistic-looking fake objects ("good fakes"), nonrealistic-looking fakes ("poor fakes"), and even fake-looking nonfakes. Consistent with our findings suggesting that appearance–reality and perspective-taking competencies are psychologically related, older subjects often draw upon their perspective-taking knowledge when thinking and talking about appearance–reality phenomena. For example, they comment spontaneously on how the appearance of a given stimulus (and therefore, perhaps, the observable appearance–reality relation) may vary with the observer's prior knowledge, previous viewing experience, or present viewing position. Finally, they can not only identify the appearances and appearance–reality discrepancies presented to them, but they can also reproduce these discrepancies, change them, or even create new ones. That is, their knowledge in this area is generative and creative as well as rich.

The appearance–reality knowledge of older subjects is also more accessible than that of younger ones, both in the sense of being (a) easily elicited by instructions and task materials and (b) readily available to conscious reflection and verbal elaboration (metaconceptual). In terms of (a), vague instructions and a few concrete examples suffice to activate their appearance–reality knowledge; they require little help from the task materials or the experimenter. In terms of (b), older subjects can describe in detail what they know and think about appearance–reality phenomena. They readily talk about their own and other people's mental events, including the expectations and inferences an object's appearance would stimulate in an observer.

In summary, the subsequent course of development in this area seems to be both lengthy and substantial. Although 6- to 7-year-olds can easily manage the simple appearance–reality tasks that 3-year-olds fail, their ability to reflect on and talk about appearances, realities, and appearance–reality relations remains very limited. In contrast, the appearance–reality and related knowledge of 11- to 12-year-olds and especially college students is both richly structured and highly accessible. In an early article on this topic, Langer and Strauss (1972) hypothesized "that the cognition of the appearance and the reality of things follows a long and varied course" (p. 106). Our evidence certainly supports their hypothesis.

What Next?

As always, there is much more to do. One obvious task for future research in this area is to find effective ways to probe for prerequisites, protoforms, and precursors in infants and very young children. Another is to make direct tests of our current hypothesis about what mediates an elementary understanding of the appearance–reality distinction. A third is to search for other abilities that seem to require the same general type of dual representation as appearance–reality and perspective-taking ones and that may for that reason be developmentally linked to them. A possible candidate we are currently examining is the ability to represent explicitly the selfsame object as simultaneously having a real identity (e.g., that of a small piece of wood) and a temporary pretend identity (e.g., that of a car, in the child's pretend play activity).

We think linking appearance–reality and perspective-taking abilities as we have done may shed new light on both. Similarly, trying to relate pretend play to these two might further illuminate all three. Continuing in this integrative vein, there seems to be a whole family of distinctions that have a similar "feel" to them. In each, one thing is represented in two ways, and the two ways have some kind of adversative, "but" type relation between them. Familiar examples: This is x but it seems or appears (perceptually, conceptually, affectively, etc.) to be y. This seems or appears x to me but seems or appears y to you.

This is x but I can imagine or pretend that it is y. Further examples: This is x but it should be y (on moral, conventional, practical, aesthetic, or other grounds). I meant x but, being an imprecise communicator, said y (Beal & Flavell, 1984; Bonitatibus & Flavell, 1985; Olson, 1981; Robinson, Goelman, & Olson, 1983). I know it is x but, deliberately lying, say it is y (Wimmer, Gruber, & Perner, 1984). I thought of doing x, but I did not actually do it (Wellman & Estes, in press). We have just begun to think about these distinctions but find them intriguing. They appear to require similar processing and therefore seem as if they might be developmentally related. But a lot more hard thinking and research will be needed to find out whether they *are—really* and *truly.*

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