ADAPTING LANGUAGE DEVELOPMENT RESEARCH PARADIGMS TO ONLINE TESTING

Delphine Nguyen, Nadine Fitzpatrick, Caroline Floccia

School of Psychology, University of Plymouth, UK

INTRODUCTION

- Online research studies have become popular among developmental researchers during the COVID-19 pandemic (Sheskin et al., 2020; Rhodes et al., 2020).
- Little research has been done to investigate looking behaviour in infants when testing in an online modality.
- We chose three paradigms which are widely used in infant research: a word recognition task using intermodal preferential looking (IPL), a word learning task using the Switch task, and a language assessment tool relying on children identifying a target word amongst a set of picture cards.
- Our goal is to validate that effects such as increased looking behaviour modulated by linguistic cues, is measurable in children doing the task online.
- Our aim is to compare our online experimental results to existing data collected face-to-face by our lab or other labs in the pre-pandemic period.

EXPERIMENT 1: WORD RECOGNITION TASK

METHOD

- 20 monolingual children aged 24 months were recruited from the Plymouth Babylab database.
- A word recognition task using IPL was adapted online using computers/laptops with the online platform Gorilla Experiment Builder (www.gorilla.sc, Anwyl-Irvine et al., 2018).

RESULTS

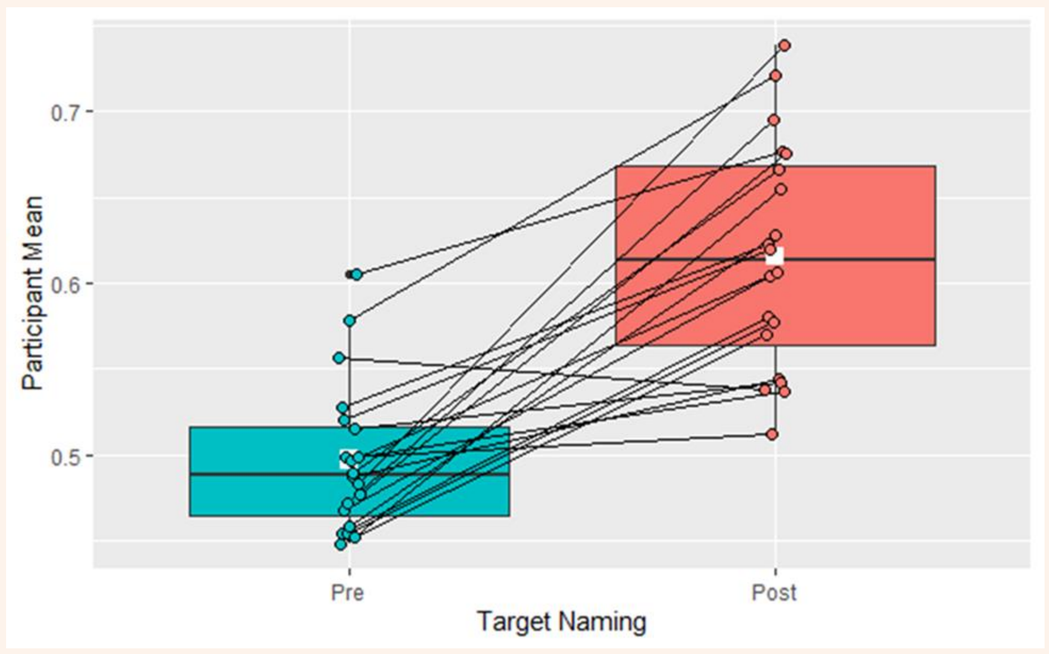

Figure 1: Experiment 1. Proportion of Looking Time Pre- and Post-naming during the online IPL study.

- The results clearly showed that infants aged 24 months looked at a picture on screen longer when the picture was named, compared to a picture that was unnamed. This is an expected outcome which indexes word recognition in children and replicates previous lab-based findings (e.g. Vihman et al., 2007).
- Experiment 1 adapts the IPL task into an online modality, providing a validation of the general testing paradigm.

EXPERIMENT 2: WORD LEARNING TASK

METHOD

- 19 monolingual children aged 17 months were recruited from the Plymouth Babylab database.
- To examine word learning, the Switch task (Stage & Werker, 1997) was implemented online using computer/laptop devices and administered via the Zoom app (Zoom Video Communications Inc., 2016).

RESULTS

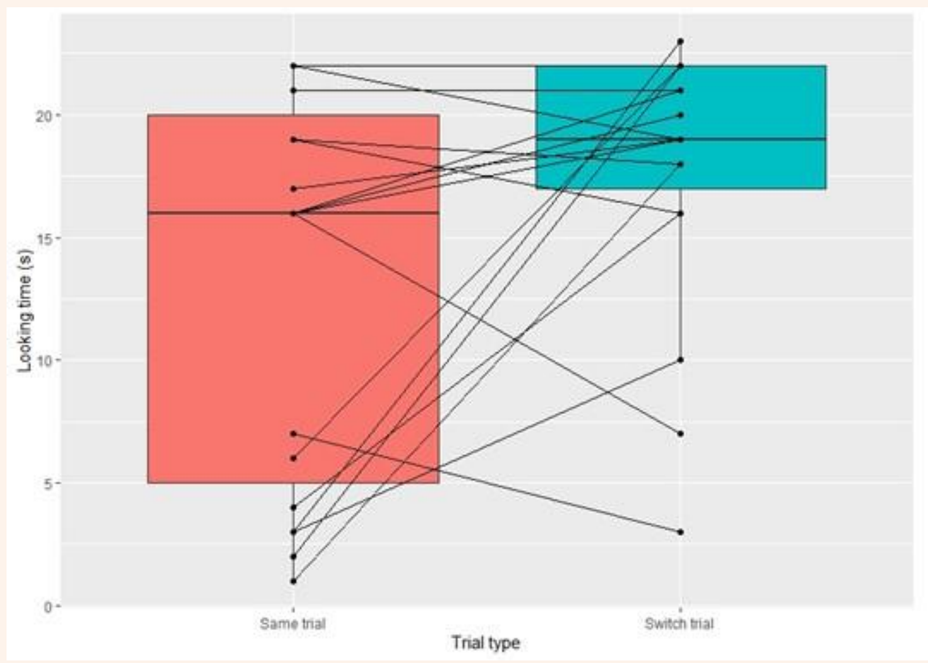

Figure 2. Experiment 2: Mean looking times to same and switch trials for each child

- 17-month-old infants successfully learned the association between a new object and a new label, as indexed by their longer looking time in switch trials as compared to same trials.
- They were able to encode phonetic detail when learning a new word, which is consistent with previous findings (e.g. Stage & Werker, 1997)

EXPERIMENT 3: LANGUAGE ASSESSMENT TASK

METHOD

- Toddlers (n=62) aged 19 to 26 months participated and were recruited from the Plymouth Babylab database.
- Children (n=32) performed the language assessment test, the WinG test (Cattani, Krott, Floccia, & Dennis, 2019) online via the Zoom application. Then, children (n=30) did the WinG test face-to-face at the University Babylab.

RESULTS

- We originally expected that the children who did the WinG in the Babylab would outperform the online participants. However, the findings are exactly opposite to this hypothesis as online children outperformed the face-to-face group.
- This is in line with what was found in the two previous experiments, where high effect sizes and poor attrition rates were observed when testing online.

Figure 3: Experiment 3. Comparison of WinG comprehension scores between online participants (N=32) and face-to-face participants (N=30).

DISCUSSION

- The results from the 3 experiments provide support for online testing validity. With some modifications to lab-based procedures, the IPL and Switch tasks successfully collected eye movement data and provided solid replications of established results. Experiment 3 demonstrated that children can perform well on a language assessment test administered online and that they were strongly engaged and responsive to the task.
- Advantages of online testing: high levels of engagement, high effect sizes, trials which are not infant-led still replicate findings in-lab, very little attrition or data loss.
- Limitations of online testing: more replication studies are required, it might not be suitable for children with language delays, coding might be time consuming, suitable electronic devices and internet connection are required.
- Recent pandemic has inadvertently opened promising avenues of investigation in early language studies, and it is likely that future research will harvest the benefits of the enforced development of online experiments, reaching out to multicultural and multilingual populations around the world.

References

Cattani, A., Krott, A., Dennis, I., Floccia, C. (2019). *WinG Words in Game Test:* A vocabulary assessment for pre-school children.
Rhodes, M., Rizzo, M. T., Foster-Hanson, E., Moty, K., Leshin, R. A., Wang, M., et al. (2020). Advancing developmental science *via* unmoderated remote research with children. *J. Cogn. Dev.* 21, 477–493. doi: 10.1080/15248372.2020.1797751
Sheskin, M., Scott, K., Mills, C. M., Bergelson, E., Bonawitz, E., Spelke, E. S., et al. (2020). Online developmental science to foster innovation, access, and impact. *Trends Cogn. Sci.* 24, 675–678. doi: 10.1016/j.tics.2020.06.004
Stager, C., Werker, J. Infants listen for more phonetic detail in speech perception than in word-learning tasks. *Nature* 388, 381–382 (1997).
Vihman, M., & Croft, W. (2007). Phonological development: Toward a "radical" templatic phonology. *Linguistics*, 45(4), 683–725.