

The Development and Testing of a Novel Face-Controlled Experimental Tool for Toddlers and Young Children

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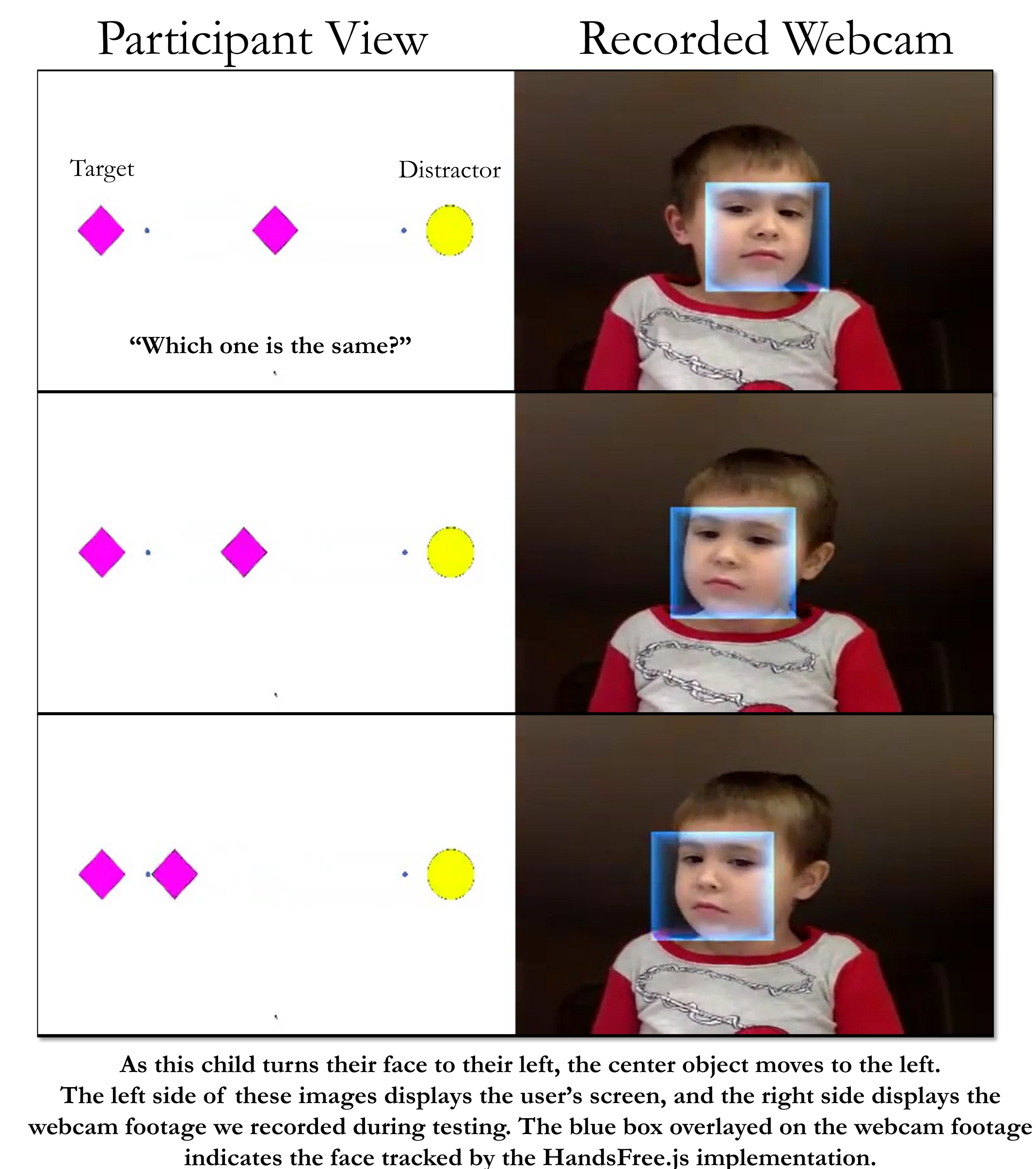
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OVERVIEW

- Remote testing methods for use with young children are limited in their contingency.
- Instead, remote stimulus presentation and experimental procedures are often non-contingent pre-recorded displays.
- This project was an initial attempt to connect participant's facial movements to stimulus presentation in a remote experimental design.
- Some participants enjoyed the game, but most did not turn their face in response to stimuli or encountered technical challenges.
- We suggest that future efforts use simple gestures, develop iteratively, and consider the technical limitations of home devices.

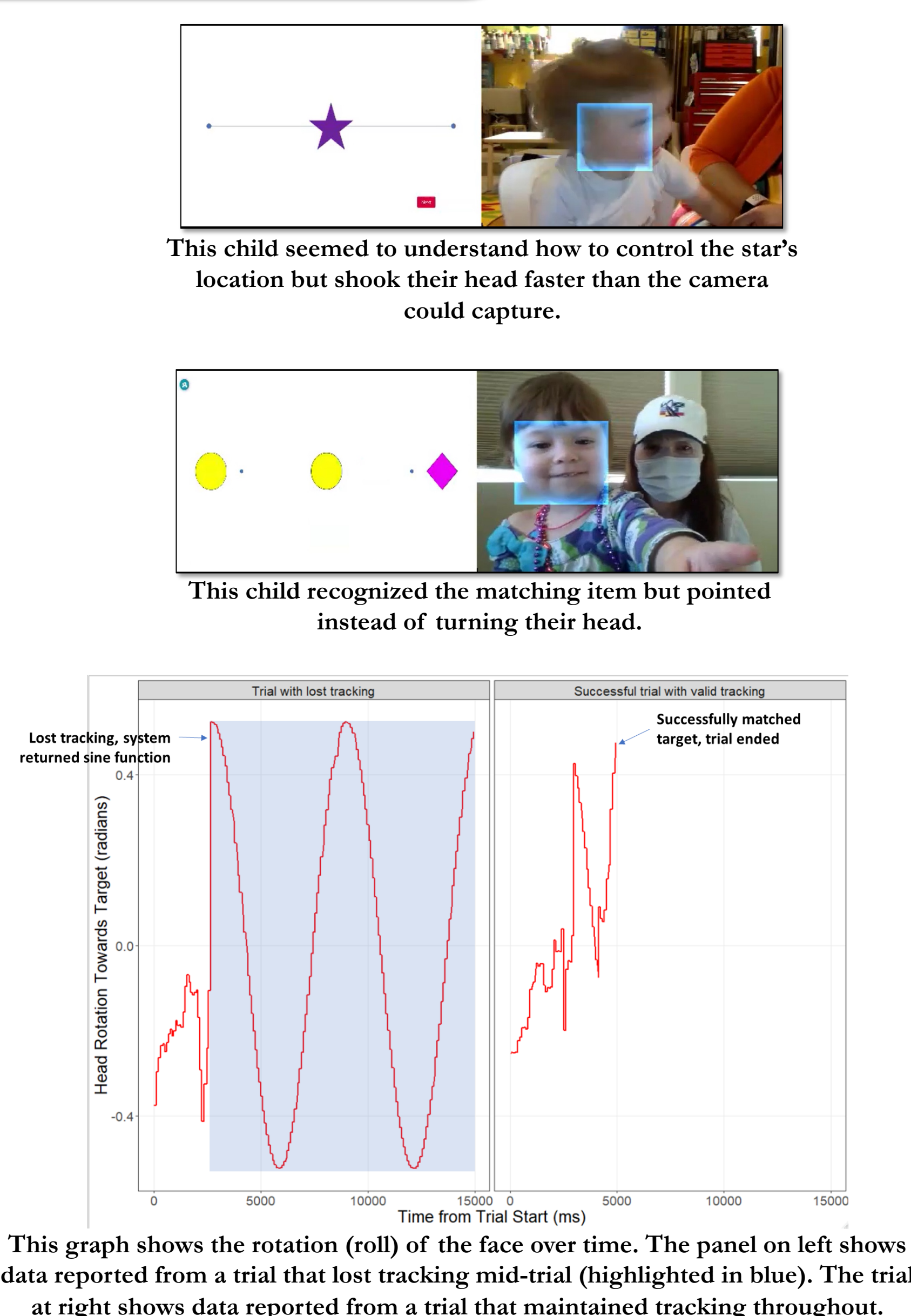
METHOD

- We used the HandsFree.js (Ramos, 2021) face tracking package to link the location of an on-screen image to the angle of a participant's face.
- By turning their face, participants could control the location of an image.
- We asked participants to use this ability to match a series of colored shapes.
- We delivered our task on the Gorilla platform (Anwyl-Irvine, Massonniè, Flitton, Kirkham, & Evershed, 2020).
- Half of participants received live instruction over Zoom, and half received a fully automated version of the task.
- **Participants:** 34 children (23 F, 11 M) ages 1-4 years (1.0-4.8, $M_{age} = 2.95$ years).



CHALLENGES IN DEVELOPMENT

1. Many children did not turn their face in response to stimuli, despite training trials and demonstrations.
2. Other children moved their face with enthusiasm – faster than we could track.
3. Some children used other methods to indicate the matching item (pointing, speaking).
4. Technical limitations:
 - Slower computers tracked less consistently than higher-end computers.
 - In a few instances, stimuli display was delayed by slow internet speeds.
 - When no face was detected, the face tracking model returned a sinusoidal function. This must be removed from the data to accurately track performance.



RECOMMENDATIONS

In future efforts we recommend that researchers:

1. **Test designs on high- and low-end devices.** Computer capabilities varied dramatically across participants and affected performance.
2. **Test with participants throughout development.** This may accelerate the process of identifying challenges and opportunities.
3. **Test across the intended age range.** Interactions that appear intuitive or obvious to older children or adults may not appear so to young children.

ACKNOWLEDGEMENTS

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Anwyl-Irvine, A.L., Massonniè J., Flitton, A., Kirkham, N.Z., Evershed, J.K. (2019). Gorilla in our midst: an online behavioural experiment builder. Behavior Research Methods. doi: <https://doi.org/10.3758/s13428-019-01237-x>

