**Editor’s comments:**

Also, please consider these two minor points:  
  
-I don't know if it would be possible to convey the expected Phi value if participants always switched, but responded randomly besides this (e.g., after choosing A, randomly choose between B, C, or D). But if a Phi value is associated with this kind of strategy, expressing it might help readers better interpret the findings. (The more general point is that the extreme Phil and Beta values are clearly expressed, but it might help to have some indication of what at least one other value might imply).  
  
-For papers to be accepted at Cognition, the data need to be made publicly available (e.g., in a public repository like OSF). So it may save time later if you were to provide the link in the next version of the paper.

We have added the data to a repository on OSF (<https://osf.io/ph9kz/>) and have included a link in the manuscript.

**Reviewer #1:** I reviewed an earlier version of this work. I see that the paper is significantly revised, which has helped to clarify the authors' claims. The paper is easier to read now and I appreciate the work that went into this. Specifically, I appreciate the inclusion of the (second) experiment with adults to help highlight developmental changes in attention and cognitive control. I also thought that the discussion of distributed versus selective attention was helpful in informing the task design (e.g., why heightened selective attention due to option saliency may affect decisions to explore). In respect to responses from reviewers, the authors provided further distinction among "systematic," "strategic" and "random" exploration, which was good. I did not find any noticeable (or glaring) grammar or spelling errors.  
  
However, my broader concerns about the interpretation of the findings remain.  
  
Let me start by resummarizing the main findings:  
When a saliency cue is present that points a high reward option children quickly hone in on this option and choose it more often (and avoid low reward options) then at Baseline or when it conflicts.  
When this cue is present, adults are "distracted" by it in the conflict condition (choosing the high reward value less) than the baseline or congruent condition.  
  
These results suggest differing roles of the salient cue for children and adults: that the cue breaks adults' ability to maximize, but helps children solve the task more effectively.  
  
The argument that the authors put forth is that children have more distributed attention than adults leading to more systematic sampling in childhood, and that by disrupting this broader attention, you disrupt this broader exploration.   
  
My concern continues to be that I'm not sure this data actually speak to a deep attentional shift/disruption; it's still not entirely clear how the children are interpreting the task, and so I don't believe there needs to be a story about attention at all here (as much as I'm sympathetic to this account and also believe it to be a deeply interesting story).  Specifically, consider that children just have a heuristic, that when a task is about exploration/sampling, the job is to try each one in succession.  This doesn't have to be because their attention is broader (indeed, you could  have perfectly focused attention and still decide to follow a rule to sample in an order, such as clockwise around the quadrants.) The question is -- what happens when the task becomes less clear -- because there is suddenly one object (salient) that is not like the others.  The children must then figure out why that object is different and how it is supposed to relate to the task. In the case when it is convergent with the reward, the inference is fairly apparent and young learners should quickly converge on maximizing the salient cue.  When the cue is not the highest reward, the cue becomes confusing in that the purpose of the task may be less clear -- leading to more random (but not systematic) exploration.  My point is simply that this explanation for the behavior does not depend on a claim of children having more distributed attention; and these results cannot thus be taken as evidence that a salient cue thus disrupts this broad attention.

The reviewer brings up a valid alternative explanation. It is possible that a disruption to distributed attention may not be the primary factor driving differences and between children in the Baseline condition compared to other conditions. In light of these concerns, we have toned down the strength the claims of the paper slightly, including in the Introduction (pg. 5), and the Discussion (pg. 17). In addition, we have added a section to the Discussion discussing this specific account and other alternative accounts of the data (pg. 18).

Indeed, the adult data speak more strongly to the claim that the saliency "breaks" the broader attentional pattern, as adults over-select the wrong item in the conflict condition, suggesting it is the adults (and not the children) that have a hard time inhibiting the saliency. This is almost counter to the broader story the authors are making, but the fact that I could tell a just-so story either way leads me to be concerned that we cannot speak clearly to the broader, developmental-cognitive theory posited here to help motivate and interpret this study.

We do not agree with the reviewer that the data better supports adults’ attentional pattern than children’s. Adults show an important, but relatively minor and straightforward, effect in that saliency causes them to explore the salient option more often than they would otherwise in the Competition condition. Their behavior is otherwise consistent across the conditions. Children’s behavior changes in several important qualitative ways that provide important insight into children’s decision-making process and how it differs from adults’, including a reduction in response switching and an overall shift toward more random exploration. In the revision we tried to better highlight the importance of these differences, particularly in the Discussion (pg. 17).

More minor note:  
On page 5, the authors note "In the same way that attention shifts over time and is less likely to return to recently focused items, less recently chosen or attended options may become increasingly appealing over time." The statement requires citation and even conflicts to some extent with recent work on attention and decision making (that more "attended to" items are more likely to be chosen in a singular decision; data from Krajbich & Rangel, 2011; modeling work from Callaway & Griffiths, 2019). It may strengthen the authors' argument to state why the less recently chosen/attended options become more appealing. Is this true for both children and adults? Intuitively it would feel correct for children, whose "meta-goal" within the game may be to learn about the world, such that appeal arises from opportunity for information gain.

We thank the reviewer for this observation and suggestion. We have expanded on this specific point in the Introduction (pg. 5) in order to clarify our hypothesis. The attentional mechanisms that the reviewer alludes to and those that we are referring to operate at different points in the decision process. It is true that within a single decision attended to items are more likely to be selected in adults, and this may also be true in children. But, after a choice is made (and the outcome for that choice observed) there may be little reason to continue to attend the object and attention may shift. The way it shifts is likely different between adults and children, where adults control attention to continue focusing it selectively on rewarding options, while children are more likely to shift to a new option. Attention would still influence choices in the suggested by the work referenced by the reviewer. More specifically, we suggest that children’s shift may be driven by something like graded novelty preference: the recently chosen option is no longer novel, but the unselected options have been increasing in novelty since last being chosen.

**Reviewer #3:** The authors have been highly responsive to the previous reviews. It is especially helpful to have the adult comparison group. The authors have clarified what is potentially novel about these results.  
  
Their argument shares some similarities with the Hierarchical Competing Systems computational model of the effect of the number of "A" trials on A-not-B task performance in infants and toddlers (see Marcovitch & Zelazo, 2009), which might be worth mentioning in the introduction.

We thank the reviewer for pointing us toward this interesting work. We have added a brief discussion of this idea to the Introduction (pg. 5).

What is most surprising about the results to me is children's performance in the Baseline condition. Why don't they home in on the high value option and stick with it, like adults do?

We agree that children’s behavior in the Baseline condition is extremely interesting, and that understanding could be important. We are very interested in this question. The current paper is a follow-up to our original study reporting this effect (Blanco & Sloutsky, 2019) and one part of a larger line of ongoing research attempting to better understand this behavior.

Three non-exclusive alternative interpretations of the results for the authors to re-consider:  
  
Children had difficulty learning to maximize rewards in this task, as shown in the Baseline. Salience scaffolded learning in the Congruent condition, but it disrupted learning in the Competition condition, where they knew the salient cue was low in value, yet could not resist it occasionally. It is a straw man argument to suggest that 5-year-olds would be lured 100% by salience alone, even when it conflicts with reward value (again, PFC is not absent at this age). On this account, it is not that their choices were "geared toward learning rather than maximizing reward" (pp.17-18), but instead, they are learning HOW to maximize rewards in the face of distracting stimuli.

This is an intriguing idea, and it may be that case that one thing that children are learning is how to maximize rewards in the face of distracting stimuli. This idea does not contradict our interpretation or results, though. But, there is little evidence to support this interpretation, since it would suggest that children should know how to maximize reward when there are no distracting stimuli (as in the Baseline condition) and should therefore maximize reward in that case. Few children do so. In addition, there is no evidence that “salience…disrupted learning in the Competition condition”, since performance was equivalent to the Baseline condition.

It could also be that children were less motivated than adults, insofar as the rewards were quite distant; they were symbolized by drawings, which symbolized the value of candy in text, which was translated into a meter tracker, which symbolized not candy, but stickers (how many?) for every 180 "candies" earned. Although adults would understand this, and might be quite motivated to do well even without the cover story of candies or stickers but merely "points," it is possible this was too abstract for children. The salient cue in the Congruent condition helped them just enough to perform better, despite them not really understanding the symbolic goal. How would mature nonhuman primates perform in this experiment, if there were real food rewards? Based on the literature, would they be expected to perform more like adults and less like children? Relatedly, I wonder how rapidly children would learn if the rewards were more direct and appetitive.

The questions of how nonhuman animals would perform on this task is quite interesting, and could provide valuable insight into human development, but that question is outside of the scope of the current paper. The potential limitation that the reviewer notes, however, that children’s behavior may be different in this relatively abstract scenario than in a directly rewarding (e.g. immediate appetitive rewards) situation, is important. We add discussion of this limitation, and the important of addressing this issue with future research, to the Discussion (pg. 18).

In addition, we clarify that children earned one sticker for each 180 candies collected (pg. 8).

Lastly, it could be that the response pattern referred to as exploration in the Baseline condition is not merely due to an underdeveloped attention system, but also due to exploration itself being intrinsically rewarding. Especially if they did not fully understand the symbolism and goal of the task, this might be a default behavior. Would adults show this pattern if they were given a 4-choice selection task with no rewards associated with them? This idea is most intriguing.

We agree with the reviewer that exploration may be intrinsically rewarding (particularly to children). This is completely consistent with our viewpoint, although we also note that the mechanisms driving the particular patterns in children’s exploratory choices still require explanation that goes beyond this possibility. The current work represents an attempt to elucidate those mechanisms. We’ve added text to the Discussion noting this possibility (pg. 18).