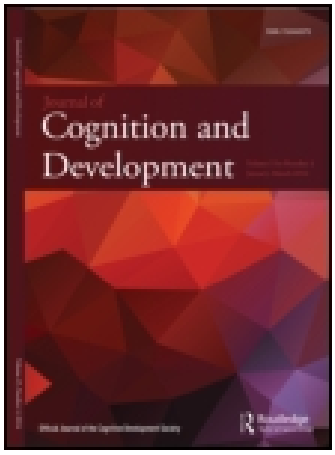

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Children's Conformity When Acquiring Novel Conventions: The Case of Artifacts

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Children's Conformity When Acquiring Novel Conventions: The Case of Artifacts

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Prior research focused on children's acquisition of arbitrary social conventions (e.g., object labels) has revealed that both 3- and 4-year-old children conform to majority opinion. Two studies explored whether children show similar conformist tendencies when making category-based judgments about a less socially arbitrary domain that offers an objective basis for judgment: object functions. Three- and 4-year-old children watched a video in which two informants disagreed with a lone dissenter on the function of a novel artifact. Children were asked to categorize the object by stating with whom they agreed. The plausibility of the majority's response was manipulated across test trials. Results demonstrated that children were more likely to agree with the majority when majority and minority opinions were equally plausible, especially when the majority demonstrated an overt consensus. However, 4-year-olds actively eschewed the majority opinion when it was implausible in context of the artifact's functional design. The current results indicate that expertise in a domain of conventional knowledge reduces conformist tendencies.

A hallmark of our humanity is that we are driven to affiliate with others. Children and adults readily form groups on the mildest of pretexts (e.g., Bigler, 1995; Bigler, Jones, & Lobliner, 1997; Dunham, Scott Baron, & Carey, 2011; Sherif, Harvey, White, Hood, & Sherif, 1961; Tajfel, 1970), a fact that is, perhaps, not surprising. Belonging to a group can engender myriad benefits including protection, self-identity, social support, and resources (e.g., Brewer, 1997; Larkin & Chartrand, 2005; Leary, Tambor, Terdal, & Downs, 1995; Lewin, 1993).

One result of this drive to affiliate is the tendency to conform to group opinion, even when we know that opinion to be wrong. The Asch Test provides the classic example. After hearing a series of confederates offer patently incorrect answers about the length of a line, 75% of adult participants deferred to majority opinion on at least one occasion and denied the evidence of their eyes about 37% of the time to remain consistent with the group (Asch, 1951). The results are striking given the minimal difficulty of the task and the minimal long-term practical cost to being wrong about the length of a drawn line. Nevertheless, the basic effect has been widely replicated (Bond & Smith, 1996), with two recent studies also reproducing these kinds of results

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with preschool children (Corriveau & Harris, 2010; Haun & Tomasello, 2011; see also Walker & Andrade, 1996).

Children's tendency to defer to majority opinion on a simple perceptual issue such as line length is interesting, and yet, as noted earlier, there is little that ultimately rests in the practical long term on being wrong about the length of particular lines. As such, the immediate social benefit of affiliating with others may simply outweigh the cost of being wrong about an issue of which the relevance is limited to the here and now. The same calculation may not hold true, however, when the content under consideration is categorical because category information is generalizable. Making errors on categorical items, therefore, has implications for accuracy in the longer term and perhaps reduces motivations to conform.

Research exploring children's susceptibility to social influence when considering category information has mainly focused on deference to adult authority or majority opinion when presented with category labels. In studies when the category label is objectively inaccurate (e.g., Jaswal, 2004, 2007; Jaswal & Markman, 2007) or when the label is ambiguous (e.g., Corriveau, Fusaro, & Harris, 2009; Fusaro & Harris, 2008), children tend to defer. For example, Corriveau et al. (2009) found that after watching a video in which two informants indicated that the referent of a novel label was one object while a dissenter indicated something else, 3- and 4-year-old children were inclined to endorse the majority view.

In many respects, children's behavior in these contexts is reasonable given the focus on a conventional domain of information that must be originally learned from another's testimony (i.e., object labels) rather than firsthand experience. This raises a crucial question: Do the dynamics of deference and conformity differ substantially when preschoolers make category-based judgments on questions where they need not rely completely on others' opinions because they have some autonomous, objective basis for judgment?

Categorization on the basis of function information represents such a case because the observable structure of an artifact constrains the function for which it can be used to perform. For example, a fork could be used to comb hair, decorate a piecrust, or pick up food, but it is unlikely to be used to carry water because its physical affordances simply do not permit it. Children's sensitivity to artifact structure–function relationships emerges early (Aguiar & Baillargeon, 1998; Brown, 1990; Kelemen, Seston, & Saint Georges, 2012; Kemler Nelson, 1999; Kemler Nelson, Frankenfield, Morris, & Blair, 2000; Kemler Nelson, Russell, Duke, & Jones, 2000; Mandler, 2007; Willatts, 1999), potentially liberating children from being solely dependent on social cues to categorize an object by its function because structural cues provide an objective basis for judgment.

By around 4 years of age, children not only understand how structure constrains usage but also actively use structural information to make deeper inferences about an object's causal history. That is, 4-year-olds will reconstruct an object's intended design by robustly applying assumptions that designers tend to create artifacts with features that optimally support, or are highly specific, to their intended function (Kelemen et al., 2012; see also Asher & Kemler Nelson, 2008; Kemler Nelson, Herron, & Morris, 2002). This ability to rationalize artifact structure in terms of an absent agent's historical intentions reflects abstract domain-specific expertise with potentially significant implications for preschool children's susceptibility to social influence. Indeed, there is already some evidence that it affects their resistance. In two studies, DiYanni and Kelemen (2008, Studies 1 and 3) found that after witnessing an adult reject a structurally optimal cookie-crushing tool in favor of a nonaffordant one, 4-year-olds were not convinced by the model's tool preferences

when making their own tool choices. Instead, they eschewed the model's choice and selected the optimal cookie-crushing tool for themselves. In follow-up studies (DiYanni & Kelemen, 2008, Studies 2 and 3), in which the model gave very explicit emphatic linguistic cues that the nonaffordant tool was ''made for'' the task, 4-year-olds, unlike more socially influenced 3-year-olds, remained autonomous in context of the incongruous verbal information and again selected the optimal tool for themselves.

These results, demonstrating resistance to social influence, conflict with prior work on 4-year-olds' reaction to testimony in an object-labeling task. Specifically, Jaswal (2004, Study 1) found that when an adult's object label (e.g., ''dog'') conflicted with children's perceptual knowledge of that familiar category (e.g., the entity looked like a cat), 4-year-olds agreed with the informant at chance levels. This at-chance performance demonstrated a degree of social influence given that in a control condition involving no testimony, 4-year-olds consistently made perceptually based inferences (e.g., they believed the entity that looked like a cat was indeed a cat). In Jaswal's (2004) Study 1, 4-year-olds vacillated between the ''right answer'' and the informant's counterintuitive labeling response. This socially influenced, chance-level behavior then later became even more actively marked compliance when 4-year-olds were given linguistic cues increasing the plausibility of the adult's choice of label (Jaswal, 2004, Studies 2 and 3). By contrast, in the case of DiYanni and Kelemen's studies (2008), emphatic linguistic and practical cues consistently did little to change 4-year-olds' autonomy about artifact functions across studies.

Four-year-olds' consistent reaction in DiYanni and Kelemen (2008) provides some insight into the way that domain-specific knowledge increases immunity to social influence. However, the procedure employed in that research involved a context in which the experimenters' opinion could have been construed as the idiosyncratic actions of a single misguided or capricious individual. The decision to reject the social cues of one person is quite different from the decision to reject the social cues of a group. The behavior of a cultural group, after all, dictates conventional status. Corriveau et al. (2009) found that children conform to the group when categorizing objects by their labels. The purpose of the present studies was therefore to determine if the tendency to conform is present for categorical judgment in another domain of conventional knowledge (i.e., object functions). Do children show resistance or deference to social influence when the opinions expressed about a novel artifact category are presented in a context where a numerical majority view is observable and pitted against a minority, dissenting view?

To explore this question, we used a video method very similar to Study 2 of Corriveau et al. (2009) in which two agreeing adults differed from a dissenting minority of one. Unlike in Corriveau et al.'s study, the adults in our videos discussed functions of novel objects rather than their labels. Children were then asked to categorize the object (i.e., state what the object was really for). Half of the test trials mimicked the structure of Corriveau et al.'s prior conformity studies assessing socially conventional knowledge acquisition insofar as children were presented with ambiguous information. Specifically, the functions stated by the majority and the minority were equally plausible given the physical structure of the artifact. These ''weak'' tests of conformity therefore provided preschoolers' baseline tendency to conform to a numerical majority when classifying objects by their functions.

In the other half of the test trials, children were presented with a situation in which there was an objectively clear and unambiguously correct answer: The function stated by the majority was implausible given the artifact's physical structure, whereas the lone opinion of the minority reflected a plausible dissenting view. These trials therefore represented ''strong'' tests of

conformity comparable to research replicating the Asch Test (e.g., Corriveau & Harris, 2010; Haun & Tomasello, 2011), with the important difference that the judgments concerned nonarbitrary, culturally generalizable category information (i.e., artifact functions). To our knowledge, this is therefore the first study to explicitly test children's ''strong'' conformity to a majority opinion in the context of domain-specific categorical information with both social and concrete practical relevance (see Jaswal, 2004, for plausibility considerations with a single informant providing object labels).

We predicted that on weak tests (i.e., equally plausible opinions), both 3- and 4-year-olds would tend to favor the majority given that this strategy carries the benefits of affiliation and conventional knowledge acquisition and has been observed in prior research involving socially arbitrary conventional information (e.g., Corriveau et al., 2009; Fusaro & Harris, 2008). On strong tests (i.e., implausible majority opinion), we again predicted that 3-year-olds would show susceptibility to social influence given that they were influenced by the social cues of a *single* experimenter in DiYanni and Kelemen (2008, Studies 2 and 3). Four-year-olds' behavior was an open question. Would the presence of a numerical majority—a strong cue to conventional opinion—increase children's affiliative tendencies relative to what was found across studies in DiYanni and Kelemen's study, or would 4-year-olds ignore the cues to conventional opinion and focus on the plausibility of the responses given their more robustly developed design stance?

In Study 1, we gave children only numerical cues (i.e., 2 vs. 1) that the majority view represented conventional opinion. In Study 2, we explored what happened when the additional social cue of explicit group cohesion was provided.

STUDY 1

Method

Participants. Twenty 3-year-olds (10 males; $M_{age} = 3;7$; range = 3;1–3;11) and seventeen 4-year-olds (11 males; $M_{age} = 4;6$; range = 4;1–4;10) were recruited from preschools in the Boston area and were 70% Caucasian, 16% Asian, 5% Hispanic, 3% African American, and 6% Unreported Race. Children were tested in their homes, preschool, or the lab.

Materials and design. Children completed six trials in which they judged the function of novel artifacts. In each trial, the experimenter placed a novel object in front of the child who watched a video in which each of three informants stated the artifact's function in response to a query by a narrator (see the Appendix for a sample script). Children were then asked what the object was for.

Four of the trials tested children's conformist tendencies. In all of these test trials, as in Corriveau et al. (2009, Study 2), two informants agreed with each other and left one informant as the lone dissenter. Two types of conformity were tested: weak and strong. In two weak trials, the functions stated by the majority and by the dissenter were equally plausible given the novel artifact's structure. In two strong trials, the functions stated by the majority were very clearly physically implausible (e.g., stating that an object with no containment capacity was for drinking), while the dissenter's answer was plausible. Implausible functions in the strong trials violated gross-level structure–function relationships about containment and support to which children

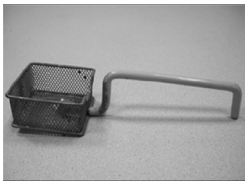
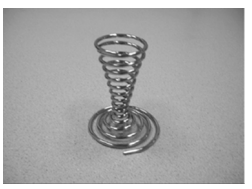
are sensitive from infancy (e.g., Baillargeon, 1995; Caron, Caron, & Antell, 1988; Hespos & Baillargeon, 2001; Needham & Baillargeon, 1993).

The two remaining trials were neutral trials in which all three informants stated different, but equally plausible, functions. The first of these occurred at the start of the test session and was included to establish, from the outset, that all the individuals were independent responders with their own viewpoints. Thus, when the two members of the majority later agreed with each other on conformity trials, the agreement appeared to occur through genuine similarity of opinion on a particular item, rather than because the two individuals consistently acted together as an in-group voting block. A second neutral trial occurred halfway through the test trials to reestablish the independence of everyone's viewpoint. Responder independence was further underscored by having the individuals introduce themselves to each other and to the narrator at the start of the film to demonstrate that they were strangers to each other without any preexisting familiarity. Because the neutral trials functioned only as a device for communicating the three informants' autonomy, these trials are not considered further.

Overall, the trial order was: neutral, weak, weak, neutral, strong, strong. Strong conformity trials were placed last so that the majority members' implausible answers would not influence responses in weak trials. A pilot group of ten 3-year-old participants confirmed the relative plausibility/implausibility of the functions stated in weak and strong trials in a modified version of Study 1. When only two informants, rather than all three, offered an opinion and thus no majority view was presented, 3-year-olds selected at chance between the equally plausible functions on weak trials, $t(9) = 0.69$, $p = .509$. They choose the response that would have been the majority opinion 40% of the time ($SD = 46\%$). However, the children significantly endorsed the plausible functions on strong trials $t(9) = 6.00$, $p < .001$, choosing the response that would have been the implausible majority opinion only 10% of the time ($SD = 21\%$). The structure–function relationships of the artifacts in the test trials were therefore transparent to 3-year-old children when their conformist tendencies were not under test. Given this sensitivity, different patterns of behavior were interpreted as indicating social influence on strong versus weak trials when children were presented with a majority view. On strong trials, in which the majority view was clearly inaccurate, anything other than active rejection of the majority view, represented by significant below-chance endorsement, was interpreted as indicating some degree of social influence. That is, given children's clear recognition of the dubiousness of the majority's stated view in other circumstances, chance-level performance in the strong trials reflected a degree of social influence. By contrast, on weak trials, in which the majority and the dissenter's views were equally plausible, only marked alignment with the majority view was treated as providing unambiguous evidence of social influence: An above-chance level of responding would indicate social influence, while chance-level responding could potentially represent guessing behavior. Study stimuli are shown in Table 1.

Procedure. Four children watched a video in which three women, Mrs. Red, Mrs. Blue, and Mrs. White (in color-coded attire), sat around a table. After everyone was introduced, the narrator placed a novel artifact on the table between the women. Children were also handed the same novel artifact so that they could directly examine the object being judged by the informants. In the video, the narrator then asked each person in turn what the artifact was for. Each informant picked up the object, soberly stated its function while making a function-consistent action, and then replaced it on the table. The other two informants did not respond or interact in any way until

TABLE 1
Novel Artifacts and Functions Used in Both Studies

Trial	*Picture*	*Function 1*	*Function 2*	*Function 3*
Neutral 1		Covering up your cup of juice so the flies don't come in	Resting your head on when you're sleeping	Scooping marbles
Weak 1		Pounding fruit	Knocking fence posts into the ground	
Weak 2		Polishing your shoes	Cleaning dust off CDs	
Neutral 2		Covering up your cup of juice so the flies do not come in	Blowing special long bubbles	Painting rainbows
Strong 1		Holding an egg so that it doesn't roll	Drinking	
Strong 2		Resting your head when you're sleeping	Cutting out cookies	

the narrator asked for their opinion. After hearing all the responses, the experimenter then asked children what they thought the object was for. The function provided by the majority on weak trials was counterbalanced across participants, and the order in which Mrs. Red and Mrs. Blue spoke was counterbalanced within trials. Mrs. White was part of the majority and always spoke last to ensure that children were drawn to note the majority view.

Results

A 2 (test: weak vs. strong) × 2 (age: 3 vs. 4) repeated-measures analysis of variance (ANOVA) on the number of times children agreed with the majority view yielded main effects of test, $F(1, 35) = 5.13$, $p < .05$, $\eta_p^2 = .13$, and age, $F(1, 35) = 4.40$, $p < .05$, $\eta_p^2 = .11$, subsumed by a significant test × age interaction, $F(1, 35) = 6.67$, $p < .05$, $\eta_p^2 = .16$. As Figure 1 shows, the interaction occurred because children's endorsement of the majority differed across age groups on strong tests, $t(35) = 3.47$, $p < .005$, but not on weak tests (4-year-olds, $M = 53\%$, $SD = 37\%$; 3-year-olds, $M = 53\%$, $SD = 41\%$). On weak tests, neither age groups' responses differed from chance, $ps > .750$. On strong tests, 4-year-olds ($M = 15\%$, $SD = 29\%$) actively rejected the majority when the cost of conforming was practical inaccuracy, $t(16) = 4.95$, $p < .001$, while 3-year-olds ($M = 55\%$, $SD = 39\%$) endorsed the majority at chance levels, $t(19) = 0.27$, $p = .790$.

Children were categorized into one of three endorsement strategies based on their behavior within each test type: ''Conformists'' agreed with the majority on two of two trials, ''nonconformists'' eschewed the majority on two of two trials, and ''ambivalent voters'' agreed with the majority once and the dissenter once (see Table 2). Individual subjects analyses revealed that 4-year-olds' endorsement strategy on strong tests was significantly different from chance, $\chi^2(2) = 24.06$, $p < .001$. On these tests, 4-year-olds were more likely to be nonconformists than conformists, $\chi^2(1) = 10.29$, $p < .005$. As Table 2 shows, no other consistent endorsement strategies were found in Study 1.

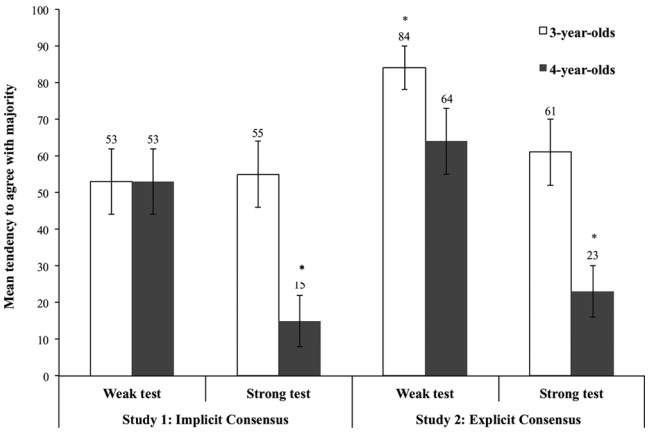


FIGURE 1 Three- and 4-year-old children's mean tendency to agree with the majority. *Significantly different from chance (50%); $p < .001$.

TABLE 2
Number of Children Who Always Agreed With the Majority (Conformists), Never Agreed With the Majority (Nonconformists), or Agreed With the Majority Once (Ambivalent) on Weak (2) and Strong (2) Conformity Tests

		Weak trials			*Strong trials*		
Study	*Age group*	*Conformists*	*Nonconformists*	*Ambivalent*	*Conformists*	*Nonconformists*	*Ambivalent*
Study 1: Implicit Consensus	3-year-olds	7	6	7	7	5	8
	4-year-olds	5	4	8	1	13	3
Study 2: Explicit Consensus	3-year-olds	16	1	5	11	6	5
	4-year-olds	11	5	6	2	14	6

Discussion

Preschoolers' tendency to conform to majority opinion when categorizing novel artifacts by their functions was explored. Compared with 3-year-olds' behavior, 4-year-olds' behavior showed little susceptibility to social influence. That is, on strong tests, 4-year-olds actively rejected the majority's opinion and agreed with the plausible suggestion put forth by the dissenter. By contrast, 3-year-olds agreed with the majority's obviously inaccurate response half of the time. Given 3-year-olds' understanding that the majority was indeed wrong, as revealed by pilot testing, this at-chance performance demonstrates their susceptibility to social influence.

Although 3-year-olds showed greater susceptibility to social influence than did 4-year-olds, the patterns for both age groups are interestingly at odds with Corriveau et al.'s (2009) study on children's conformity in the context of novel object labels, in which children in both age groups tended to actively conform (with 4-year-olds actually conforming significantly *more* than their younger peers). On current weak tests, when children were presented with equally plausible functions, both 3- and 4-year-olds' responses were at chance. They therefore guessed their answer, while remaining impervious or resistant to majority opinion rather than deferring to it. This difference to earlier results could be due to the content of the items under consideration. That is, the findings may suggest the domain of object functions operates differently than the domain of object labels. As noted, while object category labels are arbitrary symbolic conventions that, by their nature, leave children entirely reliant on social information, object functions are less arbitrary. Perhaps children's burgeoning design stance renders them less reliant on, and therefore less susceptible to, social influence when considering artifact functions.

A domain difference provided one possible explanation of children's relative lack of active conformity. However, it was also possible that a lower-level explanation accounted for children's chance-level responding on weak trials—situations in which conformity to conventional opinion would have been potentially judicious. Perhaps the presentation of the majority opinion was simply too subtle in the study. Besides the differing domain of information under scrutiny, the current study also included a procedural difference to Corriveau et al. (2009) that was potentially significant. In their study, a category label was given and the informants *pointed* to the referents *simultaneously*, while in the current study a referent was pointed out and informants

sequentially provided categorical information *verbally*. Because the informants in this study responded sequentially, children were only privy to the majority opinion once the third informant spoke—stating the same function as the first or second informant (in counterbalanced order). Conceivably then, children might have registered the two distinct suggestions about each artifact's function yet have been unable to remember which response represented majority opinion by the time they were asked to render their own judgment. Anecdotal evidence suggested that this memory explanation was unlikely: Children in both age groups spontaneously announced that ''they said the same thing'' or said ''that's what she said,'' while pointing to the members of the majority. Nevertheless, the possibility required exclusion, because if true, Study 1 would not have tested the influence of the majority because both responses in the weak trials were equally plausible and socially attractive. Study 2 was therefore conducted to test this low-level explanation.

Prior work has demonstrated that young children are sensitive to cues of approbation and disapprobation (e.g., Feinman & Lewis, 1983; Fusaro & Harris, 2008; Mumme, Fernald, & Herrera, 1996; Sorce, Emde, Campos, & Klinnert, 1985), with Fusaro and Harris (2008) demonstrating that 3- and 4-year-old children selectively learn novel words from an individual with whom bystanders show nonverbal agreement. Therefore, Study 2 applied these cues to promote the idea of the majority as a group with a consensus view that was very actively at odds with the view of the dissenter. Informants in Study 2 nonverbally acknowledged each other's views and also explicitly stated their agreement or disagreement with them. In addition, the final informant (Mrs. White) announced with whom she agreed (e.g., ''No, Mrs. Red, it's what Mrs. Blue said. This is for [function]'') to explicitly state the majority opinion (see the Appendix for a sample script).

If 4-year-olds did not conform in Study 1 because they could not detect the majority, then the additional social cues enhancing majority cohesion and dissenter conflict in Study 2 seemed likely to result in conformity akin to Corriveau et al. (2009). If, however, domain differences between labels and functions do indeed exist, then 4-year-olds, particularly in the strong trials, would be expected to continue to ignore the cues to conventional opinion and focus on the plausibility of the responses in light of their own domain knowledge.

STUDY 2

Method

Participants. Twenty-two 3-year-olds (7 males; $M_{age} = 3;6$; range = 3;2–3;10) and twenty-two 4-year-olds (15 males; $M_{age} = 4;6$; range = 4;2–4;10) from Boston-area preschools participated. They were 84% Caucasian, 5% Asian, 5% African American, 2% Hispanic, and 4% of Unreported Race. Children were tested in their homes, preschool, or the lab and had not participated in Study 1.

Materials and procedure. All aspects of the procedure were the same as in Study 1 except that in the video seen by participants, the majority formed a cohesive group by explicitly agreeing with each other and disagreeing with the dissenter. For example, while Mrs. Red (the dissenter) soberly stated an object's function and made a function-consistent action, Mrs. White and Mrs. Blue (majority members) shook their heads ''no.'' Mrs. Blue then took the object from Mrs. Red saying, ''No, this is for [function],'' and made an alternative function-consistent action while

Mrs. Red shook her head in disagreement and Mrs. White smiled and nodded (see the Appendix for a sample script). As in Study 1, at the conclusion of each interaction, the experimenter paused the video and asked the children what they thought the novel object was for.

Results

A 2 (test: weak vs. strong) × 2 (age: 3 vs. 4) repeated-measures ANOVA on the number of times children agreed with the majority view yielded main effects of test, $F(1, 42) = 28.00$, $p < .001$, $\eta_p^2 = .40$, and age, $F(1, 42) = 9.75$, $p < .005$, $\eta_p^2 = .19$. The effect of test occurred because on weak tests ($M = 74\%$, $SD = 37\%$), children conformed at above-chance levels, $t(43) = 4.33$, $p < .001$, while on strong tests ($M = 42\%$, $SD = 43\%$), children responded at chance, $t(43) = 1.23$, $p = .227$. The effect of age occurred because 3-year-olds ($M = 73\%$, $SD = 31\%$) agreed with the majority more often than did 4-year-olds ($M = 43\%$, $SD = 32\%$). As Figure 1 shows, the lack of a significant interaction, $F(1, 42) = 2.29$, $p = .138$, reveals that unlike in Study 1, 4-year-olds ($M = 23\%$, $SD = 34\%$) were not only less likely than 3-year-olds ($M = 61\%$, $SD = 43\%$) to endorse the majority view in strong tests, $t(42) = 3.30$, $p < .005$, but they were also marginally less likely to do so in weak tests (4-year-olds, $M = 64\%$, $SD = 41\%$; 3-year-olds, $M = 84\%$, $SD = 28\%$), $t(37) = 1.91$, $p = .064$. Indeed, on weak tests, 3-year-olds conformed at above-chance levels, $t(21) = 5.63$, $p < .001$, while 4-year-olds responded at chance, $t(21) = 1.55$, $p = .137$. In contrast, on strong tests, 3-year-olds responded at chance, $t(21) = 1.23$, $p = .234$, while 4-year-olds rejected the majority opinion, $t(21) = 3.81$, $p < .005$.

As in Study 1, children were categorized into one of three endorsement strategies based on their behavior within each test type: ''Conformists'' agreed with the majority on two of two trials, ''nonconformists'' eschewed the majority on two of two trials, and ''ambivalent voters'' agreed with the majority once and the dissenter once (see Table 2). Individual subject analyses revealed that endorsement strategies were significantly different from chance for all age groups and test types, $\chi^2(2)$s > 7.82, all ps $< .05$. However, additional tests comparing the two extreme endorsement strategies demonstrated that 3-year-olds were more likely to be conformists than nonconformists on weak tests, $\chi^2(1) = 13.24$, $p < .001$, but they were equally likely to be conformists as nonconformists on strong tests, $\chi^2(1) = 1.47$, $p = .225$. In contrast, 4-year-olds were more likely to be nonconformists than conformists on strong tests, $\chi^2(1) = 9.00$, $p < .005$, but they were equally likely be nonconformists as they were to be conformists on weak tests, $\chi^2(1) = 2.25$, $p = .134$.

To test the effects of explicit cues of consensus on the tendency to conform, a further 2 (study: 1 vs. 2) × 2 (test: weak vs. strong) × 2 (age: 3 vs. 4) repeated-measures ANOVA on the number of times children agreed with the majority was conducted. The results revealed a main effect of study, $F(1, 77) = 4.40$, $p < .05$, $\eta_p^2 = .05$. The explicit social consensus cues in Study 2 ($M = 58\%$, $SD = 34\%$) increased children's overall tendency to endorse the majority relative to the implicit consensus cue in Study 1 ($M = 45\%$, $SD = 30\%$). Planned post-hoc analyses demonstrated that the enhanced social cues increased 3-year-olds' tendency to endorse the majority (Study 1, $M = 54\%$, $SD = 32\%$; Study 2, $M = 73\%$, $SD = 31\%$), $F(1, 40) = 3.87$, $p = .056$, $\eta_p^2 = .09$. By contrast, the additional cues had no significant effect on 4-year-olds' overall tendency to endorse the majority (Study 1, $M = 34\%$, $SD = 25\%$; Study 2, $M = 43\%$, $SD = 32\%$), $F(1, 37) = 0.99$, $p = .326$.

Discussion

In Study 2, social cues highlighted the numerical consensus view. With the addition of these cues, 3-year-olds' conformist tendencies in the ambiguous response context of weak tests rose up to levels equivalent to those found in Corriveau et al.'s (2009) object-label study. In consequence, consistent with a low-level account of the lack of marked conformity in Study 1, when the cues to consensus are highly salient and alignment with the majority carries no cost, 3-year-olds conform to the majority view as much for artifact functions as they do for object labels (Corriveau et al., 2009; Fusaro & Harris, 2008).

However, even with the increased salience of consensus opinion, the pattern for 4-year-olds remained different to that of 3-year-olds and was inconsistent with a low-level account. Although 4-year-olds' general tendency to agree with the majority increased on weak tests in Study 2, the procedures of neither Study 1 nor Study 2 induced 4-year-olds to become markedly conformist about object functions. Instead, 4-year-olds in both studies factored in their own autonomous opinions on weak tests even though there would have been no costs—and potential social and informational benefits—to conforming.

Furthermore, on strong tests, explicit cues to consensus were not sufficient to provoke conformity in either age group. Although 3-year-olds showed some susceptibility to social influence insofar as they performed at chance rather than actively rejecting the implausible majority view, their awareness of structure–function relations nevertheless protected them from any marked acceptance of the irrational majority opinion. Four-year-olds, however, rejected the clearly implausible majority view, just as they had done in Study 1. In context of considering categorical information about artifact function then, by 4 years of age, children appear to privilege their own evaluation of the most plausible answer, not others' opinions (see DiYanni & Kelemen, 2008). This autonomy is evident in their performance on both weak and strong tests of conformity.

GENERAL DISCUSSION

Conformist behavior can yield many benefits including social inclusion and the acquisition of culturally appropriate behavioral norms. Given children's relative social vulnerability and the paucity of their conventional knowledge, it makes sense that they might be highly motivated to conform. The present research explored whether preschoolers would demonstrate conformist tendencies in the domain of object functions, in which inaccuracy can have enduring practical costs, and which, although conventional, nevertheless offers children some independent, objective basis for judgment.

Findings across two studies revealed that 3-year-olds show more susceptibility to social influence than do 4-year-olds when considering novel artifact functions. Three-year-olds, unlike 4-year-olds, are guided by cues to consensus for functions as well as labels (Corriveau et al., 2009; Fusaro & Harris, 2008) when confronted with *arbitrary* conventional information. Three-year-olds, however, did demonstrate autonomy, despite the convincing social cues, when there was obvious practical cost to conforming. This is a pattern consistent with prior findings that young children will abandon earlier conformist line judgments when they turn out to be personally impractical (Corriveau & Harris, 2010; Haun & Tomasello, 2011).

However, 3-year-olds' tendencies for autonomy paled when compared with those of 4-year-olds, whose performance—when considered across all conformity test types in both studies—persistently suggested a pattern of trusting their own judgment and only siding with others when those views aligned with their own. Taken together, these results suggest that during the preschool years, children transition from being ''Socially Malleable Threes'' to ''Forget You Fours'' (see Green, 2010). What developments foster this shift to greater nonconformist thinking and resistance to social pressure, at least in context of the artifact function domain?

As noted earlier, one answer is that by around 4 years of age, children have developed a design stance on artifacts. That is, while 3-year-olds are sensitive to structure–function relationships, 4-year-olds' deeper intentional-historical understanding of artifact structure is such that it may render children confident about resisting social information about what an artifact is ''for'' when it is in conflict with their own judgments.[1] Consistent with this interpretation, 4-year-olds, but not 3-year-olds, have been found to demonstrate an explicit and multifaceted understanding of how design intentions constrain artifact structure (Kelemen et al., 2012). Furthermore, a simple assessment of design understanding, on which 4-year-olds performed well, was found to predict children's resistance to social cues in DiYanni and Kelemen (2008) even though the equally relevant understanding of agents' differential trustworthiness or mental states did not (see DiYanni, Nini, Rheel, & Livelli, 2012, for replication). These results therefore suggest that trust in newly consolidated domain-specific expertise is at the root of 4-year-olds' nonconformist adherence to their own view of the ''right answer''—an independent mindedness that may be short-lived as children's social motivations change to ''fitting in'' in context of the formal schooling environment (DiYanni, Nini, & Rheel, 2011).

Although the current study did not directly compare conformity in the two contexts of object functions and object labels, the present results together with the extant literature (Corriveau et al., 2009; DiYanni & Kelemen, 2008; Jaswal, 2004) suggest a conclusion of domain differences. For example, as noted earlier, Jaswal (2004) demonstrated that when presented with perceptually implausible referents for familiar category labels, 4-year-olds significantly agreed with a single informant who either explicitly (Study 2) or implicitly (Study 3) indicated that it was her intention to provide the implausible category label. Although Jaswal's (2004) labeling task was procedurally very different from Study 2, it addressed a similar question about the pragmatics of social influence but resulted in very different findings. Recall that in Study 2, children were exposed to a majority who deliberately stated an implausible function in stark disagreement with the dissenter (e.g., ''No, Mrs. Red, it's what Mrs. Blue said. This is for [function]''). Arguably, as in Jaswal's (2004) studies, the informants' intentions to functionally categorize the object were clear. Despite this, 4-year-olds in our functional categorization context significantly resisted social influence—a result that differs from findings in Study 2 of Jaswal (2004) but is consistent with the pattern of results in Studies 1 through 3 of DiYanni and Kelemen (2008).

In summary, the present results suggest that specific theoretical content knowledge and emerging expertise can strongly ameliorate young children's susceptibility to social influence and that generalizations about childhood conformity and cultural knowledge acquisition must

[1]Other research that has involved artifacts suggests that the dynamics of deference are very different when other aspects of object-directed behavior aside from categorical judgments about what an artifact is ''for'' are considered—for example, when confronted with choices of arbitrary means-ends action style to achieve a goal (i.e., tool-use actions; Lyons, Damrosch, Lin, Macris, & Keil, 2011; Lyons, Young, & Keil, 2007; Nielsen & Tomaselli, 2010).

take into consideration the intrinsic structure of the content domain under discussion. From early on, young children attempt rational decision-making and bring to bear specific background knowledge and practical concerns when making judgments about generalizable information. This places constraints on their social malleability, with the current research suggesting that nonconformist thinking is particularly pronounced around 4 years of age when learning conventional object functions.

But even as parents of boundary-testing 4-year-olds might appreciate the general characterization of the ''Forget You Fours,'' it is also worth noting the numerous other factors that might ameliorate children's resistance to social influence in the artifact domain. Two factors are culture and individual personality. Prior research has suggested that children from cultures with collectivist norms are more likely to align with a majority view on an Asch line judgment task (Corriveau & Harris, 2010) and that children with more pronounced concerns about social desirability will imitate preferential tool choices of an inefficient artifact (DiYanni et al., 2011). It also seems that other social factors such as familiarity (Corriveau & Harris, 2009) or prior affiliative interactions between children and potential informants (e.g., Phillips, Seston, & Kelemen, 2012) may affect children's tendency to acquire new information and conform. It therefore remains for future research to further explore the effect of these factors and to more generally elaborate developmental changes in the influence of expertise on children's conformist behavior.

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APPENDIX

Strong Trial 1 Script Examples

Study 1:
Narrator: Mrs. Red, what is that for?
Mrs. Red: This is for holding an egg so it doesn't roll.
Narrator: Mrs. Blue, what is that for?
Mrs. Blue: This is for drinking.
Narrator: Mrs. White, what is that for?
Mrs. White: This is for drinking.
Study 2:
Narrator: Mrs. Red, what is that for?
Mrs. Red: This is for holding an egg so it doesn't roll.
(Mrs. Blue and Mrs. White shake their heads in disagreement.)
Mrs. Blue: No, this is for drinking.
(Mrs. Red shakes her head and Mrs. White nods in agreement.)
Mrs. White: I agree with her (Mrs. Blue), this is for drinking.
(Mrs. Red shakes her head and Mrs. Blue nods in agreement.)