COGNITIVE PSYCHOLOGY 15, 95–120 (1983)

Development of the Appearance–Reality Distinction

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Young children can express conceptual difficulties with the appearance–reality distinction in two different ways: (1) by incorrectly reporting appearance when asked to report reality ("phenomenism"); (2) by incorrectly reporting reality when asked to report appearance ("intellectual realism"). Although both phenomenism errors and intellectual realism errors have been observed in previous studies of young children's cognition, the two have not been seen as conceptually related and only the former errors have been taken as a symptom of difficulties with the appearance–reality distinction. Three experiments investigated 3- to 5-year-old children's ability to distinguish between and correctly identify real versus apparent object properties (color, size, and shape), object identities, object presence–absence, and action identities. Even the 3-year-olds appeared to have some ability to make correct appearance–reality discriminations and this ability increased with age. Errors were frequent, however, and almost all children who erred made both kinds. Phenomenism errors predominated on tasks where the appearance versus reality of the three object properties were in question; intellectual realism errors predominated on the other three types of tasks. Possible reasons for this curious error pattern were advanced. It was also suggested that young children's problems with the appearance–reality distinction may be partly due to a specific metacognitive limitation, namely, a difficulty in analyzing the nature and source of their own mental representations.

The acquisition of knowledge about the distinction between appearance and reality is a very important developmental problem for at least two reasons.

1. The distinction arises in a very large number and variety of ecologically significant cognitive situations. In many of these situations, the information available to us is insufficient or misleading, causing us to accept an apparent state of affairs (appearance) that differs from the true state of affairs (reality). We are variously misled or deceived by the information we receive from or concerning people, objects, actions, events, and experiences. The deceit may be deliberately engineered by another person; the person intentionally misleads us—through the use of lies, facades, dis-

This research was supported by NICHD Grant HD 09814. We are most grateful to the children, teachers, and parents whose cooperation made these studies possible. We are also much indebted to Ellen Markman, Marjorie Taylor, Carole Beal, and numerous other colleagues and students for their useful suggestions over the course of this project. Finally, we thank Rochel Gelman and two anonymous reviewers for their helpful critiques of this article.
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0010-0285/83/010095-26$07.50/0

guises, and other artifices. Very often, however, there is no intention to deceive. The time or distance seemed longer to us than it really was; the sun looks like it moves around the earth but it really does not; it appeared that S–R theory could explain language development but the reality turned out (appeared?) otherwise. The last two examples make it clear that all systematic pursuit of knowledge presupposes at least some awareness of the appearance–reality distinction (Carey, in press): "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). Although we may not know that appearances have in fact deceived us in any specific cognitive situation, we do know as a general fact that such deception is always possible. That is, although always susceptible to being deceived by appearances, we have acquired the metacognitive knowledge that appearance–reality differences are always among life's possibilities. There are also many situations in which we are aware of an existing appearance–reality discrepancy. In the above examples, for instance, we may subsequently discover the discrepancy of which we were initially unaware. Dreams constitute a frequent case in point: the events seem real during the dream; we know they were apparent rather than real when we wake up. We also deliberately create or seek out appearance–reality differences as well as discover them. Examples are as diverse as pretense and other forms of play, fantasy, the creation of imaginary or possible worlds (by philosophers, scientists, other adults, and children), magic, tricks, costume parties, jokes, tall tales, metaphor, and the arts (e.g., drama). Some differences between appearance and reality are unwanted and painful; for instance, the apparently "sure-fire" investment (financial or emotional) that really is not. Others, however, are sought after and pleasureful; good magic shows and well-crafted "whodunits" are two examples.

2. The development of knowledge about the distinction between appearance and reality is probably a universal development in human beings. The distinction seems so necessary for everyday adaptations to the human world that one can scarcely imagine a society in which normal children would not acquire it. Developments that are both ecologically significant and universal within the species seem particularly worthy of scientific investigation.

How might young children think and act if, as seems likely, their knowledge about the appearance–reality distinction were not as fully developed as our own? In situations where appearance and reality differ they might not consistently attend to both and keep the difference between them clearly in mind, even when evidence is available to indicate

what the two are and that they are indeed different. As a consequence, they might focus on only one of the two and respond only in terms of that one when queried about the situation. The question then arises as to which of the two they would tend to focus on.

A particularly obvious and likely possibility is that they would focus on and report only appearances, a tendency that is here termed *phenomenism,* after Piaget (Flavell, 1963, p. 256). In fact, young children have been observed by Piaget and others to tend to "center" or "centrate" on what is perceptually most striking, that is, on aspects of surface appearance rather than underlying reality (Flavell, 1963, 1977). In addition, a number of studies have shown that young children are prone to phenomenistic responding in certain task situations where appearance and reality conflict (Braine & Shanks, 1965a, 1965b; Daehler, 1970; DeVries, 1969; Elkind, 1966; King, 1971; Langer & Strauss, 1972; Murray, 1965, 1968; Tronick & Hershenson, 1979). Most of these investigators were interested in the child's command of the appearance–reality distinction as a possible developmental prerequisite or mediator of Piagetian conservation (e.g., Braine & Shanks, 1965a, 1965b, Murray, 1968). The earliest and most seminal studies were probably those by Braine and Shanks (1965a, 1965b).

In some of Braine and Shanks' experiments, young children were presented with two cardboard ring segments, one longer than the other. On the first trial of each trial block, the two segments were superimposed, so that the segment which really was longer also looked longer; that is, appearance and reality coincided. On subsequent trials, appearance and reality differed: the two rods were juxtaposed in such a way as to make the shorter one appear to be the longer of the two (the Jastrow or ring-segment illusion). On some trials the children were asked, "Which *looks* bigger?"; on others they were asked, "Which is *really, really* bigger?" In one study, a magnifying lens was used to create the illusory changes in apparent relative size. Braine and Shanks (1965b) also produced illusory changes in shape rather than size by immersing rods in water, causing bent rods to appear straight and straight rods to appear bent. Their studies led to the following conclusions: (1) Until about age 7 or 8 years of age, children spontaneously interpret questions about size as questions about apparent or phenomenal size. That is, they tend to report perceptual appearance regardless of whether appearance or reality is queried (phenomenism). (2) Children are generally capable of distinguishing between real and apparent size and shape by about 5 years of age. When given corrective feedback, for instance, they quickly and easily learn to differentiate appropriately between appearance and reality questions, suggesting to Braine and Shanks that they possessed at least some grasp of the appearance–reality distinction prior to training. Consistent with

this interpretation, 5-year-olds also showed good transfer and retention (2 months) of the training-elicited distinction. (3) The ability to make the distinction seems to develop rapidly between 3 and 5 years of age. The results of the other studies cited above seem at least roughly consistent with those of Braine and Shanks (1965a, 1965b).

Although reporting perceptual appearance when reality is called for (phenomenism) may be the most obvious and expected expression of a not fully developed command of the appearance–reality distinction, it is not the only logically possible one. Conceivably, a young child could also or instead express the same basic difficulty by making the opposite error, that is, by reporting reality when only perceptual appearance is requested. This error pattern has also been observed in young children. To our knowledge, however, it has not previously been related conceptually either to the appearance–reality distinction in general or to phenomenism specifically. This reality-for-appearance error has been labeled *intellectual realism* (as contrasted with *visual realism*) by Luquet (1927; see also Freeman, 1980; Piaget & Inhelder, 1956, 1969).

Intellectual realism has been operationally defined by Luquet (1927) and others as the tendency in young children to include in their drawings everything that is present in an object display (reality), rather than only what a photograph taken from their position would show (appearance). It is thus a tendency to draw what they know to be there (intellectual realism) rather than only what they see at that moment (visual realism); the distinction has also been described as that between an *array*-specific visual *world* and a *view*-specific visual *field* (Gibson, 1950; Kielgast, 1971; Light & MacIntosh, 1980).[1] In an interesting demonstration of intellectual realism in children's drawing, Freeman and Janikoun (1972) first allowed subjects of 5–9 years of age to examine a coffee mug. It was then positioned so that its handle was not visible to them, and they were asked to "draw exactly what you see from where you are sitting." The younger children tended to include the nonvisible handle in their drawings; the older ones tended to omit it. Although one study (Taylor & Bacharach, 1982) failed to replicate Freeman and Janikoun's (1972) findings, other studies have either replicated them (cited in Freeman, 1980, p. 252) or obtained results consistent with them (e.g., Light & Humphreys, 1981; Light & MacIntosh, 1980).

A recent experiment by Liben and Belknap (1981; see also Liben, 1978) indicates that young children will exhibit intellectual realism when selecting a pictorial representation of their own visual perspective as well as when drawing. On some ("unfinished") trials, their 3–5-year-old sub-

[1] *Intellectual realism* is to be distinguished from Piaget's *realism*, a related construct denoting the young child's tendency to construe psychological events or products (such as thoughts, dreams, names) as objective, thing-like entities (Flavell, 1963, p. 281).

jects saw the experimenter arrange a set of three different-sized blocks so that the smallest and middle-sized ones were positioned behind the largest from the subjects' point of view and thus became nonvisible to them. On other ("finished") trials, the blocks were prearranged out of the children's sight so they did not know the two occluded blocks were present. On each trial the subjects were then shown an array of six pictures of block arrangements and asked to "point to the picture that shows exactly what you see from where you are sitting." The children almost never chose an incorrect view picture on finished trials but often did on unfinished trials, frequently selecting pictures that displayed blocks known to be in the array but not presently visible from their perspective. These and other research findings (Freeman, 1977) suggest that tendencies toward intellectual realism could not be wholly the result of conventions, biases, or limitations in children's drawing activity.

Phenomenism responses accord very well with a widespread stereotype of the young child's mind (e.g., Flavell, 1977, pp. 79–80). This mind deals with cognitive tasks by responding only to what is most striking and noticeable in the immediate perceptual field. In contrast, intellectual realism responses seem at first to go completely against the grain of such a mentality. Intellectual realism responses reflect attention not only to that which is not perceptually striking, but also to that which is not currently perceptible at all. However, intellectual realism seems more compatible with childish thinking if we refine our stereotype a bit: Let us assume that, like their elders but probably to a greater degree, young children are primed to respond in terms of that which is most *cognitively* salient—most "up front" in consciousness—at a given moment. That could be a salient perceptual feature, of course, but it could equally well be a salient bit of knowledge (or belief, feeling, intention, etc.). If knowledge of what is hidden is highly salient cognitively when the young child is asked to report only what is presently visible, it would hardly seem "unchildlike" if the child blithely proceeded to tell all.

Intellectual realism could be thought of as cognition that is more "top down" or assimilative than the task calls for, and phenomenism as cognition that is more "bottom up" or accommodative than the task requires. In the intellectual realism case, there is cognitive overshoot: the child looks right past the requested visual field to the unrequested and nonvisible but cognitively salient visual world. The process seems analogous to unwittingly reporting the gist of a message's meaning when only the surface structure details of the message had been requested. Reporting exactly and only what was said or seen when one's consciousness is flooded with what was meant or known to be present can be difficult at any age, but may be especially difficult for young children (e.g., Gleitman, in press; Olson & Hildyard, in press; Potter, 1979; Flavell, Note 1). In the

phenomenism case, the child undershoots instead: asked to look past the visual field to the visual world, the child's processing is captured and aborted by some arresting perceptual experience.

Conceptualized in this way, intellectual realism seems no more foreign to the young child's thought (or the adult's) than phenomenism does. Both seem equally natural and, we believe, both may equally reflect problems with the appearance–reality distinction. It is worth noting that the same two kinds of errors could also occur in spatial perspective-taking tasks. Asked to reproduce or report another person's perceptual perspective, the child could err either by phenomenistically reporting only her own immediate perceptual perspective (her "appearance" rather than that of the other person) or by realistically reporting everything in the array (both her and the other person's "reality") (see Kielgast, 1971; Liben & Belknap, 1981; Light & MacIntosh, 1980). Thus, intellectual realism could be conceived more broadly as a general difficulty in abstracting out and representing to oneself a visual perspective or "appearance," either another person's (as in traditional spatial perspective-taking tasks) or one's own (as in the drawing and picture selection tasks just described). This point is elaborated further in the General Discussion section.

As indicated earlier, phenomenism and intellectual realism have apparently not previously been conceptualized as related cognitive immaturities; their research literatures do not even refer to one another. The two phenomena have accordingly been observed by different investigators, in different samples of children, using different tasks. In contrast, the procedures used in the present studies were explicitly designed to allow us to detect, in a single subject, either tendency on any one task, and either or both tendencies over a series of tasks.

To illustrate (see Experiment 2), after appropriate pretesting and pretraining concerning appearance and reality questions, the subject is presented with an extremely realistic-looking imitation egg. The subject manipulates it and establishes its real identity as "a stone that somebody painted." The experimenter then says: "Okay, now I'm going to ask you two different questions (the subject is already familiar with them). I'm going to ask you about how it *looks* to your eyes right now (appearance question), and I'm going to ask you about what it *really, really* is (reality question)." Each of these two questions supplies the child with the two possible options; the child need only select one. The experimenter then holds up the fake egg and asks whether it looks like an egg or a stone to the child's eyes right now, and whether it really, really is an egg or a stone (order of questions and question options randomized). The child's pattern of answers could then suggest: (1) the ability to differentiate between appearance and reality appropriately on this task (both answers correct); (2) some sort of hard-to-interpret confusion or inattention (both answers

incorrect); (3) phenomenism ("egg" answers to both questions); and (4) intellectual realism ("stone" answers to both questions).

If a series of such tasks were given to groups of young children of different ages we might learn several things of interest. We could discover whether young preschoolers (e.g., three years of age) can demonstrate any genuine-looking, albeit precarious, command of the appearance–reality distinction and also see if it improves during the preschool years. We could find out whether some young children are consistently phenomenistic and others consistently intellectually realistic when they err, or whether most young children who err at all will err in both directions. Our belief that both tendencies have common mediators (appearance–reality problems and cognitive salience influences) leads us to expect the latter outcome. Finally, if the latter outcome does occur, we might discover that some types of tasks systematically tend to elicit a preponderance of phenomenism errors and others a preponderance of intellectual realism errors. Experiment 1 constituted an initial exploration of these possibilities.

EXPERIMENT 1

Method

Subjects

The subjects were 60 nursery school and kindergarten children of largely middle-class backgrounds, 20 at each of three age levels: 16 female and 4 male 3-year-olds (mean age, 3–8; range, 3–3 to 4–2); 10 female and 10 male 4-year-olds (mean age, 4–8; range, 4–3 to 4–11); 10 female and 10 male 5-year-olds (mean age, 5–10; range, 5–7 to 6–1). We included children of both sexes in all three experiments reported in this article, but found virtually no sex differences.

Materials

The stimulus objects used consisted of two very realistic-looking imitation objects obtained from a joke shop, an imitation rock resembling a piece of granite made out of a soft, sponge-like material and an imitation pencil made out of rubber; a Charlie Brown hand puppet that, when covered with a white handkerchief with eyes and mouth of felt, looked like a ghost; a white index card that looked pink when placed behind a piece of pink plastic.[2]

Procedure

Each child was tested individually by the same female experimenter; a second female experimenter recorded responses. (The same was true in Experiments 2 and 3.) A randomly chosen half of the subjects in each age group were shown each object in its appearance form

[2] It might be objected that the card not only looks pink but in a sense really is pink when seen behind the plastic, since an object's color is not a physical property of the object's surface but depends upon what reflected light waves from it reach the perceiver. However, the intended distinction between real and apparent color in situations like the present one is surely as clear and unambiguous to the lay person subject as that between, say, real and apparent size and shape.

prior to its reality form, the other half experienced the reality form first. All demonstration and questioning were completed for each object before going on to the next object. In the appearance-first condition, an object was held up, the child was asked "When you *look* at this with your *eyes* right now, what does it *look* like (what color does it *look* like)?" In virtually every case, the child responded with the correct, intended appearance, and the experimenter agreed that it did look like that. The reality of that object was then demonstrated for the child nonverbally; for instance, the experimenter squeezed the fake rock and handed it to the child to squeeze. The child was then asked two questions: "What is this *really, really?* Is it *really, really* a (rock) or *really, really* (a piece of sponge)?" and "When you *look* at this with your *eyes* right now, does it *look* like a (rock) or does it *look* like (a piece of sponge)?" In the reality-first condition, the reality of each object was demonstrated nonverbally at the very outset, before the child could form an impression of its intended appearance; for example, the experimenter handed the imitation pencil to the child in a bent position. Order of presentation of the four objects and the two questions about each object was counterbalanced across the subjects in each age group. The ordering of the two alternatives within each two-choice question was assigned at random. The four appearances mentioned in these questions were "rock", "pencil", "ghost", and "pink"; the corresponding four realities were described as "piece of sponge", "piece of rubber", "Charlie Brown", and "white".

If the child performed incorrectly on whatever task she was given last, a brief training or feedback procedure was used. The experimenter held up the last prior object the child had gotten correct and said: "Remember, you said this *looked* to your eyes like a ____ but it was *really, really* a ____. You were right. It does look to your eyes like a ____ but it really, really is a ____ and all of the objects we have talked about are the same way." The experimenter similarly labeled the appearance and reality of the other two objects among the child's first three and then retested the child on the final one.

Results and Discussion

Most findings of interest are presented in Table 1. We shall discuss the results with reference to the possibilities raised in the introduction. First, some of the 3-year-olds did seem to have some grasp of the appearance–reality distinction, at least as it is instantiated in the present task situations. Although they clearly had difficulty with the two imitation objects, more than half of the 3-year-olds responded differentially and correctly to the appearance and reality questions concerning the disguised object (ghost) and the color (pink). A child who had no ability to cope with the tasks we used might be expected to have about an equal probability of getting both answers correct and both answers incorrect on each task. Except in the case of the pencil task, however, the 3-year-olds answered both questions correctly substantially more often than they answered both questions incorrectly. Six of the twenty 3-year-olds answered at least three of the four pairs of questions correctly; 11 answered at least two pairs correctly. One might have expected that our procedure would have led young children to think that we always wanted them to give different answers to the two questions. The small number of incorrect answers to both questions and the fairly large number of the same answers to both questions suggests that this probably was not the case.

TABLE 1
Patterns of Answers to Pairs of Appearance and Reality Questions

Task	Age group	Pattern of answers: Correct answers to both	Reality answers to both	Appearance answers to both	Incorrect answers to both
Rock	3	5	15	0	0
	4	17	2	1	0
	5	20	0	0	0
Pencil	3	5	3	7	5
	4	13	5	2	0
	5	19	1	0	0
Ghost	3	12	5	1	2
	4	19	1	0	0
	5	20	0	0	0
Pink	3	16	0	4	0
	4	19	0	1	0
	5	19	0	1	0

There was no evidence that the two presentation conditions (appearance-first and reality-first) had differential effects on performance. Likewise, the order of the two questions and of the two alternative answers within each question did not appear to influence performance. More interesting, the brief training/feedback procedure also had little positive effect. Of the twelve 3-year-olds who performed incorrectly on the final task and therefore received this feedback, nine performed incorrectly when retested on that same task immediately afterwards. The fact that such explicit feedback accomplished so little suggests that young children's errors on these tasks probably were not due to some superficial, easily corrected misinterpretation of the task demands or of our appearance–reality terminology (cf. Braine & Shanks, 1965a, 1965b; Tronick & Hershenson, 1979).

It is clear that the 4-year-olds were much better able to sort out appearance and reality in these tasks than the 3-year-olds, and that the 5-year-olds performed almost errorlessly. The numbers of children in each group who answered all eight questions correctly were, from youngest to oldest, 2, 11, and 18, $\chi^2(2) = 25.77, p < .001$. These findings are consistent with Braine and Shanks' (1965a, 1965b) conclusion that the ability to manage the appearance–reality distinction improves between 3–5 years of age.

The data provide strong evidence on the question of whether individual

children either make only phenomenism errors or only intellectual realism errors across tasks, rather than making both kinds. Of the fourteen 3-year-olds and two 4-year-olds who erred on more than one task, 11 and 2, respectively, made both kinds of errors. Thus, these data provide no warrant for conceptualizing either phenomenism or intellectual realism as intraindividually consistent, transituational "traits" or "cognitive styles." Rather, the evidence suggests that when a young child has trouble with an appearance–reality task, she may err either by mistaking appearance for reality or by mistaking reality for appearance.

What determines which of these two mistakes children are likelier to make? The present data suggest the hypothesis that the type of error may depend in part on whether the appearance and reality questions refer to a visual *property* of an object or to an object's *identity,* that is, to what object it is. More specifically, questions about properties may tend to elicit phenomenism errors (always reporting the appearance), and questions about identities, intellectual realism errors (always reporting the reality). Our appearance and reality questions referred to an object property (color) in the pink task and to object identity in the rock, pencil, and ghost tasks. As Table 1 shows, all six errors made on the pink task were of the phenomenistic, appearance-for-reality type. Conversely, 23 of the 27 errors on the rock and ghost tasks were of the intellectually realistic, reality-for-appearance type. Although the pattern of errors on the pencil task is obviously not consistent with those of the rock and ghost tasks, we now wonder whether all of the younger children clearly established its real identity as that intended. Although made of rubber and thus having no real, lead pencil point, the fake pencil did have a real eraser at the other end, complete with the metal band that normally attaches erasers to pencils. Although the children could scarcely have believed that the soft and compressible object they held in their hands was a real rock, for example, they may have been less sure whether the imitation pencil's identity ought to be coded as a piece of rubber or as an unusual pencil, perhaps a toy one. The fact that the pencil task seemed to elicit more double errors than the other tasks is consistent with this post hoc speculation.

The results of most previous studies seem at least consistent with this hypothesis. In most (e.g., Braine & Shanks, 1965a, 1965b) but not all (DeVries, 1969) previous demonstrations of phenomenism, the issue has been one of real versus apparent object properties (size, shape) rather than object identities. In all previous demonstrations of intellectual realism, the issue has been what objects as such rather than what object properties are really versus apparently present. Object presence/absence is not the same as object identity, to be sure, but both have to do with the object considered as a whole entity or thing rather than with some isolated property of it—with "what thing is there" rather than with "what is the

thing that is there like." Although it is also true that an object's identity is not clearly separable from its properties (especially from all of its properties taken together!), a rough distinction can be drawn between the two.

EXPERIMENT 2

This experiment was designed to test the hypothesis that questions about visible properties of objects will tend to elicit phenomenism errors and questions about object identities, intellectual realism errors. Appearance and reality questions were asked about the identity and two properties (size and color) of each of four stimuli. Developmental trends were also assessed.

Method

Subjects

The subjects were 48 nursery school children of mostly middle-class backgrounds, 24 at each of two age levels: 10 male and 14 female 3½ to 4-year-olds (mean age, 3–11; range, 3–6 to 4–4); 12 male and 12 female 4½ to 5-year-olds (mean age, 4–11; range, 4–6 to 5–4).

Materials

The stimuli were four highly realistic-looking imitation objects: a hard stone-like object that resembled an egg, a candle that looked like an apple, a silk imitation flower (red carnation) with a plastic stem, and the imitation rock made out of a sponge-like material used in Experiment 1. During the question period, these objects were always viewed through a sheet of clear plastic, a sheet of tinted plastic (green or blue), or a large magnifying or minifying lens.

Procedure

Pretraining. The child first viewed the objects, one at a time, through the clear plastic at a distance of about 150 cm. The experimenter asked, "What's this?" The objects were appropriately labeled "egg," "rock," "apple," or "flower" 97% of the time by the subjects, thereby validating the intended appearance of the objects to a naive observer.

The meanings of "looks like" and "really, really" in this context were then demonstrated in the following manner. A sheet of green plastic covered a small square of white paper with serrated edges that was placed on the black table surface. The child viewed it through a magnifying lens. The experimenter said, stressing the key words:

> When you look at this with your eyes right now, it looks like a piece of cloth that is green and big. It looks like a big, green piece of cloth. But it isn't really. It's really kind of little (magnifier removed), and it's really, really white (green plastic removed), and it's really, really a piece of paper (paper handed to child to feel). It's really a white piece of paper that is kind of little. But when you looked at it with your eyes before, it looked like a piece of cloth (paper replaced on black table surface) that was green (green plastic replaced on paper) and big (magnifier placed between child and paper). Sometimes things look like one thing when they're really something else. Right?

Test. For each object in turn, the child first discovered its real identity by feeling it and by hearing a description, and also established its real color and real size. Immediately before

the child was questioned about each object, he or she was told, "Now I'm going to ask you two different questions. I'm going to ask you about how it looks to your eyes and about what it really, really is." The child's attention was then directed, by pointing and/or shaking, to the object, which was already held in position behind the appropriate screen: a transparent plastic sheet for object identity questions; a tinted sheet for color questions; a magnifier (if the child had said the object was little) or a minifier (if the child has said it was big) for size questions. Three pairs of questions were asked about the object, two question each concerning its identity, color, and size: "When you look at this with your eyes right now, does it *look like* (a) X or does it *look like* (a) Y?" "What is this *really, really?* Is it *really, really* (a) X or is it *really, really* (a)Y?" The choices were always between the real and the apparent identity, color, or size. All orders were random (object presentation, attribute questions, questions within pairs, choices within questions). All three pairs of questions were asked of each object before proceeding to the next object.

In each task, the experimenter first handed the object to the child and said: "Let's find out some more about this." The rest of the specific procedure for each task is described below.

Egg. "It's a stone that somebody painted. Feel it. It's hard and it doesn't break (object tapped on table) and the paint comes off (object rubbed on black felt). What color did somebody paint it? Is it a big thing or a little thing?" The child was then asked in succession the three pairs of questions about that object while viewing it through clear plastic (identity), dark blue plastic to make it look blue (color), and magnifier/minifier (size).

Rock. "It's a sponge. Squeeze it. It isn't hard and it isn't heavy. What color are these spots (the experimenter points to white areas)? Is it a big thing or a little thing?" The three pairs of questions followed with the child viewing the object through clear plastic (identity), blue plastic to make the spots look blue (color), and magnifier/minifier (size).

Apple. "It's a candle. Feel it. It's made out of wax. It's hard (the experimenter bangs it on the table) and this is the thing you light to make it burn (the experimenter points to wick). What color is it? Is it a big thing or a little thing?" The subject was asked the three pairs of questions while viewing the object through clear plastic (identity), blue plastic to make it look black (color), and magnifier/minifier (size).

Flower. "It's pieces of paper. Feel it. It never grew in the ground. Somebody just made it. What color is it? Is it a big thing or a little thing?" The three pairs of questions followed, with the child viewing the object through clear plastic (identity), green plastic to make it look black (color), and magnifier/minifier (size).

We attempted to make the identity and property tasks as comparable as possible by: (a) having the child view the object through something in both types of tasks (b) placing that something in front of the object out of the child's sight, so that the child never saw the object in the actual process of changing its apparent color and size (since there was no such process to see in the case of the object's apparent identity). This out-of-sight placement was done in a second's time and the child always knew it was the same object before and after the screening.

Results and Discussion

The data provided strong support for the hypothesis (see Table 2). The predominant error pattern in both age groups on the identity tasks was to give reality answers to both questions (for the two groups combined, a total of 64 vs 18). The predominant error pattern in both age groups on both types of property tasks (size and color) was to give appearance answers to both questions (grand total = 175 vs 19). The two right columns of Table 2 show the numbers of younger and older subjects on each

TABLE 2
Patterns of Answers to Pairs of Appearance (LL) and Reality (RR) Questions and the Numbers of Subjects Correctly Answering More Reality than Appearance Questions (RR > LL) and the Reverse (LL > RR)

Type of task	Age group	Pattern of answers[a]				Number of subjects	
		Correct answers to both	Reality answers to both	Appearance answers to both	Incorrect answers to both	RR > LL	LL > RR
Identity	3½ to 4	41	35	13	7	12	3
	4½ to 5	61	29	5	1	13	0
Size	3½ to 4	18	7	70	0	1	22
	4½ to 5	53	5	36	2	1	16
Color	3½ to 4	31	8	52	5	2	18
	4½ to 5	70	9	17	0	4	8

[a] The total of the left four cells of each row is 24 subjects per age group × 4 tasks per type = 96.

task who answered more reality (RR) than appearance (LL) questions correctly and vice versa (ties are excluded). All six comparisons are in the predicted direction and all but the bottom one (4 vs 8) are significant ($p < .05$) by Sign test. These error patterns also hold at the level of individual tasks. In all but one of the 24 possible comparisons (12 tasks for each of two subject groups), the predominant error is in the predicted direction; if the two subject groups are combined, all 12 comparisons are consistent with the hypothesis.

As in Experiment 1, there was clear evidence of at least some grasp of the appearance–reality distinction within the younger group. Correct answers to both questions again greatly exceeded incorrect answers to both questions on all three types of tasks (Table 2). The numbers of 3½ to 4-year-olds getting at least two of the four pairs of questions correct on each type of tasks were 12 (identity), 4 (size), and 10 (color).

As in Experiment 1 also, there was a clear improvement with age. The comparable numbers for the 4½ to 5 year olds to those just given were 20 (identity), 16 (size), and 21 (color). Each child's pairs of correct answers were summed across the four tasks of each type and subjected to 2 (age) × 3 (task type) ANOVA. Both main effects were significant but the interaction was not, $F(1,46) = 19.17, p < .001$ for age; $F(2,92) = 5.90, p < .005$ for task type. Newman–Keuls comparisons showed that older subjects performed significantly better than younger ones on all three types of tasks and that subjects performed significantly better on identity and color tasks than on size tasks.

The data also replicated those of Experiment 1 with respect to types of errors made by individual subjects. Of the 24 younger and 18 older subjects who erred on more than one task, 22 and 15, respectively, made both types of errors. Once again, therefore, most children did not respond in a consistently phenomenistic or intellectual realistic fashion across tasks. The two types of errors also showed a moderate positive correlation (r = .49, $p < .05$) in the older group, although not in the younger group (r = .14, n.s.); we have no explanation for this pattern of results.

One might have expected that children's performance would tend to improve as the testing session progressed and they continued to hear pair after pair of contrasting appearance and reality questions. We tested this possibility for each age group separately by comparing the number of correct pairs of answers given in the first six tasks experienced (on two of the objects) versus the last six tasks (on the other two objects). The younger children showed essentially no change over tasks ($t(23) = .72$, n.s.) and the older ones actually tended to get worse ($t(23) = 1.96$, $p < .10$).

Finally, another rather interesting nonresult: Recall that if the subject initially judged the real size of an object as "small" it was made to look larger at test, whereas if she initially judged it to be "big" it was made to look smaller. The children were probably more familiar with the workings of a magnifying lens (e.g., eye glasses) than a minifying one, and might therefore be better able to keep in mind that the object's true size remained the same when the magnifying lens was used. In fact, however, which lens was used for a given child and size task had no discernible effect on performance level.

EXPERIMENT 3

This experiment had two objectives. One was to try to replicate the different error patterns predicted and found in Experiment 2 for the object properties of color and size and for object identity as assessed by the imitation-object method. The other was to see if young children would behave on new types of tasks in ways that seemed consistent with the hypothesis. Accordingly, shape property tasks were added to color and size property tasks with the prediction that they would also elicit mainly phenomenism errors. Three other new types of tasks were expected to elicit predominantly intellectual realism errors. The first was a novel kind of object identity task: a tiny picture of one object (e.g., a face) looked more like another, less visually complex object (e.g., a circle) when viewed from a distance of 3 m. The second concerned object presence rather than object identity, and was therefore somewhat similar to previous nondrawing methods of assessing intellectual realism (Freeman, 1977; Liben & Belknap, 1981): after seeing large Object A placed in front of small Object B, the child was asked if it looked like both

A and B were there and if both A and B really were there. The third dealt with the real versus apparent identities of actions rather than objects: Action A (reality) resembled Action B (appearance) when viewed from a certain perspective.

A total of 21 appearance–reality tasks were used in this study, three tasks of each of the above-mentioned seven types.

Methods

Subjects

The subjects were 40 nursery school children, mostly of upper middle-class backgrounds, 20 children at each of two age levels: nine male and 11 female 3-year-olds (mean age, 3–7; range, 3–3 to 3–11); nine male and 11 female 4-year-olds (mean age, 4–5; range, 4–0 to 4–10).

Materials

Three different objects or sets of objects were used for each of six types of tasks. Three different actions and associated objects were used as stimuli in a seventh.

Identity. The stimuli were three realistic looking fake objects: a box that looked like an old, leather-bound book; an imitation fried egg, made of rubber; the imitation rock used in Experiments 1 and 2.

Distance. The three stimuli in these new object identity tasks were very small (0.5 cm) pencil drawings of a face, a flower, and a cup. They did not look at all like these objects when seen from a distance, roughly resembling instead, a circle, a doughnut, and a spot, respectively.

Hidden. The stimuli in these object presence tasks were three pairs of objects, one of which was large enough to obstruct the child's vision of the other: a stuffed bear and a small toy horse; a stuffed dog and a crayon; a block and a little toy car.

Action. One experimenter performed three actions, each of which appeared to be an entirely different action when viewed from a different perspective: drawing a small picture on a blanked-out page inside a large, vertically held children's book; pouring coffee into a mug from a watering can, with a plant just below; winding string around a spool in a mixing bowl. A small sample of preschoolers who saw these actions only from this different "appearance" perspective identified them as reading a book, watering a plant, and making a cake, respectively.

Color. The stimuli were three objects with appeared to be a different color when seen through sheets of tinted plastic: a magenta crayon and green plastic sheet (the crayon looked blue); a red triangular tile and green plastic (black); an orange crayon and blue plastic sheet (black).

Size. The stimuli were three objects, two of which (a Nerf ball and a coffee mug) were large for their class, but appeared small when seen through a minifying lens, and one of which (fake egg) was almost always labeled as small in Experiment 2, but appeared big when seen through a magnifying lens.

Shape. The stimuli were two straight objects which were distorted in apparent shape by two glass containers filled with water, and one bent object which appeared straight when rotated 90°: a skewer and vase; a crayon and beaker; a pipe cleaner which was bent in one plane only.

Procedure

Pretest. The subject was shown two pipe cleaners, one straight and one bent. The experimenter said: "Here are two pipe cleaners. One is straight and one is bent and crooked. Which one is bent and crooked? Which one is straight?" The distinctive features of the three small drawings to be used in the Distance Condition were then pointed out to the subject in order to encourage accurate coding of the real identity of the picture: "Where is the mouth?" "Here is the stem. Can you show me the leaves?" "Where's the handle?" Finally, the child's knowledge of the colors and shapes to be used in the tasks was checked. Two children who did not perform perfectly on this pretest were dropped from the subject sample and replaced.

Pretraining. Half the children in each age group received the training in the order given below, half in the reverse order.

After showing the child the Experiment I Charlie Brown puppet, the experimenter put the handkerchief with the eyes and mouth over the puppet and said: "When you look at this with your eyes right now, it looks like a ghost. It looks like a ghost to your eyes. But it really, really isn't. It's really, really Charlie Brown. Sometimes things look like one thing to your eyes when they are really, really something else."

The child was handed a heavily starched piece of cloth to feel. Holding the cloth 1 m from the child the experimenter said "When you look at this with your eyes right now, it looks soft and easy to bend. It looks soft and bendy, like this. (Experimenter holds up and moves an unstarched piece of the same cloth.) But it really, really isn't. It's really, really stiff and hard. Sometimes things look like one thing to your eyes when they're really, really something else."

Test. Unlike the case in Experiment 2, we attempted to reduce any differential emphasis on appearance and reality by never labeling either; the children themselves sometimes labeled one or both spontaneously, however. All three tasks of a given type were administered before the next task type was presented. In each task, the child was first shown the reality, then shown the transformation to the appearance state, and then asked two questions: "When you look at this with your eyes right now, does it look (like a) X or does it look (like a) Y?" "What is this really, really? Is it really, really (a) X or is it really, really (a) Y?" The choices were always between the real and apparent identity, property, et cetera. With the constraint that each type of task was administered first at least twice within each age group, all orders were random (task type, task order within task type, questions within pairs, choices within questions). At the end of the testing session the child was asked whether each object used in the size task was a big or a little thing; 115 of the 120 responses were correct (one child said the egg was big and four said the mug was little). The specific procedure for each condition was as follows.

Identity. The condition was introduced by, "Now we are going to talk about some things I'll show you." The squeezed sponge and folded over rubber egg were handed to the child to feel. The box (with a few envelopes in it) was shown to the child in the open position; it was then closed. Questions were asked immediately following presentation of each object as the objects were held at a distance of 1.3 m. The question choices were book/box; egg/piece of rubber; rock/sponge.

Distance. "Now we are going to talk about little pictures of things." The child was handed the card with the small drawing. Holding the card so that the picture always continued to be visible to the child, the experimenter then backed up 3 m to an area of reduced illumination, and the questions were asked. The question choices were circle/face; doughnut/flower; spot/cup.

Hidden. "Now we'll talk about some things I'll show you." A pair of objects was held up for the child to see. The smaller object was placed on the table approximately 60 cm from

the child, and the larger object was positioned so that it completely obscured the child's vision of the smaller one. The question choices were: a bear here by itself/a horse and a bear here; a dog here by itself/a crayon and a dog here; a block here by itself/a car and a block here.

Action. "Now we are going to talk about some things (second experimenter) is going to do." The child observed the reality of the action, then moved around the second experimenter to a different view 2 m away. The question choices were reading a book/drawing a picture; watering the plant/pouring coffee; mixing a cake/winding string.

Color. "Now we are going to talk about some colors." The stimulus was placed on a white ground 60 cm from the child. It was then covered with a tinted plastic sheet and the question choices were blue/red; black/red; black/orange.

Size. "Now we will talk about big things and little things." The stimulus was placed on the table 1.6 m from the child. As the magnifier (egg) or minifier (ball, mug) was positioned to give the child the maximum effect, the second experimenter pointed to the stimulus. The question choices were big thing/little thing for all three stimuli.

Shape. "Now we are going to talk about things that are bent and crooked and things that are straight." The child was initially shown the crayon and skewer from 1 m. He then saw the skewer placed in the vase touching the bottom at a 45° angle and the crayon held 3 cm behind the beaker; both objects looked distinctly bent or curved under these conditions. The child viewed the pipe cleaner from a distance of 3 m under reduced illumination. It was first held so that the child could see that it was bent, then rotated 90° so that it appeared straight. The question choices for all stimuli were bent and crooked/straight.

Results and Discussion

Most but not all of the findings of Experiment 3 are consistent with predictions and previous results (see Table 3). As predicted, the predominant error pattern on the distance, hidden, and action tasks was to give reality answers to both questions (intellectual realism). The two right columns of Table 3 show the numbers of children who answered more reality than appearance questions correctly and vice versa (cf. Table 2). Of the six comparisons in these columns for these three types of tasks, only that for the younger subjects on the distance task is not significant ($p < .05$) by Sign test (it is significant for both age groups combined). As predicted also, the predominant error pattern in both age groups for the three types of property tasks (size, color, and shape) was the opposite one of giving appearance answers to both questions (phenomenism). However, only the four comparisons involving color and shape were significant. Of the 36 possible comparisons on individual distance, hidden, action, size, color, and shape tasks (three tasks per task type, for each of the two groups of children), the predominant error is in the predicted or expected direction in all but two: namely, subjects at both age levels tended to respond "big" rather than "little" when viewing the large ball through the minifying lens.

Children did not perform as predicted on two of the three identity tasks, however. As in Experiments 1 and 2, the tendency on the imitation rock task was to give reality answers for appearance questions rather than the

TABLE 3
Patterns of Answers to Pairs of Appearance (LL) and Reality (RR) Questions and the Number of Subjects Correctly Answering More Reality than Appearance Questions (RR > LL) and the Reverse (LL > RR)

Type of task	Age group	Pattern of answers[a]				Number of subjects	
		Correct answers to both	Reality answers to both	Appearance answers to both	Incorrect answers to both	RR > LL	LL > RR
Identity	3	21	13	24	2	2	9
	4	34	13	11	2	5	4
Distance	3	23	27	10	0	11	5
	4	30	22	4	4	11	1
Hidden	3	10	41	7	2	14	3
	4	32	23	4	1	13	1
Action	3	9	39	8	4	16	2
	4	31	24	3	2	11	1
Size	3	25	12	18	5	6	9
	4	31	10	19	0	3	9
Color	3	23	9	26	2	2	13
	4	34	3	19	4	1	10
Shape	3	29	4	26	1	2	15
	4	33	2	20	5	0	11

[a] The total of the left four cells of each row is 20 subjects per age group × 3 tasks per type = 60.

converse (13 vs 5 subjects). However, the opposite tendency was found for the imitation book (9 vs 15 subjects) and the imitation egg (4 vs 15 subjects). In the case of the imitation egg, at least, there is reason to wonder if a number of the children may not have initially coded it as a real if somewhat peculiar egg rather than as a piece of rubber or some other not-egg object. When initially given the folded over imitation egg to feel to establish its real identity, 10 subjects spontaneously labeled it as an egg. Of the 19 children who made comments when given the imitation rock to feel, on the other hand, all but one said reality-appropriate things, such as "That's a sponge," "It feels mushy," and "That looks like a rock but rocks are not squeezy." No child every called it a rock. This argument is similar to that concerning the imitation pencil in Experiment 1 (and is, of course, equally post hoc). The children rarely made spontaneous comments about the imitation book, and consequently we have no clues as to why this task elicited so many phenomenism errors.

Most of the remaining findings are also largely consistent with the results of Experiments 1 and 2 (see Table 3). Once again, even the younger groups showed at least some limited ability to make appearance–reality distinctions in most of our task situations. As in the previous two experiments, on most types of tasks they got both of the two questions right much more frequently than they got both questions wrong. Of the twenty 3-year-olds, five were fully correct on at least two of the three component tasks of at least four of the seven task types; 10 reached the same (arbitrary) criterion for at least three of the seven types. The corresponding figures for the twenty 4-year-olds were 11 and 13, respectively. A 2(age) × 7(task type) ANOVA revealed significant main effects for age, $F(1,38) = 5.91$, $p < .02$, and task type, $F(6,228) = 2.45$, $p < .05$, and a near-significant age × task type interaction, $F(6,228) = 2.02$, $p < .06$. The older children performed about equally well on all seven types of tasks, responding correctly on about half the tasks; somewhat better than the younger ones on the identity, distance, size, color, and shape tasks, but not significantly so; significantly (Newman–Keuls) better than the younger ones on the hidden and action tasks. The younger children performed about equally well across the former five tasks but more poorly on the latter two, mainly because of an especially strong tendency toward intellectual realism errors on these two tasks. Newman–Keuls comparisons showed that they performed significantly worse on hidden than on distance and shape, and significantly worse on action than on distance, size, and shape. Thus, even the younger group evidenced some grasp of the appearance–reality distinction on most tasks; on the other hand, even the older group did not approach ceiling performance on any task, despite the brief pretraining on the conceptual and semantic aspects of the appearance–reality distinction.

Of the 20 younger and 17 older children who erred on more than one task, all 37 made both phenomenistic and realistic errors; as in Experiment 2 also, the two types of errors showed a significant positive correlation ($r = .67$, $p < .01$) in the older group but not, again for unknown reasons, in the younger group ($r = -.35$, n.s.). As in Experiment 2, subjects' performance did not improve with additional task experience in the course of the testing session. Children in both age groups performed at about the same level on the first and last 10 of their 21 tasks, $t(19) = .13$, n.s. for the younger group; $t(19) = .08$, n.s., for the older group. Similarly, performance also did not tend to improve over the three tasks of each task type. Comparison of subjects' performance on their first-experienced versus their last-experienced task of each type, summed over the seven types, showed essentially no difference in the case of the older group ($t(19) = .44$, n.s.) and a tendency to perform worse on the last-experienced task in the case of the younger group ($t(19) = 2.15$, $p < .05$).

GENERAL DISCUSSION

The results of these experiments suggest several conclusions about the early development of the appearance–reality distinction.

1. Some ability to make the distinction in specific concrete task situations is present as early as age three. The distinction appears very precarious and unstable at this age, however.

2. Although this ability clearly improves during early childhood, older preschoolers also continue to make many errors in these task situations.

3. When young children fail to make the distinction correctly they usually do not respond randomly. Instead, they make either of two systematic errors: (a) they report appearance when reality is requested as well as when appearance is requested (phenomenism); (b) they report reality when appearance is requested as well as when reality is requested (intellectual realism). Individual children are not consistent "phenomenists" or "intellectual realists" across appearance–reality tasks, however. Quite the contrary, an important finding of these experiments is that they will often make one kind of error on one task and the other kind on the next one. The commonly held view that "the preschool age child is prone to accept things as they seem to be, in terms of their outer, perceptual, phenomenal, "on the surface" characteristics (Flavell, 1977, p. 79)" is therefore incomplete and misleading. Rather, the very same young child who stops at the phenomenal surface when she is supposed to go deeper will, on another task, go deeper when she is supposed to stop at the surface.

4. Certain types of tasks tend to induce phenomenism errors, while other types tend to elicit intellectual realism errors. If the task is to distinguish between the real and apparent properties of size, color, and shape, the child is likelier to make a phenomenism error than a realism error. Whether this would also be true of other sorts of properties is not known at present. For example, it might turn out that properties more closely associated with an object's identity, such as its characteristic functions and the substance of which it is composed, would tend to elicit realism rather than phenomenism errors. If the task is to distinguish between the real and apparent identity or presence of objects and actions, on the other hand, the child is likelier to make a realism error than a phenomenism one. Our tentative interpretations of these results are the following.

Most of the preschool subjects in these experiments must have possessed some command of the appearance–reality distinction. It is hard to imagine how else they could have succeeded in answering both questions correctly so much more often than they answered both questions incorrectly. However, their behavior also suggests that this command must have been quite limited. They would often respond correctly on one task

and incorrectly on the next, even when the next was a task of the very same type (e.g., another color task). Furthermore, neither the explicit feedback in Experiment 1 nor the explicit pretraining in Experiments 2 and 3 sufficed to produce consistently good performance. Finally, the children did not improve with additional task experience in Experiments 2 and 3. We conclude from these facts that they probably did not have a conscious, well-articulated conception of an abstract and general appearance–reality distinction. That is, they seemed not to possess the sort of high-level, metaconceptual grasp of it that would have allowed them to view all of the tasks, learning-set fashion, as just different tokens of the same type. Although further research (currently under way) will be needed to document it, we believe that subsequent development in this area prominently includes the acquisition of this higher level, metaconceptual understanding of the distinction. What the children seemed to do instead was treat each succeeding task as a wholly new problem, responding correctly to some, phenomenistically to others, and realistically to still others. Thus, the appearance–reality distinction seems to have been for them a concrete, task-bound affair that was not consistently available for use.

On tasks where the distinction was not available, the children probably focused their attention mainly on either the appearance (e.g., "blue") alone or the reality (e.g., "white") alone, rather than on both and the relation between them. Furthermore, whichever one of the two was attended to was almost certainly not thought of as an appearance; that is, even when the appearance was attended to it was not so coded. Rather, the salient information was coded as an unanalyzed and undifferentiated reality, that is, one not consciously distinguished from and contrasted with appearance. In sum, we believe that on tasks where the distinction was not made the children's tacit goal was only to identify the real state of affairs in those task situations; the idea of an "appearance" did not come into play at all.

Assuming this were true, why might they tend to incorrectly identify the appearance as this undifferentiated reality on the color, size, and shape tasks while correctly identifying the true reality on the other tasks? Our speculations are as follows: Young children probably have had relatively little need or occasion to distinguish real from apparent size, color, or shape. They have powerful perceptual-constancy mechanisms and a lot of real-world knowledge about objects to keep them from making many mistakes about the real size, color, and shape of the objects they encounter in their everyday lives. As a consequence, they may seldom have the developmentally formative experience of having simultaneously to represent an object as at first seeming big and blue, say, but then turning out to be little and white.

Although they probably have had fairly limited experience with illusory changes in such properties, they have undoubtedly had considerable experience with real changes in them. They have both perceived and produced real changes in object size (growth, adding or deleting material), color (painting, crayoning), and shape (sculpting, squashing).

These experiences may lead the child to assume implicitly, when momentarily not alert to the appearance–reality distinction, that if something is currently perceived as big, blue, or bent now it is big, blue, or bent (cf. Braine & Shanks, 1965a). The child will make this assumption even if she has kept in mind the fact that it was little or white or straight a moment ago, in a different viewing circumstance. Indeed, some of our subjects talked about property changes as if they were thinking this way. Examples include: "It's really green but now it's red" (What is it really, really?) "Red"; "That way it's big, but when you take it (the magnifying glass) off it's little"; "It was big before but now it's small" (cf. Elkind, 1966). The fact that the perceived change results from the interposition of a colored filter, magnifying glass, or a glass beaker rather than from a repainting, a physical enlargement, or a bending process is not considered relevant by the child on those occasions when the appearance–reality distinction is not clearly borne in mind. "Is big (blue, bent)" is tacitly equated with "looks big (blue, bent) now" on those occasions; no other information influences the decision process.

The opposite situation appears to hold for the identity, existence, and presence of objects. Some of the arguments below may also have force for actions and other events, as well as for objects. On the one hand, the young child has had a great deal of experience with discrepancies between appearance and reality in this domain. He has known since infancy (object permanence) that objects that have moved out of sight behind other objects continue to exist and continue to be present. Searching for apparently nonpresent objects in earnest or for fun (e.g., hide and seek games) is a very familiar script for the young child. Similarly, he knows that Person A disguised as Person or Creature B looks like B but is still really A. He has had experiences thinking that Object C was Object D and later discovering that he was mistaken. The object may have been too far away or have gone by too fast for accurate identification. Or the object may be an unfamiliar one that the child overtly misclassifies, only to be corrected by his parents. ("That's not a horse, dear, it's a zebra. It just *looks* like a horse.") The appearance–reality discrepancy that we call mistaken identity must be a familiar one to preschoolers. Even a child who had never seen a fake object could fairly easily assimilate it to this mistaken identity schema, one would think. Finally, the child has had much practice, in symbolic or dramatic play, in coding an object or person as really this but make-believe that. In contrast, we doubt if children as often deliberately

make believe than an object has a different color, size, or shape than it really does.

Although appearance and reality discrepancies occur frequently and are familiar to the child in the object case, the opposite is true for real changes. The child of this age has learned that (inanimate) objects that have disappeared behind other objects will seldom turn out to be really annihilated or really gone from the vicinity. She has also learned that the identities of self, other people, and most objects do not change with changes in appearances (Piaget, 1968).

A final difference between such properties and objects may be that young children, like the rest of us, are usually much more concerned with knowing what objects are present than what color, size, or shape they are. This greater concern may also help keep the known reality cognitively salient in the objects case. The same is probably true for actions and other events.

Such considerations might partly explain why children who have momentarily lapsed into thinking only about reality can more easily identify the reality correctly on the nonproperty tasks than on the property tasks. However, they obviously do not explain why it is appearance rather than reality that fades from awareness during these lapses. We think the reason is that young children generally find it difficult to analyze perceptual appearances (views, perspectives) as such (cf. Flavell, Everett, Croft, & Flavell, 1981 concerning "Level 2 knowledge" about visual experiences). We further believe that this difficulty may reflect a more general metacognitive limitation concerning mental representations (Flavell, 1981). Like older children and adults, young children of course have and use mental representations. However, they may be generally less cognizant of and attentive to the source and nature of their representations than their elders. They may be less disposed and able to "stand back" from these representations and reflect on their origins and other properties (e.g., their veridicality or trustworthiness). An individual who is skilled at this sort of reflection could analyze and tag his representations in such ways as the following: (1) Representation X characterizes what is literally perceptible (visible, audible, etc.) to me at this point in time and position in space; I can thus tag Representation X as a representation of present appearances. (2) Representation Y is a description of what I know to be present (true, the case, the real state of affairs) on the basis of immediately prior direct perception; I also know that it is not literally perceptible to me at this moment, however, and can tag it accordingly. (3) I am aware that Representation C is the result of inference or hearsay rather than first-hand, direct perception, now or in the past; I can tag it as such, and can also variously tag it as possibly, probably, or definitely veridical, on the basis of its source or other information I may have about it.

The expert witness is the prototype of this sort of individual. She clearly understands what is being requested when asked for a bare-bones, low-inference perceptual report ("Just the facts, ma'am") versus a well-founded but more highly inferential judgment of what probably happened. She knows that second- or third-hand information is different from and usually less trustworthy than first-hand information, but that even the latter is subject to error. She can make mistakes in the witness role, of course, as Johnson and Rae's (1981) recent work on "reality monitoring" and the vast literature on testimony amply show. The more important point is that she knows what the game is here and can usually use that metaknowledge fairly well to distinguish among representations in these ways. The older child and the lay adult undoubtedly also possess and can use such metaknowledge in varying degrees.

In contrast, the young child does not yet know this game very well. One probable consequence is that he cannot deliberately restrict his attention and verbal report to a well-defined segment or aspect of a currently salient representation. This segment or aspect could be the immediately perceptible (the "appearance"), as in the present research. It could also be that which is inferred, that which is hearsay, that which is logically necessary, that which was poorly established as a fact and may therefore be incorrect, and so on. The young child may find it difficult to report only a segment, such as the immediately perceptible, even in situations where one would think that the segment would be trivially easy to identify, as in the Experiment 3 hidden and action tasks and the various object identity tasks. The same difficulty in tagging and keeping track of a representation's epistemic source and credentials may underlie young children's occasional confusions between fact and fantasy. For example, children may tell innocent "whoppers" because they fail to tag and recall the internal, imaginative source of their representations. The possible developmental acquisition of the disposition and ability to reflect on and index one's own representations in these diverse ways is an important subject for future research. Among other things, this acquisition probably helps mediate the higher level, metaconceptual knowledge about the appearance–reality distinction that must develop in the years following early childhood.

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(Accepted September 20, 1981)