Seeking of Confirmatory and Disconfirmatory Information by Children

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Submitted to the faculty of Cognitive Science in partial fulfillment of the requirements for the degree of Bachelor of Science.

Yale University,

04/22/2019

Abstract

Adults ask questions because they want to learn more about the world around them, but they also avoid asking them when they anticipate the answer will not align to their ingroup beliefs or will elicit cognitive dissonance. Children have been found to ask more questions than adults, but they also show a propensity to avoid cognitive dissonance and to affiliate with their ingroup. In the current work, we examine whether children are more or less motivated than adults to overcome their propensity to identity protection (via cognitive dissonance avoidance and group affiliation) in order to learn new information. In our main study, we introduced each participant to two characters who held opposite beliefs in various scenarios, and asked each child whether they wanted to hear from the agreeing informant (identity protect) or the disagreeing informant (information seek). Our main result indicated an interaction between question domain (fact vs opinion) and consensus level (high vs low), such that participants sought information more on factual, high consensus questions, but chose to identity protect more on opinion, high consensus questions. This effect suggests that the disagreeing informant might be considered a norm violator, which in the opinion questions leads the children to avoid them, but not in the factual questions, as children's curiosity in what they have to say may overcome this tendency.

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1. Introduction

Imagine Mary, a 35-year-old woman waiting for her appointment with a psychologist in Massachusetts. In the waiting room, there is a table with two different pamphlets that patients can read, and she decides to take one. The first pamphlet she sees talks about a pro-choice clinic nearby, whereas the second one is an interview with a pediatrician defending that abortion should not be allowed.

Let's say that Mary is a liberal democrat, and her personal opinion is that women should be able to decide. She can choose to read the pro-choice pamphlet, thus affiliating with her group of liberal democrats and avoiding any discomfort that might arise from being exposed to information that contradicts her beliefs. Or she can choose to read the pro-life pamphlet, which would cause her some distress, as she would be exposed to ideas that contradict her own. Both options would allow Mary to learn something new about the issue of abortion, while it is likely that choosing the pro-life pamphlet would expose Mary to new data that she did not previously know, as it defends the opposite view.

Mary's situation is a very common example of information seeking behavior, which is defined as the purposive seeking for information as a consequence of a need to satisfy some goal (Wilson, 2000). Seeking information is important, as the knowledge we obtain allows us to see how the world works and to predict and interpret events in our environment (Wellman & Gelman, 1998; Rehder, 2003; Murphy & Medin, 1985).

As can be seen in Mary's example, there seems to be a balance between information seeking behavior on one side, and identity protection (including cognitive dissonance avoidance and group affiliation) on the other. Importantly, although the two pamphlets that Mary could read

would possibly give her some information, throughout the paper "information seeking" refers to the preference of the disagreeing information (e.g. pro-life pamphlet) because in order to read the pro-life pamphlet, Mary needs to overcome the tendency to protect her own identity.

Research on the development of the balance (or imbalance) between the two poles is important as it relates to issues such as political polarization and discrimination (Barberá, Jost, Nagler, Tucker, & Bonneau, 2015; Conover, Ratkiewicz, Francisco, Gonçalves, Menczer, & Flammini, 2011; Wodak, 2008). More importantly, understanding the development of these issues might help us find a way to reduce the impact of political polarization and outgroup discrimination in today's society. For this reason, examining the development of information seeking behavior is the focus of the current work.

1.1. Information Seeking Behavior in Adults

Adults seek new information every day. For example, when a couple is moving to their new apartment, they need to buy furniture. They will most likely search for the freezer that has the best quality-price ratio, that is of the correct size and shape, that uses less electricity, etc. They will gather information before making the decision. College students ask questions every day, be it in class to the professors or outside the classroom to their peers.

However, the degree to which people seek information varies widely, especially depending on the age of the information seeker. Older adults seek less information than do younger adults when making decisions or solving problems. Streufert, Pogash, Piasecki and Post (1990) recruited managers to participate in an all-day group decision-making simulation and found that older teams made fewer requests for additional information than younger teams, and were less responsive to incoming information. Reed, Mikels, and Simon (2008) asked participants to complete a choice preferences survey in which they indicated their desired number of choices across health care and

everyday decisions, and found that older adults prefer less choice than young adults. Moreover, Zwahr, Park, and Shifren (1999) found that, after reading a vignette about a medical decision, young women were more likely than older women to select information-seeking courses of action: they'd rather see another doctor for a second opinion, and seek more information about possible therapies from other sources. This pattern of age-dependent behavior has also been observed in other studies involving medical decisions (Meyer, Russo, & Talbot, 1995; Ende, Kazis, Ash, & Moskowitz, 1989).

Therefore, adults seem to seek less information as they age. Mather (2006) proposed that decreased working memory capacity with age might be a reason why older adults seek less information, as they may not be able to remember every piece of information they're given. More relevant to the current work is Mather's other proposal to explain the trend of diminishing information seeking behavior in adults: older adults are more effective at avoiding negative emotions, such as cognitive dissonance.

1.1.1. Cognitive dissonance

One negative emotion that arises from learning new information is dissonance. Two elements of information are dissonant or inconsistent if, for one reason or another, they do not fit together (Festinger, 1957;). Dissonance is psychologically uncomfortable (Elliot & Devine, 1994), at least momentarily when the existing knowledge, opinion, or cognition is challenged with new information. Dissonance will motivate the person to try to reduce it, and to actively avoid situations and information which would likely increase the dissonance.

Frimer, Skitka & Motyl (2017) found that adults seem to avoid dissonance-arousing information when it comes to controversial moral beliefs, regardless of their own ideology (contrary to previous, similar research by Nam, Jost, & Van Bavel, 2013). People on both sides of

the same-sex marriage debate were asked to either read belief-confirming statements for a chance to win some amount of money ($7) or belief-disconfirming statements for a chance to win even more money ($10). Listening to the belief-disconfirming statements would be the economically maximizing choice, yet both liberals and conservatives willingly forfeited a chance to earn the additional $3 to avoid hearing a different opinion.

Moreover, evidence suggests that cognitive dissonance avoidance increments with age. Carstensen, Pasupathi, Mayr, and Nesselroade (2000) found that, after self-reporting positive and negative experiences for a week, older participants reported negative emotions less frequently than young adults, and older adults were better at maintaining highly positive states and the absence of negative emotional states. As older adults experience fewer negative emotions, they might be actively avoiding dissonance-arousing information to a greater degree than younger adults.

In sum, evidence shows that adults present a strong motivation to avoid dissonance-arousing information. Frimer, Skitka & Motyl (2017) provided another reason for why people tended to selectively expose themselves to belief-confirming information: people have a fundamental need to feel mental synchrony with others, or to have a social identity. Achieving a shared sense of reality requires that two or more people hold beliefs in common—and that they communicate their beliefs to one another. Seeking out information from like-minded others could satisfy this fundamental need and also could avoiding information from unlike-minded others. Adults may engage in selective exposure to avoid cognitive dissonance, but also to satisfy the need for a shared reality, which we will call group affiliation.

1.1.2. Group affiliation

There is evidence that supports adults' need for group affiliation (i.e. a sense of involvement and belonging within a social group. Appiah, Knobloch-Westerwick, and Alter

(2013) found that, while deciding among different news stories to read, Black readers were more likely to select and read positive and negative stories featuring their racial ingroup, and more likely to read negative stories about their outgroup. Political affiliation is another powerful ingroup (Huddy, 2015). Graf and Aday (2002) collected three measures of attention from people perusing websites of an online publication about political issues: time spent, initial attention (or where a subject looked first), and depth of attention (or how far into a story the subject read). They found that participants spent more time reading articles consistent with their opinions than those counter to them. Subjects turned to consistent information first, and when they looked at stories they read further into the ones with consistent information.

So far, evidence has been shown that adults are not information seeking when that information contradicts previously held beliefs and attitudes (i.e. situations that arouse cognitive dissonance), or when the information is contrary to their group's beliefs. Moreover, older adults seek less information than younger adults, most likely because they avoid more dissonance-arousing information. If the trend continues, children would be more information seeking than adults.

1.2. Information Seeking Behavior in Children

Childhood is characterized by curiosity, with behaviors like visual exploration, manipulation of objects, play with toys, and quest for information (Kreitler, Zigler, & Kreitler, 1975). Asking questions is an integral part of curiosity, and it plays an important role in cognitive development (Chouinard, Harris, & Maratsos, 2007). When preschoolers encounter a gap in their knowledge or some inconsistency they have detected, asking a question allows them to get targeted information exactly when they need it, and thus are particularly receptive to it. The ability to ask questions to gather needed information constitutes an efficient mechanism for cognitive

development, as questions allow children to get information they need to move their knowledge structures closer to adult-like states. Chouinard, Harris, and Maratsos (2007) found that preschoolers ask many questions, and when they do not get an informative response, they keep asking. Therefore, young children show information seeking behavior, not merely attention seeking, especially because they ask many "why" and "how" questions (Callanan, & Oakes, 1992; Frazier, Gelman, & Wellman, 2009).

Older children also seem to seek more information than adults. In each of three trials, Ruggeri, Lombrozo, Griffiths & Xu (2015) presented participants with 16 objects on an iPad screen and requested them to find out which set of objects shared a novel causal property. For example, they had to find out what kind of objects would turn on a machine. The authors found that 7- and 10-year-olds continued to search for information even past the point at which they have narrowed their hypothesis space to a single option, whereas college students tended to stop at that point. Thus, information seeking behavior might be more pronounced at young ages.

Evidence presented so far shows that the tendency to seek less information as people age seems to continue, as younger adults seek more information than older adults. Since two causes of the decrease of information seeking behavior in adults are the avoidance of dissonance and group affiliation, let's explore these topics in children.

1.2.1. Cognitive dissonance

With respect to dissonance, children tend to experience it and avoid it. Egan, Santos, and Bloom (2007) gave preschoolers a choice between two different stickers that participants had previously judged to like equally. Given that participants valued the two stickers about the same

amount, this choice was thought to cause dissonance because it conflicted with subjects' belief that the two options were equally valuable. After the participant chose one of the two stickers, the experimenter presented subjects with another choice: between the unchosen sticker and another sticker that was originally rated as attractive as both stickers in the first choice. Preschoolers preferred the novel over the unchosen option in this experimental condition, but not in a control condition in which they did not take part in the first decision. Therefore, even though all three stickers had been given the same rating at the beginning of the study, children changed their attitude toward the unchosen sticker in the first decision, deeming it less valuable. Results indicate that the participants' cognitive dissonance that may have arisen because of the initial forced choice between two equally liked stickers is reduced by choosing the new sticker presented in the second choice. To my knowledge, there are not studies comparing adults' and children's experiences of dissonance.

1.2.2. Group affiliation

It seems like adults show a stronger tendency to group affiliation, and thus ingroup preference, than children. For example, in a study by Heiphetz & Young (2017), participants were asked for their own beliefs in five categories (fact, opinion, widely shared moral, controversial positive moral, and controversial negative moral). The experimenter attributed conflicting beliefs on each of the five categories to two fictional characters, and asked children and adults which character they liked more. While both children and adults reported preferring the characters who shared their widely shared moral beliefs (e.g. whether it is better to pull someone's hair or share with someone), adults also showed a preference for characters who shared their controversial moral beliefs (e.g. whether it is better to help someone with a project or make cookies for

someone), effect that was significantly weaker in children. Although morality is not per se considered an ingroup, Pagliaro, Ellemers, and Barreto (2011) found that group members behave in line with moral group norms because they anticipate receiving ingroup respect when enacting moral values that are shared by ingroup members.

Even though children's tendency to group affiliation seems to be less pronounced than adults', children still show intergroup bias, even when randomly assigned to groups (i.e. minimal groups). Dunham, Baron, and Carey (2011) assigned 5-year-old children to minimal groups by having them blindly choose between a red and a blue coin (for the red and blue group, respectively), and by giving them a t-shirt of their group color. The authors asked children for their judgments on unfamiliar ingroup or outgroup children. Despite an absence of information regarding the relative status of groups or any competitive context, in-group preferences were observed on explicit and implicit measures of attitude and resource allocation, behavioral attribution, and expectations of reciprocity, with preferences persisting when groups were not described via a noun label. In addition, children systematically distorted incoming information by preferentially encoding positive information about in-group members.

In sum, children seem to be more information seeking than adults, but they also have a tendency towards identity protection via cognitive dissonance avoidance and a tendency to group affiliation.

1.3. Present Study

The present study aims to examine information seeking behavior in children, concretely whether children are more motivated than adults to overcome their propensity to identity protection (via cognitive dissonance avoidance and group affiliation) in order to learn new information.

In order to do this, we developed a study that will allow us to determine whether children choose to information seek or identity protect, in a scenario where they are asked questions and then are given the opportunity to hear an answer from an agreeing informant (identity protection) or from a disagreeing informant (information seeking).

Given that children's perceived consensus might influence children's responses, we developed a study to assess children's true and perceived consensus, here called Study 1. We used items of high and low perceived consensus in the main study discussed above, here called Study 2.

2. Study 1

In Study 1, we assessed thirty-two items in order to determine the best items to use in our main study (Study 2). The goal was to identify items that children see as having a high level of consensus, and other items that children see as having a low level of consensus.

We wanted to use items of high and low perceived consensus in Study 2 because this factor might influence children's responses. As an example, you might want to hear from a disagreeing informant on a topic of high consensus (e.g., "what does two plus two equal?") because you are curious about a person who believes an answer that is "obviously wrong," whereas you might want to hear from a disagreeing informant on a topic of low consensus (e.g., "what is the correct foreign policy towards Thailand?") to learn about the topic itself. Likewise, different factors might motivate *avoidance* of hearing from a disagreeing informant on topics of high or low consensus.

The importance of Study 1 was to assess children's perceived consensus for the items, rather than relying on our adult intuitions. We could thus select items that children perceived as high and low consensus for Study 2. For clarification, throughout study 1 the terms "intended consensus" and "perceived consensus" are used. Intended consensus describes the level of consensus assigned by *researchers* to different items during the design of the study. Perceived consensus describes the level of consensus assigned by *participants*, based on the data collected in Study 1.

2.1. Method

2.1.1 Participants

Sixteen 6- and 7-year-olds (6 female, M = 6 years, 9 months; SD = 7.46 months) and sixteen 8- and 9-year-olds (8 female, M = 8 years, 8 months; SD = 8.18 months) participated in the study

via TheChildLab.com online platform (Sheskin & Keil, 2018). On this platform, researchers engage in online videoconferences with participants and their parents. Children are tested individually, and the parent does not intervene once the consent form has been read aloud and audio recorded with their permission. The session begins with the researcher introducing themselves and giving enough details about the general procedures (i.e. a practice trial) for the parent to give consent and the child to give assent. After children understood the general procedure, they engaged in simple warm-up activities (e.g. saying whether there are more blue or green circles, saying which circle is bigger; see Sheskin & Keil (2018) for a more detailed description).

2.1.2 Materials

The stimuli are in Appendix A. The thirty-two items were the result of a 2x2x8 design: intended consensus level (high vs low), question domain (fact vs opinion), and 8 categories (such as "food" or "art"). Each child saw 8 items (one from each category), with two from each cell of the 2 (intended consensus level) x 2 (question domain) design.

As can be seen in the Appendix A, each category used identical pictures for a given level of intended level of consensus, regardless of whether the question being asked was a fact or an opinion. For example, for the high intended level of consensus, both the opinion and fact questions use broccoli and pizza. Looking across the categories of high and low intended level of consensus, one picture is retained but the other is switched to change the consensus level of both the fact and the opinion questions (e.g. pizza is replaced with a carrot).

2.1.3 Procedure

Our main dependent measure allowed children to express which answer most people thought was correct, and how much consensus there was about this answer. It was asked in two stages: first, which answer most people thought was correct; second, whether the level of

agreement was “everyone” or “most” or “a little more.” See Figure 1 for an example of the main DV.

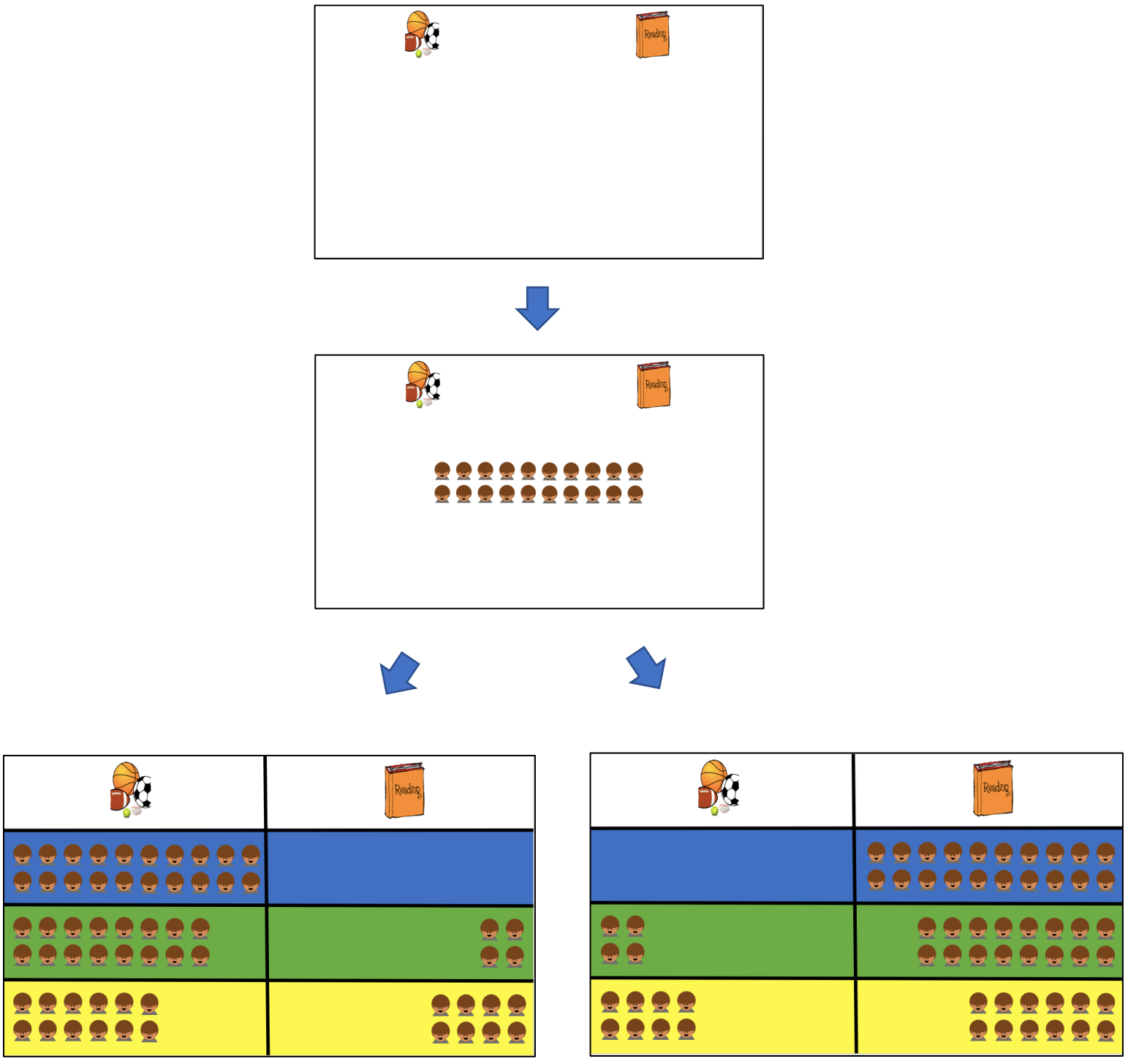


Figure 1. Main DV: Subjects item. The first slide presents the two different options (in this case, sports and reading) and asks for the participant's personal judgment on a question (e.g. "Which do you think is more fun?"). The second slide introduces a lot of people and asks the participant about their judgment (e.g. "What about other people? Do more people think sports are more fun or do more people think reading is more fun?"). Depending on which option the participant chooses for this second question, the researcher directs the PowerPoint presentation to one of the slides in the third row. The participant gives their perceived level of consensus by answering the question "How many more people think sports [reading] are [is] more fun? Blue, green, or yellow?".

We first introduced this procedure with a concrete activity of two training examples. In these examples, children were exposed to five different people, each of whom uttered one word. In the first training item, all five individuals said "cat" and none said "table", whereas in the second one, three of them said "tree" and two of them said "dolphin". Participants were asked "So, which did more people say? Table [tree] or cat [dolphin]?" Once they answered, they were introduced to the main question: "Now I'll ask how many more people said table [cat/tree/dolphin], and there are three answers: blue, green, and yellow." They were then run through what the three different options mean: the blue answer means all of them said table [cat/tree/dolphin], the green answer means most of them said table [cat/tree/dolphin], the yellow answer means a little more people said table [cat/tree/dolphin]. Children then chose which answer they thought was better (See Figure 2 for an example of a training item).

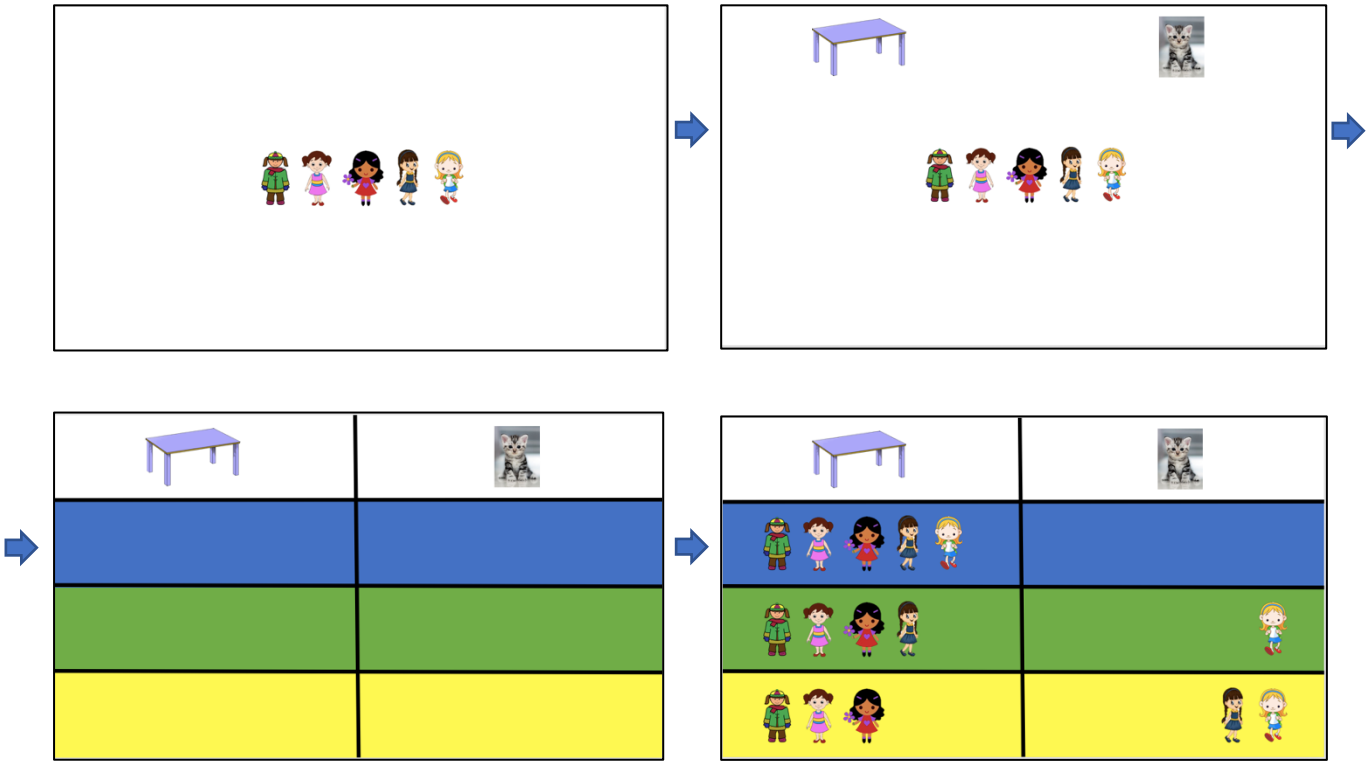


Figure 2. Training item for Study 1. The first slide introduces the five people who utter different words. The second slide shows the two options (in this case, table and cat). In the example given, the participant chose that more people said table, and so the researcher directed the PowerPoint to slide 3, which introduces the three-color approach. The fourth slide shows the different possibilities for the question "How many more people said table?".

After these training examples, the researcher introduced the new activity by showing a lot of cartoon people and stating that each of them might think differently about [item]. For example, on one condition of the food item each of the people might think broccoli is healthier, or might think pizza is healthier. Children were then asked about their own personal judgment (e.g. "What about you? Which do you think is healthier? Broccoli or pizza?"), and about other people's

possible judgment (e.g. “What about other people? What do other people think is healthier? Do more people think broccoli is healthier or do more people think pizza is healthier?”). See first two slides of Figure 1 for an example.

Once the participant’s judgments were recorded, they were asked about a perceived consensus judgment using the three-answers approach explained above. For the first two items, participants were explained what each answer meant (e.g. “The blue answer means all of them think broccoli [pizza] is healthier, the green answer means most of them think broccoli [pizza] is healthier, the yellow answer means a little more people think broccoli [pizza] is healthier.”). Children were requested to say which answer they thought was better (e.g. “How many more people think broccoli [pizza] is healthier? Blue, green, or yellow?”), which was used as a proxy for perceived consensus judgment. See last slide of Figure 1 for an example.

2.1.4 Design

We tested 32 items total: 8 categories x 2 intended consensus levels (high vs low) x 2 question domains (fact vs opinion). Each item was focused on assessing how confident participants were that people would agree on a certain judgment. We used a two-step design to get children’s perceived consensus ratings. First, we asked them to guess other people’s judgments, and then we requested to know whether everyone would agree with that judgment. Whether the judgment was made for a fact or an opinion question was counterbalanced between participants, as well as intended consensus level. Each participant saw two instances of each condition (i.e. two high intended consensus, factual questions; two low intended consensus, factual questions; two high intended consensus, opinion questions; and two low intended consensus, opinion questions) for a total of eight items total, one of each category. Therefore, each of the 32 items was seen by 8 participants. Picture position (i.e. left vs right) for each item was also counterbalanced across

participants, as well as category order. In order to ensure all these counterbalances, we created 16 different counterbalances, which can be seen in Table 1.

	CB 1 & 9	CB 2 & 10	CB 3 & 11	CB 4 & 12	CB 5 & 13	CB 6 & 14	CB 7 & 15	CB 8 & 16
Food	Fact Left	Opinion Left	Opinion Right	Fact Right	Fact Right	Opinion Right	Opinion Left	Fact Left
Box	Fact Right	Opinion Right	Fact Left	Opinion Left	Fact Left	Opinion Left	Fact Right	Opinion Right
Art	Opinion Left	Opinion Right	Fact Right	Fact Left	Opinion Right	Opinion Left	Fact Left	Fact Right
Subject	Opinion Right	Opinion Left	Fact Right	Fact Right	Opinion Left	Opinion Right	Fact Left	Fact Left
Activities	Fact Right	Fact Right	Opinion Left	Opinion Left	Fact Left	Fact Left	Opinion Right	Opinion Right
Animals	Opinion Left	Fact Right	Opinion Left	Fact Left	Opinion Right	Fact Left	Opinion Right	Fact Right
Sports	Fact Left	Fact Left	Opinion Right	Opinion Right	Fact Right	Fact Right	Opinion Left	Opinion Left
Cities	Opinion Right	Fact Left	Fact Left	Opinion Right	Opinion Left	Fact Right	Fact Right	Opinion Left

Table 1. Counterbalances for Study 1. Question domain (fact vs opinion), intended level of consensus (high vs. low), answer position (left vs right), and item order (item flow: top to bottom vs bottom to top) are counterbalanced. Intended level of consensus is shown by the difference in shading: gray-shaded boxes show intended high consensus items, and unshaded boxes represent intended low consensus items. Item order is reversed in counterbalances 9 to 16 (i.e. they start by the cities item and end with the food item), whereas the rest of characteristics (i.e. intended consensus and question domain) remain the same as their corresponding 1 to 8 counterbalances.

Before we settled for the two-step, three-color-answer design described on this method section, we piloted different approaches to get children's perceived consensus rating (see Appendix B for the two different approaches). We piloted over fifteen children and found these

approaches to be confusing. Moreover, a two-step design where we first ask children their judgment on others' beliefs and then we ask them to judge to what extent others agree on such belief seemed more intuitive and simpler than having children do both at the same time.

The task took about 10 minutes to finish, including the training examples, for children with regular speed Internet connection, although participants were scheduled for 30-minute slots.

2.2. Results and Discussion

The methods used in Study 1 allow for the assessment of two different forms of consensus: children's true consensus (i.e. most children agreed on others' judgment) and children's perceived consensus (i.e. most children reported that everyone would agree on said judgment).

To assess children's true consensus, we used children's answer to the "others" question (e.g. "What do other people think is healthier? Pizza or broccoli?"), instead of their answer to the "self" question (e.g. "What do you think is healthier? Pizza or broccoli?") because the intention of Study 1 was to assess children's understanding of the generality of an item, and not their personal opinion. However, children's answers to the "self" question and the "others" question sometimes differed, which might imply that they believe there's no high consensus for such items. Thus, we also used the number of matches between the "self" and the "others" responses for each item as information about consensus level. For children's perceived consensus, we used children's answers to the "consensus" questions (e.g. "How many more people think broccoli [pizza] is healthier?"), with "blue" being the highest level of consensus and "yellow" the lowest.

Therefore, we manually analyzed the data based on the three measures of consensus: participants' answer to "others" question, number of matches of "self" and "others" questions, and answers to the "consensus" question. We analyzed the 32 items and chose 8 for study 2, one from

each category: 4 factual items (2 low consensus, 2 high consensus) and 4 opinion items (2 low consensus, 2 high consensus). The results for the 32 items are shown in Table 2.

	High Consensus, Fact	**High Consensus, Opinion**	**Low Consensus, Fact**	**Low Consensus, Opinion**
Foods	Broccoli: 7 (3B, 2G, 2Y) Pizza: 1 (1G) Matches: 7	Broccoli: 0 Pizza: 8 (3B, 5G) Matches: 8	Broccoli: 6 (2B, 1G, 3Y) Carrots: 2 (2 G) Matches: 4	Broccoli: 3 (1B, 2Y) Carrots: 5 (1B, 1G, 3Y) Matches: 5
Boxes	Correct: 8 (3B, 4G, 1Y) Incorrect: 0 Matches: 8	Duck: 7 (2B, 1G, 4Y) Ugly toy: 1 (1Y) Matches: 7	Up arrow: 6 (2B, 4Y) Down arrow: 2 (1B, 1Y) Matches: 6	Up arrow: 3 (1G, 2Y) Down arrow: 5 (2G, 3Y) Matches: 3
Art	Paint: 8 (2B, 5G, 1Y) Water: 0 Matches: 8	Paint: 7 (2B, 3G, 2Y) Water: 1 (1G) Matches: 5	Paint: 6 (3B, 1G, 2Y) Crayons: 2 (2B) Matches: 6	Paint: 5 (2G, 3Y) Crayons: 3 (1G, 2Y) Matches: 3
Subjects	Reading: 8 (4B, 4G) Sports: 0 Matches: 8	Reading: 0 Sports: 8 (4B, 3G, 1Y) Matches: 6	Reading: 5 (2B, 3G) Writing: 3 (2B, 1Y) Matches: 7	Reading: 7 (1B, 5G, 1Y) Writing: 1 (1B) Matches: 6
Activities	Homework: 8 (7B, 1G) Videogames: 0 Matches: 8	Homework: 1 (1Y) Videogames: 7 (5B, 1G, 1Y) Matches: 6	Homework: 2 (1B, 1Y) Friends: 6 (5B, 1Y) Matches: 5	Homework: 3 (1G, 2Y) Friends: 5 (1B, 3G, 1Y) Matches: 6
Animals	Horse: 7 (7B) Grasshopper: 1 (1Y) Matches: 7	Horse: 8 (4B, 4G) Grasshopper: 0 Matches: 8	Horse: 2 (1G, 1Y) Lion: 6 (4G, 2Y) Matches: 7	Horse: 6 (3B, 1G, 1Y) Lion: 2 (2G) Matches: 5
Games	Soccer: 8 (5B, 2G, 1Y) Chess: 0 Matches:8	Soccer: 6 (1B, 2G, 2Y) Chess: 2 (1 B, 1 G) Matches: 6	Soccer: 6 (3G, 3Y) Basketball: 2 (2G) Matches: 6	Soccer: 6 (1B, 1G, 4Y) Basketball: 2 (1B, 1G) Matches: 3
Cities	New York: 4 (1B, 3Y) Detroit: 4 (1B, 2G, 1Y) Matches: 8	New York: 7 (2B, 4G, 1Y) Detroit: 1 (1B) Matches: 7	New York:7(1B, 3G, 3Y) Los Angeles: 1 (1 G) Matches: 7	New York: 6 (1B, 3G, 2Y) Los Angeles: 2 (1B, 1Y) Matches: 5

Table 2. Results for Study 1. Data was analyzed based on the three measures of consensus: participants' answer to "others" question, number of matches of "self" and "others" questions, and answers to the "consensus" question. The number of participants who chose each of the two options for a certain item (out of 8 total) are represented next to the option they chose, and the number of matches represents how many participants answered the same option for the "self" and "others" questions. In parentheses is the number of participants who chose each consensus level (B for blue, G for green, and Y for yellow). Shaded cells are the chosen items for Study 2.

As can be seen in the table (shaded), 8 items were chosen for Study 2. The chosen high consensus, factual items were those from the boxes ("Where do you think the toy is? The up arrow box or the down arrow box?" and activities ("Which do you think makes a person learn faster? Homework or videogames?"). These items were used for Study 2 because they showed high agreement on the "others" question and a substantial number of matches, and because of their number of blue answers. Throughout Study 1, the green answer (i.e. the medium consensus answer) has been the most common, which suggests that children might prefer to not overgeneralize. Therefore, when we analyzed the items, we considered green to be neutral consensus, and thus we focused on the blue and yellow options.

The chosen low consensus, factual items were those from the cities ("Which city is bigger? New York or Detroit?") and foods ("Which is healthier? Carrots or broccoli?") categories. The cities item was chosen because of its low true consensus, as half of the participants chose New York and the other half chose Detroit, and the high number of yellow answers. Note on the table above that, even though we intended this item to be high consensus, children did not perceive it as such. The food item was chosen because of its low number of matches, which suggests that children don't perceive it as being high consensus, and the relatively high number of yellows. However, we acknowledge that the low consensus items are not as clear as the high consensus ones. We could thus call the low consensus items "medium consensus" items, but for the sake of clarity, we will continue to refer to them as "low consensus" items.

The high consensus, opinion items were chosen from the subjects ("Which do you think is more fun? Reading or Sports?") and the animals ("Which do you think is more beautiful? A horse or a grasshopper?") items. These items were chosen because of their agreement on others' judgment and substantial number of matches, as well as high number of blue answers.

The low consensus, opinion items were chosen from the art ("Which do you think you'd like using more to make art? Crayons or paint?") and the games ("Which do you think you'd like to play more? Soccer or basketball?") categories. These items were chosen because of their high number of yellow answers and their low number of matches.

We chose to pick one condition from each category in order to avoid influencing participants' answers in Study 2. We thought that having two conditions from the same category would be confusing for participants and might change their pattern of responses. Therefore, we decided to pick one condition from each category: 2 high consensus, factual items (boxes and activities), 2 low consensus, factual items (cities and foods), 2 high consensus, opinion items (subjects and animals), and 2 low consensus, opinion items (art and games).

3. Study 2

Study 2 was developed to determine whether children choose to information seek or identity protect. In order to do this, we created a scenario where participants were asked questions and then were given the opportunity to hear an answer from an agreeing informant (identity protect) or from a disagreeing informant (information seek).

3.1. Method

3.1.1. Participants

We recruited forty 6- and 7-year-olds (19 female, *M* = 7 years, 1 month; *SD* = 6.90 months) and forty 8- and 9-year-olds (25 female, *M* = 9 years, 1 month; *SD* = 6.51 months). As in Study 1, participants engaged in online videoconferences via TheChildLab.com online platform, where we shared a PowerPoint presentation.

3.1.2. Materials

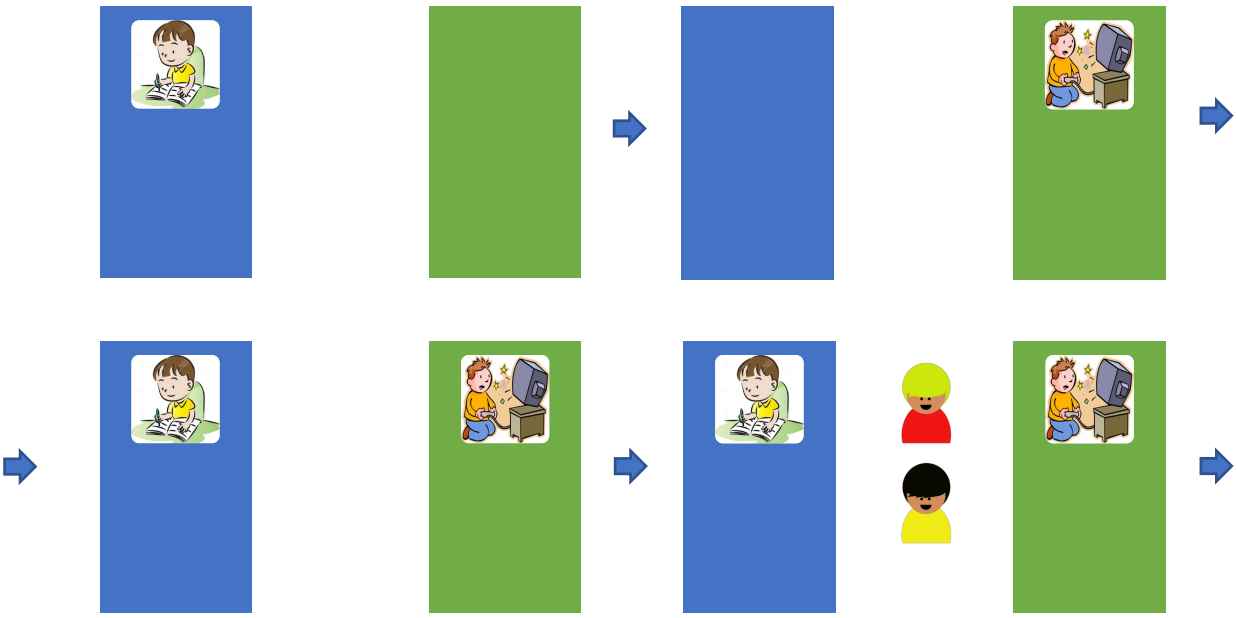
Stimuli from Study 1 were used, in particular 8 items: 2 high consensus, factual items (boxes and activities), 2 low consensus, factual items (cities and foods), 2 high consensus, opinion items (subjects and animals), and 2 low consensus, opinion items (art and games). The pictures used for each item were the same as the ones used in Study 1.

Given that, for factual questions, there is a correct answer, we counterbalanced where the correct answer is (left or right). For opinion questions, as there is no correct answer, we treated the item that more participants in Study 1 chose as the "correct" answer and its position was also counterbalanced.

3.1.3. Procedure

After the initial warm-up at the beginning of the online session (described in Study 1), participants were presented with the first item. As in Study 1, participants were shown two pictures (e.g. New York and Detroit), and they were asked to give their personal judgment (e.g. "Which do you think is a bigger city?").

After this initial judgment, for each item, the researcher introduced two new characters (from now on, informants), and participants were told that they hold opposite judgments: one of them said "blue" (e.g. New York is a bigger city) and the other said "green" (e.g. Detroit is a bigger city). Afterwards, participants were instructed to declare for which answer they had more interest in hearing a reason: "Since the two boys gave different answers, I asked each one why he gave his answer. Which do you want to hear?". This forced-choice question constituted the first and main measure of participants' information-seeking behavior (see Figure 3 for an example item).



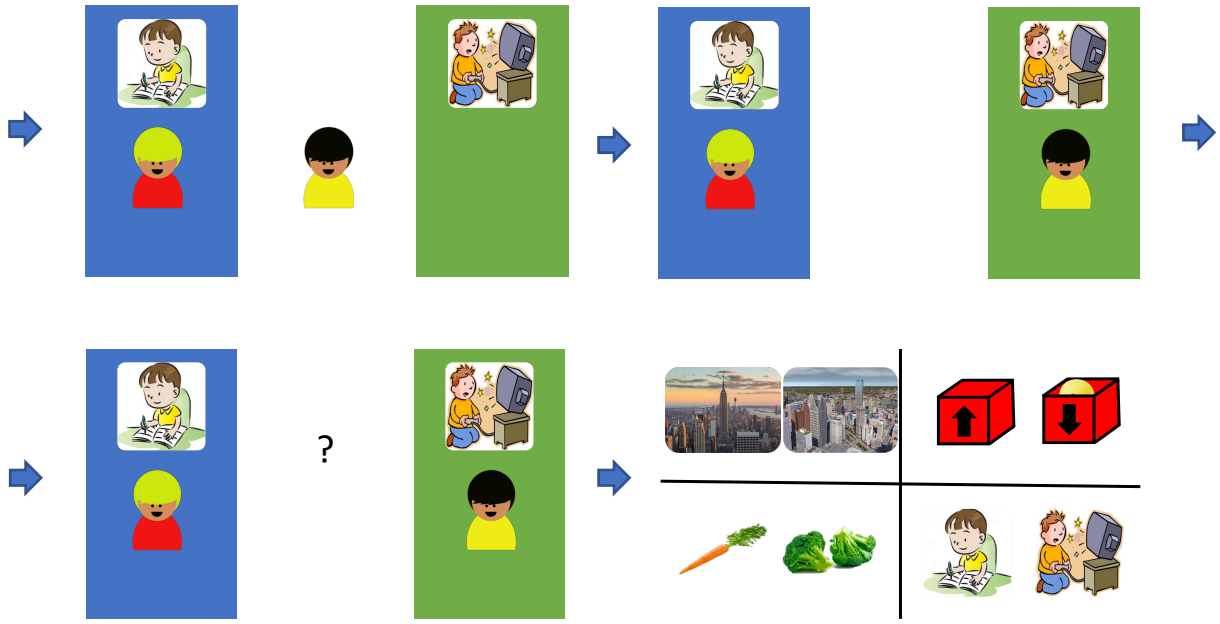


Figure 3. Main DV: Activities item. The first three slides present the two different options (in this case, homework and videogames) and asks for the participant's personal judgment on a question (e.g. "Which do you think helps a person learn faster? Homework in blue or videogames in green?"). The fourth slide introduces the two informants, who are either agreeing or disagreeing with the participant's personal judgment (slides 5-6). The seventh slide asks for choice of informant: "Since the two boys gave different answers, I asked each one why he gave his answer. Which do you want to hear?". If this were the first item being asked to the participant, the researcher would say: "Okay! In a couple of minutes, you'll get to hear that answer! Let's see a few more questions first!". The last slide, shown at the end of the activity, has all 8 possible answers, and participants are asked if they want to hear any of them, and which ones.

Once participants had chosen which informant they wanted to hear from, the researcher assured them they would hear the chosen informant's answer at the end of the activities, and continued to the next item. At the end of the activity, participants were reminded of all the questions they were asked and the two possible options for each question, and were offered the chance to hear any of the eight possible answers (see last slide of Figure 3). They could hear the answer from as many items as they wanted to, and they could also choose not to hear any of the answers. This non-forced-choice question constituted the second measure of participants' information seeking behavior. Therefore, there were two different dependent measures of information-seeking behavior: a forced-choice question where they had to choose which one of the fictional characters they wanted to hear from, and a non-forced-choice question where they could hear as many answers as they wanted to (or hear none at all).

The non-forced-choice question, the second measure of information seeking behavior, was not used on the analysis of the current study because most children were not specific on which answer they wanted to hear (e.g. they'd say they wanted to hear the cities question, but not specify if they wanted to hear from the informant who said New York or Detroit). Therefore, we decided that there was not enough reliable data to analyze, and focused out analyses on the set of forced-choice questions.

3.1.4. Design

Each child was asked four questions, either all fact or all opinion. Either way, there were two high consensus and two low consensus items. Therefore, question domain was between-subject, and consensus level was within-subject. We decided to use a mixed design, and have question domain as between-subject, because we thought the mindset for factual questions would

be different from the opinion one (if only because factual questions have a correct answer), and changing back and forth between the two mindsets could influence results. Picture position and category order were counterbalanced. The task took about 8 minutes to complete, including training examples.

3.2. Results

The data from each item were coded such that 0 meant that participants chose to hear the answer from the disagreeing informant and 1 meant that they chose to hear from agreeing informant. Thus, for each participant, two composite scores were created: one that ranged from 0 to 2 on the low consensus items, and one that ranged from 0 to 2 on the high consensus items. For each composite score, 0 meant a participant chose the disagreeing informant on both items, 1 meant a participant chose the disagreeing informant on one, but not the other, and a score of 2 meant a participant chose the agreeing informant on both items. The means of each condition's composite scores were used in main data analyses.

These two composite scores by level of consensus were compared to obtain 7 different patterns of behavior. If the two composite scores were 0, it meant that a participant chose the disagreeing informant for all four questions they saw, and if both were 2, it meant that a participant chose the agreeing informant for all four questions. If both composite scores were 1, the participant chose each informant twice, one for each consensus level. If the composite score for one of the consensus levels was 0 and the other was 2, the participant chose the agreeing informant for either high consensus or low consensus only. If the composite score for one of the consensus levels was simply greater than the other (but did not fall into the 0 vs 2 pattern), the participant chose the agreeing informant more often for either high consensus or low consensus, but not for all the questions. These seven patterns were used for exploratory analysis.

3.2.1 Main Analyses

A 2 (domain) x 2 (consensus level) two-way mixed ANOVA was run across all 80 participants to examine the effect of consensus level and question domain on choice of informant. There was no significant main effect of consensus level, $F(1,78) = .08$, $p = .778$. Although there seems to be a trend of question domain such that participants chose the disagreeing informant more for factual questions ($M = 0.84$; $SD = 0.84$) than opinion questions ($M = 1.09$; $SD = 0.79$), this effect was not significant, $F(1,78) = 2.63$, $p = .109$. However, a significant interaction was found between the effects of consensus level and question domain on choice of informant, such that participants chose the disagreeing informant more on high consensus questions when they were factual, but chose the agreeing informant more on high consensus questions when they were opinions, $F(1,78) = 9.47$, $p = .003$.

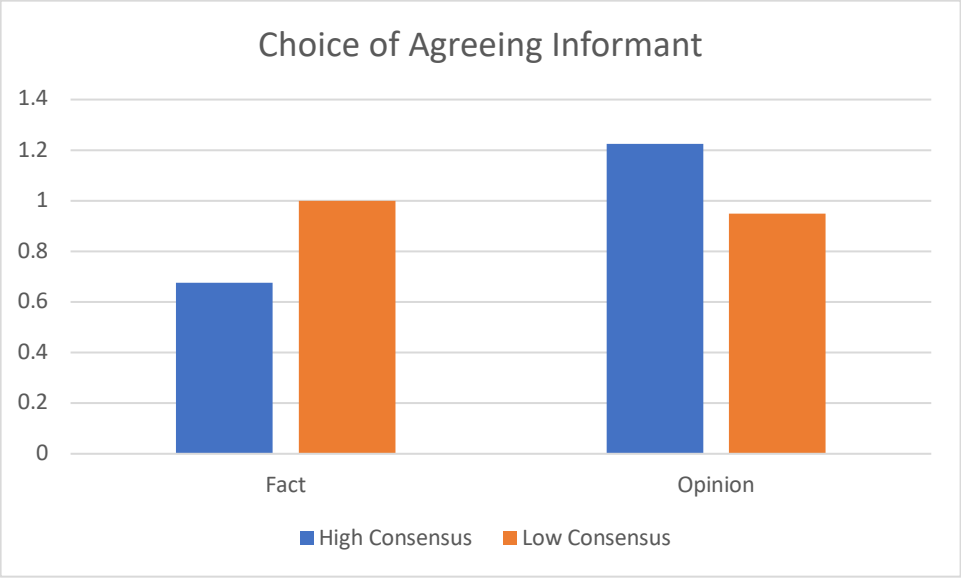


Figure 4. Effects of consensus level and question domain on choice of informant. The graph shows an interaction effect such that participants significantly preferred to hear from the disagreeing informant on the high consensus factual question, but preferred the agreeing informant for high consensus opinion questions.

In order to assess whether there was an effect of level of consensus within a certain question domain, two paired-samples t-tests were conducted. A significant effect was found for factual questions, as participants chose the disagreeing informant more on high consensus questions (M = 0.68; SD = 0.85) than low consensus questions (M = 1; SD = 0.81); $t(39) = -2.48$, $p = .0176$. A trend was found for opinion questions, as participants chose the agreeing informant more on high consensus questions (M = 1.23; SD = 0.76) than low consensus questions (M = 0.95; SD = 0.80); $t(39) = 1.92$, $p = .062$.

3.2.2 Exploratory Analyses

We had three exploratory analyses: an age split, a pattern analysis, and tests of whether each DV varied from random response.

We explored age differences. Although we analyzed our data with all participants (N = 80) and no age split because we were not expecting to have the power to see interactions with age by using a 2 (domain) x 2 (consensus level) x 2 (age group) three-way ANOVA design, we wanted to see if each age group looked like the overall pattern. Thus, we ran our main 2x2 analysis with the data split by age groups: participants in group 1 (n = 40) were 6-7 years old (M = 7 years, 1 month; SD = 6.90 months) and in group 2 (n = 40) were 8-9 years old (M = 9 years, 1 month; SD = 6.51 months). Although no significant results were found for participants in the younger age

group ($p > .05$ for all main effects and interaction), a significant effect of domain question was found for 8- and 9-year-olds, where they chose the disagreeing informant on factual questions ($M = 0.63$; $SD = 0.74$) significantly more than on opinion questions ($M = 1.13$; $SD = 0.71$), $F(1,39) = 6.40$, $p = .016$. There was no significant effect of consensus level, such that participants chose the disagreeing informant at the same rate for high consensus items ($M = 0.93$; $SD = 0.81$) and low consensus items ($M = 0.83$; $SD = 0.76$), $F(1,39) = 0.73$, $p = .397$. However, there was a significant interaction effect of consensus level and question domain, $F(1,39) = 12.17$, $p = .001$.

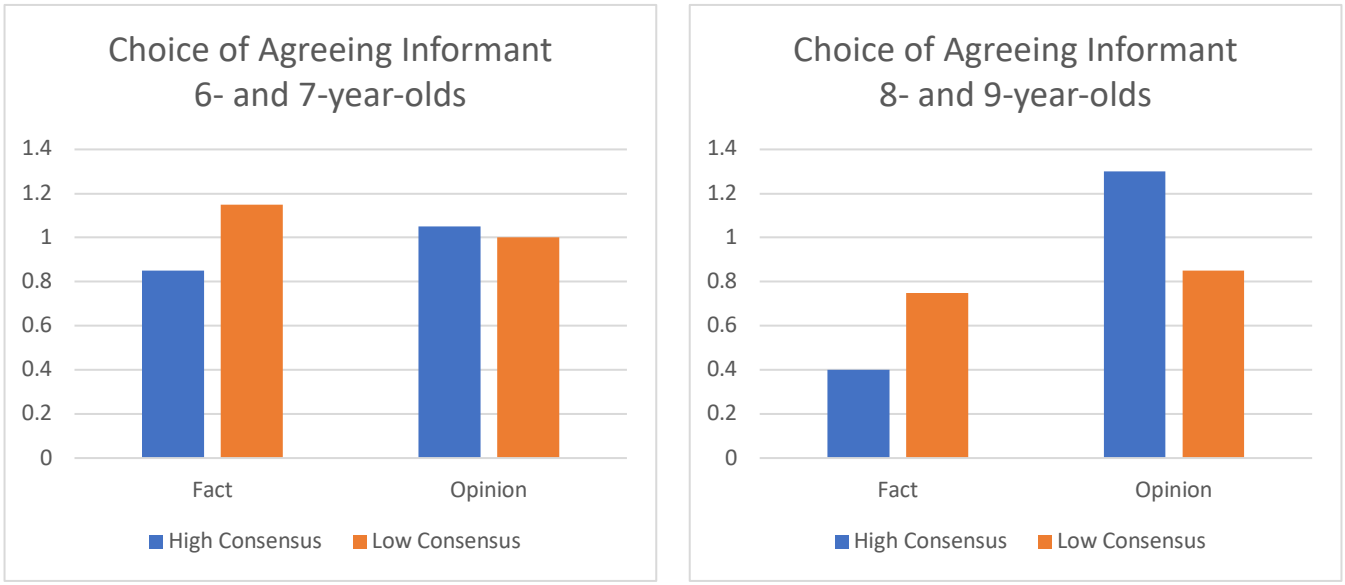


Figure 5. Choice of agreeing informant by age. The interaction present with all participants is observable on the 8- and 9-year-olds, but not the 6- and 7-year-olds.

Furthermore, we looked at the frequency of the seven different patterns that arouse from participants' two composite scores for all four questions they were asked (see Table 3). Some of

the patterns are quite specific and rarely occurred. For example, "OnlyHC" meant that the agreeing informant was chosen both times on the high consensus items and neither time on the low consensus items, and was a pattern shown by only one child asked fact questions and three children asked opinion questions. However, three patterns are salient in the table. The first is that 12 children in the fact condition never chose the agreeing informant (i.e., always chose the disagreeing informant) whereas this was the case for only 4 children in the opinion condition. Second, combining the pattern in which the agreeing informant was chosen either only in the low consensus condition, or more often in the low consensus condition than the high consensus condition, again shows much higher numbers for the fact condition (3+12=15) than the preference condition (1+6=7). Third, combining the pattern in which the agreeing informant was chosen either only in the high consensus condition, or more often in the high consensus condition than the low-consensus condition, shows much lower numbers for the fact condition (1+3=4) than the opinion condition (3+13=6).

	Always	Never	OnlyHC	OnlyLC	MoreHC	MoreLC	Mix
Fact	6	12	1	3	3	12	3
Preference	8	4	3	1	13	6	5

Table 3. Patterns of information seeking behavior. Each column shows the questions for which the agreeing informant was selected. "MoreHC" indicates that the agreeing informant was chosen more often for the high consensus questions *without* being the most extreme pattern (categorized separately as "OnlyHC") of choosing the agreeing informant both times for the high consensus questions and neither time for the low consensus questions.

A final exploratory analysis investigated whether the participants answers differed from chance. We used a value of 1 as the baseline for this, although the true baseline might not be 1. This uncertainty is because asking the child two questions in such close proximity might lead them to maintain their answer (e.g., having just answered "crayons" they might answer "crayons" again) or switch their answer (e.g., having just answered "crayons" they might think a second question should have a different answer and so switch to "paint").

Thus, we use 1 as the baseline, but note that it there is no way to know whether it is in our data. We ran four one-sample t-tests to compare each of the 4 conditions to 1 to see if the results are significantly different from chance. Only high consensus factual questions (M = 0.68; SD = 0.86) were found to be significantly different than 1, $t(39) = -2.39$, $p = .022$, although high consensus opinion questions (M = 1.23; SD = 0.77) showed a trend towards significance, $t(39) = 1.85$, $p = .071$. Low consensus factual questions (M = 1; SD = 0.82) were not significantly different than 1; $t(39) = 0$, $p = 1.000$, as well as low consensus opinion questions (M = 0.95; SD = 0.81), $t(39) = -0.39$, $p = .700$.

We were also interested in looking at potential item effects. We determined, for each item, the number of matches (i.e. participants chose the agreeing informant) out of 40, and most of them are within the 18-22 range (see Table 4). However, the boxes item and the activities item had 14 and 13 matches, respectively; the subjects item had 28 matches. These three items look notably different than the rest, so it is likely that they are driving the results, which thus should be interpreted with caution.

	Boxes	Activities	Cities	Foods	Animals	Subjects	Art	Sports
Number of Matches	14	13	21	19	21	28	20	18

Table 4. Number of Matches per item. In five of the 8 items, around half of the 40 participants that saw either factual or opinion questions chose the disagreeing informant and around half chose the agreeing informant. The three items shaded in gray show a different pattern, so they might be driving the effects found.

3.3. Discussion

3.3.1 General Discussion

Our main result indicated an interaction between question domain (fact vs opinion) and consensus level (high vs low), such that participants sought information (i.e. chose the disagreeing informant) more on high consensus questions when they were factual, but chose to protect their identity (i.e. chose the agreeing informant) more on high consensus, opinion questions. We suggest two possible explanations for this finding.

On the one hand, it might be that when the informant has a very unusual answer to a factual question, children want to hear what they are thinking because they want to learn about a "strange person" (i.e. norm violator) and not new information, since they did not information seek to the same extent for low consensus factual questions. Although they might want to be interested in learning about a norm violator when it's a "obvious" fact question, they do not want to associate with said norm violator, instead wanting to avoid them, which explains why children chose to group affiliate when it comes to high consensus, opinion questions.

In fact, there is previous developmental research showing that children avoid interacting with norm violators. (Thornberg, 2011). In their review, the author shows that, when children were describing reasons for bullying, they talked about the victim as 'odd', 'weird' or used other expressions of deviance, and they reported that these students deserved to be treated with hostility

(Teräsahjo and Salmivalli, 2003). Just as these authors propose that deviant students threaten the status quo, the disagreeing informant in our study seems to be against the norm, which can lean children towards group conformity and identity protecting behavior. Evolutionarily, it is advantageous to associate with peers who do not violate social norms of the group, as they enhance group cohesion and reciprocity (Horne, 2001; Sethi & Somanathan, 2005), and deviant people are interpreted as norm violators of the peer culture (Phelan and Link, 1999). Therefore, our results could be explained by children's propensity to avoid norm violators, which is only overcome when they are interested in knowing what they are thinking (i.e. in high consensus, factual questions).

Another possibility would be that children believe that, because the correct answers to the high consensus, factual questions were so obvious, the disagreeing informant must have a piece of privilege information that they don't have. Thus, children might not have chosen the disagreeing informant because they wanted to hear what a "strange person" thought, but because they wanted to learn new information. However, as there is no correct answer to the high consensus, opinion questions, children may not believe that there is privilege information to know, which would explain why they tended to avoid the disagreeing informant. Again, the disagreeing informant might have been considered a norm violator, which led the children to avoid them and affiliate with their group. In this hypothesis, children's propensity to avoid norm violators would be overcome by their desire to learn new information about the world, not about the odd informant as proposed above. The current design cannot differentiate between the two hypotheses, so future studies could be useful to explore why children group affiliate for high consensus, opinion questions but not for high consensus, factual questions.

Nevertheless, our results do indicate a trend where children seem to choose the disagreeing informant on factual questions significantly more than on opinion questions, which might show

that children do want to learn new information about the world and that's why the overcome their propensity to affiliate with their ingroup. Given that questions play an important role in cognitive development and that children use them to fill a knowledge gap (Chouinard, Harris, & Maratsos, 2007), it is possible that children are also interested in learning new information when it is offered to them. Nonetheless, this trend (although close to significance) it's not statistically significant, and thus more research is needed to assess whether such an effect exists.

When it comes to what type of information children seek, a significant effect of consensus level was found, such that participants sought information to a greater extent on high consensus, factual questions than low consensus, factual questions. Therefore, the information offered needs to be interesting to them in order for children to consistently want to hear from the disagreeing informant, and if the question is sufficiently interesting, children seem to information seek above chance. Given that participants didn't choose to information seek when it came to low consensus, factual questions, it seems like low consensus questions were not of interest to them. A reason might be that the items were so similar that any of the options could be the correct answer, so participants were not curious to know the answer (as it could be both) and thus chose at random. The opposite trend was found for opinion questions, as participants sought less information on high consensus questions than low consensus questions. As explained above, a reason might be that, while the disagreeing informant can be seen as a norm violator for high consensus, opinion questions, children might think that the answers provided on the low consensus, opinion questions are valid: those informants are not considered norm violators and thus do not lead children towards group affiliation. Therefore, if children believe the informant has behaved in a sufficiently strange way, they will choose to affiliate with their group above chance.

The reported interaction between question domain and consensus level appears to be driven by the older age group, the 8- and 9-year-olds. Although 6- and 7-year-old participants seemed to be choosing at random, the older age group sought information more on high consensus questions when the questions were factual, but chose to protect their identity more on high consensus, opinion questions. This age difference is interesting because is it possible that the effects found do not emerge until later in life, which could imply that group affiliation as a defense against norm violation develops during childhood. However, these results are exploratory, so they are interpreted with caution.

Another exploratory result we analyzed was the pattern of behavior that each participant demonstrated, and it seems like there are some clear patterns of behavior (e.g. more participants chose the agreeing informant with more frequency on the high consensus questions than a low consensus question when they were opinions rather than facts). Nonetheless, participants behaved in every kind of pattern, which seems to imply that there are individual differences in children's curiosity levels, or in the degree to which they want to group affiliate.

3.3.1 Implications

We found that when the informant provides a very unusual factual answer, children want to hear what they are thinking, whereas informants who provide a strange opinion are avoided. If the trends we find in the older age increase over time, these results could have important implications in the domain of adult morality (even though we did not use moral belief items), as controversial moral beliefs have been found to be judged as opinion-like, and not fact-like, by adults (Heiphetz & Young, 2017). Therefore, it is possible that adults would see someone who disagrees with them about abortion not as someone to argue with and maybe learn something new, but as someone to be avoided. Thus, the balance between information seeking behavior on one

side, and cognitive dissonance avoidance and group affiliation on the other would incline in favor of the latter phenomena when it comes to moral beliefs. This can lead to political polarization and discrimination against the outgroup, as people who disagree on certain items will avoid each other. Indeed, some researchers have found that information (via Twitter) is exchanged primarily among individuals with similar ideological preferences in the case of political issues (Barberá, Jost, Nagler, Tucker, & Bonneau, 2015), and that people avoid retweeting from others with opposite political views (Conover, Ratkiewicz, Francisco, Gonçalves, Menczer, & Flammini, 2011). If children's imbalance turns out to be less pronounced than adults' because they see moral beliefs as facts and not opinions, education might be shaped to avoid its increase, which would decrease political polarization and discrimination.

Moreover, bullying could also be reduced. Given that children started choosing the group affiliating answer for high consensus, opinion questions at ages 8-9 (and not 6-7), it is possible that norm violators are not seen as people to be avoided at younger ages. Therefore, these ages could be the best to intervene bullying behaviors and emphasize that everyone is to be respected, no matter what how "strange" they are. Nonetheless, the age results were exploratory, so more research (with higher statistical power) should be conducted in order to see whether the age effect is significant.

Given the implications of this study on morality, future research should include morality questions. One possible study could be a replication of our results for high confidence questions (because they were the ones that drove the results) with an extension to investigate how the moral domain works. For example, there could be two questions for each domain (fact, opinion, moral belief) and each participant could be asked all six. Given that children judged both widely-shared and controversial moral beliefs to be fact-like, and not opinion-like like adults do (Heiphetz &

Young, 2017), it's possible that the results are more similar to our pattern of results for factual questions rather than opinion.

Moreover, we investigated the effects of question domain and level of consensus on information seeking behavior. However, there are more possible effects that could be looked at, one of which is the framing. The effects of framing on information seeking behavior have been researched in adults (Fisher, Knobe, Strickland & Keil, 2018), so it is possible that the effects begin in childhood. We asked children which answer they wanted to "hear", but we could have chosen other worlds such as "learn" or "know", and the pattern of results could be different for these framings. For example, a study could have a 2 (framing: learn vs hear) x 2 (consensus level: high vs low) design for factual questions, as that was the domain where participants sought information the most. This study would be a replication of our results for factual questions, with an extension to examine whether children respond differently when prompted with "learning" goal. It is possible that, when they are prompted to learn (vs simply hear), children would choose to information seek more.

Furthermore, we used informants (i.e. the children who participants had to choose between) who were very similar (their only differences were hair and shirt color), and their personal characteristics were not introduced or described. Nonetheless, if the confidence that each informant has is changed (e.g. one of them is a teacher, and one of them is a student), children might choose to information seek depending on the level of confidence of the informant, and not the question domain or level of consensus. For example, children might information seek when the informant is knowledgeable, but identity protect when they're not, as they might not want to associate with them.

3.3.2 Limitations

One limitation is that the effect seems to be driven by 3 items, so all the results shown here are to be taken with caution. Future studies would need to see if the effect stands with other items as well. However, the fact that we found a significant interaction and some effects at the trend level, seems to indicate that the paradigm is interesting and children are indeed thinking about the questions differently.

Another limitation is that, with the current design, group affiliation and cognitive avoidance are not differentiable phenomena in the results. If a child chose to hear the answer from the agreeing informant, we can't know if it is because they actively wanted to affiliate with their group, or because they did not want to choose the disagreeing informant, as that would elicit cognitive dissonance. Therefore, creating a method that allows us to differentiate these two reasons (or know that the pattern is influenced by both phenomena) is a goal for future studies.

4. Conclusion

The balance between information seeking behavior on one side, and identity protection (including cognitive dissonance avoidance and group affiliation) seem to simultaneously depend on question domain and consensus level, for children sought information more on high consensus questions when they were factual, but chose to protect their identity more on high consensus, opinion questions. A possible explanation is that children want to hear what a norm violator is thinking for factual questions because they want to learn about a "strange person", or they might genuinely think they have new information. Nonetheless, children might avoid being associated with a norm violator, instead affiliating with their group. Results should be taken with caution because the results seem to be driven by three items. Future directions will attempt to replicate this effect with more items, and perhaps include moral items, given the implication of this research for adult political polarization and out-group discrimination.

5. Acknowledgments

I would like to thank my advisor, Mark Sheskin, for caring so deeply about my learning (and that of the rest of his students) and always being willing to teach me about research, science, Excel, and Buffy the Vampire Slayer.

Thank you to Frank Keil and the Cognition and Development Lab, for allowing me to become as involved as I hoped I would be, and to Aaron and Mandy, I truly could not have done this without both of you. I want to thank all the research assistants, for helping me when I needed it and for being there with me, one week after the other.

I would like to thank my friends and family, for supporting me from New Haven or Spain. No matter where you were, I always knew I could count on you.

Lastly, I thank my parents, as I wouldn't be here today without their support and their constant reminder that I can do anything if I put my mind to it, and my sister, for being with me since the very beginning, through thick and thin. You're my biggest inspiration.

6. Author Contributions

Adoración Guzmán conducted the literature research, guided by Mark Sheskin. Topic and approach were crafted in collaboration with Mark Sheskin, with input from other members of the lab. Data for studies 1 and 2 were collected by Adoración Guzmán, Mark Sheskin, Aaron Chuey and Amanda McCarthy. Data were coded and analyzed by Adoración Guzmán, with guidance from Dr. Mark Sheskin. Suggestions for the discussion section were incorporated from Emory Richardson and Aaron Chuey. The study was conducted under the supervision of Frank Keil.

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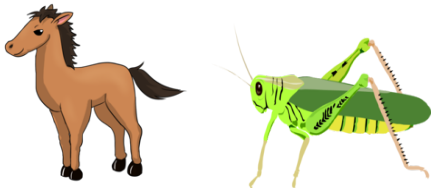
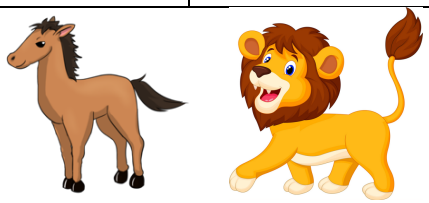
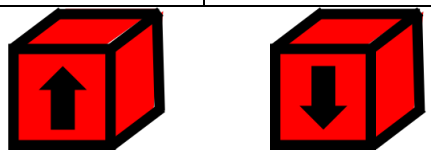
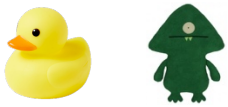
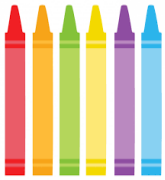
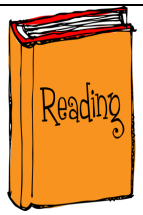
Appendix A

<table>
<tr><th></th><th colspan="2">High Consensus</th><th colspan="2">Low Consensus</th></tr>
<tr><th></th><th>Fact</th><th>Preference</th><th>Fact</th><th>Preference</th></tr>
<tr><td>Animals</td><td colspan="2"> 
Here are two animals: a horse and a grasshopper.</td><td colspan="2"> 
Here are two animals: a horse and a lion.</td></tr>
<tr><td></td><td>Which animal do you think is heavier?</td><td>Which animal do you think is more beautiful?</td><td>[same as easy fact]</td><td>[same as easy preference]</td></tr>
<tr><td>Food</td><td colspan="2"> 
Here are two foods: Pizza and broccoli.</td><td colspan="2"> 
Here are two foods: carrots and broccoli.</td></tr>
<tr><td></td><td>Which do you think is healthier?</td><td>Which do you think tastes better?</td><td>[same as easy fact]</td><td>[same as easy preference]</td></tr>
<tr><td>Boxes</td><td colspan="2"> 
Here are two boxes. A box with an UP arrow, and a box with a DOWN arrow. Here are two toys.
 
Each toy will go into one of the boxes [Each toy moves into a different box and remains partially visible]</td><td colspan="2">[same as easy preference and easy fact, except (1) for the hard fact the toys are not seen going into the boxes and are not visible at all after going into the boxes, and (2) the blue toy is replaced with a different toy, making the preference question harder]
  </td></tr>
<tr><td></td><td>Where do you think the yellow duck is?</td><td>Where do you think the best toy is?</td><td>[same as easy fact]</td><td>[same as easy preference]</td></tr>
</table>

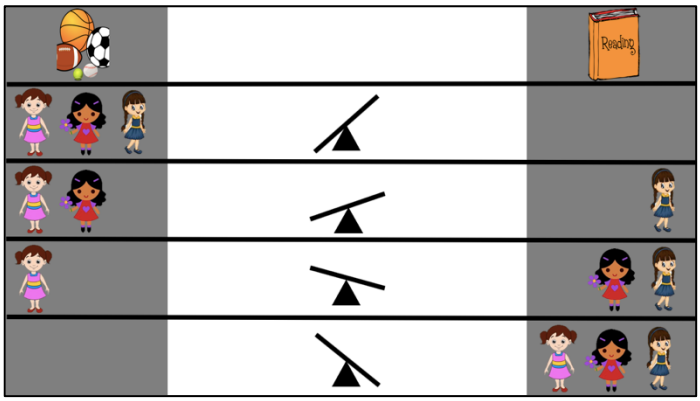
<table>
<tr><td rowspan="3">Art</td><td colspan="2">  
Here are two ways to make art: paint and water.</td><td colspan="2">  
Here are two ways to make art: paint and crayons.</td></tr>
<tr><td>Which do you think is more expensive?</td><td>Which do you think you’d like using more to make art?</td><td>[same as easy fact]</td><td>[same as easy preference]</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">Subjects</td><td colspan="2">  
Here are two things people learn at school: reading and sports.</td><td colspan="2">  
Here are two things people learn at school: reading and writing.</td></tr>
<tr><td>Which do you think uses more words?</td><td>Which do you think is more fun?</td><td>[same as easy fact]</td><td>[same as easy preference]</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">Activities</td><td colspan="2">  
Here are two activities: doing homework and playing video games.</td><td colspan="2">  
Here are two activities: doing homework and studying with friends.</td></tr>
<tr><td>Which do you think makes you learn faster?</td><td>Which do you think you’d like to do more?</td><td>[same as easy fact]</td><td>[same as easy preference]</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">Cities</td><td colspan="2">  
Here are two cities: New York and Detroit.</td><td colspan="2">  
Here are two cities: New York and Los Angeles.</td></tr>
<tr><td>Which do you think is bigger?</td><td>Which do you think you would like to visit more?</td><td>[same as easy fact]</td><td>[same as easy preference]</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Games	  Here are two games: soccer and chess.		  Here are two games: soccer and basketball.	
	Which do you think is more tiring?	Which do you think you'd like to play more?	[same as easy fact]	[same as easy preference]

Appendix B

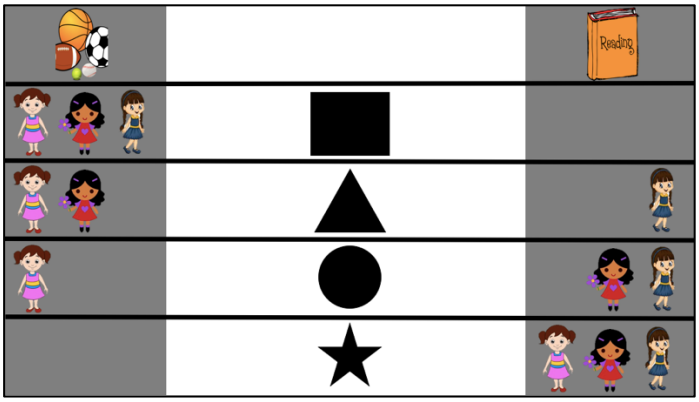
Before we settled for the two-step, three-color-answer design described on this method section, we piloted different approaches to get children's perceived consensus rating. We proposed two different one-step, four-answer designs. The four options include two options where everyone choose the same option (i.e. in one of them everyone chooses the left-side answer and in the other the right-side answer), and two options where some people choose one option or the other to different degrees. Therefore, there are less options and they are all within the same slide. Moreover, both approaches are not based on color, but on different shapes: the first one is based on different angles of a seesaw, whereas the second one is based on different geometrical shapes, each of which has a different meaning.

- **First approach: seesaw**



The first approach we tried consisted of representing each of the four answers by a seesaw on different positions in the middle of the screen, based on how many people agree on a specific item. When the seesaw is very inclined to the left, it means everyone agreed that the picture on the left was the correct answer; the more to the right it inclines, the more people agree that the correct answer was the picture on the right.

- **Second approach: shapes**



A second approach we tried was to label each possible answer with a shape. For example, the answer where everyone agrees that the correct answer was the picture on the left was represented by a circle in the middle of the screen, whereas the answer where everyone agrees that the correct answer was the one on the right was represented by a star.