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BRIEF REPORT

Novelty preferences depend on goals

Claudia G. Sehl[1] · **Emma Tran**[1] · **Stephanie Denison**[1] · **Ori Friedman**[1]

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Abstract
People are sometimes drawn to novel items, but other times prefer familiar ones. In the present research we show, though, that both children's and adults' preferences for novel versus familiar items depend on their goals. Across four experiments, we showed 4- to 7-year-olds (total N = 498) and adults (total N = 659) pairs of artifacts where one was familiar and the other was novel (e.g., a four-legged chair and ten-legged chair). In Experiment 1, children wanted to have familiar artifacts, but to learn about novel ones. Experiment 2 replicated this pattern using a simpler procedure, and found the same pattern in adults. In Experiment 3, 4- to 6-year-olds and adults more strongly preferred familiar items when choosing which they would rather have than when choosing which they would rather try using. Finally, Experiment 4 replicated adults' preferences to have familiar items and learn about novel ones with an additional set of items. Together these findings show that preferences for novelty depend on people's goals. We suggest these effects arise because children and adults are motivated both by the promise of information and the desire for safe options in high commitment decisions that entail risk.

Keywords Novelty seeking · Information gain · Resource seeking · Cognitive development

Introduction

At a furniture store, you see an unusual chair for sale. It has ten legs, rather than four. You might be more interested in learning about this chair than the regular chairs next to it. But your curiosity does not necessarily mean you like or want the chair. After all, you might worry that it would be uncomfortable and cumbersome, or that it would look out of place among your other furniture. Preferences for novelty, then, may depend on people's goals, and might be stronger when people seek to learn about objects than when they decide what to acquire.

Much previous work shows that people often prefer novel items over familiar ones (Berlyne, 1957, 1958; Wittmann et al., 2008), and this tendency has been extensively explored in children. For example, in some studies, children were first familiarized with some pictures, and later chose whether they wanted to see those pictures again, or to see new ones. Children aged 4–7 years viewed novel pictures longer than familiar ones (Cantor & Cantor, 1964; Hutt, 1975), and 6-year-olds also chose novel pictures over familiar ones when asked which they preferred (Hutt, 1975). These findings reveal preferences for stimuli that are novel in the context of an experiment, but people are also drawn to novelty as it relates to their general prior knowledge. For instance, 5- to 7-year-olds are more likely to repeatedly look at pictures of items they have never seen (e.g., a bird with four legs) than pictures of familiar-looking items (e.g., a regular bird; Smock & Holt, 1962).

People also often show the opposite tendency, though, and prefer familiar items over novel ones (see Gershman & Niv, 2015, for a recent discussion). For example, studies of the "mere exposure" effect show that people often prefer stimuli when they have been repeatedly exposed to them (Bornstein, 1989; Montoya et al., 2017; Zajonc, 2001). Familiarity increases adults' choices of consumer products (Hoyer & Brown, 1990), their preferences for political candidates (Verhulst et al., 2010), and even their valuations of the purchasing power of currency (Alter & Oppenheimer, 2008). Likewise, young children often prefer familiar over novel options when judging whom to befriend (Kinzler et al., 2009; Paquette-Smith et al., 2019) and what to eat (Birch & Marlin, 1982; Birch et al., 1987; also see Shutts et al., 2013).

These opposing tendencies for novelty versus familiarity are especially evident in studies examining how novelty affects exploration. For example, children generally prefer

✉ Claudia G. Sehl
claudia.sehl@uwaterloo.ca

[1] University of Waterloo, Psychology, Waterloo, Canada

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exploring novel over familiar objects and relations (Bonawitz et al., 2012; Cook et al., 2011; Gweon et al., 2014; Schulz et al., 2019; van Schijndel et al., 2015). But these preferences reverse when there is more to learn about the familiar objects. For example, after 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).

Why do people sometimes prefer novel items and other times prefer familiar ones? We suggest that one contributing factor may be people's goals. Returning to the opening example, choices between the chairs might depend on whether people are trying to *learn* about the chairs, or instead deciding which they would rather *have*. When learning is the goal, people might prefer the ten-legged chair, as novel items often offer more opportunities for learning. This is a key claim of information gain theories of curiosity. People may spend cognitive resources on items that provide the best opportunities for learning and may avoid spending resources on familiar items that provide little or no new information (Kidd & Hayden; 2015; Wittmann et al., 2008; see also Loewenstein, 1994; Murayama et al., 2019).

However, this preference for novelty may diminish, or even reverse, when information seeking is not the main goal. For example, people might prefer the regular chair when deciding which chair they actually want to have. This decision involves greater commitment and risk than deciding what to learn about, and might therefore favor familiar items that carry little risk. This might explain children's preference for the familiar in decisions about friendship and food choices (e.g., Birch et al., 1987; Kinzler et al., 2009), as these decisions also involve commitment and risk. Thus, for these kinds of choices, people may sacrifice the opportunity to gain new information for the reduced risk of committing to a familiar item.

We investigated this proposal in four experiments on children and adults. We tested participants at both ages because children sometimes differ from adults in their preferences for novelty versus familiarity. For example, adults may be more prone than children to show the "mere exposure" effect (Bornstein, 1989), and while adults robustly prefer scarce over common objects (Kim & Markus, 1999; Nisbett & Masuda, 2003), findings with young children are mixed (e.g., Diesendruck et al., 2019; Echelbarger & Gelman, 2017). Thus, testing both age groups allowed us to assess whether any impact of goals on these preferences are similar across children and adults. But we did not predict specific developmental trends, so this investigation was purely exploratory.

In each experiment, participants saw pictures of pairs of novel and familiar items (e.g., ten-legged chair and four-legged chair) and chose between them. In Experiment 1, 4- to 7-year-olds judged which items they would rather have, and which they would rather learn about. Experiment 2 examined the same judgments in 4- to 7-year-olds using a slightly simplified procedure, and also examined adults. Experiment 3 compared 4- to 6-year-olds' and adults' judgments about which items they preferred to have and which they preferred to try using. Finally, Experiment 4 examined adults' judgments for having and learning about new objects.

Experiment 1

Method

Participants We tested 89 children aged 4–7 years (M_{age} = 6;1 (years;months), range = 4;4–7;9, 47 female). In this experiment, we aimed to test 30 children per age (in years) to ensure a total of 30 younger children (4–5 years) and 30 older ones (6–7 years) per between-subjects condition. We anticipated this rule would ensure a sufficiently large sample to detect effects of age, condition, and an interaction between them. However, the final sample contained fewer 4-year-olds (N = 14) and 7-year-olds (N = 16) as the experimenter left the lab before data collection was completed. Also, an additional 5-year-old was excluded due to experimenter error. In all experiments, children were tested individually in childcare centers and schools in Waterloo region.

Materials and procedure Children completed four trials. In each trial, they were shown pictures (on a laptop) of two artifacts from the same category (umbrellas, chairs, cups, lamps). One item in each pair was familiar and the other was novel (e.g., a four-legged chair and a ten-legged one; see Fig. 1). The experimenter explained that the familiar item was common and the novel one was uncommon. In one between-subjects condition, children were asked which item they would want to have. In the other condition, children were asked which item they would want to learn about. In each experiment, participants were randomly assigned to each condition.

The four trials were presented in the same order across both conditions (umbrellas, chairs, cups, lamps). The location of the unusual item on-screen was counterbalanced across slides (right, left, left, right). This trial order and counterbalancing scheme was also used in the other studies, for both children and adults.

Data availability and analysis The data and materials from all experiments are available online at https://osf.io/c9vn5/

In Experiments 1–3 we analyzed the results using generalized estimating equation models (GEE; binary logistic, independent correlation matrix). Condition was entered as a predictor, and age in months (mean-centered) was entered as

Experiment 1. "Here are two [umbrellas/chairs/cups/lamps]. This [X] is different from most other [X]s in the world. There aren't a lot of [X]s like it. And this [X] is like most other [X]s in the world. There are lots of [X]s like it. Which [X] would you want to [have / learn about]?
Experiment 2 & 3. "Here are two [umbrellas/chairs/cups/lamps]. Which [X] would you want to [have / learn about / try using]?

Experiment 4. "Which one of these [X] would you want to [have / learn about]?"

Fig. 1 Stimuli and script for all experiments

a covariate in analyses of data from children. In Experiment 4, we analyzed the results using a GEE (linear, independent correlation matrix), with condition entered as a predictor. Child and adult data were analyzed in separate models (Experiments 2 and 3).

The Online Supplemental Materials (OSM) report additional analyses showing that the results do not emerge from item effects. Child results (Experiments 1–3) yield the same conclusions when the analyses test for non-linear effects of age. Also, our adult results (Experiments 2–4) remain unchanged when analyses include participants who failed the comprehension questions.

Results

Children's responses showed a main effect of condition, Wald $\chi^2(1) = 41.49$, $p < .001$, as they were more likely to select novel items for learning than having (see Fig. 2 for children's results in all experiments). There was also a main effect of age, Wald $\chi^2(1) = 14.53$, $p < .001$, as older children were more likely than younger ones to choose novel items. Condition and age did not significantly interact, Wald $\chi^2(1) = 0.50$, $p = .478$. To determine the age where children's have judgments rose to chance (i.e., so that they no longer preferred the familiar item), we examined when the 95% confidence intervals (CIs) first overlapped with chance (i.e., 0.5; also see Lee & Warneken, 2020). This was at age 6;8, 95% CI [.32, .50].

Discussion

Children preferred novelty when choosing what to learn about, but mostly favored familiarity when choosing what they would rather have. Children might have reached these judgments by drawing on their existing knowledge (e.g., chairs normally have four legs, not ten), or by also considering the descriptions of the items as common or rare. We next investigated whether these judgments might arise from existing knowledge alone and broadened our sample to include adults.

Experiment 2

Method

After testing on children had been initiated, we pre-registered the adult version of the experiment at https://aspredicted.org/3h65g.pdf

Participants We tested 242 children aged 4–7 years (M_{age} = 5;11, range = 4;0 – 7;11, 108 female). In this experiment, we aimed for a larger sample of children of 30 per age in years in each condition, but accidentally tested two

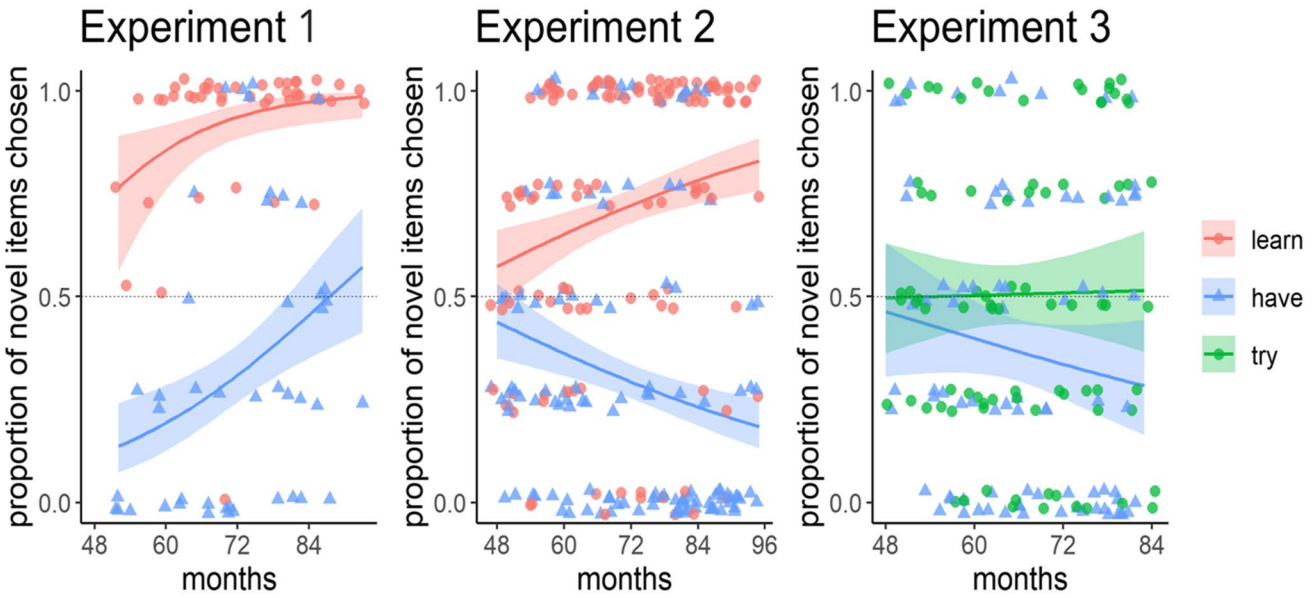

Fig. 2 Proportion of novel items children chose in Experiments 1, 2, and 3. *Note*. Colored bands show 95% confidence intervals; points are jittered to avoid overplotting

extra 4-year-olds. At each age, equal numbers of children were randomly assigned to each condition. We also tested 253 adults (M_{age} = 36, range = 20–72 years; 93 female; 160 male). Data were excluded from an additional 47 adult participants who failed at least one of two comprehension checks or who neglected to answer on one or more trials. Adults in this experiment, and the next one, were recruited from Amazon Mechanical Turk (http://www.mturk.com/). They were located throughout the USA and had a HIT rate of above 95%. The experiment took approximately 5 min to complete, and participants were renumerated US$0.50.

Materials and procedure In each of four trials children saw the same pictures used in Experiment 1. In each trial, children were simply told, "Here are two [items]," and were then asked which item they would want to have, or which they would want to learn about. In contrast with the first experiment, the script did not mention whether items were common or rare, and so responses could be based only on the artifacts' appearances. Adults were tested using an online version of the task and responded by clicking on items. After adults completed the task, they were asked two four-option multiple choice comprehension checks to ensure they had read the instructions and attended to the stimuli.

Results

Children showed a significant main effect of condition, Wald $\chi^2(1) = 64.79$, $p < .001$, as they were more likely to select novel items for learning than having. There was no main effect of age, Wald $\chi^2(1) = 0.01$, $p = .940$, but it significantly interacted with condition, Wald $\chi^2(1) = 13.13$, $p < .001$. This interaction resulted because choices for the novel item were more common in older than younger children in the learn condition, Wald $\chi^2(1) = 5.93$, $p = .015$, but more common in younger than older children in the have condition, Wald $\chi^2(1) = 7.44$, $p = .006$.

To determine the age at which learning and having responses first diverged, we examined when their 95% CIs no longer overlapped. This was at age 4;3: learn condition, 95% CI [.51, .67]; have condition, [.34, .50]. The CIs also show that responses in the learn condition first exceeded chance at 4;3, 95% CI [.51, .67], and responses in the have condition first fell below chance at 4;4, 95% CI [.34, .49].

Adults showed a significant main effect of condition, Wald $\chi^2(1) = 161.13$, $p < .001$, because they also were more likely to select novel items for learning than having (see Fig. 3 for adult results in all experiments). Single-sample tests showed they mostly preferred learning about novel items, but having familiar ones, both ps $< .001$.

Discussion

Both children and adults preferred novelty for learning, but familiarity for having. These preferences were driven by participants' existing knowledge, as they could only base their judgments on the artifacts' appearances. Children's judgments differed somewhat from the first experiment, as we found an age-related increase in preferences to have familiar items, whereas we observed the opposite pattern in the first

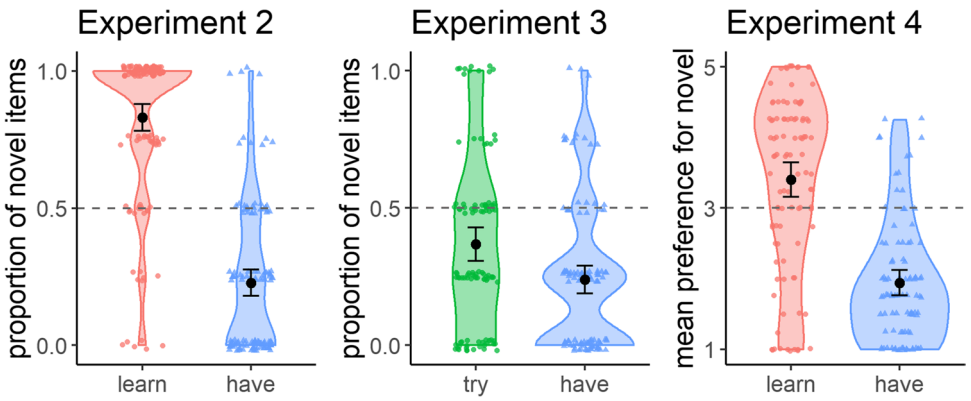

Fig. 3 Adult findings for Experiments 2–4. *Note.* Each plot illustrates the kernel probability density of choosing the novel items (i.e., the width of the shaded area represents the proportion of the data). Error bars show ±1 standard error

experiment. This difference may have resulted from methodological differences (i.e., children in this experiment were not told whether items were common or rare).

The experiments so far contrasted having versus learning. In the next experiment we asked participants about which items they would rather *have* or which they would rather *try using*. Temporarily trying an object is like having it, because both involve physically interacting with it. But temporarily trying resembles learning because both provide a low-risk opportunity to gain information. So, children and adults might show a greater novelty preference when deciding which artifacts they would want to try using than when judging which they would rather have. Broadly consistent with this, 6-year-olds may prefer playing with toys they have not previously used, but may prefer to keep toys they have previously used (Linford & Linford, 1977).

Experiment 3

Method

After testing on children had been initiated, we pre-registered the adult version of the experiment at https://aspredicted.org/an27i.pdf.

Participants. We tested 167 children aged 4–6 years (M_{age} = 5;7, range = 4;0–6;11, 81 female). As in the previous experiment, we aimed to test 30 children per age (in years) in each condition. However, the COVID-19 pandemic forced us to stop short of this goal. Overall, we tested 47 children aged 4, 58 aged 5, and 62 aged 6 years (two extras were accidentally tested). We did not succeed in testing any 7-year-olds before testing ceased. We also tested 212 adults (M_{age} = 38 years, range = 22–70, 78 female, 133 male, and one other). One adult declined to provide their gender. Data were excluded from an additional 87 adult participants who failed either one or both comprehension checks or neglected to answer one or more trials.

Materials and procedure. Children saw the same items and were introduced to them in the same way as in Experiment 2. They were then either asked which item they would want to have (Have condition) or which item they would want to try using (Try condition). As in Experiment 2, adults completed an online version of the task.

Results

Children showed a significant main effect of condition, Wald $\chi^2(1) = 6.71$, $p = .010$, as they were more likely to select the novel items for trying than having. There was no main effect of age, Wald $\chi^2(1) = 0.79$, $p = .373$, and no significant interaction between condition and age, Wald $\chi^2(1) = 1.14$, $p = .286$. Single-sample tests showed that children mostly wanted to have familiar items, $p = .001$, but responded at chance when indicating which artifacts they would want to try using, $p = .874$.

Adults also showed a significant main effect of condition, Wald $\chi^2(1) = 10.44$, $p = .001$, because they too were more likely to select novel items for trying than having. Single-sample tests found that they mostly chose familiar items for both judgments, both $ps < .001$. Exploratory analyses reported in the OSM show that there were some item effects for adults. Specifically, the effect of condition was significant for the chair and cup, but not the lamp or umbrella.

Discussion

Children and adults again preferred familiarity when judging what they would rather have. They did not favor these items as strongly, though, when judging which items they would want to try using, but also did not prefer novel items for these judgments. Hence, the findings again show that

preferences for novelty depend on one's goals. We consider explanations for this response pattern in the *General discussion*.

One concern with the previous experiment is that most novel items may have appeared more complex than the familiar ones. So perhaps people's preferences depended on complexity rather than novelty. We addressed this concern in a final experiment on adults by using new pairs of items.[1]

Experiment 4

Method

We pre-registered this experiment at https://aspredicted.org/2yq67.pdf.

Participants We tested 194 adults (M_{age} = 39.55 years, range = 19–84, 90 female; 103 male, one other/unspecified). Data were excluded from an additional 18 participants who failed the first comprehension check.[2] Adults in this experiment were tested on CloudResearch and were required to have completed at least 100 HITs with a 95% acceptance rate.

Materials and procedure Participants saw four pairs of objects that we normed in OSM Experiment 2: watering cans, chairs, cups, and lamps. We aimed to select pairs where the unfamiliar item was at least as simple at the familiar one (but see the OSM for more details). In one between-subjects condition, participants were asked which items they would want to have. In the other condition, they were asked which items they would want to learn about. Because this experiment only included adults, we used a more sensitive measure. Participants responded on a 5-point scale ranging from "definitely left [item]" (1) to "definitely right [item]" (5) with "equal" as the midpoint. Also, the presentation order of items was randomized across participants.

Results

Adults showed a significant main effect of condition, Wald $\chi^2(1) = 93.14$, $p < .001$, as they were more likely to select novel items in the learn condition than in the have condition. Single-sample tests found that they mostly preferred to learn about novel items but to have familiar ones, both ps $< .001$.

Discussion

Using new pairs of items, we again found that adults wanted to have familiar objects and learn about unfamiliar ones.

General discussion

Children and adults preferred novelty when judging what they wanted to learn about, but preferred familiarity when judging what they would rather have. When judging what they would prefer to try using, neither preference dominated in children, whereas adults preferred familiar items. The present results show that preferences for novelty depend on goals and that the impact of goals is similar in children and adults. This is notable given that much previous work has found developmental differences in factors that affect preferences for objects (Bornstein, 1989; Ferera et al., 2020; John et al., 2018; Kim & Markus, 1999; Montoya et al., 2017; Nisbett & Masuda, 2003).

This work contributes to our knowledge of factors that affect whether novelty is preferred. Earlier work suggested that preferences for novelty are abated when stimuli are extremely unfamiliar and difficult to integrate with existing knowledge (e.g., Kidd et al., 2012), and when there are lingering questions about familiar stimuli (e.g., Schulz & Bonawitz, 2007). The present work, though, shows that even when holding constant the fit between stimulus novelty and existing knowledge, preferences for novelty are diminished, and even reversed, for goals that do not exclusively concern information gain.

Similar points apply to the relation between our findings and research on the explore-exploit trade-off. When people are faced with multiple resources, they can either sample resources they have not tried before (explore) or commit to familiar resources (exploit). For instance, a person at a restaurant might order a meal they have never tried before, or one they have previously enjoyed. A growing body of

[1] Before running this experiment, we also ran two norming experiments (N = 115 and 98). These are fully reported in the OSM. In these experiments, participants rated complexity and other aspects of the original item pairs and the new ones. We found the results hard to interpret. Even when we selected atypical items specifically chosen to be simple, participants rated them as more complex than typical items. So perhaps judgments of complexity, and related judgments, are impacted by item novelty and not just by an items' physical features. However, if we take the ratings at face value, they may suggest people prefer having comparatively attractive, useful, and simple items, while preferring to learn about comparatively unattractive, non-useful, and complex ones.

[2] We preregistered that we would also exclude participants if they failed either comprehension check. However, we accidently included two correct answers in the second comprehension question. Thus, we only excluded participants who failed the first question. Excluding these participants (N = 77) does not impact our results; adults still showed a main effect of condition, Wald $\chi^2(1) = 68.94$, $p < .001$, and they mostly preferred to learn about novel items but to have familiar ones, both ps $< .001$.

developmental work shows that children and adults differ in their tendencies to explore versus exploit: Children often sample many options with differing rewards (explore), while adults choose options that maximize rewards (exploit; e.g., Blanco & Sloutsky, 2021; Sumner et al., 2019; Schulz et al., 2019).

Although we did not look at the explore-exploit distinction, our tasks may be related to it. Learning is akin to exploring, whereas acquiring may present a trade-off between exploration and exploitation because people choosing to acquire objects may balance between trying new options and sticking with familiar ones. So given the aforementioned developmental shift from explore to exploit (Gopnik, 2020; Liquin & Gopnik, 2022), we might have expected children to predominantly prefer having atypical items. Instead, we found that children and adults both preferred having familiar items.

Children's and adults' preferences to learn about novel artifacts fits with information-gain accounts of curiosity (e.g., Kidd & Hayden, 2015; Loewenstein, 1994), as novel items offer more opportunity for learning than familiar ones. Why then did participants favor familiar items when judging which they would rather have? Acquiring an object might serve information gain, but also brings commitment and risk. Having the ten-legged chair might allow you to learn about it, but it also leaves you with a chair that is potentially uncomfortable and impractical. Choices of which artifacts to acquire might also be influenced by social factors, even for the youngest children in our experiments. Young children tend to choose items that others like and avoid items that others dislike (e.g., Hennefield & Markson, 2016, 2017). This could partly arise from conformity concerns, which affect adults (Asch, 1956) and children from as young as 4-years-old (e.g., Corriveau et al., 2013; Haun & Tomasello, 2011). Importantly, conformity-based choices themselves may reduce risk. Familiar artifacts may be widely used because they are actually better than most novel variants. Also, to the extent that conformity is valued, having novel artifacts could hurt one's reputation.

Given these explanations, it might be puzzling that our participants did not prefer novel artifacts when judging which items they would rather try using. A novelty preference might be expected here, because trying an artifact provides the opportunity to learn about it, but with little commitment or risk. So why did these judgments not yield a strong preference for novelty? One answer is that not all information gain is equal. Using an artifact is informative about its physical properties and how well it functions. But using it is unlikely to tell you why it was made, who made it, and so on. Children and adults might have anticipated that trying the novel artifacts would not provide the kinds of information that most interested them.

Future research

We examined novelty by contrasting artifacts we expected participants to find familiar with ones they were unlikely to have previously encountered. This approach to manipulating novelty has been used in other studies (e.g., Smock & Holt, 1962; Soley & Hannon, 2010), and ensures that familiar items truly feel familiar (e.g., everyone has experience with four-legged chairs). However, a drawback to this approach is that items are not randomly assigned to be familiar versus novel, as is possible in tasks where familiarity is established within the context of the experiment. It will be important, then, for future work to establish whether the effects of goals extend to such tasks.

Future research is also needed to further assess the risk account, as we did not directly manipulate risk. One follow-up would be to present participants with *real* opportunities for learning about or having resources. We used hypothetical questions because it would have been impractical and costly to provide the items, and we felt that low-cost items (e.g., stickers and trinkets) might make the choices feel inconsequential. The risk account could be tested by examining preferences for natural objects, like pinecones and rocks. Because most natural kinds do not have human-serving functions, people might feel that acquiring them is riskless and want novel ones as much as familiar ones, or perhaps even more. Similar predictions may also arise for artifacts, such as art pieces and others that are primarily decorative.

For now, our findings suggest that preferences depend on whether we are seeking information or resources. Similar patterns were found across children and adults, suggesting that these preferences emerge early and remain across development. The main upshot of our findings is that answers to questions of whether people prefer novelty or familiarity may often depend on goals.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.3758/s13423-022-02118-9.

Declarations

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Open Practices Statement

The materials and data from all experiments are available via the Open Science Framework and can be accessed at https://osf.io/c9vn5/. The adult versions of Experiments 2–4 were preregistered at https://aspredicted.org/3h65g.pdf; https://aspredicted.org/an27i.pdf, and https://aspredicted.org/2yq67.pdf.