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Children's Novelty Preferences Depend on Information-Seeking Goals

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Abstract

Children are often drawn to novelty, but these preferences may depend on their goals. In two experiments (N = 302), we show that children have differing preferences for novelty when seeking information compared to when they are asked to prioritize other goals. In Experiment 1, 4-7-year-olds wanted to have typical items (e.g., a four-legged chair) and learn about atypical items (e.g., a ten-legged chair). In Experiment 2, 4-6-year-olds wanted to learn about foreign characters, but liked foreign and local characters equally. We propose that children prefer to learn about novel instances for the promise of new information, which is evident in at least two domains (artifacts and people). However, this preference diminishes when children are asked about who they like, and it reverses to a familiarity preference when choosing between artifacts to acquire. In sum, our findings suggest that children's preferences for novelty versus familiarity are sensitive to different goals.

Keywords: novelty seeking; information gain; resource seeking; social preferences; cognitive development; preferences

Introduction

At a store, you see an unusual umbrella on display. It has the handle and canopy of a regular umbrella, but it also has a smaller second canopy above the main one. You may want to learn more about this unusual umbrella rather than the regular one next to it. However, suppose you are looking to buy one of the umbrellas. Though people's tastes may vary, you likely prefer to buy the regular umbrella over the unusual one. This example illustrates how a preference towards novelty (e.g., unusual umbrella) or familiarity (e.g., normal umbrella) may depend on your goal. Specifically, people may prefer novelty when seeking to learn about objects and avoid novelty when committing to have an object as a resource.

Children often prefer novel items over familiar ones. In one study, three- to five-year-olds were given a set of toys to play with. After, when choosing between other toys to play with, children preferred sets with mostly novel toys over sets that included toys they previously played with (Mendel, 1965; for similar findings with 8- and 12-month-olds see Hunter et al., 1983). In another study, 4- to 6-year-olds were familiarized with some pictures and later chose whether they wanted to see those pictures again, or to see new ones. Children viewed novel pictures longer than ones which they had been familiarized with, and 6-year-olds also chose novel pictures over familiar ones when asked which they preferred (Cantor & Cantor, 1964; Hutt, 1975). These findings suggest that children are drawn to novel stimuli in experimental contexts, but children are also drawn to novelty as it relates to their general prior knowledge. For example, when images in a study consisted of usual (e.g., a bird with wings) and unusual (e.g., a bird with four legs) objects, 5- to 7-year-olds were more likely to repeat pictures of novel than familiar objects (Smock & Holt, 1962).

Children's preference for unfamiliar over previously introduced items is so robust that it has been used to investigate the factors that affect children's exploration (e.g., Bonawitz et al., 2012; Schulz et al., 2019). In these studies, children prefer to explore novel over familiar objects in baseline conditions, but these novelty preferences reverse when there is still more to learn about the familiar objects. For example, when 4- to 6-year-olds observed demonstrations of confounding evidence about a toy, they preferred playing with it over a novel alternative (Schulz & Bonawitz, 2007).

Findings like these suggest that novelty preferences may arise from a drive to acquire new information. This preference helps us avoid wasting cognitive resources on familiar items and events, as they are already known (Kidd et al., 2012; Loewenstein, 1994; Murayama et al., 2019). Indeed, we are most curious about novel and uncertain stimuli, as it is more valuable for learning than familiar stimuli (Wittman et al., 2008). Although novelty can provide the best opportunities for learning, high degrees of novelty are often avoided, as this information cannot be integrated with our prior knowledge (Kidd et al., 2012; Kidd & Hayden, 2015; Kirkham et al., 2002). Altogether, these preferences suggest that information-seeking behaviors may be greatest when stimuli are optimally unfamiliar: neither too novel nor too familiar.

Here we investigate whether preferences for novelty diminish, or even reverse, when information seeking is not the main goal. Returning to the opening example, you may prefer to learn about the unusual umbrella, as more information can be gained from it than the familiar one. However, you may prefer to have the familiar over the unusual umbrella. This decision involves greater commitment and risk, as you do not want to be stuck with an umbrella that is cumbersome or does not protect you from the rain. Broadly consistent with this, young children often prefer familiar foods over novel ones (Birch & Marlin, 1982; Birch et al., 1987). When committing to have an object, then, children may sacrifice the opportunity to gain new information for the security of having a familiar object.

These preferences for novelty may also arise in social decisions. When choosing who to befriend, children often

prefer people who have similar characteristics to them, such as those who share their accent, language, or race (Kinzler et al., 2009; Paquette-Smith et al., 2019). However, preferences may be different when choosing who to learn about. In this case, just as with artifacts, children may be interested in learning about people who are different from them, as they may provide more opportunity for learning new things.

We investigated whether preferences for novelty depend on children's goals. In Experiment 1, we compared how 4- to 7-year-olds choose between objects when judging which they would rather have and which they would rather learn about. In Experiment 2, we compared how 4- to 6-year-olds choose between children when judging which they like better and which they would rather learn about.

Experiment 1

Methods

Participants We tested 242 children: 62 4-year-olds (M_{age} = 4;6 [years;months], range = 4;0 – 4;11, 27 female), 60 5-year-olds (M_{age} = 5;6, range = 5;0 – 5;11, 24 female), 60 6-year-olds (M_{age} = 6;6, range = 6;0 – 6;11, 29 female), and 60 7-year-olds (M_{age} = 7;4, range = 7;0 – 7;11, 28 female).We aimed to test 30 children per age in years in each of two between-subjects conditions, but accidentally tested two additional four-year-olds. At each age, equal numbers of children were randomly assigned to each condition.

Materials and Procedure Each child completed four trials. In each trial, children were shown pictures on a laptop computer. All pictures were of two items from the same category: umbrellas, chairs, cups, and lamps. In each pair, there was a typical and an atypical item (see Figure 1). Children were then asked one of two questions: which item they wanted to have, or which item they wanted to learn about.

The pairs of items were presented in the same order across both between-subjects conditions; umbrellas, chairs, cups, then lamps. Locations of the atypical items were counterbalanced (right side of screen, left, left, right).

"Here are two [umbrellas/chairs/cups/lamps]. Which [X] would you want to [have / learn about]?

Figure 1. Stimuli and script for Experiment 1.

Results

In both experiments, we analyzed the results using generalized estimating equation models (GEE; binary logistic, independent correlation matrix). In this experiment, condition was entered as a predictor, and age in months (mean-centered) was entered as a covariate (see Figure 2).

Children showed a significant main effect of condition, Wald χ^2 (1) = 64.79, $p < .001$, as they were more likely to select the atypical item when judging which item they would want to learn about than which they would want to have. There was no main effect of age, Wald χ^2 (1) = 0.06, $p = .940$, but there was a significant interaction between condition and age, Wald χ^2 (1) = 13.13, $p < .001$.

This interaction resulted because children in the learn condition were more likely to select the atypical item as they got older, Wald χ^2 (1) = 5.93, $p = .015$, whereas this selection decreased with age for children in the have condition, Wald χ^2 (1) = 7.44, p = .006. Nonetheless, children at each age (in years) were more likely to choose the typical item in the have condition than the learn condition, 4-year-olds, Wald χ^2 (1) = 7.83, $p = .006$, 5-year-olds, Wald χ^2 (1) = 11.36, $p < .001$, 6-year-olds, Wald χ^2 (1) = 15.91, $p < .001$, 7-year-olds, Wald χ^2 (1) = 31.94, $p < .001$.

Single-sample tests (using an intercept-only GEE) also revealed that children at each age (in years) mostly preferred to learn about atypical items, all $ps \leq .030$. Children aged 5 and older mostly preferred to have typical items, $ps \leq .031$, but this effect was not significant at age 4, $p = .076$.
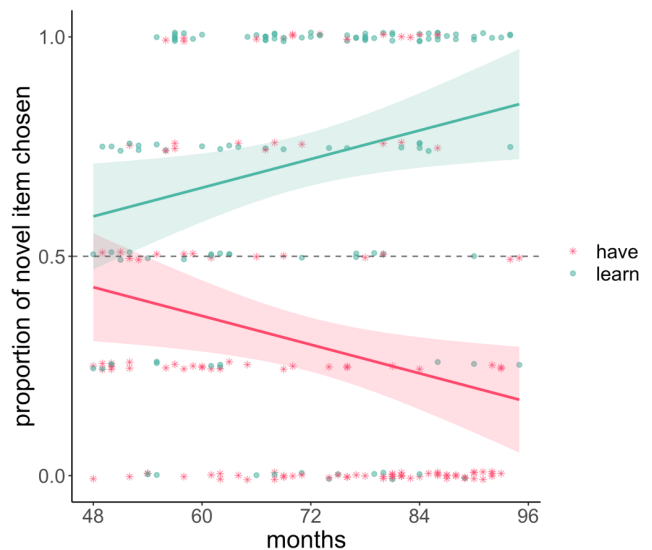

Figure 2. Results for Experiment 1. Colored bands show 95% confidence intervals; points are jittered to avoid overplotting.

Discussion

Children preferred novelty when choosing what to learn about, but preferred familiarity when choosing what they would rather have. This difference in preferences may have originated from a desire to maximize information gain and

minimize risk when acquiring objects. In the next experiment, we examined the robustness of this pattern by examining whether a similar difference arises in children's social judgments using a within-subjects design.

Experiment 2

To examine novelty preferences in social judgments, we told children about two characters, one described as living nearby and the other described as living in a foreign country. We then asked children which character they would rather learn about, *and* which character they liked better. If novelty preference depends on goals, children should be more likely to choose the foreign child when judging who they would like to learn about, than when judging who they like more. We would have preferred to compare the "learning about" judgments with judgments about which character children would rather befriend, as this decision carries commitment and risk. However, we chose against this, because we anticipated that children could be influenced by the practical difficulty of being friends with someone living in a foreign country.

Methods

Participants We tested 60 children: 20 4-year-olds (M_{age} = 4;6, range = 4;0 – 4;11, 15 female), 20 5-year-olds (M_{age} = 5;4, range = 5;0 – 5;11, 9 female), 20 6-year-olds (M_{age} = 6;7, range = 6;2 – 6;11, 7 female), with sample size decided in advance of testing. One additional 5-year-old was excluded due to non-compliance. Seven-year-olds were not included in this sample, due to limited testing during the COVID-19 pandemic. In this experiment, children were tested individually online in a live video call, in the presence of their parent or guardian. Parents were instructed to look down or to turn away from the screen while testing took place.

Materials and Procedure To introduce the task, children were asked if they knew which country they lived in. After correctly identifying the country, the experimenter agreed by saying, "that's right, we live in Canada". Some children instead identified a city or region. In these cases, the experimenter also agreed. The experimenter then described that there are many countries in the world, and some are far away.

Children then completed two trials (see Figure 3). In each trial, children were shown pictures of two similar-looking characters. One character was described as living in the same place as the participant ('local character'), and the other was from far away ('foreign character'). Children were told three characteristics about each character and where they are from, and were shown accompanying pictures. The local character had characteristics typical of the child's location. For example, they were described as living in a place with maple trees, Honda cars, and where people eat spaghetti. The foreign character had characteristics that were atypical of the child's location. For example, they were described as living in a place with Joshua trees, twizy cars, and where people eat

shakshuka. Children were then asked two questions: which child they liked better and which they would want to learn more about.

Question order was counterbalanced. The images of the characters in the trials were gender-matched for each participant, and looked approximately the same age as participants. The characters in each trial were identifiable by the color box they were in. A warm-up task was used to ensure children could refer to items on screen by indicating the color of its surrounding box. In the warm-up, children saw two trials in which a dog appeared in different colored boxes. When asked where the dog was, children typically identified its location by referring to the color box it was in. If they gave other responses (e.g., "right there" or "on the left"), they were prompted to refer to the dog's location by using color.

Colors were counterbalanced across trials. The local character was in the blue box in the first trial, and the foreign character was in the blue box on the second trial. The location of the children was counterbalanced across trials (i.e., local character on the left in first trial and on the right in second trial).

Pre-test: Do you know which country we live in? Yes, that's right, we live in Canada. There are many other countries in the world and some of them are far far away.
Test: See this girl? This girl lives far far away from us. She lives in a different country. Where she lives, the trees look like this. The cars look like this. And the people there like to eat this. See this girl? This girl lives in Canada, just like we do. Where she lives, the trees look like this. The cars look like this. And the people there like to eat this.
So which girl lives near us? Which girl lives far far away from us? **Which girl do you like better? Which girl would you want to learn more about?**

Figure 3. Stimuli and script for Experiment 2.

Results

Age in months (mean-centered) was entered as a covariate, and within-subjects condition (like, learn) as a predictor (see Figure 4). There was a significant main effect of age, Wald χ^2 (1) = 5.72, p = .017. There was also a main effect of condition, Wald χ^2 (1) = 4.31, p = .038, as children were more likely to select the foreign character when judging which

character they wanted to learn about than which they liked better. No significant interaction between age and condition emerged, Wald χ^2 (1) = 3.10, p = .078. Children ages 5- and 6-years-old were more likely to choose the foreign character when asked which character they wanted to learn about rather than which they liked better, 5-year-olds, Wald χ^2 (1) = 3.87, p = .049, 6-year-olds, Wald χ^2 (1) = 5.36, p = .021. This pattern did not emerge at age 4, Wald χ^2 (1) = 0.63, p = .429.

We conducted single sample comparisons to chance for each age in years in each condition (learn, like) using intercept-only GEEs. Six-year-olds chose the foreign character more than would be expected by chance in the learn condition (p < .001), and no other comparisons were significant (all ps > .102). Hence, children's liking preference was not significant, as they chose the local and foreign characters equally.
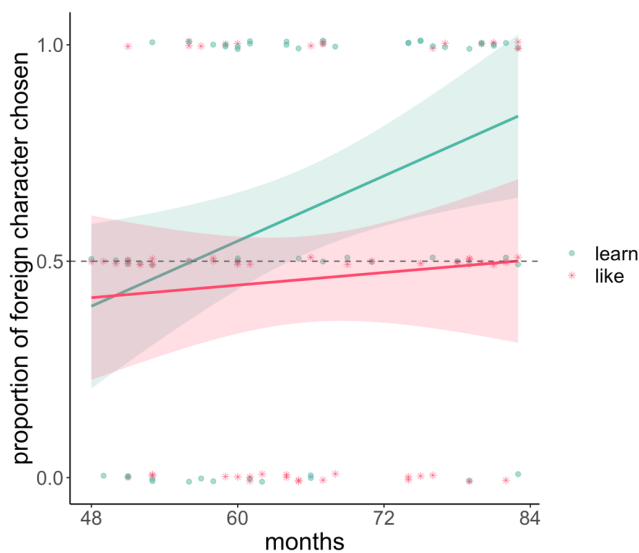

Figure 4. Results of Experiment 2. Colored bands show 95% confidence intervals; points are jittered to avoid overplotting.

Discussion

Children preferred novelty when judging which person they would rather learn about. However, when choosing which person they liked more, no clear patterns emerged. Hence, these findings again show that preferences for novelty depend on children's goals. We consider explanations for this pattern of responses below.

General Discussion

Across two experiments, we show that children's preferences for novelty depend on whether they are seeking information. We found that they preferred to learn about novel objects and foreign people. However, different patterns emerged when children did not have this goal. Children wanted to have familiar objects, but liked local and foreign people equally. Together these results reveal that children's preferences between novel and familiar items depend on their goals.

Previous studies revealed that children prefer novelty by examining which objects children liked, looked longer at, or chose among a set (Cantor & Cantor, 1964; Hutt, 1975; Mendel, 1965; Smock & Holt, 1962). This earlier research did not manipulate children's goals. Our experiments replicated this novelty preference and extended previous work by showing it can be attenuated or even reversed by manipulating children's goals.

We also show that novelty preferences in information seeking extend to social judgments. However, our finding that children showed no familiarity preference in their liking judgments contrasts with previous work. Much work on social preferences shows that children prefer to befriend people who are native speakers of their language, have native accents (Kinzler et al., 2007; Souza et al., 2013), are of the same race (Kinzler et al., 2009), or have the same preferences as them (Fawcett & Markson, 2010a; 2010b). In our second experiment, we did not find this familiarity preference. This may be due to methodological differences. We asked children which character they liked better, rather than who they would rather be friends with. Also, the characters in our experiment differed based on their geographic location, preferences, and customs, rather than language, accent, and race. These characteristics may exemplify the contrast between the two characters stronger than those used in our experiment.

We theorized that children wanted to learn about novel items as it maximizes information gain, and they wanted to have familiar items to reduce risk when committing to these objects. Children's familiarity preference when seeking material resources could also reflect conformity. Children may choose to have objects they have seen others use. Previous research has shown that children choose objects that others like, and avoid objects that others dislike (Hennefield & Markson, 2017). In our tasks, children had never seen anyone own or use the novel objects, but likely had seen people use the familiar kinds. So conformity might have led them to choose familiar objects. This alternative explanation could be investigated by exploring children's choices for objects where conformity is less likely. For example, research could investigate choices between natural kinds. Children as young as three years old expect artifacts to be owned, but natural objects to be unowned (Neary et al., 2011). Examining children's preferences for natural kinds could determine if children's preferences are driven by conformity, as they do not expect natural objects to be widely owned or used by people.

Exploring children's choices between familiar and novel natural kinds might also be useful for testing the extent to which children consider risk in deciding which resources to acquire. Children in our experiment may have chosen to have familiar artifacts because they want to reduce the risk of committing to novel artifacts, which might not serve their functions as well. Children might not view decisions between natural kinds as carrying similar risks, as they do not *spontaneously* assume that natural kinds have human-serving functions (Greif et al., 2006). Perhaps, then, children would prefer novelty when choosing which natural kinds to acquire,

as they might prioritize collecting novel objects over familiar ones (e.g., having a flame lily is more original than having a common daisy).

Thus far, our research contrasted judgments about learning with judgments about having and liking. In ongoing work, we are contrasting choices for having objects with choices about temporarily trying them. Trying out objects is similar to having them in that it involves physical interaction with objects. But like when learning about objects, it offers the opportunity for information gain without substantial risks. So children might show a greater novelty preference for trying than for having objects. Broadly consistent with this, one study found that six-year-olds chose to play with novel toys immediately, and chose to take home and keep familiar toys permanently (Linford & Linford, 1977). Thus, directly comparing preferences in low- and high-commitment settings could yield different choices when seeking resources.

Similarly, future research could explore other judgments in social scenarios. In our experiment, we asked children which character they liked more, as befriending a foreign character could be impractical. However, liking one character over another is a relatively low-risk commitment. Higher-risk commitments such as friendship may lead to differing preferences. This comparison would be possible if characters differed by other characteristics, like accents (e.g., Kinzler et al., 2009). This choice between non-accented and accented characters presents the opportunity to ask children's preferences for friendship as they are no longer constrained by location.

Finally, future work could also explore other ways of manipulating novelty. We manipulated object novelty by comparing atypical items with common ones. But related research has examined novelty by manipulating *scarcity*. In this research, children are shown a set of objects where some items are common and others are rare (e.g., one ball sticker and ten spiral stickers), and are asked which ones they prefer or want to keep. Children from eastern countries (i.e., Taiwan) do not display a scarcity preference even by the age of ten, though children from western countries (i.e., Israel) do by the age of seven (Diesendruck et al., 2019), or by age six when in the presence of competitors (John et al., 2018). When choosing among a set of unusual items that varied by scarcity, no scarcity preference emerged for four- to twelve-year-olds (Echelbarger & Gelman, 2017). Unusualness and scarcity are related concepts—highly unusual items are likely to be scarce. It might be interesting for future research to examine how scarcity affects children's information seeking. Perhaps children would consistently prefer scarce items if asked which types of items they would rather learn about.

Limitations

One limitation of our findings is that we assessed children's preferences for pictures of objects and people. Children's choices might differ if they were faced with real objects and people. For example, when choosing between real objects, children might be more inclined to acquire the novel options.

Additionally, children chose between a familiar and a novel option in this forced-choice paradigm. This is likely an ecologically-valid measure, as choices are often made in the presence of only a few alternatives. However, future work could investigate whether findings would be similar if children saw each option individually, and indicated their choices on a graded scale.

Another limitation is that in our second experiment, children were shown images about each character's location. This was done to establish the local character as similar to participating children, and the foreign character as different. As such, children's preferences to learn about the foreign character may have actually been driven by their interest in learning about their novel characteristics (e.g., Joshua trees, twizy cars, and shakshuka). Currently, we are exploring this possibility in a further experiment by excluding these characteristics. Instead, characters' novelty is only exhibited by their geographic distance. This manipulation will allow us to identify if children's social preferences in Experiment 2 were truly driven by the characters' novelty.

Concluding Remarks

Our findings suggest that children's novelty preferences depend on their goals. We propose that when children are asked about their preferences for learning, they prefer novel objects and unfamiliar people, in order to maximize information gain. Conversely, children appear to prefer familiarity when seeking resources to acquire, suggesting that risk reduction is paramount in this case. Children did not appear to like more novel or more familiar people when asked about two unknown people. The ability to make different choices across these contexts demonstrates that children are aware of their own knowledge and can seek opportunities to optimize information gain and minimize risk.

Acknowledgments

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