Four experiments used a free-naming task to examine children's and adults' default construals of solids and nonsolids. In Experiment 1, 4-year-old children viewed entities presented in familiar geometric shapes (e.g., square, triangle), without touching them. One half saw solids (e.g., a square made of wood); the other half saw nonsolids matched carefully in shape (e.g., a square with the same dimensions but made of peanut butter). To tap their default construals, children were simply asked, "What is that?" Answers varied sharply with the type of stimulus. If the entity was solid, children tended to provide an individual-related word (e.g., "a square"), even if they also knew a substance-related word (e.g., "wood"). But if the stimulus was nonsolid, children tended to give a substance-related word (e.g., "peanut butter"), even if they also knew an individual-related word (e.g., "a square"). These words were usually common nouns produced in appropriate sentential contexts, suggesting that 4-year-olds represented the words as naming kinds. The same pattern of results obtained in Experiments 2 and 3, which were modified replications of Experiment 1. The results of Experiment 4 replicated the main findings of Experiment 1 using adults as participants. The studies suggest that, as a default, 4-year-olds conceptualize solids and nonsolids in (a) fundamentally distinct, (b) kind-based (rather than perceptual property-based), and (c) adult-like ways.

Young children's expertise at learning the meanings of new words has led many researchers to posit the existence of child-internal assumptions that help in the task of lexical acquisition (e.g., Baldwin, 1989; Bloom, 1994; Carey, 1982; Golinkoff, Mervis, & Hirsh-Pasek, 1994; Hall & Waxman, 1993; Landau, Smith, & Jones, 1988; Markman, 1989; Waxman & Gelman, 1986; Waxman & Kosowski, 1990; for an alternative perspective, see Levy &
Nelson, 1994; Nelson, 1988, 1990; see Behrend, 1990, for discussion). A common strategy for documenting these assumptions has been to study how children extend a new word ("X") that is defined ostensively (e.g., through pointing) for a novel (previously unnamed) entity. As noted by Quine (1960), an ostensive definition is consistent with a huge number of possible interpretations; thus, stable patterns of extending new words introduced under these conditions have been used to infer the existence of "default" assumptions about meaning (see Markman, 1992; Woodward & Markman, 1991).

This article concerns recent claims about these default meaning assumptions, specifically that they are fundamentally different when a new word is used to label a novel solid entity (e.g., an object) than when it is used to name a novel nonsolid entity (e.g., a portion of liquid, gel, or powder). The basic phenomena at issue are these: (a) Children who hear a word defined ostensively for a novel solid entity (e.g., a spoon) tend to extend it to other "individual-related" entities (e.g., other spoons or spoon-shaped things; for evidence and discussion, see Landau, Jones, & Smith, 1992; Landau et al., 1988; Soja, Carey, & Spelke, 1991, 1992; for further evidence, see Hall, Waxman, & Hurwitz, 1993; Imai & Gentner, 1993; Jones, Smith, & Landau, 1991; Markman & Wachtel, 1988; Soja, 1992); and in contrast, (b) Children who hear an ostensive definition involving a novel nonsolid entity (e.g., a pile of sand) tend to extend the word to other "substance-related" entities (e.g., other portions of sand or sand-colored/textured portions; see Imai & Gentner, 1993; Soja, 1992; Soja et al., 1991).

One way to characterize the preceding phenomena is in terms of default construals. If an entity is solid (e.g., a metal spoon), it could be construed in either individual-related terms (e.g., the new word could mean spoon or spoon-shaped) or substance-related terms (e.g., the word could mean metal or metal-colored/textured). The same is true of a nonsolid entity: A pile of sand could be conceptualized in either a substance-relevant way (e.g., the new word could mean sand or sand-colored/textured) or an individual-relevant manner (e.g., the word could mean pile or pile-shaped). As adults, we can name solids and nonsolids in both individual-related and substance-related ways, suggesting flexibility in our ability to construe an entity. Yet the results from the word extension tasks suggest that children learning words for novel solids and nonsolids may be influenced by different default ways of conceptualizing these two types of entity: Children may view solids fundamentally in individual-related terms, whereas they may see nonsols fundamentally in substance-related terms (see also Bloom, 1994; Bloom & Keleman, 1995; Soja, 1992; Soja et al., 1991). As a result, words that name default conceptualizations—solid individual object words (e.g., "spoon") and nonsolid substance words (e.g., "sand")—may be relatively easy to acquire in the presence of a novel entity. In contrast, words naming non-de-
fault construals—solid substance words (e.g., “metal”) and nonsolid individual portion words (e.g., “pile”)—may be relatively hard for young children to learn when faced with a novel entity (see Dickinson, 1988; Soja, 1992). The fact that children do learn words naming non-default construals is not at odds with the proposed assumptions. Indeed, according to several views of lexical development (e.g., Mutual Exclusivity, as proposed by Markman & Wachtel, 1988; or Contrast, as described by Clark, 1987), after children have acquired a word naming a default interpretation, they should tend to interpret a new word for the same entity as having a different (non-default) meaning.

The research presented here was motivated by both methodological and conceptual concerns. Two methodological issues associated with previous novel word extension tasks suggest alternatives to the claim that children, as a default, conceptualize novel solids but not novel nonsolids in individual-related terms. First, previous studies have not matched the shape of solid and nonsolid entities in order to equate them in terms of a possible individual-related construal. In some of the past work (e.g., Soja et al., 1991), the complexity of the individual-related construals was varied by independently manipulating the shapes of the entities, so that sometimes the shape of the solid entity was more complex than that of the nonsolid, and vice versa. This manipulation had little effect on children’s performance (but see Imai & Gentner, 1993, for evidence that shape complexity affected Japanese children’s tendency to construe a solid entity in individual-related terms; individual-related construals were more common if the shape was complex than if it was simple). Yet regardless of shape complexity, the possibility remains that in past work an individual-related construal has simply been more namable and/or familiar for the solid than for the nonsolid. This concern could be alleviated by presenting both solid and nonsolid entities with the same shapes. Any differences in the manner of construing them then could not be attributed to differences in shape namability or familiarity and could provide a more clear-cut demonstration that children do make an individual-related interpretation specifically in the context of a novel solid entity.

Second, in previous research investigating children’s construals of solids and nonsolids using word extension tasks, children have been encouraged to manipulate the named entities (e.g., Soja et al., 1991). As a result, children discovered that the shape of the nonsolid, but not the solid, entities could be deformed. Children may thus have been more likely to categorize the solid than the nonsolid entity in individual-related terms, simply because the shape was more salient (e.g., stable) in the case of the solid (for discussion, see Gathercole, Cramer, Somerville, & op de Haar, 1995; Soja, 1993). This concern could be addressed by not allowing children to touch the stimuli.

The two preceding methodological concerns were addressed in the current research, along with an important issue about the underlying nature of
preschool children's default construals. There are (at least) two possible explanations of what it means to claim that children conceptualize an entity in either individual-related or substance-related terms. Children could be interpreting the new words as naming either kinds or properties. An individual-related interpretation could be either a kind of individual (like spoon) or a salient perceptual property such as shape (like spoon-shaped) (for extensive discussion of this issue, see Baldwin, 1992; Carey, 1994; Golinkoff, Shuff-Bailey, Olguin, & Ruan, 1995; Imai, Gentner, & Uchida, 1994; Landau et al., 1988; Landau et al., 1992; Soja, 1993; Soja et al., 1991, 1992). Similarly, a substance-related construal could be either a kind of substance (like sand) or a substance-related perceptual property such as color or texture (like sand-colored or -textured). It has even been suggested that the nature of the interpretation of new words, at least for solid entities, shifts over the course of development from initially being more perceptual property- (shape-) based to later becoming more kind- (or "taxonomy"-) based (Imai et al., 1994).

Construing entities in terms of perceptual properties is fundamentally different than construing them in terms of kinds. As Golinkoff et al. (1995) suggested for the case of solids, if construals are based on the property of shape, "it would mean that, for children, extension is not as much based on the kind of object something is as on how it appears—a more superficial basis for extension" (p. 496). Indeed, kinds and properties are named by different grammatical categories in the adult language—kinds by common nouns (count nouns, mass nouns), properties by adjectives; and common nouns (e.g., "a liberal") have been shown to support more inductive inferences than adjectives (e.g., "liberal") for adults (Markman, 1989). In semantic terms, common nouns name kinds that provide identity conditions supporting quantification (e.g., counting or measuring) over their extensions (count nouns in terms of individuals; mass nouns in terms of portions); adjectives do not. Thus, it is important to understand the nature of children's default interpretations at any point in development. Any change in the primary manner of construing entities might signal an important discontinuity in semantic development. Moreover, as Golinkoff et al. (1995) indicated, if young children do extend new words for solids on the basis of the property of shape and only later on the basis of kind, it is not clear "how children move beyond perceptual similarity to object kind as a basis for extension" (p. 496; for some possibilities, see Imai & Gentner, 1994).

Researchers have usually explored whether children, as a default, interpret a new word for a novel entity as naming a kind or a perceptual property by using novel word extension tasks. However, in the case of a solid entity, a kind of individual interpretation (e.g., the basic-level kind, spoon) and certain perceptual property interpretations (e.g., the property, spoon-shaped) would often result in the same pattern of word extension behavior.
A similar problem also often arises in interpreting children’s word extensions when the referent is nonsolid: Substance kind (e.g., sand) is typically closely linked to certain substance-relevant properties like color/texture (e.g., brown/coarse).

One approach to illuminating the underlying status of children’s default concepts is to design novel word extension tasks that distinguish between entities that share a common salient perceptual property (e.g., shape) and those that share a common kind (e.g., object kind). Some recent work has taken this general approach (e.g., Baldwin, 1992; Golinkoff et al., 1995; Imai et al., 1994; Poulin-Dubois, Klein, Graham, & Frank, 1993). The work provides important new insight into the role of both perceptual properties and kinds in early lexical development. For example, Golinkoff et al. (1995) (Experiment 6) have shown that 4-year-olds will extend a novel (“puppet”) word from familiar solid objects to same-shaped basic-level kind members but not to same-shaped out-of-kind distractors, suggesting that children construe the entities specifically in terms of (basic-level) kinds. However, one limitation of the research for the present question is that it focused exclusively on solid entities. Moreover, the work involved teaching novel words (albeit “foreign” or “puppet” words) for entities that were already familiar (previously labeled) for children, raising the possibility that children’s interpretations did not reflect their first or default construals (e.g., they might have been affected by Mutual Exclusivity or Contrast; see Markman, 1989). Most importantly, the fact that these studies used a word extension paradigm still leaves the results subject to the same inherent ambiguity described earlier. For example, even if children do extend a novel word from a solid entity to another individual of the same object kind (with or without the same shape), but not to an individual of the same shape from a different object kind, children still could have interpreted the word as naming some unanticipated property (-ies) rather than a kind.

One feature of the results of previous word extension tasks does, however, favor the idea that even very young children (2-year-olds) construe novel entities, as a default, in terms of kinds rather than perceptual properties (Soja et al., 1991; see also Carey, 1994). In a two-option forced-choice task, children are more likely to extend a new word from one novel solid object to another same-shaped solid object if the alternative is a differently shaped single solid object than if it is three pieces of solid material. If children think the novel word names a property (shape), then this difference is hard to explain: The shape is the same in both cases, and so children should be equally likely to extend the word to the same-shaped object. However, if children think the novel word names a kind of object, then the result makes sense: When the alternative is three pieces of solid material, it cannot be an object at all, let alone an object of the same kind as the named entity, and so children should extend the new word at ceiling levels to the same-shaped
object, as they do. When the alternative is a single solid object, however, children have two objects to choose from. Thus, their tendency to select the same-shaped object should now be somewhat lower (as it is), plausibly reflecting the fact that they do not yet have a clear-cut way of deciding what counts as the "same kind of object." In striking contrast, there is no difference between children's tendency to extend a novel word from a single novel nonsolid referent to either one or three portions of the same nonsolid substance. This finding is consistent with the claim that children construe novel entities in terms of kinds, because both one and three portions of a nonsolid substance are equally good examples of the "same kind of substance." The effect of number on children's extension performance thus favors the idea that their construals of solids and nonsolids are in terms of kinds.

Another approach to shedding light on the latent nature of children's default construals is to use a task other than word extension. The experiments in this article used a free-naming task. Participants viewed material entities and were simply asked, "What is that?" Like the word extension task involving novel entities, the free-naming task requires participants to indicate their primary or default conceptualization of an entity. In fact, free naming data have been used along with classification and word-learning data in previous research examining the psychologically privileged manner of categorizing solid objects (e.g., Rosch, 1978; Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976). However, the free-naming task taps the default construal of an entity differently than the novel word extension task: Instead of asking how participants project a new word beyond a named novel entity, the free naming task asks participants to produce a single label for a previously named entity. The task thus generates data that are words having specific meanings and belonging to specific grammatical categories. If children provide common nouns (words that name kinds in the adult language) in the task, then this would suggest that their default construals are in terms of kinds.

However, if children produced common nouns in the free-naming task, this would not, on its own, be convincing evidence that they represented the words as naming kinds. For example, young children might simply have a tendency to map nouns onto perceptual properties; common nouns in children's early vocabularies would thus actually function as adjectives. Stronger evidence that children represented nouns as naming kinds would be obtained if children produced the nouns with appropriate noun morphology and/or in suitable noun sentential contexts. For example, if they produced count nouns in contexts like "It's a ball," but produced mass nouns in contexts like "It's some milk," this would suggest more strongly that children's nouns did map onto kinds, because in the adult language (a) count nouns may be preceded by the indefinite article ("a") and other discrete
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modifiers that quantify over individuals (e.g., objects), and (b) singular mass nouns may be preceded by continuous modifiers like "some", which quantify over portions (e.g., nonsolid substances). In contrast, all properties are marked in the adult language by adjectives, which are not quantified. And even 3- and 4-year-old children appear to have an adult-like understanding of the quantificational properties of many determiners and quantifiers. For example, they distinguish appropriately between the reference of novel words modeled in count noun contexts ("an X") and those modeled in mass noun contexts ("some X") (Brown, 1957) and adjective contexts ("an X one") (e.g., Hall et al., 1993; Smith, Jones, & Landau, 1992; Taylor & Gelman, 1988). To the extent that children's understanding of determiners and quantifiers is adult-like, their use of these words in the free-naming task can contribute useful additional information about the latent nature of their default construals of solid and nonsolid entities.

In the studies shown in this article, the free-naming task was adapted for the first time to examine children's default construals of both solids and nonsolids. One half of the participants saw solids and the other half saw nonsolids, without touching them. Note that either an individual-related or a substance-related word is a possible answer to a free-naming request involving either a solid or a nonsolid. However, if solids and nonsolids are construed as a default in fundamentally different ways, then children should produce individual-related words if the entity is solid and substance-related answers if the entity is nonsolid. Furthermore, if solids and nonsolids are conceptualized in terms of kinds, then the words children produce should be (appropriate marked) common nouns (count nouns, mass nouns).

Rosch et al. (1976) noted two possible artifacts of the naming task, both of which were dealt with in the design of the present experiments. One is that the results may simply reflect linguistic ignorance. For example, participants may give an individual-related or a substance-related answer because they do not know any other word for the entity. This issue was addressed in these studies by also asking participants—after they had completed the free-naming task—to provide words for both the individual and the substance. In this way, it was possible to determine if answers in the naming task reflected a preferred construal or simply the only construal for which participants knew a name. It was thus also possible to shed light on whether participants are flexible in their ability to categorize and name the very same entity in more than one way. Previous research has suggested that young children may deny that a solid entity can be labeled in terms of two or more different kinds of individuals (e.g., that a dog is both a "dog" and an "animal") (see Macnamara, 1982; Markman & Wachtel, 1988; but see also Waxman & Hatch, 1992). The current task addresses the important issue of whether preschool children have a similar difficulty in categorizing (here, as
judged by naming) the same entity (either solid or nonsolid) both as an individual and as a substance.

A second possible artifact of the free-naming task noted by Roach et al. (1976) is that responses might reflect a preference for the more common or frequent word in the adult language, not for a word of one or another conceptual type per se. This issue was addressed as follows. First, the frequency of the substance-related words was controlled. In all cases where the substance was marked with a single word rather than a phrase, the solid substance kind word in a pair was always as frequent as, or more frequent than, the associated nonsolid substance kind word (Kucera & Francis, 1967; frequency data were not available for substances marked with a phrase rather than a word). Thus the frequency data actually stacked the deck against the hypothesis that nonsolid substance words (naming default concepts) should be preferred to solid substance words (naming non-default concepts). Second, frequency of the individual-related words was controlled by using the same shape for both solids and nonsolids. In other words, pairs of solid and nonsolid stimuli (controlled in the frequency of their associated substance-related words) were matched carefully in shape. Sometimes (Experiments 1, 2, and 4) these were familiar geometrical shapes—circles, squares, triangles, and rectangles. For example, one pair of stimuli consisted of a wood square (solid) and a peanut butter square (nonsolid) of exactly the same dimensions. Other times (Experiment 3), the shapes were more complex and irregular, but they were still matched carefully in pairs between the solid and nonsolid conditions.

One requirement of the free-naming task is that those participating have to be old enough to be able to produce at least one word for material entities. Furthermore, knowledge of at least some non-default words is useful for assessing whether performance in the free-naming task reflects a preference for one type of construal over another. Children below the age of 4 years tend to know few words for the hypothesized non-default concepts, specifically solid substance words (e.g., Dickinson, 1988; Prasada, 1993). Thus, Experiments 1 to 3 focused on 4-year-olds. In addition to knowing words to name both solids and nonsolids, 4-year-olds appear to have acquired an adult-like understanding of the referential correlates of the sentential contexts and morphology associated with these words (e.g., Brown, 1957; Katz, Baker, & Macnamara, 1974; Taylor & Gelman, 1988; see also Brown, 1973; Emslie & Stevenson, 1980; Gordon, 1988; Maratsos, 1976). Thus, 4-year-olds' productions of words in particular contexts or with specific morphological markers can reasonably bolster inferences about how children represent the words. Most important, 4-year-olds fall within the range of ages that have been the focus of much of the recent investigation into the underlying nature of assumptions about word meaning (e.g., Baldwin, 1992; Golinkoff et al., 1995; Imai & Gentner, 1993). Experiment 4 in this
article examined adults to determine what, if any, changes occur in the
default manner of construing solids and nonsolids in a naming task between
the time of preschool and adulthood.

In sum, the experiments presented in this article examined how 4-year-
olds and adults labeled solid and nonsolid entities in a free-naming task. The
experiments involved carefully shape-matched solid and nonsolid stimuli,
and eliminated manipulation of stimuli, so that two methodological con-
cerns about the interpretation of previous research no longer arise. More-
over, because the studies did not use a comprehension task, but rather a
production task, the results offer evidence from a new source about the
underlying nature of children’s default concepts of solids and nonsolids.

EXPERIMENT 1

Method

Participants. Twenty-four 4-year-olds took part. One half were as-
signed to each of two conditions, Solid ($M = 4;4; SD = 3.4$ months; range
$= 3;10 - 4;9; 6$ girls and $6$ boys) and Nonsolid ($M = 4;4; SD = 4.3$ months; range
$- 3;9 - 4;10; 8$ girls and $4$ boys). Some were tested in their nursery classroom,
in a quiet corner or an adjoining area. The rest were tested in the laboratory.
The same numbers of children in each condition were tested under each set
of circumstances. Parents of children who came to the laboratory were
contacted through newspaper advertisements, hospital prenatal clinics, or
health-care workers. Children and parents were brought by taxi to the
laboratory, but were not paid for their participation. Children in both set-
tings were from a range of socioeconomic backgrounds.

Stimuli. Two sets of stimuli were prepared. The solid set consisted of
one piece of four different solid substances, each cut into one of four simple
geometric shapes. The stimuli were: a circle (paper), a square (wood), a
triangle (metal), and a rectangle (cloth). The nonsolid set consisted of one
portion of four different nonsolid substances, each molded carefully into
one of the same four geometric shapes. The stimuli were: a circle (butter), a
square (peanut butter), a triangle (strawberry jam), and a rectangle (dirt).
The circles had a diameter of approximately $11$ cm; the squares had sides of
about $11$ cm; the triangle was isosceles, with a base of about $9$ cm and a
height of about $10$ cm; the rectangle had a length of about $12$ cm and a width
of about $7$ cm. The paper circle was about $1$ mm thick; the wood square
about $8$ mm thick; the metal triangle about $2$ mm thick; and the cloth
rectangle about $1$ mm thick. We attempted to match the nonsolid substances
to the solids as closely as possible in terms of thickness. To ensure that the
shapes of the nonsolids were molded as precisely as possible, some of them
Table 1. Stimuli used in Experiments

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid</td>
<td>Nonsolid</td>
</tr>
<tr>
<td>Experiments 1 and 4</td>
<td></td>
</tr>
<tr>
<td>Circle</td>
<td>paper</td>
</tr>
<tr>
<td>Square</td>
<td>wood</td>
</tr>
<tr>
<td>Triangle</td>
<td>metal</td>
</tr>
<tr>
<td>Rectangle</td>
<td>cloth</td>
</tr>
<tr>
<td>Experiment 2</td>
<td></td>
</tr>
<tr>
<td>Circle</td>
<td>wicker</td>
</tr>
<tr>
<td>Square</td>
<td>cork</td>
</tr>
<tr>
<td>Triangle</td>
<td>vinyl</td>
</tr>
<tr>
<td>Rectangle</td>
<td>polystyrene</td>
</tr>
<tr>
<td>Experiment 3</td>
<td></td>
</tr>
<tr>
<td>Odd shape 1</td>
<td>paper</td>
</tr>
<tr>
<td>Odd shape 2</td>
<td>wood</td>
</tr>
<tr>
<td>Odd shape 3</td>
<td>metal</td>
</tr>
<tr>
<td>Odd shape 4</td>
<td>cloth</td>
</tr>
</tbody>
</table>

were first chilled. A full list of the stimuli appears in Table 1. Each set of four was arranged in a row on a long white plastic serving tray. There was a cover for each item.

Procedure. We used the solid stimuli in the Solid condition and the nonsolid stimuli in the Nonsolid condition. The procedure was the same in each condition.

1. Warm-up. Children were told they were going to play a game and that they should not do any touching. We scrupulously avoided using any language that might indicate a particular construal of the stimuli (e.g., we never said anything like “We’re going to look at some things” or “We’re going to look at some stuff”). Children were told that we were going to ask some questions, and that if they knew the answer they should tell us the answer, but that it was okay not to know the answer, and that they should say “I don’t know” in that case. Before continuing, we asked children to repeat to us these details, in order to be sure that children knew it was fine to say “I don’t know” if they did not know an answer. We then brought out the tray of stimuli; each item was covered.
2. “What-is-that?” task. We uncovered one of the four stimulus items (chosen randomly), pointed to it, and asked, “What is that?” If children failed to answer, we repeated the questions, “Can you tell me what that is?” and “What is that?,” until children gave an answer or said “I don’t
know," up to a maximum of five times. We then uncovered the second, third, and fourth items (also chosen randomly among those remaining) one at a time, and asked the same question(s).

3. **Probe task.** We then returned to each stimulus item, in the order in which they had been uncovered in the “What-is-that?” task, to determine if children knew words to construe the stimuli both as an individual and as some substance: (a) To find out if children knew an individual-related word or words to conceptualize the stimuli, we asked, “Can you tell me what kind of thing that is?” and “What shape is that?”; (b) To find out if children knew a substance-related word or words to conceptualize the stimuli, we asked, “Can you tell me what kind of stuff that is?” and “What is that made of?” If children failed to answer any of these questions, we repeated them until children answered or said “I don’t know” or “No,” up to a maximum of five repetitions. The order in which parts (a) and (b) of the Probe task were administered was random. We were aware that the questions in the Probe task did not necessarily call for a single type of answer. For example, the question “Can you tell me what kind of thing that is?” could be interpreted as calling for either an individual-related word or a substance-related word. However, we expected that, taken together, the questions in the probe task provided children with sufficient prodding to give words for both individual-related and substance-related construals—if indeed they did know them.

**Scoring.** We scored the data in two ways. The first was a simple coding of children’s answers to the “What-is-that?” questions, one that considered these answers in their own right. The second was a contingent coding of the “What-is-that?” answers, one that simultaneously took into account children’s answers to the Probe task questions.

1. **Simple coding of “What-is-that?” answers.** We assigned children’s answers to one of three categories for subsequent analysis.
   a. **Individual-related word.** This category comprised any words that indicated a construal as an individual or as a related property (shape). The category included object or portion words (e.g., “a circle,” “a pizza,” “a piece”), whether or not they were marked explicitly as count nouns (e.g., preceded by an indefinite article). Note that answers such as “a chunk” may have been part of a phrase that included a substance word, such as “a chunk of wood”; nonetheless, we took them to reveal a conceptualization as an individual (e.g., as a chunk, which is a portion), not in terms of a substance (in which case, we reasoned that children would have said, e.g., “wood”
or "some wood"). The category also included shape adjectives (e.g., "round").

b. **Substance-related word.** This category included any answers that indicated a construal in terms of a substance or a related property (color and/or texture). The category consisted of substance words (e.g., "some soil"), whether or not they were marked explicitly as mass nouns (e.g., appearing in the singular and preceded by a continuous quantifier like "some"). The category also included color or texture adjectives. We noted that some color words are ambiguous and could be either mass nouns or adjectives (e.g., "silver" for the metal triangle).

c. **Don't know or Other.** Any answer that did not fall into one of the first two categories (including "I don't know") was included in this category.

2. **Contingent coding of "What-is-that?" answers.** We assigned children's answers to one of three categories for subsequent analysis.

a. **Individual-related construal preference.** This category included any of the answers described in 1 (a), provided that the child also offered a substance-related word—described in 1 (b)—in response to any one of the probe questions for that item. The logic here was this: The individual-related word can be viewed as a preferred construal response if the child was also able to provide a substance-related word but chose not to. The category also included any answers described in 1 (c), provided that the child also (i) gave a substance-related word in response to any one of the probe questions and (ii) did not give an individual-related word in response to any of the probe questions for that item. The reasoning here was that an "I don't know" (or other) answer can be viewed as an (implicit) individual-related construal preference if the child also knew a substance-related word but chose not to provide it in response to the "What-is-that?" question.

b. **Substance-related construal preference.** This category included any of the answers described in 1 (b), provided that the child also gave an individual-related word—described in 1 (a)—in response to one of the probe questions for that item. The category also included any answers described in 1 (c), provided that the child also (i) gave an individual-related word in response to any one of the probe questions and (ii) did not give a substance-related word in response to any of the probe questions for that item. The logic behind this classification scheme was analogous to that described for 2 (a).

c. **No preference.** This category included those answers provided in 1 (a) and 1 (b) in which the child gave no answer of any other type in response to the probe questions; we reasoned that such answers could not reflect preferred construal responses because the child
may simply have lacked a word to name more than one type of construal of the stimulus. The category also included (the rare) cases where the child answered as in 1 (c), but provided both an individual-related word and a substance-related word in response to the probe questions; we reasoned that such answers could not reflect any implicit preferred construal because the child knew words to construe the stimulus in both ways, but yet still failed to offer either in response to "What is that?"

There were two independent coders. They disagreed about the coding of only three of the responses provided in the "What-is-that?" and Probe tasks; these disagreements were resolved through discussion.

Results and Discussion
We first address the question of children’s familiarity with names for the substances. Then we explore the simple coding, the contingent coding, and the grammatical categories of children’s answers to the “What-is-that?” questions.

**Familiarity with substance words.** We first examined children’s responses to both the “What-is-that?” and the Probe task questions in order to determine whether they knew correct (e.g., “butter” for butter) or plausible (e.g., “custard” for butter) substance kind words. (We did not include color or texture adjectives in these counts.) We credited children with knowledge of a substance word on 77.1% of trials in the Solid condition and on 75.0% of the trials in the Nonsolid condition. The difference between the two conditions in terms of familiarity with a name for the substance kind was not significant when either children ($t[22] = 0.22, p > .75$) or items (paired-$t[3] = 0.29, p > .75$) were treated as random factors.

**Simple coding of “What-is-that?” answers.** The simple coding results appear in the top half of Table 2. As can be seen, in the Solid condition, children tended to give individual-related answers ($M = 0.77, SD = 0.23$) but not substance-related answers ($M = 0.06, SD = 0.16$). In contrast, in the Nonsolid condition, they typically gave substance-related answers ($M = 0.67, SD = 0.39$) and rarely gave individual-related ones ($M = 0.08, SD = 0.19$). The proportions of individual-related words and substance-related words were submitted to an ANOVA with condition (Solid, Nonsolid) as a between-subjects factor and answer type (individual-related, substance-related) as a within-subjects factor. The interaction effect was large and significant, $F (1, 22) = 51.10, p < .0001$.

We then examined overall patterns of responding across the four trials. Any child who gave 3 or 4 out of 4 individual-related answers was classified
Table 2. Results of Experiment 1

<table>
<thead>
<tr>
<th>Condition</th>
<th>Solid</th>
<th>Nonsolid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Simple Coding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of Responses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual-related word</td>
<td>0.77 (0.23)</td>
<td>0.08 (0.19)</td>
</tr>
<tr>
<td>Substance-related word</td>
<td>0.06 (0.16)</td>
<td>0.67 (0.39)</td>
</tr>
<tr>
<td>Don't know or Other</td>
<td>0.17 (0.20)</td>
<td>0.25 (0.30)</td>
</tr>
<tr>
<td><strong>Number of Children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 or 4 Individual-related words</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>3 or 4 Substance-related words</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Contingent Coding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of Responses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual-related construal preference</td>
<td>0.77 (0.25)</td>
<td>0.10 (0.25)</td>
</tr>
<tr>
<td>Substance-related construal preference</td>
<td>0.06 (0.16)</td>
<td>0.69 (0.36)</td>
</tr>
<tr>
<td>No preference</td>
<td>0.17 (0.25)</td>
<td>0.21 (0.30)</td>
</tr>
<tr>
<td><strong>Number of Children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 or 4 Individual-related construal preferences</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>3 or 4 Substance-related construal preferences</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Note. $N = 12$ per condition.

as having made an individual-related construal. A child who provided 3 or 4 out of 4 substance-related answers was said to have made a substance-related construal. In the Solid condition, 8 children made an individual-related construal; none made a substance-related construal. However, in the Non-solid condition, no child made an individual-related construal, whereas 7 made a substance-related construal. A Fisher's exact test revealed that the relation between condition and construal type was significant, $p < .0001$.

Contingent coding of “What-is-that?” answers. We turn now to analyses based on the coding that assessed whether children's answers reflected a preferred manner of construing the stimuli (e.g., if children said “a square” for the wood square, did they also know “wood”?: if they said “peanut butter” for the peanut butter square, did they also know “a square”?). These contingent coding results appear in the lower half of Table 2. They are similar to those from the simple coding. In the Solid condition, children tended to show an individual-related construal preference ($M = 0.77, SD = 0.25$) and hardly ever a substance-related construal preference ($M = 0.06, SD = 0.16$). However, in the Non-solid condition, they typically had a substance-related construal preference ($M = 0.69, SD = 0.36$) and rarely an individual-related construal preference ($M = 0.10, SD = 0.25$). The proportions of individual-related construal preferences and substance-related con-
Strual preferences were submitted to an ANOVA with condition (Solid, Nonsolid) as a between-subjects factor and answer type (individual-related construal preference, substance-related construal preference) as a within-subjects factor. There was again a large and significant interaction effect, $F(1, 22) = 50.10, p < .0001$.

We next examined overall patterns of responding across the four trials. Any child who showed 3 or 4 out of 4 individual-related construal preferences was classified as having shown an individual-related construal preference. A child who provided 3 or 4 out of 4 substance-related construal preferences was said to have demonstrated a substance-related construal preference. In the Solid condition, 8 children showed an individual-related construal preference; none revealed a substance-related construal preference. However, in the Nonsolid condition, 1 child revealed an individual-related construal preference, whereas 8 showed a substance-related construal preference. A Fisher's exact test indicated that the relation between condition and preference type was significant, $p < .0005$.

**Grammatical categories.** Finally, we examined the grammatical class of the words children produced in the free-naming ("What-is-that?") task. Of the 42 individual-related words that were provided in the two conditions, 30 (71.4%) were overtly marked count nouns (i.e., they were preceded by the indefinite article), suggesting that children represented them as naming kinds. Nine answers were bare count nouns, leaving it less clear that they named kinds (rather than properties) for the children. One was a bare adjective ("round"), suggesting that it named a property. The remaining two ("oblong" and "square") were either bare adjectives or bare count nouns.

Of the 35 substance-related words produced in the two conditions, all were mass nouns. All were produced bare, leaving it uncertain that children represented them as naming kinds rather than properties. However, it seems pragmatically natural for adults (for whom mass nouns surely name kinds) to answer "What is that?" with a bare mass noun (see Experiment 4), lending plausibility to the suggestion that children’s mass nouns in this task also named kinds.

Four-year-olds’ answers in the free-naming task were thus overwhelmingly nouns. Moreover, children usually produced count nouns and mass nouns in distinct and appropriate sentential contexts, fortifying the suggestion that their construals of the solids and (possibly) nonsolids were generally in terms of kinds.

To summarize: The results of Experiment 1 revealed that 4-year-olds, as a default, construed solids in individual-related terms and nonsolids in substance-relevant terms, even though the solids and nonsolids were (a) matched so that children were roughly equally likely to know words for both the individual and the substance, and (b) not touched. Clearly, the
effect did not reflect the fact that children knew words to construe the stimuli in only one manner; the findings held even when the analyses were based on a contingent coding, in which children's answers counted as being either individual-related or substance-related only if they also knew a word for the other type of construal. Finally, children generally produced two distinctly and appropriately marked types of common noun (count nouns, mass nouns), suggesting default construals in terms of kinds.

Experiment 2 was a modified replication of Experiment 1, using new substances. Recall the finding that the solid and nonsolid substance kinds used in Experiment 1 were familiar to 4-year-olds. In Experiment 2, we used substances that we expected would be less familiar (see, e.g., Prasada, 1993; Soja et al. 1991). Our interest in doing so was to determine whether the lack of a name for the substance kind (either solid or nonsolid) would promote an increase in individual-related answers. We know from the first experiment that most children in both conditions did know (and could provide) individual-related words for the shapes we used. Children in the Nonsolid condition of the first experiment simply failed to offer these words in answering the “What-is-that?” questions; individual-related answers were very rare. Decreasing children’s familiarity with a name for the substances thus led to a test of the strength of the hypothesized default construals of solids and nonsolids.

One possibility was that the use of less familiar substances in Experiment 2 would promote the giving of the familiar individual-related answers, and that this would be particularly apparent in the Nonsolid condition (where there had been so few such answers in Experiment 1). However, a second possibility was that the solid-nonsolid distinction would again exert a strong effect on the default construal of the stimuli, and so, rather than witness an increase in the familiar individual-related answers in the Nonsolid condition, we would observe an increase in Don't know or Other answers or invented substance words in response to the “What-is-that?” questions. In other words, we would witness the following striking phenomenon: Children would be no more likely to give an individual-related word in the Nonsolid condition of this experiment than they were in Experiment 1, even though they were (a) less likely to know a substance-related word, and (b) equally (and highly) likely to know an individual-related word.

**EXPERIMENT 2**

**Method**

*Participants.* Twenty-four 4-year-olds took part. None had taken part in Experiment 1. One half were assigned to each of two conditions, Solid (\(M = 4;4; SD = 3.1\) months; range = 4;0–4;8; 7 girls and 5 boys) and Nonsolid (\(M = 4;5; SD = 3.5\) months; range = 4;0–4;9; 4 girls and 8 boys). They were
tested in one of the two sets of circumstances described in Experiment 1 and were from the same general populations.

**Stimuli.** Two sets of stimuli were prepared. The *solid* set consisted of one piece of four different solid substances, each cut into one of four simple geometric shapes. The stimuli were: a circle (*wicker*), a square (*cork*), a triangle (*vinyl*), and a rectangle (*polystyrene*). The *nonsolid* set consisted of one portion of four different nonsolid substances, each molded into one of the same four geometric shapes. The stimuli were: a circle (*shaving foam*), a square (*hand cream mixed with small bits of gravel*), a triangle (*hair styling gel*), and a rectangle (*moist coffee grounds*). All dimensions except for thickness were the same as in Experiment 1. The wicker circle was about 4 mm thick; the cork square about 4 mm thick; the vinyl triangle about 2 mm thick; and the polystyrene rectangle about 9 mm thick. As in Experiment 1, we attempted to match the nonsolid substances to the solids as closely as possible in terms of thickness. A full list of the stimuli appears in Table 1. Each set of four was arranged in a row on a long white plastic serving tray. There was a cover for each stimulus item.

**Procedure.** As in Experiment 1, the solid stimuli were used in the Solid condition, and the nonsolid stimuli were used in the Nonsolid condition. The procedure was exactly as described in Experiment 1.

**Scoring.** This was exactly as in Experiment 1.

There were the same two independent coders as in Experiment 1. They disagreed about the coding of two answers; disagreements were resolved through discussion.

**Results and Discussion**
Again, we consider first children’s familiarity with names for the substances. We then examine the simple coding, the contingent coding, and the grammatical categories of children’s answers to the “What-is-that?” questions.

**Familiarity with substance words.** As we predicted, children were less familiar with names for both the solid and nonsolid substances in this experiment than they were in Experiment 1. Correct or plausible substance kind answers (excluding color or texture adjectives) were offered on only 35.4% of the trials in the Solid condition and on 45.8% of trials in the Nonsolid condition. The difference between the two conditions in terms of familiarity with a substance word was not significant when either subjects ($t[22] = 0.77, p > .25$) or items (paired-$t[3] = 0.65, p > .75$) were treated as a random factor. Moreover, these percentages were significantly lower than the corresponding percentages in Experiment 1. The familiarity in the Solid
Table 3. Results of Experiment 2

<table>
<thead>
<tr>
<th>Condition</th>
<th>Solid</th>
<th>Nonsolid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Coding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of Responses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual-related word</td>
<td>0.75</td>
<td>(0.28)</td>
</tr>
<tr>
<td>Substance-related word</td>
<td>0.06</td>
<td>(0.16)</td>
</tr>
<tr>
<td>Don’t know or Other</td>
<td>0.19</td>
<td>(0.19)</td>
</tr>
<tr>
<td>Number of Children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 or 4 Individual-related words</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>3 or 4 Substance-related words</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Contingent Coding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of Responses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual-related construal preference</td>
<td>0.38</td>
<td>(0.38)</td>
</tr>
<tr>
<td>Substance-related construal preference</td>
<td>0.13</td>
<td>(0.23)</td>
</tr>
<tr>
<td>No preference</td>
<td>0.50</td>
<td>(0.35)</td>
</tr>
<tr>
<td>Number of Children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 or 4 Individual-related construal preferences</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>3 or 4 Substance-related construal preferences</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

Note. N = 12 per condition.

The condition of Experiment 2 (35.4%) was lower than the familiarity in the Solid condition of Experiment 1 (77.1%)—t(22) = 3.63, p < .005 (participants as a random effect); paired-t(3) = 4.63, p < .05 (items as a random effect). The familiarity in the Nonsolid condition of Experiment 2 (45.8%) was lower than the familiarity in the Nonsolid condition of Experiment 1 (75.0%)—t(22) = 2.46, p < .05 (participants as a random effect); paired-t(3) = 3.66, p < .05 (items as a random effect). Thus, although the substances used in Experiment 2 were not entirely unfamiliar to the children, they were clearly less familiar than those used in Experiment 1.

Simple coding of “What-is-that?” answers. The results of the simple coding appear in the top half of Table 3. As in Experiment 1, in the Solid condition children tended to give individual-related answers (M = 0.75, SD = 0.28) but not substance-related answers (M = 0.06, SD = 0.16). In contrast, in the Nonsolid condition children were still much more likely to offer substance-related answers (M = 0.46, SD = 0.35) than individual-related answers (M = 0.13, SD = 0.20). The proportions of individual-related words and substance-related words were submitted to an ANOVA with condition (Solid, Nonsolid) as a between-subjects factor and answer type (individual-related, substance-related) as a within-subjects factor. There was
a significant effect of condition, with overall more answers provided in the Solid than in the Nonsolid condition, $F(1, 22) = 4.84, p < .05$; this finding reflects the fact that more children provided *Don't know or Other* answers in the Nonsolid condition than in the Solid condition, and so the total proportion of individual-related and substance-related words was lower in the Nonsolid than in the Solid condition. There was, however, a large and significant interaction effect, $F(1, 22) = 31.04, p < .0001$, exactly as observed in Experiment 1.

Notice three things about how the results from the Nonsolid condition differed in Experiments 1 and 2. First, there were fewer substance-related answers in the Nonsolid condition of this experiment ($M = 0.46, SD = 0.35$) than in Experiment 1 ($M = 0.67, SD = 0.39$); this finding presumably reflects the fact that the substances were less familiar in Experiment 2. Second, the proportion of individual-related answers in the Nonsolid condition in this experiment ($M = 0.13, SD = 0.20$) was roughly the same as it was in the corresponding condition in Experiment 1 ($M = 0.08, SD = 0.19$). Third, the proportion of *Don't know or Other* answers in the Nonsolid condition in this experiment ($M = 0.42, SD = 0.31$) was higher than it was in Experiment 1 ($M = 0.25, SD = 0.30$). These three facts about the Nonsolid conditions of Experiments 1 and 2 suggest that children's being less likely to know a substance-related word in Experiment 2 did not lead to an increase in the familiar individual-related answers; instead, it led to an increase in *Don't know or Other* answers. In other words, children still typically seemed to construe the nonsolid stimuli (as a default) as substances, even though they did not know the substance names.

We then examined overall patterns of responding across the four trials. Any child who gave 3 or 4 out of 4 individual-related answers was classified as having made an individual-related construal. A child who provided 3 or 4 out of 4 substance-related answers was said to have made a substance-related construal. In the Solid condition, 9 children made an individual-related construal; none made a substance-related construal. However, in the Nonsolid condition, no child made an individual-related construal, whereas 5 made a substance-related construal. A Fisher's exact test revealed that the relation between condition and construal type was significant—$p < .0005$.

*Contingent coding of "What-is-that?" answers.* The contingent coding results are provided in the lower half of Table 3. Again, in the Solid condition, children showed an individual-related construal preference ($M = 0.38$) more often than a substance-related construal preference ($M = 0.13, SD = 0.23$). However, in the Nonsolid condition they frequently demonstrated a substance-related construal preference ($M = 0.60, SD = 0.29$) but rarely an individual-related preference ($M = 0.04, SD = 0.14$). An ANOVA with condition (Solid, Nonsolid) as a between-subjects factor and answer
type (individual-related construal preference, substance-related construal preference) as a within-subjects factor on the proportion scores revealed a large and significant interaction effect, $F(1, 22) = 53.13, p < .0001$.

Despite the similarity of the pattern of results of Experiments 1 and 2, the findings obtained using the contingent coding in Experiment 2 differed from those obtained in Experiment 1. In particular, the proportion of individual-related construal preferences in the Solid condition of Experiment 2 ($M = 0.38$) was much lower than in Experiment 1 ($M = 0.77, SD = 0.25$); this reflects the fact that children often did not know a substance-related word in Experiment 2 and so could not be credited with an individual-related construal preference. Thus, more children were credited with having no preference in the Solid condition of Experiment 2 ($M = 0.50, SD = 0.35$) than in Experiment 1 ($M = 0.17, SD = 0.25$).

We also examined overall patterns of responding across the four trials. Any child who showed 3 or 4 out of 4 individual-related construal preferences was classified as having shown an individual-related construal preference. A child who provided 3 or 4 out of 4 substance-related construal preferences was said to have demonstrated a substance-related construal preference. In the Solid condition, 3 children showed an individual-related construal preference; one indicated a substance-related construal preference. However, in the Nonsolid condition, no children revealed an individual-related construal preference, whereas 6 showed a substance-related construal preference. A Fisher's exact test indicated that the relation between condition and construal type was significant, $p < .05$.

**Grammatical categories.** Next, we examined the grammatical class of the words children produced in the free-naming ("What-is-that?") task. There were 44 individual-related words in the two conditions, of which 31 (70.5%) were overtly marked count nouns (i.e., they were preceded by the indefinite article or pluralized), suggesting construals in terms of kinds. Ten words were bare count nouns, leaving it less clear that they named kinds rather than properties. Three answers were either bare adjectives or bare count nouns (three children said "square").

There were 24 substance-related words produced in the two conditions, only one of which was a mass noun produced in an overt mass noun context ("some soil"), suggesting that at least one child clearly represented it as naming a kind. Twenty were bare mass nouns, leaving it unclear that children represented them as naming kinds rather than properties. However, as noted in Experiment 1, it seems pragmatically natural for adults (for whom mass nouns surely name kinds) to produce mass nouns bare when answering, "What is that?" (see Experiment 4), increasing the plausibility of the idea that children’s mass nouns in this task also named kinds. The three
remaining words were bare adjectives (two children said "white;" one said "blue"), suggesting that children represented them as naming properties.

Four-year-olds' pattern of answers in the free-naming task of Experiment 2 thus suggests, as it did in Experiment 1, that children as a default generally construed the solid and (possibly) nonsolid stimuli in terms of kinds, because their answers were, for the most part, distinctly and appropriately marked count and mass nouns.

In sum, the results of Experiment 2 replicated the central results of Experiment 1, showing that children construed solids in individual-relevant ways and nonsolids in substance-related terms, even though the solids and nonsolids were (a) untouched, and (b) matched so that children were equally likely to know a word for the kind of individual (object or portion) and roughly equally likely to know a word for the kind of substance. Again, the effect did not reflect the fact that children knew words to construe the stimulus in only one way, because the findings persisted when a contingent coding was used, whereby children's answers counted as individual-related or as substance-related construal preferences only if they also knew a word for the construal of the stimulus in the other manner. Furthermore, children generally produced two appropriately and distinctly marked types of noun (count nouns, mass nouns), suggesting that as a default they construed the stimuli in terms of kinds.

The central difference between Experiments 1 and 2—the lower familiarity of the substance words in Experiment 2—had some impact on the results. However, the lower familiarity did not lead to more individual-related answers in the Nonsolid condition in Experiment 2 than in Experiment 1. Instead, we obtained an intriguing finding: Children were more likely to answer "I don't know" (or give some other answer) to the "What-is-that?" questions, even though they usually did know an individual-related word (as revealed in the Probe task). Thus, although an individual-related word was generally a familiar and possible answer to the "What-is-that?" question for both the solids and the nonsolids, it was clearly not a preferred answer in the Nonsolid condition. The results thus provide evidence that children strongly adhered to their distinctive default concepts of solids and nonsolids.

Experiment 2 showed that lowering the familiarity of the substance kind words did not eradicate the central effect of Experiment 1. It did not make individual-related words more popular in the free-naming task in the Nonsolid condition. Experiment 3 reports a manipulation designed to examine further how the solid–nonsolid distinction conditions default construals of material entities. Now the question was whether it would be possible to increase the prevalence of substance-related words in the Solid condition by lowering the familiarity of the form in which the entities were presented. To do this, in Experiment 3, we used the same familiar substances from Experiment 1 but now presented them in more complex and irregular shapes. Our
interest in doing this was to determine whether the lack of an obvious name for the kind of individual would promote an increase in substance-related answers; after all, we know from Experiment 1 that most children in both conditions did know substance-related words for the substances that were used. Children in the Solid condition of the first experiment simply failed to offer these words in answering the "What-is-that?" questions; substance-related answers were extremely rare. Decreasing familiarity with a name for the individual (shape) thus offered a different test of the strength of children’s default construals of solids and nonsolids.

One possibility was that the use of less namable “individuals” would promote the giving of substance-related answers, and that this would be particularly apparent in the Solid condition (where there had been few such answers in Experiment 1). A second possibility was that the solid–nonsolid distinction would again exert a strong effect on the default construal of the stimuli, and so, rather than observe an increase in substance-related answers in the Solid condition, we would observe an increase in “I don’t know” or invented individual-related answers (inspired by the odd shapes) in response to the “What-is-that?” questions. In other words, we would observe the following phenomenon: Children would be no more likely to give a substance-related word in the Solid condition of this experiment than they were in Experiment 1, even though they were (a) less likely to know a familiar individual-related word, and (b) equally (and highly) likely to know a substance-related word.

**EXPERIMENT 3**

**Method**

**Participants.** Twenty-four 4-year-olds took part. None had taken part in either Experiment 1 or 2. One half were assigned to each of two conditions, Solid ($M = 4.5$; $SD = 2.2$ months; range = 4.0–4.8; 4 girls and 8 boys) and Nonsolid ($M = 4.6$; $SD = 3.3$ months; range = 3.11–4.10; 7 girls and 5 boys). They were tested in one of the two sets of circumstances described in Experiment 1, and they were from the same general populations.

**Stimuli.** Two sets of stimuli were prepared. The *solid* set consisted of one piece of the four solid substances used in Experiment 1, now cut into one of four irregular and more complex shapes. The stimuli were: odd shape 1 (*paper*), odd shape 2 (*wood*), odd shape 3 (*metal*), and odd shape 4 (*cloth*). The *nonsolid* set consisted of one portion of the four different nonsolid substances, each molded into one of the same four irregular shapes as the solids. The stimuli were: odd shape 1 (*butter*), odd shape 2 (*peanut butter*), odd shape 3 (*strawberry jam*), and odd shape 4 (*dirt*). The numbers refer to the same shapes in both conditions. The rough size of the stimulus pairs was
the same as in the previous experiments. The thicknesses of the stimuli were roughly the same as those in Experiment 1. A list of the stimuli appears in Table 1. Each set of four was arranged in a row on a long white plastic serving tray. There was a cover for each stimulus item.

**Procedure.** As in Experiment 1, the solid stimuli were used in the Solid condition, and the nonsolid stimuli were used in the Nonsolid condition. The procedure was exactly as described in Experiment 1.

**Scoring.** This was exactly as in Experiment 1.

The two independent coders from Experiments 1 and 2 coded the results. They disagreed about the coding of only one answer; this was resolved through discussion.

**Results and Discussion**

Again, we consider first children's familiarity with names for the substances. We then examine the simple coding, the contingent coding, and the grammatical categories of children's answers to the "What-is-that?" questions.

**Familiarity with substance words.** Confirming the findings from Experiment 1, the results showed that children were highly familiar with names for both the solid and nonsolid substances. Children provided correct or plausible substance kind answers (excluding color or texture adjectives) on 75.0% of the trials in the Solid condition and on 81.3% of trials in the Nonsolid condition. The difference between the two conditions in terms of familiarity with a substance word was not significant when either participants ($t[22] = 0.64, p > .50$) or items (paired-$t[3] = 0.52, p > .50$) were treated as a random factor. Moreover, the difference in familiarity between the Solid conditions of Experiments 1 and 3, and between the Nonsolid conditions of Experiments 1 and 3, was not significant when either participants or items were treated as random.

**Simple coding of "What-is-that?" answers.** The simple coding results appear in the top half of Table 4. As in Experiment 1, children in the Solid condition usually gave individual-related words ($M = 0.81, SD = 0.32$) and rarely provided substance-related words ($M = 0.08, SD = 0.20$). In the Nonsolid condition, they tended to provide substance-related words ($M = 0.69, SD = 0.43$) and less frequently gave individual-related words ($M = 0.23, SD = 0.38$). The proportions of individual-related words and substance-related words were submitted to an ANOVA with condition (Solid, Nonsolid) as a between-subjects factor and answer type (individual-related, substance-related) as a within-subjects factor. As in Experiment 1, there was a large and significant interaction effect, $F(1, 22) = 21.21, p < .0001$. 
Table 4. Results of Experiment 3

<table>
<thead>
<tr>
<th></th>
<th>Solid</th>
<th>Nonsolid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Simple Coding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Proportion of Responses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual-related word</td>
<td>0.81 (0.32)</td>
<td>0.23 (0.38)</td>
</tr>
<tr>
<td>Substance-related word</td>
<td>0.08 (0.20)</td>
<td>0.69 (0.43)</td>
</tr>
<tr>
<td>Don’t know or Other</td>
<td>0.10 (0.29)</td>
<td>0.08 (0.22)</td>
</tr>
<tr>
<td><strong>Number of Children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 or 4 Individual-related words</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>3 or 4 Substance-related words</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Contingent Coding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Proportion of Responses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual-related construal preference</td>
<td>0.77 (0.33)</td>
<td>0.23 (0.39)</td>
</tr>
<tr>
<td>Substance-related construal preference</td>
<td>0.08 (0.20)</td>
<td>0.67 (0.43)</td>
</tr>
<tr>
<td>No preference</td>
<td>0.15 (0.23)</td>
<td>0.10 (0.20)</td>
</tr>
<tr>
<td><strong>Number of Children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 or 4 Individual-related construal preferences</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>3 or 4 Substance-related construal preferences</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

*Note. N = 12 per condition.*

Strikingly, there was no significant difference between Experiments 1 and 3 in the prevalence of either individual- or substance-related words in either the Solid or Nonsolid conditions. Thus, lowering the familiarity of the individual-related words in Experiment 3 did not increase the prevalence of substance-related words in either condition. On the contrary, the proportions of individual-related words given in the Solid (M = 0.81, SD = 0.32) and Nonsolid (M = 0.23, SD = 0.38) conditions were actually somewhat higher than the corresponding proportions in Experiment 1 (Solid condition: M = 0.77, SD = 0.23; Nonsolid condition: M = 0.08, SD = 0.19). Apparently, the complex forms used in Experiment 3 inspired slightly more individual-related construals than the simple shapes used in Experiment 1.

Overall patterns of responding across the four trials were then examined. The results were again consistent with those from Experiment 1. Any child who gave 3 or 4 out of 4 individual-related answers was classified as having made an individual-related construal. A child who provided 3 or 4 out of 4 substance-related answers was said to have made a substance-related construal. In the Solid condition, 9 children made an individual-related construal; none made a substance-related construal. However, in the Nonsolid condition, 2 children made an individual-related construal, whereas 9 made a substance-related construal. A Fisher's exact test revealed that the relation between condition and construal type was significant, p < .0005.
Contingent coding of "What-is-that?" answers. The contingent coding results are given in the bottom half of Table 4. In the Solid condition, children often showed an individual-related construal preference \((M = 0.77, SD = 0.33)\) and, infrequently, a substance-related construal preference \((M = 0.08, SD = 0.20)\). In the Nonsolid condition, they often demonstrated a substance-related construal preference \((M = 0.67, SD = 0.43)\) and less often showed an individual-related construal preference \((M = 0.23, SD = 0.39)\).

An ANOVA with condition (Solid, Nonsolid) as a between-subjects factor and answer type (individual-related construal preference, substance-related construal preference) as a within-subjects factor on the proportion scores revealed again a large and significant interaction effect, \(F(1, 22) = 17.30, p < .0005\), as in Experiment 1. There was again no significant difference between Experiments 1 and 3 in the prevalence of either individual-related or substance-related construal preferences in either the Solid or Nonsolid conditions.

We also examined overall patterns of responding across the four trials. Any child who showed 3 or 4 out of 4 individual-related construal preferences was classified as having shown an individual-related construal preference. A child who provided 3 or 4 out of 4 substance-related construal preferences was said to have demonstrated a substance-related construal preference. In the Solid condition, 9 children showed an individual-related construal preference; none indicated a substance-related construal preference. However, in the Nonsolid condition, 2 children revealed an individual-related construal preference, whereas 8 showed a substance-related construal preference. A Fisher’s exact test revealed that the relation between condition and construal type was significant, \(p < .001\).

Grammatical categories. We examined the grammatical class of the words children provided in the free-naming ("What-is-that?") task. Fifty individual-related words were given in the two conditions, of which 42 (84.0%) were overtly marked count nouns (i.e., they were preceded by the indefinite article), suggesting that children represented them as naming kinds. The eight remaining answers were bare count nouns, leaving it less clear that children represented them as naming kinds rather than properties.

There were 37 substance-related words in the two conditions. All were mass nouns produced bare, leaving it uncertain that children represented them as naming kinds (rather than properties). However, it is pragmatically appropriate for an adult (for whom mass nouns surely name kinds) to answer a “What-is-that?” question with a bare mass noun (see Experiment 4), lending favor to the possibility that children’s mass nouns in this task also named kinds.

As in Experiment 1, children’s productions in Experiment 3 were nouns (count or mass), generally marked distinctly and appropriately. This finding
again suggests that children's default conceptualizations of the stimuli—both solid and (possibly) nonsolid—in this task were usually in terms of kinds.

To summarize: The results of Experiment 3 replicated the main findings of Experiment 1. Again, 4-year-olds as a default construed solids in individual-related terms and nonsolids in substance-related terms, even though the solids and nonsolids were (a) matched in shape and in familiarity of the associated substance words and (b) not manipulated. Again, the effect did not reflect the fact that children knew words to construe the stimulus in only one way, because the findings persisted when a contingent coding was used, whereby children's answers counted as individual-related or as substance-related construal preferences only if they also knew a word to construe the stimulus in another manner. And again, children's answers to the free-naming task were usually distinctly and appropriately marked nouns, suggesting that their default construals of the entities were in terms of kinds.

What was most remarkable about the results of Experiment 3 was that children did not show an increased tendency to give a substance-related word in the Solid condition compared to Experiment 1. Children in the Solid condition of Experiment 3 did not even show an increased tendency to answer "I don't know," in fact, the proportion of "I don't know" answers in the Solid condition of Experiment 3 was slightly lower than it was in Experiment 1, where the shapes were highly namable. Instead, children in the Solid condition (and even, to a lesser extent, the Nonsolid condition) tended to come up with imaginative "individual" answers, ranging from letters of the alphabet ("a V," "a C"), to animals ("a duck," "a crocodile"), to artifacts ("a boat," "a glove"). Sometimes the same imaginative answer was provided for both the solid and the nonsolid stimulus in a pair. For example, both the metal and the strawberry jam shared a common shape, and they both elicited, from different children, "a duck." Similarly, paper and butter shared a common shape and they both elicited, from different children, "a boat." These findings provide reassurance that the shapes in both the Solid and Nonsolid conditions were indeed well matched and construable as the same kind of individual, even though they were highly irregular. However, it is important to stress that these imaginative names were much more prevalent in the Solid than in the Nonsolid condition.

Moreover, the results do not suggest that the shapes were "familiar" to children, as judged by the near-total lack of consensus over a name for them. In Experiments 1 and 2, when children came up with an individual-related answer, it was almost always the name of the familiar shape—"a triangle," "a square," "a circle," or "a rectangle." This was not so in this experiment. Consider the shape used with metal and strawberry jam. Among the individual-related words children provided for this shape were these: "a puzzle," "a curtain," "a vest," "a glove," "a fish," "a mouse," "a duck," "a dog face,"
and "a strawberry." Similar diversity was found for the three other shapes, suggesting that these forms were not, in a typical sense of the word, "familiar." The results of Experiment 3 thus demonstrate that even when an individual-related word is not highly familiar (as revealed by a lack of consensus over a name), children still choose to invent one (or, sometimes, to answer "I don't know") if they are asked to name a solid stimulus, rather than offer a known familiar solid substance word. In other words, children strongly hold to their default construal of a solid entity in individual-related terms.

One final issue addressed in this article was whether answers in the free-naming task change over the course of development. In particular, it was of interest to know whether 4-year-olds' default construals of material entities in the free-naming task are similar to those of adults—in terms of being individual- or substance-related, and in terms of being kinds (or perceptual properties). Successful and efficient communication between adults and children requires that their default conceptualizations of entities, solid or nonsolid, should be essentially similar. Differences between children and adults might reflect an important discontinuity in the privileged manner of conceptualizing material stimuli. To address this matter, we replicated Experiment 1, but using adults as participants.

**EXPERIMENT 4**

**Method**

*Participants.* Twenty-four adults took part. They were a mix of graduate students and parents of laboratory-tested children who took part in one of Experiments 1 to 3. (Children and parents did not, of course, see each other take part in the study.) One half were assigned to each of two conditions, Solid and Nonsolid.

*Stimuli.* These were the same as in Experiment 1.

*Procedure.* As in Experiment 1, the solid stimuli were used in the Solid condition, and the nonsolid stimuli were used in the Nonsolid condition. The procedure was exactly as described in Experiment 1.

*Scoring.* This was exactly as in Experiment 1. There were two independent coders, the same as in the preceding experiments. They disagreed about the coding of two answers; these disagreements were resolved through discussion.
Results and Discussion
Again, we consider first familiarity with names for the substances. We then examine the simple coding, the contingent coding, and the grammatical category of answers to the “What-is-that?” questions.

Familiarity with substance words. Adults provided correct or plausible substance words (excluding color or texture adjectives) 100% of the time in both Solid and Nonsolid conditions.

Simple coding of “What-is-that?” answers. The simple coding results appear in the top half of Table 5. In the Solid condition, adults virtually always gave individual-related answers ($M = 0.98$, $SD = 0.07$) (one adult answered “silk” for the cloth rectangle); they hardly ever gave substance-related answers ($M = 0.02$, $SD = 0.07$). In contrast, in the Nonsolid condition, they almost always offered substance-related answers ($M = 0.98$, $SD = 0.07$) (one adult said “crumbs” for the dirt rectangle) and rarely provided individual-related ones ($M = 0.02$, $SD = 0.07$). No analyses were performed on these virtually categorical results, but it is worth noting their general similarity to those of the 4-year-olds in Experiment 1, aside from the fact that adults were less likely than children to answer with “I don’t know.”

Table 5. Results of Experiment 4

<table>
<thead>
<tr>
<th>Condition</th>
<th>Solid</th>
<th>Nonsolid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Simple Coding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Proportion of Responses</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual-related word</td>
<td>0.98 (0.07)</td>
<td>0.02 (0.07)</td>
</tr>
<tr>
<td>Substance-related word</td>
<td>0.02 (0.07)</td>
<td>0.98 (0.07)</td>
</tr>
<tr>
<td>Don’t know or Other</td>
<td>0.00 (0.00)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td><strong>Number of Adults</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 or 4 Individual-related words</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>3 or 4 Substance-related words</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Contingent Coding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Proportion of Responses</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual-related construal preference</td>
<td>0.96 (0.10)</td>
<td>0.02 (0.07)</td>
</tr>
<tr>
<td>Substance-related construal preference</td>
<td>0.02 (0.07)</td>
<td>0.98 (0.07)</td>
</tr>
<tr>
<td>No preference</td>
<td>0.02 (0.07)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td><strong>Number of Adults</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 or 4 Individual-related construal preferences</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>3 or 4 Substance-related construal preferences</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Note. N = 12 per condition.*
We then examined overall patterns of responding across the four trials. Adults were classified as were children in the earlier experiments. Any adult who gave 3 or 4 out of 4 individual-related answers was classified as having made an individual-related construal. Any adult who provided 3 or 4 out of 4 substance-related answers was said to have made a substance-related construal. In the Solid condition, all adults made an individual-related construal; none made a substance-related construal. However, in the Nonsolid condition, no adult made an individual-related construal; all made a substance-related construal. No analyses were performed.

**Contingent coding of “What-is-that?” answers.** The bottom half of Table 5 provides the contingent coding results. Again, in the Solid condition, adults almost always showed an individual-related construal preference ($M = 0.96, SD = 0.10$) and hardly ever showed a substance-related construal preference ($M = 0.02, SD = 0.07$). In the Nonsolid condition, they almost always demonstrated a substance-related construal preference ($M = 0.98, SD = 0.07$) and hardly ever showed an individual-related construal preference ($M = 0.02, SD = 0.07$). Again, no analyses were performed on these clear-cut results, which resembled those from the preschoolers in Experiment 1, with the exception that adults, unlike children, were virtually never coded as showing “No preference.”

We also examined overall patterns of responding across the four trials. Any adult who showed 3 or 4 out of 4 individual-related construal preferences was classified as having shown an individual-related construal preference. An adult who provided 3 or 4 out of 4 substance-related construal preferences was said to have demonstrated a substance-related construal preference. Again, in the Solid condition, all 12 adults showed an individual-related construal preference; none had a substance-related construal preference. However, in the Nonsolid condition, no adult revealed an individual-related construal preference; they all showed a substance-related construal preference. No analyses were performed.

**Grammatical categories.** We examined the grammatical class of the words adults provided in the free-naming (“What-is-that?”) task. There were 48 individual-related words given in the two conditions, of which 47 (97.9%) were overtly marked count nouns (i.e., they were preceded by the indefinite article or pluralized). The single remaining answer was a count noun produced bare. It seems reasonable to propose that all the count nouns named kinds for the adults.

There were 48 substance-related words in the two conditions, all of which were mass nouns. All were produced bare, suggesting that it is pragmatically natural for an adult to omit determiners and quantifiers when offering a
mass noun in a free-naming task. All mass nouns presumably named kinds for the adults.

Adults’ answers in the free-naming task of Experiment 4 thus were nouns (count and mass) that were marked distinctly and appropriately. This finding suggests that adults’ default construals of the stimuli—both solid and non-solid—were in terms of kinds. These findings are similar to those from Experiment 1, with the exception that adults were more likely than 4-year-olds to produce count nouns in unambiguous count noun sentential contexts (e.g., preceded by the indefinite article).

In sum, the results of Experiment 4 replicated, much more categorically, the main findings of Experiment 1. As with the children, as a default adults construed solids in individual-relevant terms and nonsolids in substance-relevant ways, even though the solids and nonsolids were matched in shape and in familiarity of the associated substance words and not touched. Again, the effect did not reflect the fact that adults knew words to construe the stimulus in only one way, because the findings persisted when a contingent coding was used, whereby adults’ answers counted as individual-related or as substance-related construal preferences only if they also knew a word for the construal of the stimulus in the other manner. In addition, adults’ answers in the free-naming task were exclusively nouns (distinctly and appropriately marked count and mass nouns), suggesting that their primary construal of the stimuli was in terms of kinds. In short, the findings from Experiment 4 suggest that 4-year-olds’ manner of responding in Experiment 1 was highly adult-like; by the age of 4, children’s default construals of solid and nonsolid material entities appear to be essentially similar to those of adults.

**GENERAL DISCUSSION**

Recent investigations into how children learn the meanings of words have suggested that, as a default, children categorize novel solid and nonsolid entities differently (e.g., Imai & Gentner, 1993; Soja et al., 1991; Soja, 1992). Specifically, children appear to interpret a new word applied ostensively to an unfamiliar solid stimulus as naming an individual-related construal, but they tend to interpret a word applied to an unfamiliar nonsolid entity as labeling a substance-related construal. These default construals help explain young children’s remarkable success at word learning in circumstances that underdetermine the appropriate interpretation (e.g., under conditions of ostensive definition). However, claims about children’s default construals have been based mostly on children’s patterns of extending novel words from a target to new referents. Word extension behavior offers only one perspective on the underlying nature of children’s construals—for example, on whether they are in terms of kinds (e.g., kind of object, kind of substance) or perceptual properties (e.g., shape, color, texture). The four experiments
in this article used a free-naming production task designed to tap the same
default construals as the word extension comprehension task (see Rosch,
1978; Rosch et al., 1976), with the goals of (a) illuminating further the status
of children's default construals of both solids and nonsolids, and at the same
time (b) addressing two methodological concerns associated with the pre-
vious research.

Experiments 1 to 3 provided evidence confirming that 4-year-old chil-
dren, as a default, construe solids and nonsolids in fundamentally distinct
ways, even when methodological concerns about past research are ad-
dressed. Children preferred individual-related construals if the stimuli were
solid but substance-related construals if the stimuli were nonsolid. Prefer-
ence for one type of construal was inferred only if children also knew and
provided a word to name the other type of construal and thus were flexible
in their ability to construe the same entity in more than one way. These
preferences were obtained despite the fact that—unlike previous re-
search—the solid and nonsolid stimuli were (a) matched in terms of shape,
and (b) not touched. Thus, regardless of solidity or nonsolidity, names for the
individual-related construals associated with the stimuli were always (a)
equally well known, and (b) stable throughout the task. Furthermore, the
findings held up when the associated substance and individual-related
words were both familiar (Experiment 1), when the substance words were
less familiar (Experiment 2), and when the individual-related words were
less familiar (Experiment 3). The findings also were obtained even more
categorically among adults in Experiment 4, which was a replication of
Experiment 1. The results also suggest that children's default construals
were in terms of kinds because the preschoolers generally named the enti-
ties with common nouns (count and mass).

Aside from the fact that their productions were usually common nouns,
there is further reason to believe that the words children used did indeed
name kinds. Children generally produced count nouns in appropriate sen-
tential contexts (i.e., alone and immediately following the indefinite article
70% of the time or more in Experiments 1, 2, and 3). As noted in the
Introduction, other evidence suggests that 4-year-olds know that single
words following the indefinite article name kinds of individuals; for exam-
ple, children distinguish in an adult-like way between the reference of novel
words modeled in a count noun context ("an X") and those modeled in a
mass noun context ("some X") (Brown, 1957), an adjective context ("an X
one") (e.g., Hall et al., 1993; Smith, Jones, & Landau, 1992; Taylor & Gelman,
1988), and even a proper name context ("X") (Gelman & Taylor, 1984; Katz
et al., 1974). Moreover, even though children typically did not produce
singular mass nouns in unambiguous mass noun contexts (i.e., they typically
produced them bare), this fact does not imply that they did not represent
the mass nouns as marking kinds. We can infer this because adults (for
whom the mass nouns surely named kinds) also always omitted overt mass noun markers when producing these words. At the very least, these naming data indicate that the children construed the nonsolids differently than the solids; and the pattern of data is at least consistent with the claim that—in a free-naming task—4-year-olds construe both solid and nonsolid entities, as a default, in terms of kinds. To the extent that the free-naming task and novel word extension task tap the same underlying default construals (see Rosch et al., 1976), the results suggest that 4-year-olds extend new words for novel entities not on the basis of any shared property per se, but rather on the basis of shared kind membership.

It is not clear from these studies exactly what informed children's judgments about whether the stimuli were solid or nonsolid. Children may know that solid physical objects—not portions of nonsolid substance—are connected and bounded entities that maintain their connectedness and boundaries as they move about freely (Spelke, 1990). Yet the solid and nonsolid entities in these studies were left untouched and had identical and stationary boundaries; as a result, these cues to solid objecthood or nonsolid substancehood were not available to children. The substances were sometimes familiar to the children, in which cases their solidity or nonsolidity was probably known in advance; however, the substances were often quite unfamiliar (as in Experiment 2). Four-year-olds' ability to distinguish the solid and nonsolid entities in this research thus suggests impressive knowledge of certain static visible properties that normally characterize the two types of referent.

These studies do not address the question of performance outside the neutral context of naming entities. The finding that children have a default manner of construing certain entities in the free-naming task does not imply that they are incapable of categorizing the same entities differently (nor, for that matter, does the existence of default assumptions in novel word extension tasks). Clearly, children's performance on the probe task reveals that they could construe the entities flexibly. However, it is not clear under what circumstances children might be willing to override these default construals of the stimuli (i.e., their answers to "What is that?"). For example, if the shape boundary of a nonsolid entity were made to seem more relevant (e.g., by moving a finger around the perimeter when asking "What is that?") it might be possible to increase the prevalence of individual-related answers, words like "puddle" and "pile." (However, it is interesting to note that many common individual portion words, including "puddle" and "pile," do not imply a particularly rigid type of shape.) It might also be possible to increase individual-related answers by further increasing the complexity or namability of the entity's shape boundary, making it more difficult to view this boundary as arbitrary. For example, what if the shapes used in the task were the outlines of animals or complex artifacts?
In contrast, if the texture and/or color of a solid entity were made to seem relevant (e.g., by rubbing one's hand on the surface of the stimulus when asking "What is that?"), it might be possible to increase the likelihood of receiving a substance-related answer (see also Gathercole et al., 1995, for a study of how functional information might play such a role for adults). More substance-related answers might also be obtained if the entity’s shape boundary were made to seem more arbitrary in some way. For example, what if the shape boundaries were obtained by shattering (a pane of glass) or splintering (a chunk of wood)? Clearly, additional research will be required to determine how strongly children and adults hold to their default construals when faced with information that contradicts these assumptions. The results of the studies shown in this article suggest that when they lack such information, as when they first hear new words applied ostensively to at least some novel entities, both preschoolers and adults typically construe solids in terms of kinds of individuals, for whose “identity” the boundaries are assumed to have relevance. In contrast, they conceptualize nonsolids in terms of kinds of substances, for whose “identity” the precise form boundaries are taken to be not relevant.

The suggestion that children construe solid and nonsolid entities in terms of kinds does not imply that children of this age ignore perceptual properties. On the contrary, lacking a mature understanding of the underlying core features shared by members of (especially basic-level) kinds, young children do appear to rely heavily on perceptual properties as being diagnostic of common kind membership. This reliance does not mean, however, that children extend new words because of a common perceptual property. As Baldwin (1992) suggested for the case of solid objects, “[p]erhaps children extend labels on the basis of shape not for the sake of shape similarity per se, but rather as a guide to taxonomic relations [kind membership]” (p. 396); see also Golinkoff et al. (1995) and Soja et al. (1992) for similar ideas. Moreover, if children extend words from the outset of lexical development in terms of kinds, relying on perceptual properties only as a useful heuristic for judging (basic-level) kind membership, this also alleviates the need to explain how children might come to change their primary mode of construing material entities from perceptual properties to kinds.

However, the findings in these studies bear only on older preschoolers’ default construals. They do not address children’s initial modes of conceptualizing entities, nor do they concern what sort of changes might occur to these construals prior to the age of 4 (e.g., Golinkoff et al., 1994; Imai et al., 1994). For example, children may receive feedback from repeated experience in asking adults “what something is,” to the effect that a natural or sensible way to refer to a solid is in kind-of-individual terms, whereas a natural way of referring to a nonsolid is in kind-of-substance terms. This possibility raises the interesting question of what sources of knowledge
underlie 4-year-olds' performance in the free-naming task. (Of course, this question also arises in the interpretation of the results of the large body of research that uses novel word extension tasks. By the time they are 4, children have probably learned much from past experience about natural or sensible ways to extend ostensively defined words.) Soja et al.'s (1991) word extension results suggest that distinct and kind-based construals of solids and nonsolids occur to children as young as 2 years of age and pre-date the mastery of count and mass noun syntax. Yet whatever the origin of the construals, the contribution of the current studies is clear: They provide new evidence that, at the age of 4 years, children's default concepts of solids and nonsolids are fundamentally distinct, kind-based, and highly adult-like.

REFERENCES


