Dear Dr. Kibbe

Thank you for the opportunity to revise and resubmit our manuscript entitled, “The Exploration Advantage: Children’s instinct to explore leads them to find information that adults miss.” We appreciate the thoughtful feedback from you and the two reviewers. My coauthors and I have made substantial changes to the manuscript in light of the comments from you and the reviewers. Notably, we have expanded the introduction and discussion, redid the figures, and added frequentist analyses to the online material.

Please see below for our point-by-point responses to each reviewer’s feedback. Our responses appear in blue.

Thank you again for your consideration.

Sincerely,

Dr. Emily Sumner, Ms. Amy X. Li, Dr. Andrew Perfors, Dr. Brett K. Hayes, Dr. Danielle Navarro, and Dr. Barbara W. Sarnecka

**Dr. Kibbe’s Comments**

I have received two reviews of the manuscript entitled The Exploration Advantage: Children’s instinct to explore leads them to find information that adults miss. (XGE-2020-2649R1) that you recently submitted to Journal of Experimental Psychology: General. I was fortunate to receive comments and evaluations from individuals who are very knowledgeable and highly respected experts in the topical area you are investigating. I read the manuscript prior to receiving these reviews in order to gain an independent perspective on the paper, and then again with the reviews in hand.

I appreciate the effort you put into revising the manuscript based on my suggestions in my initial action letter. I think the revision goes part of the way toward grounding the work. However, both of the reviewers brought up that the major contribution of this paper is still unclear. Reviewer 1 notes that there is a lack of engagement with exploration literature which is likely to be highly relevant, and believes that the paper makes a modest contribution to this literature. Reviewer 2 believes that the contribution is more substantial, but that contribution is currently not clear. Given the brevity of the introduction and discussion, and the still quite limited engagement with previous work, the manuscript does not do enough to convince the reader of why these findings are exciting and novel or how these findings might impact the theorizing of the JEP:G reader.

I am therefore rejecting the manuscript in its current form, but I am inviting you to submit a revision. **A successful revision would have an expanded introduction and discussion with additional references that clarify the contribution of the work above and beyond that of previous work. Reviewer 1 suggests some specific work to cite, and Reviewer 2 suggests noting parallels between your work and other work showing that children often spot things that adults miss.**

We have addressed the reviewer’s comments. See below. For our point-by-point responses.

**Issues identified by the Editor**

1. **Significance of Contribution**: We have revised and expanded the Introduction and Discussions sections to better explain our novel research contribution. Specifically, we point out that the current work brings together two issues concerning children’s tendency to explore that have been treated separately in previous work: i) children’s tendency to explore more than adults in environments where the goal is to maximize rewards (e.g., ), and ii) children’s discovery of change in when the learning environment changes (e.g., Blanco & Sloutsky, 2019b). Our work is the first to demonstrate the advantages of children’s exploration in a dynamic reward-learning environment – such that children are more likely to detect change and to exploit this knowledge.
2. **APA style**. We have restructured the paper subheadings to reflect APA style and added the requested details to the Participants sections. We have removed the 0s from the left of the decimal points
3. Figure 2. We have reformatted Figure 2 into 2 figures to make it easier to read. We have made the data points and fonts larger. We think it is easier to navigate now -- thank you for the suggestion
4. “ The last sentence of the discussion is very strong and does not really reflect your findings. I think it is fine to leave this statement in if you frame it more as a speculation rather than a conclusion”. As suggested, we changed this sentence to… “Far from being wasteful or inefficient, we speculate that exploration allows children to build a deep and flexible understanding of the complex and ever-changing environment into which they have been born.”

**Additional Issues identified by Reviewer 1**

1. Relation to previous work on children’s exploration

As noted, we have revised the Introduction and Discussion sections to provide a more detailed review of previous work on children’s exploration (including exploration in a dynamic environment) and how the current work advances our understanding of the advantages of exploration in a reward-learning environment.

2. Inclusion of standard inferential statistics in addition to the Bayes analyses.

As requested we ran frequentist versions of all of our analyses. Bceuase inclusion of all details would have greatly added to the paper’s length we added the following note on page..

“The frequentist versions of these analyses had the same results==. The frequentist versions can be found on the online supplemental”

3. Distributions of participants who do discover the 8-star monster in the dynamic environment. For example, adults only discover the 8-star monster on 9.8% of trials - is this driven by a only few adults who discovered it and then persisted in selecting it (therefore switching less after the discovery), or is it driven by many adults who discovered it but only selected one or two times?

-For the analysis of how what percent of participants chose the "best" option, the authors provide percentages for the dynamic condition but not the static condition.

**Additional Issues identified by Reviewer 2**

1. Large age range. In this revision we acknowledge the issue of use of a large age range in our child cohort and note that developmental change in exploration could take place within this range. We suggest that this is a key issue for future research. (see p. )
2. 79.2% accuracy for adults on the post-test items seems pretty low. Were they just not paying attention toward the end? Or was it that they exploited so much they forgot the values of the low-paying monsters? Or was it actually that they were just incorrect in the dynamic condition on the monster that changed and otherwise were very accurate? The last option makes sense, but it would be nice to break it down by condition (and/or monster) to see if this is the case.

We thank the reviewer for raising this issue. As suggested we examined performance broken down by condition and monster item. This showed that the relatively poor post-test performance of adults was primarily due to inaccuracy on the 8-star monster in the dynamic condition. When this item was excluded from scores, adult post-test accuracy in both the dynamic (X%) and static (Y%) conditions was relatively high. We have revised the way we present these results, including condition means for each age group (see p. ).

1. It looks like children's proportion of choosing the best monster actually went down in the second half in dynamic condition. They actually chose the best option less often in the second half in the dynamic than in the static condition. Without an explanation this seems some to contradict the interpretation of the results somewhat. Maybe it is that noticing the change causes them to start exploring even more? That would be interesting to show if there is an analysis that can confirm it. If not, it needs to at least be addressed somewhere.

4 MINOR ISSUES

Requested means added

In the analyses in several places it would be nice to have the means (or other central tendency) listed in the text. For example, on pg. 8 several tests say children were higher (or lower) than adults on some measure, but the values are not stated. I know they are in the graphs, but it would be helpful not to have to look back and forth. For some tests the numbers are mentioned, but others they are missing. I noticed it on both pg. 8 and pg. 11.

Panel J in Figure 2 would probably make more sense as a line graph than a bar graph, but it's your call how to present the data if there is some reason you like the bar graphs here.

Because these are discrete bins rather than continuous data, we would rather keep it as a bar graph.

TYPOS ETC

pg. 5 "For child participants, the experimenter ask," should be 'asked'

Fixed, thank you!

pg. 9 missing space "predictors.Comparing"

Fixed, thank you.

pg. 13 bottom: "unstructured free play shouldn't be viewed wasteful" seems to be missing a word

Fixed, thank you!