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Brief Report

Children weigh the number of informants and perceptual uncertainty when identifying objects

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A B S T R A C T

The aim of this study was to evaluate how 3- to 5-year-old children ($N = 150$) identify an object when they are confronted with conflicting evidence, notably when the available perceptual evidence is contradicted by the testimony of either a lone informant or a three-informant consensus. Results showed that (a) 5-year-olds were more likely than 3- or 4-year-olds to rely on the perceptual evidence, ignoring claims made by the informants; (b) the three-informant consensus had more impact than a single informant for all age groups; and (c) children were more likely to make a perception-based response if the stimulus was perceptually unambiguous rather than equivocal with respect to its identity. Moreover, when children's task was to identify equivocal stimuli, they endorsed the three-informant consensus more than the lone informant. In contrast, when they needed to identify unambiguous stimuli, the number of informants did not influence children's responses. Taken together, the results show that the tendency to resist testimony on the basis of perceptual evidence increases with age. Moreover, preschoolers monitor both the characteristics of their informants and the relative ambiguity of the perceptual stimuli when they need to weigh verbal testimony against perceptual evidence.

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Introduction

Humans rely on information communicated to them by others. Nevertheless, given the risk of being accidentally or intentionally misinformed, it is likely that humans have acquired a suite of cognitive mechanisms for epistemic vigilance in the course of evolution (Sperber et al., 2010). These cognitive mechanisms rely on a variety of cues to gauge the reliability of speakers and the plausibility of information received through communication. From this evolutionary perspective, it is plausible that epistemic vigilance leads us to attach more weight to information provided by our senses than to information provided by others. At the same time, it has been argued that following a consensus is crucial for the transmission of culture because it promotes rapid and stable in-group uniformity (e.g., Boyd & Richerson, 2009; Henrich & Boyd, 1998). How these strategies for acquiring information interact and how that interaction develops during early childhood remain open questions, especially with respect to equivocal perceptual input, that is, input that generates uncertainty about the identity of the perceptual stimulus in question. The aim of the current study was to evaluate how children respond when they are confronted with conflicting evidence, notably when perceptual evidence is contradicted by the testimony of either a lone informant or a three-informant consensus.

A growing body of research shows that young children select among their informants (e.g., Clément, 2010; Harris, 2007; Harris, 2012). For instance, 4- and 5-year-olds prefer to learn from an accurate informant rather than an inaccurate informant (e.g., Birch, Vauthier, & Bloom, 2008; Clément, Koenig, & Harris, 2004; Corriveau & Harris, 2009b; Pasquini, Corriveau, Koenig, & Harris, 2007; Scofield & Behrend, 2008). Moreover, they give an informant's accuracy greater weight than other cues such as accent (Corriveau, Kinzler, & Harris, 2013), age (Jaswal & Neely, 2006), and familiarity (Corriveau & Harris, 2009a).

A useful strategy, especially when learning from unfamiliar informants, is to monitor several individuals and estimate their level of consensus. Even if it is not absolute proof, unanimity is good evidence for the truth of a given claim—especially a claim that involves a relatively straightforward perceptual judgment. The impact of claims made by a group of informants has traditionally been studied by social psychologists who showed that adults sometimes defer to a unanimous consensus whose claims conflict with perceptual input (Asch, 1956; Moscovici, 1980; Sherif, 1936). The famous "Asch paradigm" showed that participants are more likely to accept a claim about line length that conflicts with their own perceptual judgment when it is endorsed by a consensus (Asch, 1956). Recent research suggests that children are also receptive to the claims made by a consensus (e.g., Bernard, Proust, & Clément, in press; Corriveau, Fusaro, & Harris, 2009; Haun & Tomasello, 2011), but their receptivity depends on the nature of the perceptual input. In this regard, it is helpful to distinguish three types of perceptual input.

First, perceptual input can be unambiguous, for instance, when the stimulus is obviously an X rather than a Y so that the evaluation of the stimulus is unproblematic for the perceiver. Corriveau and Harris (2010) showed that in such cases, the majority of 3- and 4-year-olds favored their own perceptual judgment. Only approximately 30% of children favored an alternative claim made by a three-person consensus, similar to the percentage observed among adults in the classical Asch paradigm (see also Corriveau, Kim, Song, & Harris, 2013). Similarly, in a study involving estimations of the typical size of familiar animals, Haun and Tomasello (2011) found that 4-year-olds typically made their own judgment—mostly rejecting the judgment supplied by three peers. More generally, this reliance on unambiguous perceptual information is also observed in mislabeling tasks involving a single informant. For instance, when children hear a ball labeled as a "shoe," even toddlers reject the informant's label (Koenig & Echols, 2003; Pea, 1982).

Second, perceptual input can be ambiguous. For example, some unfamiliar objects can be plausibly labeled in one of two ways. In such cases, 3- to 6-year-olds accept the claims of a majority (Bernard et al., in press; Corriveau et al., 2009; Fusaro & Harris, 2008). Similarly, Haun, Rekers, and Tomasello (2012) showed that even 2-year-olds were more likely to copy an action demonstrated by a majority of three informants, rather than an action demonstrated three times by a single informant, when seeking to open a box.

Finally, we may consider cases in which perceptual input is neither unambiguous nor ambiguous but rather "biased." For instance, a hybrid composed predominantly of the features of one entity but retaining a minority of the features of a second entity is a biased stimulus. Jaswal (2004) showed that when presented with such biased hybrids, 4-year-olds accepted the claim of an informant that was based on a minority of the perceptual features provided the informant signaled that he or she was not making a mistake. Thus, when the informant said, "You are not going to believe this, but this is an X," this name was accepted by 4-year-olds even though it conflicted with most of the perceptual evidence. Indeed, 2- and 3-year-olds do not necessarily need pragmatic cues (e.g., "You are not going to believe this") to accept the claim of an adult naming a hybrid in a way that is consistent with only a minority of the perceptual features (Jaswal, 2004; Jaswal & Markman, 2007).

These results imply that young children sometimes give more credit to testimony than to their own senses. Yet, these results conflict with research showing that young children tend to give more weight to their own perception (e.g., Clément et al., 2004; DiYanni & Kelemen, 2008; DiYanni, Nini, Rheel, & Livelli, 2012; Koenig & Echols, 2003; Lane, Harris, Gelman, & Wellman, 2014; Pea, 1982). From an evolutionary perspective, such a bias toward perceptual evidence makes sense. Given the potential risk of being duped, our epistemic vigilance usually gives more weight to our senses than to the words of others (Sperber et al., 2010). Viewed from this broader perspective, the findings that preschoolers sometimes follow the testimony of others more than their own senses warrant additional complementary research. In particular, we may ask whether older preschoolers also trust informants' claims in the context of biased stimuli if these claims are not consistent with most of the perceptual evidence. It is possible that children gain confidence in their own judgment during the preschool period and increasingly favor their own perception to the detriment of testimony.

Accordingly, a central aim of the current experiment was to examine preschoolers' receptivity to unexpected testimony, notably claims about stimuli that run counter to the majority of the perceptual evidence. We also asked whether children respond differently to such unexpected testimony when it is provided by either a single informant or a consensus of three informants. Finally, we examined potential age changes; we asked whether 3-, 4-, and 5-year-olds vary in the relative weight that they attach to a single informant versus a consensus of three informants when they are presented with equivocal perceptual stimuli. To our knowledge, this study constitutes the first attempt to evaluate how two major sources of information—perception and the claims made by a consensus—interact when children are asked to identify equivocal perceptual stimuli.

Method

Participants

The experiment involved 150 children: 52 3-year-olds (M_{age} = 42.69 months, SD = 2.90, range = 38–47), 48 4-year-olds (M_{age} = 54.21 months, SD = 3.53, range = 48–59) and 50 5-year-olds (M_{age} = 65.42 months, SD = 3.81, range = 60–72). Approximately half of the children were female. All children were recruited from four day-care centers in a French-speaking city. Most children came from middle- and upper middle-class families. All children were administered the experimental task on an individual basis in a quiet room located in their day-care center. The procedure lasted approximately 10 min.

Material and procedure

Pretest phase

A pretest was conducted with a sample of 17 adults (8 women, M_{age} = 25.06 years, SD = 4.51, range = 19–36) to check whether the dominant features of each hybrid were salient. For each adult, six hybrids (from Jaswal & Markman, 2007) were presented on a video: three hybrid animals (a rabbit–squirrel, a bird–fish, and a bear–pig) and three hybrid objects (a shoe–car, a spoon–key, and a pen–toothbrush). Each animal and each object was composed of 75% of the features from one entity and 25% of the features from a second entity. The experimenter showed the six hybrids one at a time on a laptop and asked the adult participants to name each of them in a forced-choice procedure. In

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making their decision, the adults could refer to the names of the two entities comprising each hybrid (75% and 25%), which were written on the screen below the stimuli. One point was assigned when adults named the hybrid consistent with most of the perceptual evidence, and zero points were assigned when they did not. The results showed that two of the six hybrids were too equivocal to permit identification of the 75% entity. Thus, the mean number of correct choices for the pen–toothbrush and bear–pig did not exceed chance expectation, where chance was set at .50: pen–toothbrush ($M = .65$, $SD = .49$), $t(16) = 1.23$, $p = .236$, $d = 0.61$; bear–pig ($M = .35$, $SD = .49$), $t(16) = -1.23$, $p = .236$, $d = -0.61$. The remaining four hybrids yielded reliable judgments and were used in testing the children (Fig. 1).

To check whether the dominant features of these four hybrids were also more salient for children, a second pretest was conducted with 66 children: 22 3-year-olds ($M_{age} = 41.41$ months, $SD = 3.91$, range = 36–47), 23 4-year-olds ($M_{age} = 54.56$ months, $SD = 3.69$, range = 48–59), and 21 5-year-olds ($M_{age} = 64.90$ months, $SD = 3.51$, range = 60–71). The demographics of these children were similar to those of the 150 children tested in the main experiment. The experimenter showed the four hybrids one at a time on a laptop and asked the children, ‘‘According to you, what is the name of this [animal/object]? Is this a [25% label], or is this a [75% label]?'' (the order was counterbalanced). One point was assigned when children named the hybrid consistent with most of the perceptual evidence, and zero points were assigned when they did not.

For each hybrid, a Kruskal–Wallis one-way analysis of variance (ANOVA) yielded no significant main effect of age group: rabbit–squirrel, $\chi^2(2, N = 66) = 2.14$, $p = .343$; bird–fish, $\chi^2(2, N = 66) = 2.00$, $p = .368$; shoe–car, $\chi^2(2, N = 66) = 1.82$, $p = .403$; spoon–key, $\chi^2(2, N = 66) = 0.67$, $p = .715$. For each hybrid, the mean number of correct choices exceeded chance expectation, where chance was set at .50: rabbit–squirrel ($M = .98$, $SD = .12$), $t(65) = 32$, $p < .001$, $d = 7.94$; bird–fish ($M = .98$, $SD = .12$), $t(65) = 32$, $p < .001$, $d = 7.94$; shoe–car ($M = .82$, $SD = .39$), $t(65) = 6.65$, $p < .001$, $d = 1.65$; spoon–key ($M = .71$, $SD = .46$), $t(65) = 3.78$, $p < .001$, $d = 0.94$. Nevertheless, these results suggest that two hybrids, rabbit–squirrel and bird–fish, were unambiguous (as defined earlier), whereas the other two hybrids, shoe–car and spoon–key, were biased. Further analysis confirmed these conclusions. Although there was no significant difference between rabbit–squirrel and bird–fish ($p = 1$), or between shoe–car and spoon–key ($p = .163$), the hybrid rabbit–squirrel was significantly different from shoe–car ($p = .002$) and spoon–key ($p < .001$) and the hybrid bird–fish was also significantly different from shoe–car ($p = .001$) and spoon–key ($p < .001$). Given these results, we distinguish between two types of items in our analyses below: unambiguous items (rabbit–squirrel and bird–fish) and biased items (shoe–car and spoon–key).

Test phase

For each child, a video was presented on a laptop and lasted approximately 3 min. The experimenter started the video, and the on-screen presenter explained the procedure. Approximately half of the children in each age group were assigned to one of two conditions. In the One Informant condition, 80 children received four trials in which only one informant named the hybrid (Fig. 2). In the Three Informants condition, 70 children received four trials in which all members of a three-informant consensus named the hybrid simultaneously (Fig. 2), mimicking the mode of presentation adopted in studies by Bernard and colleagues (in press), by Chen, Corriveau, and Harris (2013), and by Corriveau et al. (2009). Irrespective of condition, the label that was provided contradicted most of the perceptual evidence in the case of both the unambiguous and biased items.

The presenter (center) explained the task. She presented each hybrid on a card and questioned either the single informant or the three informants. She then asked children to name the hybrid (‘‘What would you call this [animal/object]?'').

Most children responded by either endorsing the label provided by the informant(s) or naming the hybrid in terms of most of its perceptual features. Occasionally, children invented their own labels. If these inventions reflected most of the perceptual evidence rather than the name provided by the informant(s), they were grouped together with children's other perception-based responses. These kinds of perception-based inventions occurred only with the shoe–car item; children tended to name the shoe–car item as a ‘‘roller skate'' or with equivalent wording (e.g., ‘‘shoe with wheels''). Regarding

Fig. 1. The four hybrids from Jaswal and Markman (2007): The rabbit (75%)–squirrel (25%), the bird (75%)–fish (25%), the spoon (75%)–key (25%), and the shoe (75%)–car (25%).

Fig. 2. Sample screenshots for hybrid presentation in each condition.

these inventions, we judged that children were not placing the item in exactly the same category as a shoe but saw it as sharing most of its perceptual features with a shoe and only some with a car.

Immediately after children had named the hybrid, the experimenter asked children an inference question. They were asked what the rabbit–squirrel hybrid eats (carrots or nuts), where the bird–fish hybrid lives (in trees or in the water), what was the function of the shoe–car hybrid (walking or driving), and what was the function of the spoon–key hybrid (eating or opening). For instance, in the shoe–car trial, children were asked, "What do you think? Is this used for walking or for driving?" This procedure was repeated for each of the four trials.

Results

One point was assigned when children named the hybrid consistent with most of the perceptual evidence or when they produced an invention consistent with most of the perceptual evidence (collapsed over age group and condition, 7.5% of children produced these kinds of inventions). Zero points were assigned when they named the hybrid consistent with the unexpected label provided by the

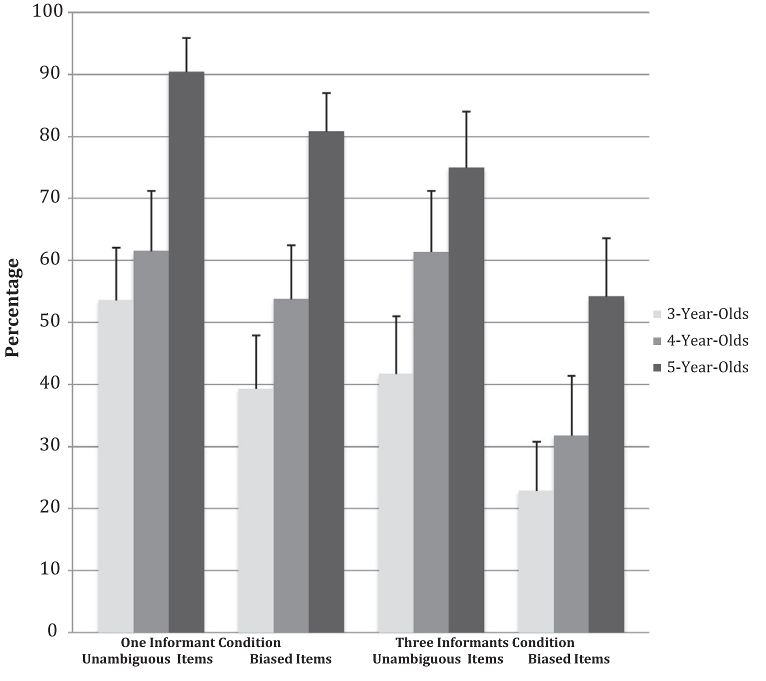

Fig. 3. Percentages of perception-based responses as a function of age group, condition, and type of item.

single informant or by the three-informant consensus. Thus, across the four trials, each child could obtain a maximum score of two points for the unambiguous items and two points for the biased items. Note that occasionally children used labels that were not related to the perceptual evidence (e.g., "pig" for the bird–fish item) or responded with "I don't know." We excluded these two types of responses and calculated the number of perceptual responses as a proportion of the number of items to which children responded (excluding these two types of responses).[1]

Fig. 3 shows the percentages of perception-based responses as a function of age group, condition, and type of item.

A three-way ANOVA with age group (3, 4, or 5 years) and condition (One Informant or Three Informants) as between-participants variables and type of item (unambiguous or biased) as the within-participants variable was calculated for the proportion of perception-based responses. This revealed a significant main effect of age group, $F(2, 144) = 11.27$, $p < .001$, $\eta^2 = .13$. The 5-year-olds ($M = .76$, $SD = .39$) produced significantly more perception-based responses than both the 3-year-olds ($M = .40$, $SD = .44$), $p < .001$, and the 4-year-olds ($M = .52$, $SD = .47$), $p = .011$.[2] No significant difference was found between the performance of 3-year-olds and that of 4-year-olds ($p = .300$).

The ANOVA also revealed significant main effects of condition, $F(1, 144) = 6.02$, $p = .015$, $\eta^2 = .04$, and type of item, $F(1, 144) = 27.53$, $p < .001$, $\eta^2 = .16$, as well as a Condition $\times$ Type of Item interaction, $F(1, 144) = 3.82$, $p = .052$, $\eta^2 = .03$. Children produced significantly more perception-based responses in the One Informant condition ($M = .63$, $SD = .44$) than in the Three Informants condition ($M = .48$, $SD = .47$), $p = .015$, and produced more perception-based responses for the unambiguous items ($M = .64$, $SD = .45$) than for the biased items ($M = .47$, $SD = .45$), $p < .001$. Further analysis of the interaction using tests of simple effects showed that for unambiguous items, children produced no more perception-based responses in the One Informant condition ($M = .68$, $SD = .44$) than in the Three

[1] Preliminary analyses revealed no significant effects of gender. Thus, this factor is not introduced in the following analyses.
[2] All comparisons were calculated according to the Bonferroni procedure.

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Table 1
Proportions (and standard deviations) of times children produced perception-based response by condition, age group, and type of item.

	One informant				Three informants			
	Unambiguous		Biased		Unambiguous		Biased	
	M (SD)	*t*	*M* (SD)	*t*	*M* (SD)	*t*	*M* (SD)	*t*
3-Year-olds	.54 (.45)	0.42	.39 (.46)	−1.24	.42 (.46)	−0.89	.23 (.39)	−3.41††
4-Year-olds	.61 (.49)	1.18	.54 (.44)	0.44	.61 (.46)	1.15	.32 (.45)	−1.89
5-Year-olds	.90 (.28)	7.26***	.81 (.32)	4.92***	.75 (.44)	2.77*	.54 (.46)	0.44

Above chance performance: *** $p < .001$; * $p < .05$; below chance performance: †† $p < .01$.

Informants condition ($M = .59$, $SD = .46$), $F(1, 148) = 1.40$, $p = .238$, $\eta^2 = .009$. For biased items, however, children produced significantly more perception-based responses in the One Informant condition ($M = .57$, $SD = .44$) than in the Three Informants condition ($M = .36$, $SD = .45$), $F(1, 148) = 8.31$, $p = .005$, $\eta^2 = .05$. In the One Informant condition, children produced more perception-based responses for unambiguous items than for biased items, $F(1, 79) = 7.24$, $p = .009$, $\eta^2 = .08$. The same pattern was found, albeit more strongly, in the Three Informants condition, $F(1, 69) = 20.44$, $p < .001$, $\eta^2 = .23$.

Table 1 displays the proportions of times that children produced a perception-based response. In the One Informant condition, 5-year-olds performed above chance for both the unambiguous and biased items, whereas the other two age groups did not exceed chance expectation for either item type. In the Three Informants condition, the same pattern was found for the unambiguous items. For the biased items, both 4- and 5-year-olds no longer performed above chance, whereas 3-year-olds performed below chance.

With regard to inferences, children received one point if they produced an inference consistent with most of the perceptual features and zero points if they did not. Thus, children could obtain a maximum score of two points for both types of item. Note that the forced-choice inference question (e.g., "What do you think? Is this used for walking or for driving?") was not relevant when children had invented a response and, therefore, was not asked. Accordingly, we excluded invented responses and calculated the number of correct inferences as a proportion of the number of inference questions that children were asked.

Fig. 4 shows the percentages of correct inferences as a function of age group, condition, and type of item.

A three-way ANOVA with age group (3, 4, or 5 years) and condition (One Informant or Three Informants) as between-participants variables and type of item (unambiguous or biased) as the within-participants variable was calculated for the proportion of correct inferences. This revealed a significant main effect of age group, $F(2, 137) = 7.34$, $p = .001$, $\eta^2 = .09$. The 5-year-olds ($M = .71$, $SD = .41$) produced significantly more correct inferences than both the 3-year-olds ($M = .45$, $SD = .43$), $p = .001$, and the 4-year-olds ($M = .51$, $SD = .46$), $p = .015$. No significant difference was found between the performance of the 3-year-olds and that of the 4-year-olds ($p = 1.00$).

The ANOVA also revealed significant main effects of condition, $F(1, 137) = 4.14$, $p = .044$, $\eta^2 = .03$, and type of item, $F(1, 137) = 31.88$, $p < .001$, $\eta^2 = .19$. Children produced significantly more correct inferences in the One Informant condition ($M = .61$, $SD = .44$) than in the Three Informants condition ($M = .50$, $SD = .45$), $p = .044$, and produced more correct inferences for the unambiguous items ($M = .66$, $SD = .43$) than for the biased items ($M = .46$, $SD = .44$), $p < .001$. The Condition × Type of Item interaction was not significant, $F(1, 137) = 0.19$, $p = .664$, $\eta^2 = .001$.

Table 2 shows that in the One Informant condition, 5-year-olds made more perception-based inferences than would be expected by chance for both the unambiguous and biased items, whereas the other two age groups did not exceed chance expectation for either item type. In the Three Informants condition, the same pattern was found for unambiguous items. For the biased items, 5-year-olds no longer performed above chance, whereas both 4- and 3-year-olds performed below chance.

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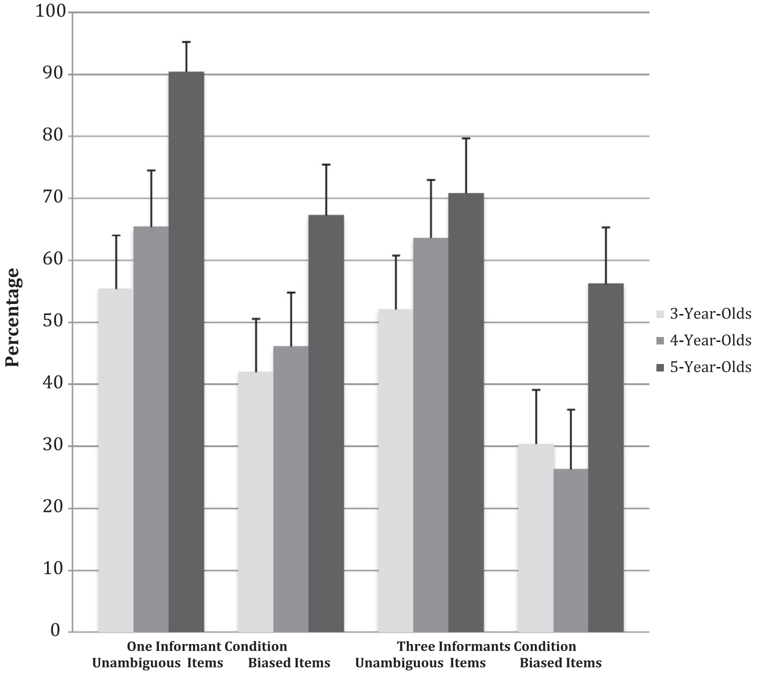

Fig. 4. Percentages of correct inferences as a function of age group, condition, and type of item.

Table 2
Proportions (and standard deviations) of times children produced correct inferences by condition, age group, and type of item.

	One informant				Three informants			
	Unambiguous		Biased		Unambiguous		Biased	
	M (SD)	*t*	*M* (SD)	*t*	*M* (SD)	*t*	*M* (SD)	*t*
3-Year-olds	.55 (.46)	0.62	.42 (43)	−0.94	.52 (.43)	0.24	.30 (.42)	−2.24†
4-Year-olds	.65 (.46)	1.69	.46 (.44)	−0.44	.64 (.44)	1.45	.26 (.42)	−2.45†
5-Year-olds	.90 (.24)	8.38***	.67 (.42)	2.09*	.71 (.44)	2.32*	.56 (.45)	0.68

Above chance performance: *** $p < .001$; * $p < .05$; below chance performance: † $p < .05$.

Discussion

The current experiment examined the weight that 3-, 4-, and 5-year-olds attach to the claims made by a three-informant consensus or by a lone informant when those claims conflict with children's independent judgments about unambiguous or biased stimuli. Taken together, the results supported several conclusions.

First, 5-year-olds were more likely than 3- and 4-year-olds to ignore the claims made by the informants and to base their judgment on the available perceptual evidence. This age change was quite robust. It emerged when the stimuli were unambiguous so that they provided little support for the informants' claims but also when the stimuli were biased so that they provided at least some support for the informants' claims. In addition, the age change emerged when children were invited to name the stimulus and when they were asked to infer its properties. In each case, 5-year-olds were more likely than the two younger age groups to answer on the basis of the available perceptual evidence rather than the informants' claims.

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Second, turning to the effects of condition, children were more likely to defer to a consensus of three informants than to a single informant. Again, this finding was relatively stable. It did not interact with age, and it emerged for both the naming measure and the inference measure. For the naming measure, however, there was an interaction with the type of item. The number of informants had a greater effect on children's naming in the context of biased items as opposed to unambiguous items.

Finally, all three age groups were sensitive to the difference between unambiguous and biased stimuli. More specifically, children were more likely to give perception-based replies if the stimulus was unambiguous with respect to its identity as opposed to biased. Thus, all three age groups were likely to discount the informants' claims if the stimulus lent little support to those claims but were more likely to accept those claims if the stimulus lent some support. Indeed, as noted above, when naming the biased stimuli, children were especially likely to accept claims made by a three-person consensus rather than by a single informant.

We now consider each of these three conclusions in more detail, beginning with the effect of age. Corriveau and Harris (2010) proposed the existence of an autonomous, perceptually driven mode (available to each age group) that competes with a socially driven mode. One possible interpretation of the robust age change seen in the current study is that as children get older there is an increasing dominance of the perceptually driven mode over the socially driven mode. Such a shift might come about if perceptual processing becomes more effective. For example, 5-year-olds might register more of the available perceptual evidence so that they have stronger convictions about the identity of both the unambiguous and biased stimuli. Hence, they become less receptive to the alternative claims made by the adult informants. However, scrutiny of the data obtained in the second pretest casts doubt on this interpretation. Recall that an initial test for age differences in that pretest revealed no significant variation among the three age groups. Thus, children in all three age groups were very close to unanimity in their judgments about the two unambiguous stimuli and displayed a relatively strong consensus for the biased stimuli. By implication, all three age groups were just as effective at processing the available perceptual information.

An alternative possibility is that competition between the two modes changes because of a weakening of the socially driven mode between 3 and 5 years of age. A study by Corriveau and Harris (2009a) sheds some light on this possibility. These authors tested whether preschool children were more ready to accept the claims of a familiar teacher as compared with an unfamiliar teacher and the extent to which the past naming accuracy of each teacher modulated this preference. In a pretest phase, 3-, 4-, and 5-year-olds more readily accepted the claims of the familiar teacher rather than the unfamiliar teacher. Following familiarization trials that revealed inaccurate naming by the familiar teacher, the selective preference initially displayed by 3-year-olds for the familiar teacher was minimally affected. In contrast, the preference for the familiar teacher initially displayed by 4-year-olds was reduced. Finally, the selective preference for the familiar teacher initially displayed by 5-year-olds was overturned; they now preferred the unfamiliar teacher if she had proved to be more accurate in the accuracy familiarization trials. These data suggest that children become increasingly alert to the potential inaccuracy of an informant during the preschool years. The current findings are also consistent with other results showing that 4-year-olds are more reluctant than 3-year-olds to accept informants' claims that go against their own perception (e.g., DiYanni & Kelemen, 2008). Finally, a study by Corriveau et al. (2009) further reinforces the proposal that there is a weakening of the socially driven mode among 5-year-olds. These authors showed that 5-year-olds favored the claims of a stranger rather than the claims of their own mother when the stranger's claims were consistent with more of the perceptual evidence.

In a broader perspective, it is worth noting that the relation between these two modes, the socially driven mode and the perceptually driven mode, could be influenced by variables other than age. Indeed, Corriveau and Harris (2010) showed that, as compared with European American preschoolers, Asian American preschoolers were more deferential to informants' claims when facing a conflict between their own unequivocal perception of the situation and the claims made by a majority of three people (see also Corriveau, Kim, et al., 2013). This difference has also been found in children's imitation of a non-efficient model (DiYanni, Nasrini, Nini, Kurkul, & Corriveau, 2013). In their consensus condition, these authors showed that Asian American children were significantly more likely than Caucasian American children to copy the model's preference for an inefficient tool. Taken together, these findings suggest that, as compared with Caucasian American children, Asian American children may be socialized to display respectful deference to the opinion of others rather than to rely on their own autonomous beliefs and judgments (Harris & Corriveau, 2013).

We now turn to the second major finding. Children gave fewer perception-based responses when the label was provided by a consensus rather than by a single informant. These results are consistent with previous research showing that preschoolers are quite receptive to a consensus when unfamiliar objects can be plausibly labeled in one of two ways. Thus, Fusaro and Harris (2008) showed that when two informants made equally plausible but conflicting claims, bystanders' approval of one particular claim markedly influenced children's choice between the two claims. Similarly, in a study by Corriveau et al. (2009), the fact that three informants all indicated one object, whereas a lone dissenter pointed to a different object, was an important cue in guiding children's choices (see also Bernard et al., in press; Chen et al., 2013). In sum, various studies converge on the conclusion that preschoolers are swayed more by a consensus than by a single informant.

Finally, we note that all three age groups were less likely to accept the informants' claims about unambiguous items as compared with biased items. These findings are in line with research showing that preschoolers have the capacity to monitor their uncertainty and to select a response strategy accordingly (e.g., Balcomb & Gerken, 2008; Lyons & Ghetti, 2011; Lyons & Ghetti, 2013; Paulus, Proust, & Sodian, 2013). For instance, Lyons and Ghetti (2013) asked 3- to 5-year-olds to decide whether or not to select one drawing from two degraded drawings of a target item and to rate their confidence in their answer. Children selectively withheld responses for trials on which they reported being uncertain. Thus, children can monitor their perceptual uncertainty and select a response strategy on this basis.

Second, children demonstrated that they can monitor their own uncertainty and also the kind of social input they are offered. Thus, for unambiguous items children produced just as many perception-based responses whether claims were made by three informants or by a single informant, but for biased items children produced significantly fewer perception-based responses when claims were made by three informants rather than by a single informant. This last result fits with recent research showing that children's tendency to follow a consensual perceptual judgment increased with the difficulty of making an initial judgment (Morgan, Laland, & Harris, in press).

Further research is needed to understand the process by which children weigh informants' claims in relation to their own observation or knowledge. In particular, it will be important to understand the nature of the social context in which children tend to trust informants' claims, including the number of informants making up a consensus, whether or not the informants are physically present or presented on video, and the way in which informants' claims are presented (either simultaneously or successively). Regarding this latter point, some previous studies—like the current study—have presented consensual responses simultaneously (Bernard et al., in press; Chen et al., 2013; Corriveau et al., 2009). In contrast, other studies have presented them successively (Corriveau & Harris, 2010; Haun & Tomasello, 2011; Haun et al., 2012; Hermann, Legare, Harris, & Whitehouse, 2013; Seston & Kelemen, 2014; Turner, Nielsen, & Collier-Baker, 2014). The only study comparing these two modes of presentation showed that children were more likely to imitate a consensus expressed by a simultaneous presentation than by a successive presentation (Hermann et al., 2013). By implication, the consensus effect demonstrated in our study might be weaker with a successive presentation. Further research would be needed to fully assess this possibility.

In conclusion, the current study has made three important contributions to the understanding of how children learn from others. First, it revealed a developmental change in the extent to which children resist the claims made by informants. The 3- and 4-year-olds were more likely than the 5-year-olds to follow the claims made by informants and thus, arguably, to rely on the socially driven mode rather than on the perceptually driven mode. Second, all three age groups were more likely to defer to a three-informant consensus than to a single informant. Finally, children monitored the uncertainty linked to perceptual stimuli. They were less likely to accept informants' claims about unambiguous items than about biased items. Moreover, when children needed to identify stimuli, they monitored both their own uncertainty and the number of informants making verbal claims, deferring more to a three-informant consensus than to a lone informant when presented with biased items.

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Children can use at least two strategies for acquiring information: learning from their own perception and learning from information provided by others. The current study examined how preschoolers use these two strategies, particularly when either a consensus or a single informant makes claims about a stimulus. Past research on children's judgments about unambiguous stimuli has focused on the impact of claims made by a consensus (e.g., Corriveau & Harris, 2010). Conversely, past research on children's judgments about equivocal stimuli has focused on the impact of claims made by a single informant (Jaswal, 2004; Jaswal & Markman, 2007). The current study is the first to examine the impact of variation in the ambiguity of the stimulus as well as the number of informants. The results offer a promising direction for future research by focusing on how different pieces of conflicting information—perceptual input and verbal testimony—are weighted.

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