2021

The Feasibility of Assessing Infants' Social Evaluations Using Within-Subject Repeated Measures in a Virtual Format

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THE FEASIBILITY OF ASSESSING INFANTS' SOCIAL EVALUATIONS USING WITHIN-
SUBJECT REPEATED MEASURES IN A VIRTUAL FORMAT

By

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A Thesis Submitted to the

Graduate School

In Partial Fulfillment of the

Requirements for the Degree of

MASTER OF ARTS

College of the Pacific
Behavioral Psychology

University of the Pacific
Stockton, California

2021

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DEDICATION

This thesis is dedicated to my parents, my sister, Emily, Nate, and all the residents of Bess Place and the Lake House; last, but most certainly not least, this thesis is dedicated to the classic 1997 Disney film, *Flubber*.

ACKNOWLEDGEMENTS

THE FEASIBILITY OF ASSESSING INFANTS' SOCIAL EVALUATIONS USING WITHIN-SUBJECT REPEATED MEASURES IN A VIRTUAL FORMAT

Abstract

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Foundational research on infant social evaluations (e.g., Hamlin et al., 2007; Hamlin et al., 2011; Hamlin & Wynn, 2011) has been cited over 2,500 times and infant researchers suggest these data show infants have an unlearned preference for prosocial others. However, several failed replications have been published, which might be attributable to the type of research methods used to investigate this question. A single measure of the dependent variable is ubiquitous among these studies; within-subject repeated measures are rarely used. In the current study, we adapted methods used by Hamlin and Wynn (2011) to a video-only format, due to COVID-19 restrictions; we extended their methods by including four puppet shows and four corresponding puppet choices to assess for choice stability within and across participants. Six infants were assessed; all but one infant failed to make all four choices and three sessions had to be terminated early due to fussiness. Among the four infants who made at least two choices, no infant showed a robust preference for the helper puppet, two infants chose a puppet on the same side at least three times, and one infant chose the hinderer on three of four opportunities. Our data suggest that a completely virtual method might not be feasible for assessing infants' choices between two puppets presented on a screen. Suggestions for addressing the limitations of the current study and directions for future research are described.

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min	minute
s.	seconds
in.	inches

CHAPTER 1: INTRODUCTION

Researchers have suggested that infants prefer prosocial others and that this may be largely unlearned (Hamlin, 2013; Hamlin et al., 2007; Hamlin et al., 2011; Hamlin & Wynn, 2011). The impact of this research in academic circles can be seen in the citation rates. For example, three foundational studies (i.e., Hamlin et al., 2007; Hamlin et al., 2011; Hamlin & Wynn, 2011) collectively have been cited over 2,500 times. These studies also have had a substantive impact on scientific knowledge disseminated to the public and on the public's general beliefs about morality (e.g., Bloom, 2010; CBS, 2012; Chun, 2014; Shermer, 2014; Tucker, 2013). However, an increasing number of failed replications have been published (e.g., Cowell & Decety, 2015; Cruz-Khalili et al., 2019; Loheide‑Niesmann et al., 2020; Nighbor et al., 2017; Salvadori et al., 2015; Schlingloff et al., 2020; Vaporova & Zmyj, 2020), suggesting that the methods used to produce these data warrant closer scrutiny.

Methods of the Original Studies and Failed Replications

The methods described by Hamlin and colleagues in their foundational studies (i.e., Hamlin et al., 2007; Hamlin et al., 2011; Hamlin & Wynn, 2011) include the use of group designs and a dependent measure that consists of infants making a single choice between two puppets. There are a few key limitations to the use of a single assessment of the dependent variable (i.e., infant puppet choice). With only one choice per participant, the reliability of infants' choices cannot be examined. Moreover, other possible influences on infants' choices cannot be ruled out (e.g., Cruz-Khalili et al., 2019; Nighbor et al., 2017; Scarf et al., 2012). This is especially true given the growing number of published, peer-reviewed failed replications that use the same methods as the original studies (e.g., Cowell & Decety, 2015; Loheide‑Niesmann

et al., 2020; Salvadori et al., 2015; Schlingloff et al., 2020; Vaporova & Zmyj, 2020). In addition to peer-reviewed failed replications, we also found two non-peer-reviewed failed replications: a thesis for which Hamlin was the direct supervisor (Sitch, 2018) and a dissertation (Colaizzi, 2016). It is quite possible other failed replications exist, but also go unpublished in peer-reviewed outlets, adding to the growing concern that statistically significant findings go unpublished (i.e., the "file drawer effect", Dalton et al., 2012). All of this suggests the need for closer scrutiny of the puppet paradigm method. One way to increase the extent to which the reliability and validity of the single puppet choice paradigm and the corresponding data can be assessed is to use a within-subject repeated measures research design.

Failed Replications: Within-Subject Repeated Measures

Cruz-Khalili et al. (2019) and Nighbor et al. (2017) used within-subject repeated measures in their replications of infant social evaluation studies. In both studies, following the puppet shows, rather than making a single choice, each infant was asked to choose between the two puppets several times. In both experiments, between 30-65% of the infants chose the prosocial puppet as their first choice. However, across repeated choices, on most trials, more infants reached for the same side (45%-64%) than for the prosocial puppet (10%-15%).

Critiques of Failed Replications Using Within-Subject Repeated Measures and How We Might Address Them

Although the results of within-subject repeated measures studies (Cruz-Khalili et al., 2019; Diedrich et al., 2001; Nighbor et al., 2017) provide strong evidence that the current group design and single choice method might not be adequate to assess infants' social evaluations, they are not without criticisms. For example, a reviewer of Cruz-Khalili et al. (2019) suggested that the infant's first choice is their true choice, and that requiring an infant to make additional

choices confuses them, rending the repeated measures data meaningless. Additionally, a reviewer of Nighbor et al. (2017) suggested that asking infants to make more than one choice induces same-side reaching (e.g., Diedrich et al., 2001) or looking (Fisher-Thompson, 2014) and the only way to avoid this pattern is to ask infants to make only one choice. For example, Diedrich et al. (2001) observed that infants repeatedly reached for the same side when presented with two wooden lids that were identical except for their color; this suggests that the nearly identical appearance of the puppets, except for shirt color, might induce side perseveration. However, the methods could be re-arranged so that infants watch more than one puppet show and make a single choice after each puppet show. This method would result in a series of first choices, which ought to address the concerns that repeated consecutive choices confuse infants or cause them to engage in side-perseveration. Additionally, this method could provide information about the reliability of within- and between-subject choices.

Summary and Current Study

Several often-cited studies have had a large impact on the field of developmental psychology (e.g., Hamlin et al., 2007; Hamlin et al., 2011; Hamlin & Wynn, 2011) and mainstream public science (e.g., Bloom, 2010; CBS, 2012; Chun, 2014; Shermer, 2014; Tucker, 2013). However, several failed replications have been published (e.g., Cruz-Khalili et al., 2019; Cowell & Decety, 2015; Loheide☐Niesmann et al., 2020; Nighbor et al., 2017; Salvadori et al., 2015; Schlingloff et al., 2020; Vaporova & Zmyj, 2020), which suggest researchers do not know enough about the puppet choice paradigm to use it for evaluating infants' choices.

To address these limitations and questions, in the current study, we used a within-subject repeated measures design and addressed the aforementioned critiques of the two published studies that incorporated a repeated measures design. We did this by having infants watch a set

of puppet shows prior to being asked to make one puppet choice and then repeated this process three times. With this method, each infant made four "first" choices, which allowed for four within-subject replications of Hamlin and Wynn (2011) and the ability to assess choice patterns and stability (Nighbor et al., 2017).

CHAPTER 2: METHOD

General Considerations Due to COVID-19 Restrictions

We initially planned to replicate and extend Hamlin and Wynn's (2011) live methods. However, after COVID-19 restrictions were put into place, we had to consider conducting the experiment virtually. Before moving the study to a virtual format, we first conducted a literature review. We wanted to assess whether infants would watch videos as opposed to live puppet shows and whether they would reach for puppets presented on a screen.

Few studies exist in which infants are assessed using videos or are asked to reach for something displayed on a screen. Some research shows that infants might look or reach for puppets after viewing videoed puppet shows (e.g., Vaillant-Molina & Bahrick, 2012). However, other research shows that infants are less likely to make a live puppet choice (or choose the prosocial puppet) after viewing videoed puppet shows (e.g., Cowell & Decety, 2015; Schlingloff et al., 2020; Vaporova & Zmyj, 2020). Similarly, Zack et al. (2009) noted that infants perform tasks more accurately when the task and demonstration of the task are presented in the same format. From these studies, we concluded that the format of the puppet shows and choice measure should be congruent. However, all the aforementioned studies presented only one item on the screen. This still left open the question of whether infants would reach for one of two puppets presented on a screen. Some research shows that, when shown photographs of objects or live objects (Yonas et al., 2005), or objects on a video screen (Ziemer & Snyder, 2016), infants engage in similar reaching behavior. Such data suggest that infants might reach for puppets on a screen. We thus concluded it would be reasonable to conduct the study virtually.

That is, infants could be shown videos of puppet shows and then be asked to choose between one of two puppets shown on a screen.

Participants

Participants (Ps) included six typically developing male infants, ranging in age from 8 to 12 months and their parents (one parent per infant participant). Five participants were White (P1, P2, P4, P5, P6), and one was Hispanic (P3). Parents were recruited via virtual flyers and word of mouth. Infant-parent dyads were eligible to participate in the study if they met the following inclusion criteria: infants were full-term, typically developing, and between 5 and 16 months old; parents had a device (e.g., a laptop or tablet) with a screen big enough for experimenters to see which puppet the infant reached toward; and parents had a smart phone with the Zoom application (Zoom Video Communications, n.d.) installed for an additional view of the infant for choice coding. A tripod was mailed to parents for them to place their phone on for this view, and they were allowed to keep this tripod. After completion of the study, parents received an electronic 30-dollar Amazon or Target gift card as a token of appreciation for their time.

Setting

Participants and their parents were in their homes using the Zoom video conferencing application (Zoom Video Communications, n.d.) via two devices (i.e., a computer or tablet and a smart phone). Experimenters used laptops to access the Zoom video conferencing application and participated from their homes.

Materials and Counterbalancing

We used MacBook Pro laptops, with 2560 x 1600 resolution and Intel Iris Plus graphics to create videos of the box familiarization, puppet shows, and choice measures. Videos of the

helper and hinderer puppet shows were recorded to resemble the puppet shows used by Hamlin and Wynn (2011). This included a 122 cm wide and 66 cm high display, clear box, and brightly colored rattle. The puppets were a yellow duck and two identical gray elephant puppets (one in a red shirt, the other in a yellow shirt), similar to those in Hamlin et al.'s (2011) supplementary videos. All videos were played via Zoom in full screen. The principal investigator enacted both scenarios so that all infants saw the materials and puppets presented by the same person. Each participant was given one of four sequences of the pre-recorded helper and hinderer puppet show videos. Across participants, the order of the puppet shows, **t**he puppet's shirt color, and the side of the helper during the puppet show were counterbalanced. Within participants, the side on which the helper puppet was presented during the choice measure was counterbalanced. A table of the counterbalancing methods can be seen under Appendix A. Participants were assigned to the following sequences: sequence one (P1 and P5), sequence two (P2 and P6), sequence three (P3) or sequence four (P4).

Experimenter Training

The secondary and tertiary experimenters were trained by the principal investigator, who also served as the primary experimenter. All trainings took place on Zoom. The primary experimenter scheduled all meetings with infant-parent dyads, assigned participant numbers, and thus was the only experimenter who knew the puppet assignments. The primary experimenter also conducted the first meeting with the parents. During this meeting, primary experimenter instructed parents how to establish the setting from which they would participate, assisted the parents with device set-up, and how to fill out forms and email them back to the primary experimenter. During the sessions in which infants made puppet choices, the primary

experimenter played the box familiarization and puppet show videos and provided the optional break following the choice measures.

The secondary experimenter, who was blind to puppet assignment, played the pre-recorded choice measure video. The tertiary experimenter, also blind to puppet assignment, coded infants' choices within the session. An additional coder, blind to puppet assignment, did not attend Zoom sessions, and instead coded infant choices using the video recording of the session. After infants made a puppet choice, the tertiary experimenter recorded the choice and stated "got the choice" so that the secondary experimenter knew whether to move to the next part of the procedure or to play the video again. Following P4, additional coders were asked to mute the video recording while taking data. This modification was made to eliminate the possibility that the timing of the phrase "got the choice" could have served as a cue that a puppet choice was coded, influencing the additional coder's behavior.

Because every experimenter joined the Zoom meeting from separate settings on their own devices, they were provided a document with detailed instructions (i.e., the task analysis, or TA) on how to the carry out the tasks of their assigned roles (see Appendix B). Practice meetings consisted of experimenters conducting the procedure using the TA while a different research assistant played the role of the infant-parent dyad. Each practice was video recorded. Seventeen practice meetings took place totaling approximately 12 hours.

The principal investigator provided feedback to the secondary and tertiary experimenters during the practice meetings. The faculty supervisor provided additional feedback to the principal investigator and experimenters based on viewing the video recordings. Following practice meetings, the TAs were modified as needed; there were approximately 23 revisions. Several revisions were related to guidelines related to how experimenters should navigate their

devices within the Zoom meeting, which required minor, but frequent updates. For example, some of these instructions included how to share a screen, how to share sound, and ensure the parent could view the correct experimenter in full screen. Nothing about the actual study methods were revised in these T.A.s.

Procedure

Parent Meeting

Before conducting the puppet shows and puppet choice session, the primary experimenter held a first meeting with the parent to review forms, establish the participation setting, and set up devices. First, the parent's internet connection was tested and an appropriate setting (i.e., a quiet space with minimal distractions) for the infant-parent dyad was identified. Next, the parent was instructed to log into the Zoom meeting via their two devices. Then, they were instructed to set-up and position the tripod with their phone for the additional view of themselves and their infant. A diagram with an image of the desired tripod placement (see Appendix C) was shown via the shared screen to assist the parent with the set-up. The parent was also instructed to set up the devices (e.g., computer, tripod containing their phone) to allow for a clear view of their infant reaching. Once both devices were in an adequate position, a screen shot was taken for the parent to reference while setting up devices before the second meeting. This meeting was not recorded. Following the first meeting, instructions for device set-up, the diagram of the tripod placement and the screen shot were sent to parents via email.

Sessions (Infant Choices)

The session was scheduled between 3-18 days after the parent meeting. Sessions consisted of a brief adjustment of devices (i.e., the computer or tablet and tripod containing the parent's phone) followed by the puppet shows and choice assessments. Each session was

recorded for coding purposes and parents were alerted when recording began. The sequence of the session (see Appendix D) resembled the sequence described by Hamlin and Wynn (2011); following the first puppet shows and choice, infants watched three additional sets of puppet shows (one of each type of show) and made a choice following each set. Following each set of puppet shows, parents could opt to take no break or a break between 1 and 5 mins. The break was set on a timer by the primary experimenter via the shared screen. An alarm (that sounded like a harp strumming) went off when the break was over. All six parents opted to take breaks during the scheduled break time. Parents who initially took less than a 5-min break were asked if they would like additional time when the alarm went off; no parent requested additional time. Three parents requested breaks outside of the established break time; two of these requests occurred when infants became fussy, after which one infant continued data collection and one infant's session was terminated due to continued fussiness. Overall, breaks lasted 1 to 6 min.

Subsequent Sessions

Subsequent sessions for three infant-parent dyads (P1, P3, P4) were scheduled because either the infant made no puppet choices (P1), or because the prior session had to be terminated due to fussiness (P3, P4).

Familiarization Process

Once devices were adjusted and infant-parent dyads were in an adequate position, parents were instructed to sit with their infant sitting securely in their lap and facing close to the screen. Then, the primary experimenter (i.e., the principal investigator) played the pre-recorded box familiarization video, which used the procedure as described by Hamlin and Wynn (2011). During the video, the principal investigator held the box and said, "Look!", while shaking the box. Then, the principal investigator opened the box, took out the rattle, and asked the infant to

look at the rattle. Finally, the principal investigator put the rattle back in the box and closed the box; this scenario was repeated once during the video that was played one time through.

Puppet Shows

Following the box familiarization video, the primary experimenter played the pre-recorded puppet show videos. During the first set of puppet shows, alternating helper and hinderer puppet show videos were played five times each. This differed from the habituation method used by Hamlin and Wynn (2011), in which infants' gaze helped determine when to terminate puppet shows. Eye tracking was not feasible in the Zoom format; however, a fixed criterion of six puppet shows (alternating between the two types, helper, or hinderer) has been used in a successful replication of Hamlin and Wynn (2011) (i.e., Steckler et al., 2017), so we opted for that method. A total of 10 puppet shows occurred for the habituation method based on the average number of habituation shows that occurred in previous studies (Hamlin & Wynn, 2011; Nighbor et al., 2017; 9 and 10 shows, respectively). During the remaining three sets of puppet shows, the helper and hinderer videos were played one time each. Although this excluded the habituation procedure, the infants had already seen 10 puppet shows during the first set within the last 10 min, and we had to balance the time expenditure of additional puppet shows against the probability of increased fussiness and inattentiveness as the minutes progressed.

At the start of each puppet show video, the principal investigator stated, "Up goes the curtain!" while an image of a black curtain was shown on the screen to resemble the procedures used by Hamlin and Wynn (2011) and Nighbor et al. (2017). Then, the physical stage appeared, and the protagonist appeared from behind the black curtain. The protagonist's movement paused briefly, and then waddled to either the left or right side of the box. The protagonist leaned down to look inside the box twice, and then jumped on the front corner of the box. The protagonist

then attempted to open the box four times. On the first two attempts, the protagonist pulled and lifted up the edge of the box only a few inches, and then dropped the lid back down. On the third and fourth attempt, the protagonist lifted the edge of the lid and lowered it, while continuously holding onto it, as if the lid was too heavy for the protagonist to open. During the fifth attempt, either a "helper" or "hinderer" puppet entered on the side opposite the protagonist puppet.

Helping Puppet Show

During helping puppet shows, the helper puppet moved forward, grabbed the corner of the box lid on the side opposite the protagonist and opened the box with the protagonist. Then, the protagonist dived into the box, and grabbed the rattle. The helper then exited the stage while facing the infant.

Hindering Puppet Show

During hindering puppet shows, the hinderer puppet moved forward and jumped on the box lid on the side opposite the protagonist, slamming the box shut. Then, the protagonist dived down next to the box. The hinderer then exited the stage while facing the infant.

Choice Measure (Dependent Measure)

After observing P1 playing with the keyboard rather than attending to the screen and sitting too far to reach the screen, all parents were asked to ensure that their infant could touch the screen and to cover the keyboard with a plain towel or some item that would limit their infant's access to the keyboard. At the beginning of the choice measure, the secondary experimenter instructed parents to cover the keyboard and sit with their infant facing close enough to touch the screen while still sitting securely in their lap. Then, parents were instructed to turn their head 90 degrees toward their phone and close their eyes until instructed to reopen them by the experimenter.

The secondary experimenter played the pre-recorded video that was used to prompt infants to choose between the helper and hinderer puppets. During the video, the principal investigator presented the two puppets to the infant by placing each puppet about 10 in. from one another and 23 in. from the screen. The infant was instructed to look at both puppets. The principal investigator instructed "look," and shook one puppet, and then "look," and shook the other puppet. Finally, the principal investigator said "look" to prompt the infant to look toward the principal investigator. The principal investigator then placed each puppet about 13 in. from the screen and said, "which one would you like to play with?" Infants were given a 10-s window of opportunity to choose a puppet (Nighbor et al., 2017); each choice prompt was followed by 10 s of the puppets remaining still on the screen before the video ended.

There were a total of four sets of puppet shows. Infants made one choice after each set of puppet shows, so that each infant made a total of four choices. Choices were recorded as the first puppet that the infant concurrently looked at and reached toward on the screen. If infant did not reach for a puppet during the first video, the secondary experimenter played the video again. If the infant still did not reach for a puppet by the end of the second video, it was played a third and final time. If the infant did not choose a puppet by the time the end of the third video, the tertiary experimenter recorded the trial as "no choice".

Reliability

Interobserver agreement was calculated for each choice. Agreement was scored if there was agreement between the tertiary experimenter and the additional coder for the same trial. Percent agreement was calculated as the total number of agreements divided by the total number of trial agreements and disagreements, multiplied by 100%. The IOA for 33 total trials was 88%.

If both coders did not agree on a particular trial, an additional coder watched the video of the recorded trials and coded the infant's choices. If the third coder did not agree with the either the tertiary or first video coder, the principal investigator and faculty supervisor reviewed the recording to evaluate the trial. Out of 33 trials, there was "no agreement" for one trial because the coders could not agree on whether the infant did or did not concurrently look and reach for the puppet.

Analyses

We counted the number of infants who made no choices, fewer than four choices, and had their sessions terminated due to fussiness. We also conducted both within and across-subject analyses of infant choices. First, we counted the number who chose the same puppet on at least two or more trials. We also counted the number who chose a puppet on the same side on at least two or more trials. We also looked at whether age was associated with any patterns of infant choices.

CHAPTER 3: RESULTS

A total of six infants participated in the study. Three infants participated in one session, two infants participated in two sessions, and one infant participated in three sessions. This resulted in a total of 10 sessions and 40 possible choice opportunities. Due to infant fussiness, three of these sessions were terminated early, resulting in a total of 33 choice opportunities. Out of the 33 opportunities, 13 choices were made (39% of opportunities) by five of the six infants. The total time expenditure per participant was between 45 and 105 mins and all infants took at least one break in one or more of their sessions. The results of all infants' puppet choices for all 33 opportunities are depicted in Figure 1.

Multiple Sessions and Session Terminations

Three infants (P1, P3 and P4) participated in multiple sessions (see Figure 1). P1 and P4 participated in two sessions, and P3 participated in three sessions. No data were collected during P1's first session, during which he played with the keyboard and could not reach the screen; this resulted in changes to the methods to include covering the keyboard and ensuring that participants could reach the screen. Additionally, P1's first session occurred when he was 8 months old; we hypothesized that P1 might have been too young, so P1's second session occurred approximately 2.5 months later when he was 10-months old. P3 and P4 ended their first or second session early due to fussiness. P3's second session was 4 days following their first; P3 was 10 months at the time of his first and second session which were both terminated due to fussiness. P3 completed a third session approximately 2 months later when he was 12 months old. P4's second session was approximately 2 weeks following his first session; P4 was 12 months old during both sessions.

No Choices

Among infants with completed sessions, two made no choices (P1, session 1; P4, session 2) and four made fewer than four choices (P1, session 2; P3, sessions 1 and 3; P5 and P6) (see Figure 1). Among infants with sessions that were terminated early, two infants (P3, session 2; P4, session 1) made no choices.

Puppet and Side Choices

Five infants made a total of 13 choices. In terms of puppet choice, 8 of these 13 choices were made for the hinderer puppet. In terms of side choice, 8 of these 13 choices were made for the puppet on the right side (see Figure 2). Although 8 choices were made for both the hinderer puppet and the right side, when the hinder puppet was chosen, it was on the right side only 5 times. All three infants (P2, P3, session 1; P3, session 3; P5) who made a choice following the first set of puppet shows chose the hinderer puppet (i.e., their first choice was the hinderer). Two infants' (P2 and P5) data showed possible patterns. P2 chose the hinderer puppet during his first three choices and then chose the helper puppet during his last choice. P2 also chose a puppet on the left side for three out of four choice opportunities. P5 reached for the right side during all three choices. There do not seem to be any other clear patterns evident in the data.

Age and Puppet Choices

The ages of our participants ranged from 8 to 12 months across 10 sessions. Two infants' (P1 and P3) sessions occurred approximately 2-2.5 months apart; P1 was 8 months at the first session and 10 months at the second session; P3 was 10 months at the first two sessions and 12 months at the third session. Figure 3 depicts infants' choices by age. Overall, there did not seem to be any correlation between infants' ages and number of puppet choices made. The youngest

infants (i.e., 8 months old) made 0 or 1 choices and the oldest infants (i.e., 12 months) made 0 or

2 choices. Infants aged 9 and 10 months old made 0 to 4 choices.

CHAPTER 4: DISCUSSION

The purpose of this study was to replicate and extend previous research on infant social evaluations (e.g., Hamlin & Wynn, 2011; Nighbor et al., 2017) using an entirely virtual format. Each of the six infants watched a total of 10 puppet shows (alternating between helping and hindering puppet shows) prior to making their first puppet choice. Next, each infant watched two puppet shows (one hindering and one helping) and made a puppet choice, and this sequence occurred three times. This procedure resulted in each infant having four opportunities to make a "first" puppet choice. Across the six infants, there were a total of 10 sessions. Three infants participated in more than one session, either because they made no choices during the first session or the first session had to be terminated due to fussiness, resulting in 33 choice opportunities. Out of the 33 choice opportunities, infants collectively made a total of 13 puppet choices. One infant selected a puppet on all four trials, four infants selected a puppet on a least one trial, and one infant never made a puppet choice. Four out of five infants' first or only puppet choice was for the puppet presented on the right side. All three infants who made a choice following the first set of puppet shows chose the hinderer puppet. There is also some indication that infants may choose from the same side more often, as the two infants for whom we have at least three data points chose a puppet on the same side on three out of three or four trials.

Overall, what can we make of these data? Certainly, we cannot come to any firm conclusions. However, this is not altogether different from what we might be able to conclude from the published data. In fact, given that it is rare to find 100%, or near 100% of infants choosing the prosocial puppet (estimates are closer to 65%, Margoni & Surion, 2018), many

factors might be influencing infants' choices (e.g., Cruz-Khalili et al., 2019; Loheide-Niesmann, et al., 2021; Nighbor et al., 2017; Scarf et al., 2012). Infants' reaching behavior might be influenced by their learning histories (e.g., Schlinger, 1995, also see Peleaz et al., 2012 for an example of infants' reaching being put under the control of their mothers' facial cues) or specific artifacts of the method (Loheide-Niesmann, et al., 2021; Scarf et al., 2012). For example, even well-established phenomenon, such as object permanence, can be upended when factors (e.g., the direction of the experimenter's gaze) related to infant behavior are experimentally manipulated (e.g., Dunn & Bremner, 2020).

Replications and extensions of the puppet paradigm have shown that the side on which puppets are presented (Cruz Khalili et al., 2019; Nighbor et al., 2017), similar appearances (e.g., Diedrich et al., 2001), and specific movements associated with one puppet (e.g., Scarf, et al., 2012) all influence infants' choices. For example, it is possible that infants choose the helper puppet (e.g., Hamlin et al., 2007; Hamlin et al., 2011; Hamlin & Wynn, 2011) because of the association between the hinderer puppet and an aversive sound (i.e., the loud slamming of the box) (e.g., Vervliet & Boddez, 2020; Watson & Rayner, 1920), rather than preference for prosocial others. The hinderer puppet is always associated with a loud bang and the helper puppet never is (see Scarf et al., 2012 for similar findings showing infants' puppet choices are sensitive to particular puppet movements rather than the prosocial behavior of the puppet). Collectively, results from the bulk of infant social evaluation studies, including failed replications, suggest infants' puppet choices are likely influenced by several different factors, only one of which may be the prosocial behavior of the puppet.

CHAPTER 5: LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Five of the six infants we assessed did not make a puppet choice on at least one trial. This percentage is quite high compared similar studies in which very few infants failed to reach for one of the puppets (i.e., Hamlin & Wynn, 2011, 2 infants; Nighbor et al., 2017, 0 infants). Our data might be explained by several procedural limitations. First, we had to use pre-recorded videos of the box familiarization, puppet shows, and choice measure, rather than live versions (Hamlin & Wynn's, 2011). Although data show infants might reach for a photo or screen (i.e., Yonas et al., 2005; Zack et al., 2009; Ziemer & Snyder, 2016), our study differed from these studies in several ways. Yonas et al. (2005) and Ziemer and Snyder (2016) presented only one item at a time and conducted their studies in controlled laboratory settings. We presented both puppets on either side of the screen during the puppet choice in a less controlled home environment, which included several environmental distractions. For example, one infant played with the keyboard (P1, session 1), and one tried to access items in the room (P4, session 1). Some infants tried to remove the towel or item covering the keyboard (P1, session 2; P3 sessions 1, 2 and 3; P4 session 1; P5), and most grabbed and tried to move the screen (P3 sessions 1, 2 and 3; P4 session 1; P5, P6). Finally, there were two meetings (P3, session 3; P4, session 2) during which someone entered the room to talk to the parent, which might have distracted the infants.

Additionally, because our study was completely virtual, infants were expected to attend to the screen for the entire duration of the session, whereas in the other screen choice studies (i.e., Yonas et al., 2005; Zack et al., 2009; Ziemer & Snyder, 2016), infants interacted with live experimenters and only attended to the screen for a portion of their participation. Although Zack

et al. (2009) also conducted their study from participants' homes, their participants were older than our participants (15-16 months compared to 8-12 months in our study), and they may have had the skills to attend to the tasks for longer periods of time. It was also difficult to get some infants (i.e., P1, session 1; P4, session 1) close enough to the screen. Although we tried to ensure that infants could sit at an adequate distance after running P1, some infant-parent dyads' seating arrangements limited where, and how close to the screen that the infant could reach. Finally, requesting that infants sit for long periods of time might have contributed to them becoming inattentive and/or fussy, limiting the number of puppet choices made and resulting in early termination of the session.

The total time expenditure per participant was between 45 and 105 mins and all infants took at least one break in one or more of their sessions, with some taking additional breaks. Five out of six infants became inattentive (e.g., playing with the keyboard or screen) and whined or fussed at various points of the session. Two infants had to terminate the session due to extended fussiness. Many of the highly cited studies (e.g., Hamlin et al., 2007; Hamlin et al., 2011; Hamlin & Wynn, 2011) do not report information about the length of their sessions. Nighbor et al.'s (2017) sessions were much shorter than ours, approximately 20 minutes on average, and no sessions were terminated due to fussiness. This length of time might have resulted in less inattentiveness and/or fussiness and might have resulted in more puppet choices.

To our knowledge, this is the first attempt at replicating an infant social evaluation study using an entirely virtual procedure; the extent to which this format adversely affected infants' reaching behavior is unclear. One way to evaluate the effects of a virtual format on infants' choices would be to examine choice reliability across modalities. We could do this by assessing infants both virtually and live, using the same setting for both, to control for extraneous

environmental factors. Infants could participate from the lab, and for each participant, we could

implement both a live procedure (as described by Hamlin & Wynn, 2011) and a virtual

procedure (similar to our method), with both procedures including within-subject repeated

measures. Infants could be assessed on the same day (with breaks) and the order of the modality

(i.e., virtual, or live) could be counterbalanced across participants. This might provide us with

more information about reliability across modalities (live vs. virtual) and whether one method is

superior to another.

If infants' prosocial puppet choices continue to be assessed using the current puppet

paradigm (e.g., Hamlin & Wynn, 2011), it might also be beneficial to learn more about the

stability of infants' choices across time. We could do this by assessing infants in the lab on the

same day (with breaks) or on two separate days. If within-subject choices are variable across

time, this would further support the notion that infants' choices are not associated with the

prosocial behavior of the puppet.

Another way to assess choice reliability would be to assess infants' preferences for parent-

nominated preferred and non-preferred items by doing a paired-choice assessment (e.g., Fisher et

al., 1992). We were able to locate only one published study examining the use of a paired-choice

preference assessment with one 15-month-old infant (Rush et al., 2005). Results of this study

showed that a paired-choice preference assessment did identify the infant's preferred items, a

treatment analysis supported the results of the preference assessment. This suggests it is feasible

to use this type of method to identify infants' preferences. Because preference assessments are

used to identify more and less preferred items, with no assumption that an item will be

exclusively chosen, this may fit well with the current puppet choice paradigm. If infants do not

choose "preferred" items reliably, this suggests the puppet paradigm may not be the appropriate

method to answer questions about infant social evaluations. However, if infants do choose the preferred item reliably, this might suggest the method is appropriate, but then the failed replications must be explained (Cowell & Decety, 2015; Cruz-Khalili et al., 2019; Loheide☐ Niesmann et al., 2020; Nighbor et al., 2017; Salvadori et al., 2015; Schlingloff et al., 2020; Vaporova & Zmyj, 2020).

Perhaps more important than identifying whether we can assess infants' preferences through a preference assessment is understanding the conditions under which infants' choices can be experimentally manipulated. Cruz-Khalili et al., (2019) examined whether parents' knowledge of the study purpose was one such controlling variable; their results showed it was not. However, there are many other controlling variables to evaluate under many types of conditions (e.g., Rosenthal, 2002). Researchers could design an experiment in which infants' puppet choices are put under experimental control (e.g., similar to Scarf et al., 2012, but using single-case design and repeated measures), such that we can predict when they will choose the helper puppet, reach for the same side, etc. This might be the first step to understanding the conditions under which infants choose one puppet (or side) over the other.
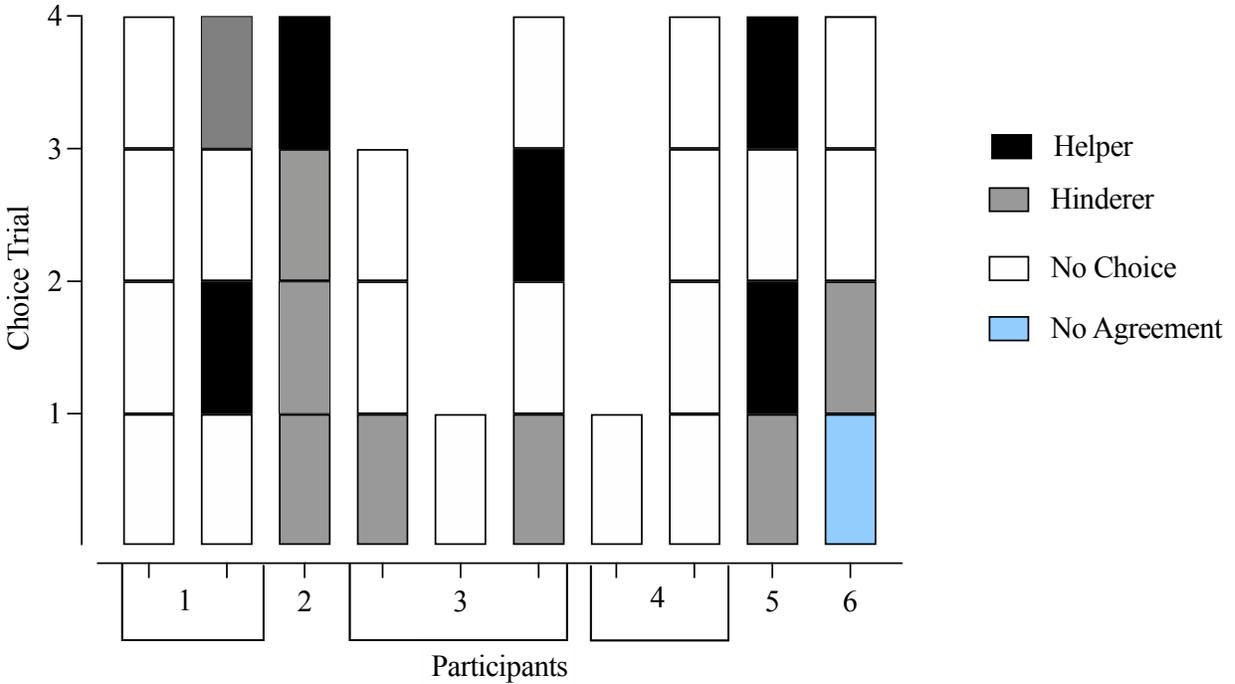
Figure 1. Within-subject results for all choice opportunities.

The x-axis depicts each participant. The brackets indicate the number of sessions per

participants (e.g., P1 participated in two sessions, P3 in three sessions). The y-axis depicts each

infant's choice for each of the four choice trials. Each bar segment represents one choice trial for

each infant; black bars represent choices for the helper and gray bars represent choices for the

hinderer. White bars represent trials in which there was no choice made for either puppet. The

blue bar indicates no agreement among the coders regarding the infant's puppet choice for that

trial. Sessions that do not include all four bar segments were sessions that were terminated early.
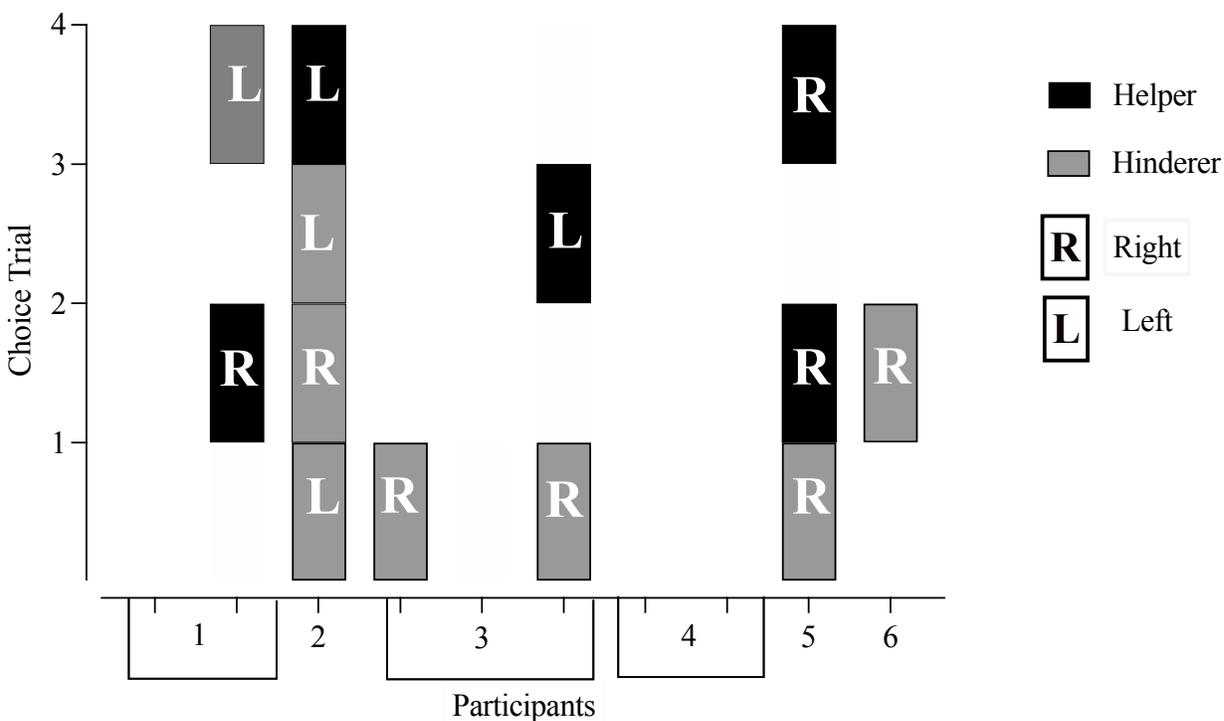
Figure 2. Within-subject puppet choice and corresponding side choice.

The x-axis depicts each participant. The brackets indicate the number of sessions per participants (e.g., P1 participated in two sessions, P3 in three sessions). The y-axis depicts each infant's choice for each of the four choice trials. Black bars represent choices for the helper, and gray bars represent choices for the hinderer. The letters "R" (right) and "L" (left) overlay the puppet choice to indicate which side the puppet was presented on during that trial. With one exceptoin, blank areas indicate one of the following: the infant made no puppet choice or the session was terminated due to fussiness; P6's first choice is shown as a blank area because the coders could not come to an agreement (see Figure 1).
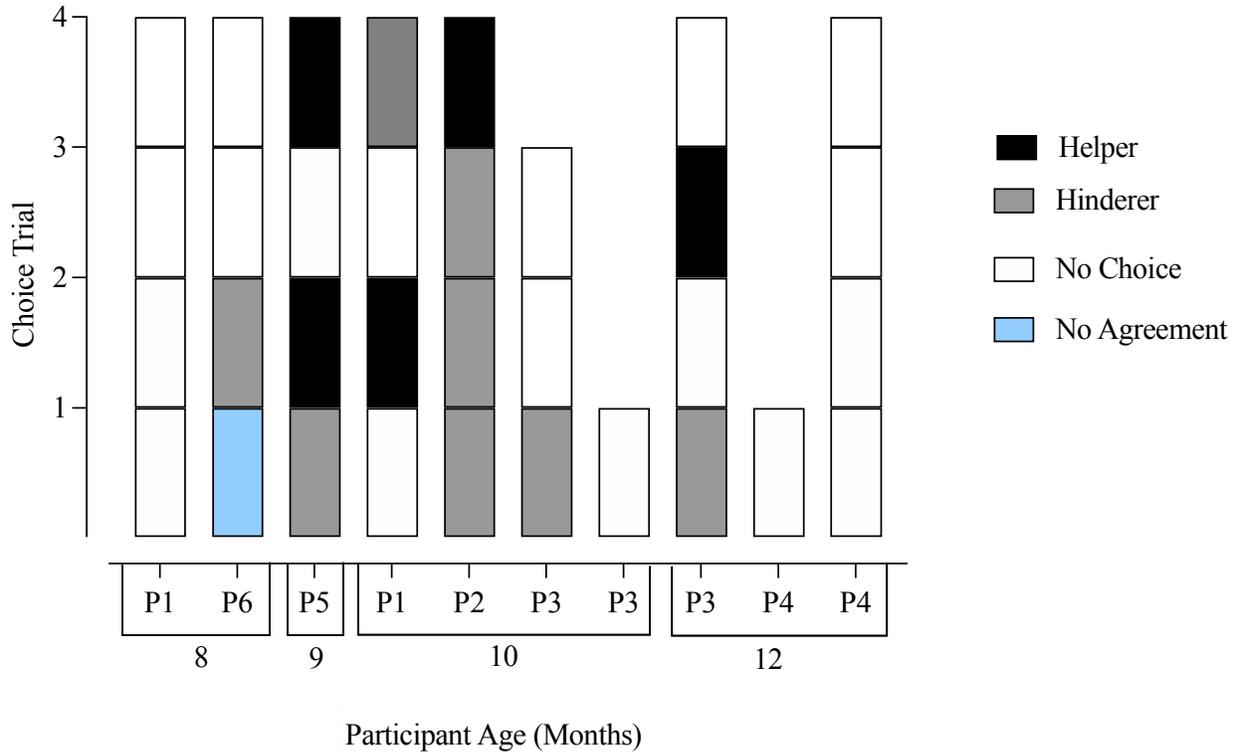
Figure 3. Age and within-subject puppet choice.

Infants' ages are grouped together chronilogically in brackets on the x-axis; individual infants' are noted on the x-axis under their corresponding bar segment. The y-axis depicts each infant's choice for each of the four choice trials.

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APPENDIX A: COUNTERBALANCING TABLE

Sequence One		
Session 1		
Puppet shows	**Order of puppet shows**	**Location of puppet during choice trial**
Habituation (10 puppet shows)	**1st Video** Helper Yellow Shirt Left side of screen **2nd Video** Hinderer Red Shirt Right side of screen	Helper Puppet – Left Side
Session 2		
2 puppet shows	**1st Video** Hinderer **2nd Video** Helper	Helper Puppet – Right side
Session 3		
2 puppet shows	**1st Video** Helper **2nd Video** Hinderer	Helper Puppet – Left Side
Session 4		
2 puppet shows	**1st Video** Hinderer **2nd Video** Helper	Helper Puppet – Right side

Sequence Two		
Session 1		
Puppet shows	**Order of puppet shows**	**Location of puppet during choice trial**
Habituation (10 puppet shows)	**1st Video** Hinderer Yellow Shirt Left side of screen **2nd Video** Helper Red Shirt Right side of screen	Helper Puppet – Right Side
Session 2		
2 puppet shows	**1st Video** Helper **2nd Video** Hinderer	Helper Puppet – Left side
Session 3		
2 puppet shows	**1st Video** Hinderer **2nd Video** Helper	Helper Puppet – Right Side
Session 4		
2 puppet shows	**1st Video** Helper **2nd Video** Hinderer	Helper Puppet – Left side

Sequence Three		
Session 1		
Puppet shows	**Order of puppet shows**	**Location of puppet during choice trial**
Habituation (10 puppet shows)	**1ˢᵗ Video** Helper Yellow Shirt Right side of screen **2ⁿᵈ Video** Hinderer Red Shirt Left side of screen	Helper Puppet – Left Side
2 puppet shows	**1ˢᵗ Video** Hinderer **2ⁿᵈ Video** Helper	Helper Puppet – Right side
Session 3		
2 puppet shows	**1ˢᵗ Video** Helper **2ⁿᵈ Video** Hinderer	Helper Puppet – Left Side
Session 4		
2 puppet shows	**1ˢᵗ Video** Hinderer **2ⁿᵈ Video** Helper	Helper Puppet – Right side

Sequence Four		
Session 1		
Puppet shows	**Order of puppet shows**	**Location of puppet during choice trial**
Habituation (10 puppet shows)	**1ˢᵗ Video** Hinderer Yellow Shirt Right side of screen	Helper Puppet – Right Side
	2ⁿᵈ Video Helper Red Shirt Left side of screen	
Session 2		
2 puppet shows	**1ˢᵗ Video** Helper	Helper Puppet –Left side
	2ⁿᵈ Video Hinderer	
Session 3		
2 puppet shows	**1ˢᵗ Video** Hinderer	Helper Puppet – Right Side
	2ⁿᵈ Video Helper	
Session 4		
2 puppet shows	**1ˢᵗ Video** Helper	Helper Puppet – Left side
	2ⁿᵈ Video Hinderer	

APPENDIX B: TASK ANALYSES

<u>Primary Experimenter Task Analysis:</u>
Infant Virtual Task Analysis – First Sequence

Materials

Experimenter One (Primary): Box Familiarization Video**,** Phone Set up Diagram, EL Choice Videos

Experimenter Two (Secondary): Video data sheets, choice videos

Experimenter Three (Tertiary): Choice data sheets

<u>Before Parent Meeting (at least 24 hours prior to Session One):</u>
- Email parent the consent forms
- Email parent with a notice to have their phone charged and have experiment devices ready, have Zoom downloaded, and have Zoom link accessible on their phone via email
- Email parent the link with meeting ID & password

<u>Parent Meeting</u>
Make sure you write down the session start time.

Say: "Hi! Thank you so much for taking the time to participate. Just to double check, is your phone charged? Since we will briefly have you log into Zoom from your phone today, if it isn't charged, please put it on the charger now"
- Introduce yourself and quick background (e.g., name, grad student in Dr. Kohn's lab, and the other folks here today are also in the lab). Say, "In the second session, _____ (secondary experimenter) and I are going to be playing videos and interacting with you throughout the session while our other experimenter(s) (INSERT NAMES) observe and take data."

Say: "Before we get started, do you have a towel you can put on your keyboard during the next session? We ask because there will be times during the procedure where you will be asked to cover your keyboard so that your infant is not distracted by the keyboard and can reach toward the screen. In the participants we have run so far, we have noticed that they are more interested in the screen, so the covering of the keyboard is a new thing that we have added. So, do you think you'll be able to find a towel to cover the keyboard before the next session? We will also include in the next email confirming the second session a reminder to bring it with you to session two."

Say: "My thesis examines infant choices, and our first meeting today will be to set up the devices. We will get you logged into Zoom from your phone, set up the tripod, and make sure we can get a good view of you and your infant for the procedure; and today's session will last

approximately 30-45 minutes. Before we get started, we just have a couple forms to review first. Did you receive the email with three attached forms? First, you will want to download the forms so you can edit them."

Review consent form with participant (video and recording). Make sure to get these documents emailed back, then say: "We will now briefly go over the consent form, titled 'virtual informed consent.' Let me know when you have it pulled up and I will go over it with you."

Consent form: (when they have opened it)
Say: "This study consists of two sessions, the first session today will last approximately 30-45 minutes, the second will last 45-90 minutes. The first session will be to establish internet connection, establish a setting in your home that you and your infant can participate in, set up devices and fill out required forms. The second session will include the procedure, in which you and your infant will view the puppet shows and your infant will make puppet choices."

Say: "During the second session, you will be asked to sit with your infant in your lap as they watch several brief puppet shows. There will be 4 sets of puppet shows, the first set will last approximately 4 minutes and the remaining 3 sets will last about 1 minute each. After the puppet shows, your infant will be asked to choose between one of two puppets presented on the screen. Before your infant makes a choice, you will be asked to put a towel on your keyboard to limit distractions. When your infant is asked to make a choice, you will be asked to close your eyes and turn your head 90 degrees while your infant chooses a puppet. After your infant makes a choice, you and your infant will have the option to take a 1 to 5-minute break, depending on your preference."

Say: "There are no major risks to participating and though there is no direct benefit, you will get to keep the tri-pod that was mailed to you and after completion of the study, you will receive a gift card or item from Target or Amazon worth $30 as a token of our appreciation. You and your infant's participation are entirely voluntary. If you decide to allow your infant to participate, you are free to discontinue participation at any time without repercussions. Do you have any questions?"

*If they ask about confidentiality, you can say: "We include that because it is possible that data could be accessed if computers were hacked, though that has never happened to any data from the lab, so though it is possible, it's very unlikely"

After answering questions, say: "If you are willing to participate, sign the form and email it back to me right away. Your typed name will serve as your signature"
Video recording form:
Say: "We just have a couple more forms to review, but the next two should be quick! Please pull up the emailed form that says, "virtual video consent" and let me know when you have opened it."

(When they have opened it) say: "This form is consent for video recording. Today's session won't be recorded, but the next session in which your infant makes choices will be recorded. The recording will only be viewed for data collection purposes and will be accessed only by students in Dr. Kohn's lab. The recordings will not be released anywhere else without your permission, and the only place it would be used would be for presentation purposes, for example, at a conference, in which case we would have your face blurred out so there is no identifiable part of you in the recording. If you consent to video recording, please sign (by typing) in the allotted space and email it back to me when you have done that. The 'witness signature' is for us, so you can leave that blank."

If they consent: have them fill out demographics form and make sure to get this form emailed back.

Demographics form:
Say: "If you pull up the form entitled 'demographics form' please fill that out on your own by typing in your infant's gender and birthday and highlighting the rest of your answers. Don't worry about the participant ID because we fill that part out. I will now share my screen and show how to highlight the document."

Share your screen and show typed/highlight example and ask if they have any questions

Say: "Go ahead and fill out the form and let me know if you need clarification on anything. When you are done filling it out, email it back to me."

When all forms have been emailed back, say: "Thank you for filling those out. Let's get set up!"

Setting up the tripod:
If you (experimenter) have a tripod with you, grab it so that you can model how to set it up

Say: "First, we will set up the tripod. This is going to be used to get a view of what your infant is looking at and reaching toward on the screen."

Steps to setting up the tripod:
1. Say: "Grab the tripod that was mailed to you, it looks like this."
2. Share screen of tripod
   1. use this photo to point to the sections you are describing during set up
   https://www.amazon.com/60-inch-UBeeszie-Extendable-Wireless-Compatible/dp/B085QNKTX9/ref=sr_1_19?dchild=1&keywords=smartphone+full+size+tripod+59&qid=1612369548&sr=8-19
3. Say: "First, to separate the legs (the 3 single rods on the bottom that are bunched together), you will first loosen the knob at the top of the 3 small rods to loosen it. Do not turn it all the way though, then pull them apart."
4. Say: "Next, tighten the knob by turning it to the right so the legs stay in place."
5. Say: "Next, unclip the first clip above the legs and pull up as far as you can, then re-fasten the clip. Do this for every clip and rod so the tripod is at full height."

6. Say: "Grab the phone holder"
1. (Point this to the amazon page on shared screen)
7. Say: "Flip up the two sides of the phone holder. Put the phone holder on the tripod by putting the screw in the slot. Next, tighten it by spinning the wheel to the right."
8. Say: "Now turn the phone holder up right and tighten the knob at the top directly below the wheel when the phone is in the correct position."

Admitting parent into Zoom call from phone:
Say: "We are going to have you get your phone now to join the zoom meeting. You can use the same link and it should get you into the call from your phone as well. Please grab your phone. To get a secure connection with Zoom, you should get onto Wifi on your phone. Then, get into the Zoom call. To do so, get on your email to connect to this call using the link in the email. When you get in, do not connect to audio as this will cause an echo since the audio will be coming from both your phone and computer. Turn your video on by clicking the video camera icon on the bottom of the Zoom screen."

If they end up in a screen that says, "tap to speak," tell them to swipe to the right to get back to the main screen

If they do connect to audio, tell them to:
1. tap on the screen
2. push the button that has 3 dots about the word "more"
3. choose "disconnect audio"

Say: "Now, place your phone on its side in the holder on the tripod with the camera facing toward the computer. You can do this by pulling up on the top plastic piece of the tripod, placing your phone in the holder, then let go so it is secure."

If they need to swap the camera view to face the computer:
1. Say: "Click anywhere on the screen on your phone, then click the camera icon with the arrows that is on the top left corner of the screen"

Now instruct the parent to position the tripod as follows:
1. Pull up "phone set up diagram" from drive
2. Say: "Using this positioning (as in phone diagram) please set up the phone to your right and angled behind you at the angle as shown on the screen."
3. Make sure you are able to see a view of the zoom screen and the parent seated.
4. Ask parent to get infant (if they could make it to this meeting) and make sure they will be able to sit with their infant close to screen
5. Ask parent to move their screen as close to the infant as possible
6. If their infant is not present, say: "Do you think you could sit in a position with your infant where they are close enough to touch the screen?"
7. Once the screen set up looks good, say: "I am going to take a screen shot of the position if your computer right now so that before our next meeting, you can set it up at the same angle and will email you the photo to reference for setting up before the next meeting"

8. Take screen shot of parents back view to see computer
9. Once the set-up is done, say: "Next time we meet, we will have you log into the Zoom call from your phone and computer, using the same set-up we did today."

Say: "Now we will briefly discuss what the next session will consist of, then we will be done! Your infant can sit with you for the remainder of this meeting, but they don't have to be here, it's up to you. During our next meeting, the session with your infant will last approximately 45 minutes to 1 and a half hours. We will be playing some videos several times and then will be asking your infant to make puppet choices. You can be turned toward the screen and watch the videos with your infant, but when we ask them to choose, we are going to instruct you to close your eyes and turn your head with your infant still facing the screen. After your infant has made a choice, you have the option to take a break. We will ask you if you would like to take a break after each choice that your infant makes. During the breaks, if you choose to take one, you and your infant have free reign to do whatever you like, then you will be alerted when it is time to get seated with your infant again.

There will be a total of 4 puppet show viewings followed by your infant making a choice, followed by the optional break. That will conclude your participation. For the break, we will use an alarm on the computer, but it would be good to have your phone number in case we need to contact you. In the email confirmation I will send at the end of this meeting, I will ask for your number and you can email it back to us. If you don't feel comfortable sending us your number, we will just use an alarm on the computer. Before the next session, we ask that you have already set-up your devices, and we will just spend a few minutes in the beginning making some adjustments. That being said, for the first few minutes, your infant will not need to be present. Then we will do the procedure with you and your infant using both your computer and phone, so please charge your phone before the session. Thank you for your time today, you can keep the tri-pod after the study is complete, and when we finish the next session, you will receive a gift card or Target/Amazon item worth $30"

Next, set up date and time for next meeting. Send email with instructions for next meeting, screen shot of set-up and date/time of next meeting.
Confirm next session time and send email confirmation

Say: "Do you have any questions? See you next time with your infant. Thank you!"

Make sure you write down the session start time and end time and put the total duration of session into the document titled: "Participant #s, Session Times and Parent Contact"

Infant Choice Session

Steps to complete before admitting parent into Zoom meeting:
- make sure alarm is ready to go for break in chrome window with no other tabs open
- set up break out rooms when session 2 begins
   - select the experimenters that will be going into the room while puppet shows are playing, but don't open this room yet

Make sure you write down the session start time and end time and put the total duration of session into the document titled: "Participant #s, Session Times and Parent Contact"

Say: "Hi! As stated in the email, we are going to have you set up your two devices (computer/phone) as we did in session one. Your infant does not need to be in the room right now, and we will let you know when to get him/her. Just to double check, is your phone fully charged and connected to Wifi? Also, do you have a towel that you could put on your keyboard? We won't use this yet but will ask you to place it on your keyboard when we ask your infant to make a choice."

- If they do not have a charger, ask if they have a charger that they could use to charge their phone while their phone is on the tripod, or, if they could use an alternative phone or extension cord to plug it in if needed.
- If they are not on Wi-Fi, ask them if they can get to settings, and connect to Wi-Fi.

Say: "If you could place the tripod where it was in session 1, similar to the diagram so it is angled behind you, that would be great. Go ahead and log into zoom from your phone if you haven't already. Do not join audio but turn your video on. Once you are logged in, place your phone on the tripod with your camera facing you."

- If they need to swap the camera view to face the computer, tell them to "click anywhere on the screen on your phone, then click the camera icon with the arrows that is on the top left corner of the screen"
- If they do connect to audio, tell them to:
  1. tap on the screen
  2. push the button that has 3 dots about the word "more"
  3. choose "disconnect audio"

When the Zoom cameras are both set up, pin the back view of the parent to see it the angle seems okay and help them re-adjust as needed.
Say: "Before we get started, just to review from last time, we __ (secondary experimenter) and I are going to be playing videos and interacting with you throughout the session while our other experimenter(s) (INSERT NAMES) observe and take data. (INSERT NAMES OF EXP 3 AND VIDEO RECORDER) will have their video off during the experiment to limit distractions and, if we were doing this live, we wouldn't have several people all staring at you and your infant at once. Why don't you get seated with your infant and let's get started!"

When they get their infant, say: "Can we make sure that your infant could get into a position where they are close enough to touch the screen? They don't need to touch the screen yet but will later on in the procedure."

Say: "First, we will watch a video to familiarize your infant with the materials used. Then, we will show a video of 10 short puppet shows followed by asking your infant to make a choice. Then, we will have an optional break. Then, we will show a video of 2 puppet shows, followed by asking your infant to make a choice, and then an optional break 3 additional times, for a total of 4 sessions of puppet shows, asking your infant to make a choice and an optional break. Please sit with him/her in your lap in a position where they are facing the screen and as close to the

screen as possible and try not to say anything while videos are playing and while your infant makes a choice. If your infant isn't looking at the screen, just try to adjust their position without saying anything."

Make sure the side view of the infant is good to make choices, and that screen is positioned with infant as close as possible.

Say: "Do you have any questions before we get started? As discussed in the previous meeting, we will be recording today's session and we will begin recording now."

Experimenters 1, 3 and video recorder should start recording now.
- Press CMD + SHIFT+ 5 to record entire screen

Make secondary experimenter co-host on Zoom

Say: "We are going to play a short video before moving to the puppet shows."

Ask parent to pin your video; you may need to say:
1. "Will you hover over the box that says my name, INSERT NAME, and then click the blue box that shows up when you hover over my name box. Then click 'pin.'"
2. If they say that this is not an option they may need to go to the top right of the screen, hit "view" then click "standard view"
3. If this is not an option, click "gallery view", then they should be able to hover over your name and get to the blue dotted box, then pin your video.
4. To make your video full screen, they may need to go to the view options on the top right and click "full screen"

Make sure the parent can see your video full screen.
1. Ask them to minimize the side bar if necessary
   1. Say: "Will you hover over the top of the boxes with our videos, and there should be a little bar that looks like a minus sign, click that to minimize our videos"

Pull up box familiarization video and make sure video sound is shared. After video is shared, say: "You will need to put the view in standard again by going to the top right corner, and clicking view, then standard view, so my shared video should be full, and you should not see any faces."

Play Box Familiarization Video Once
- make sure you move your mouse so that the play bar disappears on the video

After this is done say: "Now we will be playing puppet show videos."

Puppet Show Videos – Round 1
Pull up Video titled "G-ONE"

Ask parent to pin Experimenter 1 video & confirm that the video of the experimenter is in full view.
1. You may need to say: "Will you hover over the box that says my name, INSERT NAME, and then click the blue box that shows up when you hover over my name box, then click 'pin.'"
2. If they say that this is not an option they may need to go to the top right of the screen, hit "view" then click "standard view"
3. If this is not an option, click "gallery view", then they should be able to hover over your name and get to the blue dotted box, then pin your video

Put everyone else except yourself and the parent in break out room
- Un-check the box so there is no timer in breakout room

Say: "Now we will be playing puppet show videos. We will be showing the same video multiple times, so please sit with him/her in your lap in a position where they are facing the screen and as close to the screen as possible and try not to say anything while videos are playing. If your infant isn't looking at the screen, just try to adjust their position without saying anything".

Screen share of the video:
1. Make sure video sound is shared
2. Make sure the parent can see your video full screen
3. If you see your video next to the puppet show on the screen, ask the parent to put your video in full screen
    1. Say: "Will you go to the top right corner, then click "view" and then hit either standard view or full screen so you can just see the puppet show?"
4. Make sure the parent can hear the video by playing the video for a few seconds
    1. Say: "Please let me know if you cannot hear the video when it starts playing."
5. Play video one time through and mute yourself
6. When playing video, make sure to move your mouse or click somewhere on the screen so that the play bar disappears
7. Close breakout room to let everyone else back in
8. Stop sharing the video
9. Un-mute yourself
10. Say: "That's it for this round of puppet show videos"

Choice Measure 1: Done by Secondary Experimenter
- Mute yourself

Break – Round 1
Ask: "Now we have an optional break in which you and your infant can do whatever you'd like for between 1 and 5 minutes, or we can keep going. We have 3 more sets of puppet shows, with 2 shows in each, and 3 more choices left. Would you like to take a break?"

If no, then move to puppet show videos, and say "Now we will be playing puppet show videos again."

If yes, say: "How long would you like to take a break between 1 and 5 minutes? We will set a timer for X minutes to start and end the break early if you're ready. If you aren't back within 5 minutes, we might text you to remind you to head back."

1. Pull up timer: https://onlineclock.net/sounds/?sound=Harp-Strumming
2. Say "Now we will take an X minute break when the timer starts."
3. Share screen with website link above and share sound
4. Say: "I'll put a timer up on the screen when you hear the harp sound [play sound on website] you know when it is time to come back."
5. On website, click "set alarm sound" then set "timer" on bottom of screen and set to 3 minutes
6. If they decide they are ready before 3 minutes is up, move to puppet show videos. Say: "Now we will be playing puppet show videos again."
7. After 3 Minutes, say: "Would you like another minute?"
    1. If no, go into puppet show videos again. Say: "Now we will be playing puppet show videos again."

Puppet Show Videos – Round 2

Pull up Video titled "G-TWO"

Ask parent to pin Experimenter 1 video & confirm that the video of the experimenter is in full view.

1. You may need to say: "Will you hover over the box that says my name, INSERT NAME, and then click the blue box that shows up when you hover over my name box, then click 'pin.'"
2. If they say that this is not an option they may need to go to the top right of the screen, hit "view" then click "standard view"
3. If this is not an option, click "gallery view", then they should be able to hover over your name and get to the blue dotted box, then pin your video

Put everyone else except yourself and the parent in break out room
- Un-check the box so there is no timer in breakout room

Say: "Now we will be playing puppet show videos. We will be showing the same video twice, so please sit with him/her in your lap in a position where they are facing the screen and as close to the screen as possible and try not to say anything while videos are playing. If your infant isn't looking at the screen, just try to adjust their position without saying anything".

Screen share of the video:
1. Make sure video sound is shared
2. Make sure the parent can see your video full screen
3. If you see your video next to the puppet show on the screen, ask the parent to put your video in full screen
    1. Say: "Will you go to the top right corner, then click "view" and then hit either standard view or full screen so you can just see the puppet show?"
4. Make sure the parent can hear the video by playing the video for a few seconds
    1. Say: "Please let me know if you cannot hear the video when it starts playing."

5. Play video one time through and mute yourself
6. When playing video, make sure to move your mouse or click somewhere on the screen so that the play bar disappears
7. Close breakout room to let everyone else back in
8. Stop sharing the video
9. Un-mute yourself
10. Say: "That's it for this round of puppet show videos"

Choice Measure 2: Done by Secondary Experimenter
• Mute yourself

Break – Round 2
Ask: "Now we have an optional break in which you and your infant can do whatever you'd like for between 1 and 5 minutes, or we can keep going. We have 2 more sets of puppet shows, with 2 shows in each, and 2 more choices left. Would you like to take a break?"

If no, then move to puppet show videos, and say "Now we will be playing puppet show videos again."

If yes, say: "How long would you like to take a break between 1 and 5 minutes? We will set a timer for X minutes to start and end the break early if you're ready. If you aren't back within 5 minutes, we might text you to remind you to head back."
1. Pull up timer: https://onlineclock.net/sounds/?sound=Harp-Strumming
2. Say "Now we will take an X minute break when the timer starts."
3. Share screen with website link above and share sound
4. Say: "I'll put a timer up on the screen when you hear the harp sound [play sound on website] you know when it is time to come back."
5. On website, click "set alarm sound" then set "timer" on bottom of screen and set to 3 minutes
6. If they decide they are ready before 3 minutes is up, move to puppet show videos. Say: "Now we will be playing puppet show videos again."
7. After 3 Minutes, say: "Would you like another minute?"
   1. If no, go into puppet show videos again. Say: "Now we will be playing puppet show videos again."

Puppet Show Videos – Round 3
Pull up Video titled "G-THREE"

Ask parent to pin Experimenter 1 video & confirm that the video of the experimenter is in full view.
1. You may need to say: "Will you hover over the box that says my name, INSERT NAME, and then click the blue box that shows up when you hover over my name box, then click 'pin.'"
2. If they say that this is not an option they may need to go to the top right of the screen, hit "view" then click "standard view"

3. If this is not an option, click "gallery view", then they should be able to hover over your name and get to the blue dotted box, then pin your video

Put everyone else except yourself and the parent in break out room
- Un-check the box so there is no timer in breakout room

Say: "Now we will be playing puppet show videos. We will be showing the same video twice, so please sit with him/her in your lap in a position where they are facing the screen and as close to the screen as possible and try not to say anything while videos are playing. If your infant isn't looking at the screen, just try to adjust their position without saying anything".

Screen share of the video:
1. Make sure video sound is shared
2. Make sure the parent can see your video full screen
3. If you see your video next to the puppet show on the screen, ask the parent to put your video in full screen
   1. Say: "Will you go to the top right corner, then click "view" and then hit either standard view or full screen so you can just see the puppet show?"
4. Make sure the parent can hear the video by playing the video for a few seconds
   1. Say: "Please let me know if you cannot hear the video when it starts playing."
5. Play video one time through and mute yourself
6. When playing video, make sure to move your mouse or click somewhere on the screen so that the play bar disappears
7. Close breakout room to let everyone else back in
8. Stop sharing the video
9. Un-mute yourself
10. Say: "That's it for this round of puppet show videos"

Choice Measure 3: Done by Secondary Experimenter
- Mute yourself

Break – Round 3
Ask: "Now we have an optional break in which you and your infant can do whatever you'd like for between 1 and 5 minutes, or we can keep going. We have 1 more set of puppet shows, with 2 shows in each, and 1 more choice left. Would you like to take a break?"

If no, then move to puppet show videos, and say "Now we will be playing puppet show videos again."

If yes, say: "How long would you like to take a break between 1 and 5 minutes? We will set a timer for X minutes to start and end the break early if you're ready. If you aren't back within 5 minutes, we might text you to remind you to head back."
1. Pull up timer: https://onlineclock.net/sounds/?sound=Harp-Strumming
2. Say "Now we will take an X minute break when the timer starts."
3. Share screen with website link above and share sound

4. Say: "I'll put a timer up on the screen when you hear the harp sound [play sound on website] you know when it is time to come back."
5. On website, click "set alarm sound" then set "timer" on bottom of screen and set to 3 minutes
6. If they decide they are ready before 3 minutes is up, move to puppet show videos. Say: "Now we will be playing puppet show videos again."
7. After 3 Minutes, say: "Would you like another minute?"
   1. If no, go into puppet show videos again. Say: "Now we will be playing puppet show videos again."

Puppet Show Videos – Round 4
Pull up Video titled "G-FOUR"

Ask parent to pin Experimenter 1 video & confirm that the video of the experimenter is in full view.
   1. You may need to say: "Will you hover over the box that says my name, INSERT NAME, and then click the blue box that shows up when you hover over my name box, then click 'pin.'"
   2. If they say that this is not an option they may need to go to the top right of the screen, hit "view" then click "standard view"
   3. If this is not an option, click "gallery view", then they should be able to hover over your name and get to the blue dotted box, then pin your video

Put everyone else except yourself and the parent in break out room
   • Un-check the box so there is no timer in breakout room

Say: "Now we will be playing puppet show videos. We will be showing the same video twice, so please sit with him/her in your lap in a position where they are facing the screen and as close to the screen as possible and try not to say anything while videos are playing. If your infant isn't looking at the screen, just try to adjust their position without saying anything".

Screen share of the video:
   1. Make sure video sound is shared
   2. Make sure the parent can see your video full screen
   3. If you see your video next to the puppet show on the screen, ask the parent to put your video in full screen
      1. Say: "Will you go to the top right corner, then click "view" and then hit either standard view or full screen so you can just see the puppet show?"
   4. Make sure the parent can hear the video by playing the video for a few seconds
      1. Say: "Please let me know if you cannot hear the video when it starts playing."
   5. Play video one time through and mute yourself
   6. When playing video, make sure to move your mouse or click somewhere on the screen so that the play bar disappears
   7. Close breakout room to let everyone else back in
   8. Stop sharing the video
   9. Un-mute yourself

10. Say: "That's it for this round of puppet show videos"

Choice Measure 4: Done by Secondary Experimenter
- Mute yourself

End of Session
When all data is taken and infants have made multiple choices, say: "Will you pin my video again? Thank you again for your participating! We can offer you a $30 Amazon or Target electronic gift card. We will email you soon with information on how to get access to the gift card code, and to ask which gift card you would like."
- If university employees, say: "Please email me your item selection in the next week, and we will be in touch about getting the item shipped to you."

Say: "Thanks again!"

If they ask questions, we can answer them now.
- If they ask if their infant did good in the study, say: "Your infant did great because they were able to sit the whole time and follow instructions. We were assessing if infants will choose something on a screen over Zoom."

Make sure you write down the session start time and end time- put the total duration of session into the document titled: "Participant #s, Session Times and Parent Contact"

<u>After Infant Choice Session is Concluded</u>
When video is done converting, upload the video to the drive with title:
- PX (number of participant) and DATE of session into the "participant videos" folder

When the choice data sheet has been uploaded, make sure to input the participant number and put it in the participant number folder

Secondary Experimenter Task Analysis
Infant Virtual Task Analysis –First Sequence

Materials

Experimenter One (Primary): Box Familiarization Video**,** Phone Setup Diagram, EL Choice Videos

Experimenter Two (Secondary): Choice Videos, Methods Table

Experimenter Three (Tertiary): Choice Data Sheets

Infant Choice Session

Primary:
1. Video Set-Up
1. Box Familiarization
2. Puppet Show Videos

Secondary:
As puppet shows are happening, pull up video for choice that you will use
- Pull up video entitled "G CHOICE 1"

Choice Measures
Session 1

Secondary:
Pin participants' video of the back view (where you can see where the infants' arm would be reaching)

Once puppet show videos are over:

Say: "Now we will be asking your infant to make a choice"

Choice Video Setup
1. **Instruct parent to pull up the sidebar again to see experimenters:**
    1. Say: "If you see a bar up top that says "talking" hover over it, and click the stacked squares on the far right, this should bring up all of the other experimenters"

2. **Ask parent to pin your video & confirm that your video is in full view:**
    1. Say: "Will you hover over the box that says my name, INSERT NAME, and then click the blue box that shows up when you hover over my name box, then > click "pin"

(If they say that this is not an option they may need to go to the top right of the screen, hit "view" then> "standard view" if this is not an option, click "gallery view", then, they should be able to hover over your name and get to the blue dotted box, then pin your video)

Make sure the parent can see your video full screen.

Ask them to minimize the side bar if necessary
Say: "Will you hover over the top of the boxes with our videos, and there should be a little bar that looks like a minus sign, click that to minimize the videos of the other experimenters"

3.   Ask parent to cover keyboard
a.   Say: "Will you please grab the towel and completely cover the keyboard with it?"

4.   Share Screen (Make sure sound is shared)
 .   If the screen goes back to split screen so your face and the video are showing side by side, instruct the parent to get it full screen, say: "you will need to put the view in standard again by going to the top right corner, and clicking view>standard view, so my shared video should be full and you should not see any faces"

5.   Once your video is in full screen:
a.   Say: "Please sit with your infant facing close enough to touch the screen while still sitting securely. Please turn your head 90 degrees toward your phone with your infant still facing the screen and close your eyes, we will let you know when you can turn back. We will be playing a video, and after I let you know that the video has started, please keep your head turned and verbally let us know if you don't hear (if you do hear it, just say nothing)"

6.   Choices begin

Choice 1
Only choice, 1 per session

Note: f the infant messes with the towel or the Zoom screen to where the video changes (is minimized, something else obstructs it) ask parent to fix it and re-do that choice prompt

Choice Prompt 1
1. Play the video entitled "**G CHOICE 1"** (Yellow puppet should be on the left side of the screen)

1. Say "the video is starting now." (when you hit the play button)

2. Mute yourself
1. When videos are playing don't hover the mouse over the video until it is done as this will block puppets
2. Once tertiary says, "got the choice," close the video and move to break
      1. When the video stops playing, if tertiary has not confirmed a choice (as the video includes a 10-second pause) move to choice prompt 2

Choice Prompt 2
1. Replay the video
1. Once tertiary says, "got the choice," close the video and move to break
      1. When the video stops playing, if tertiary has not confirmed a choice (as the video includes a 10-second pause) move to choice prompt 3

Choice Prompt 3
1. Replay the video
1. Once tertiary says, "got the choice," close the video and move to break
      1. When the video stops playing, if tertiary has not confirmed a choice, it will be recorded as no choice - move to break

Secondary: When choice is done

Say: "You can go ahead and open your eyes and face the screen, and we will move to an optional break"

Primary:
1. Break 1
2. Puppet Show Videos

Secondary:
As puppet shows are happening, pull up video for choice that you will use
- Pull up video entitled "G CHOICE 2"

Choice Measures
Session 2

Secondary:
Pin participants' video of the back view (where you can see where the infants' arm would be reaching)

Once puppet show videos are over:

Say: "Now we will be asking your infant to make a choice"

Choice Video Setup
1. **Instruct parent to pull up the sidebar again to see experimenters:**
    1. Say: "If you see a bar up top that says "talking" hover over it, and click the stacked squares on the far right, this should bring up all of the other experimenters"

2. **Ask parent to pin your video & confirm that your video is in full view:**
    1. Say: "Will you hover over the box that says my name, INSERT NAME, and then click the blue box that shows up when you hover over my name box, then > click "pin"

        (If they say that this is not an option they may need to go to the top right of the screen, hit "view" then> "standard view" if this is not an option, click "gallery view", then, they should be able to hover over your name and get to the blue dotted box, then pin your video)

        Make sure the parent can see your video full screen.

        Ask them to minimize the side bar if necessary
        Say: "Will you hover over the top of the boxes with our videos, and there should be a little bar that looks like a minus sign, click that to minimize the videos of the other experimenters"

3. **Ask parent to cover keyboard**
    1. Say: "Will you please grab the towel and completely cover the keyboard with it?"

4. **Share Screen (Make sure sound is shared)**
    1. If the screen goes back to split screen so your face and the video are showing side by side, instruct the parent to get it full screen, say: "you will need to put the view in standard again by going to the top right corner, and clicking view>standard view, so my shared video should be full and you should not see any faces"

5. **Once your video is in full screen:**
    1. Say: "Please sit with your infant facing close enough to touch the screen while still sitting securely. Please turn your head 90 degrees toward your phone with your infant still facing the screen and close your eyes, we will let you know when you can turn back. We will be playing a video, and

after I let you know that the video has started, please keep your head turned and verbally let us know if you don't hear (if you do hear it, just say nothing)"

6. Choices begin

Choice 2
Only choice, 1 per session

Note: f the infant messes with the towel or the Zoom screen to where the video changes (is minimized, something else obstructs it) ask parent to fix it and re-do that choice prompt

Choice Prompt 1
1. Play the video entitled "**G CHOICE 2"** (Yellow puppet should be on the right side of the screen)
   1. Say "the video is starting now' (when you hit the play button)

   2. Mute yourself
   3. When videos are playing don't hover the mouse over the video until it is done as this will block puppets
      1. Once tertiary says, "got the choice," close the video and move to break
      iv.   When the video stops playing, if tertiary has not confirmed a choice (as the video includes a 10-second pause) move to choice prompt 2

Choice Prompt 2
   1. Replay the video
      1. Once tertiary says, "got the choice," close the video and move to break
      ii.   When the video stops playing, if tertiary has not confirmed a choice (as the video includes a 10-second pause) move to choice prompt 3

Choice Prompt 3
   1. Replay the video
      1. Once tertiary says, "got the choice," close the video and move to break
      ii.   When the video stops playing, if tertiary has not confirmed a choice, it will be recorded as no choice - move to break

Secondary: When choice is done

Say: "You can go ahead and open your eyes and face the screen, and we will move to an optional break"

Primary:
1. Break 2
2. Puppet Show Videos

Secondary:
As puppet shows are happening, pull up video for choice that you will use
- Pull up video entitled "G CHOICE 3"

Choice Measures
Session 3

Secondary:
Pin participants' video of the back view (where you can see where the infants' arm would be reaching)

Once puppet show videos are over:

Say: "Now we will be asking your infant to make a choice"

Choice Video Setup
1. **Instruct parent to pull up the sidebar again to see experimenters:**
   1. Say: "If you see a bar up top that says "talking" hover over it, and click the stacked squares on the far right, this should bring up all of the other experimenters"

2. **Ask parent to pin your video & confirm that your video is in full view:**
   1. Say: "Will you hover over the box that says my name, INSERT NAME, and then click the blue box that shows up when you hover over my name box, then > click "pin"

      (If they say that this is not an option they may need to go to the top right of the screen, hit "view" then> "standard view" if this is not an option, click "gallery view", then, they should be able to hover over your name and get to the blue dotted box, then pin your video)

      Make sure the parent can see your video full screen.

      Ask them to minimize the side bar if necessary
      Say: "Will you hover over the top of the boxes with our videos, and there should be a little bar that looks like a minus sign, click that to minimize the videos of the other experimenters"

3.   Ask parent to cover keyboard
a.   Say: "Will you please grab the towel and completely cover the keyboard with it?"

4.   Share Screen (Make sure sound is shared)
.   If the screen goes back to split screen so your face and the video are showing side by side, instruct the parent to get it full screen, say: "you will need to put the view in standard again by going to the top right corner, and clicking view>standard view, so my shared video should be full and you should not see any faces"

5.   Once your video is in full screen:
a.   Say: "Please sit with your infant facing close enough to touch the screen while still sitting securely. Please turn your head 90 degrees toward your phone with your infant still facing the screen and close your eyes, we will let you know when you can turn back. We will be playing a video, and after I let you know that the video has started, please keep your head turned and verbally let us know if you don't hear (if you do hear it, just say nothing)"

6.   Choices begin

Choice 3
Only choice, 1 per session

Note: f the infant messes with the towel or the Zoom screen to where the video changes (is minimized, something else obstructs it) ask parent to fix it and re-do that choice prompt

 Choice Prompt 1
 1. Play the video entitled "**G CHOICE 3"** (Yellow puppet should be on the left side of the screen)
 2. Say "the video is starting now" (when you hit the play button)

 3. Mute yourself
 4. When videos are playing don't hover the mouse over the video until it is done as this will block puppets
a.   Once tertiary says, "got the choice," close the video and move to break
 i.   When the video stops playing, if tertiary has not confirmed a choice (as the video includes a 10-second pause) move to choice prompt 2

 Choice Prompt 2
 1. Replay the video
 2. Once tertiary says, "got the choice," close the video and move to break

iii.   When the video stops playing, if tertiary has not confirmed a choice (as the video includes a 10-second pause) move to choice prompt 3

Choice Prompt 3
1. Replay the video
2. Once tertiary says, "got the choice," close the video and move to break
       iii.   When the video stops playing, if tertiary has not confirmed a choice, it will be recorded as no choice - move to break

Secondary: When choice is done

Say: "You can go ahead and open your eyes and face the screen, and we will move to an optional break"

Primary:
1. Break 3
2. Puppet Show Videos

Secondary:
As puppet shows are happening, pull up video for choice that you will use
- Pull up video entitled "G CHOICE 4"

Choice Measures
Session 4

Secondary:
Pin participants' video of the back view (where you can see where the infants' arm would be reaching)

Once puppet show videos are over:

Say: "Now we will be asking your infant to make a choice"

Choice Video Setup
1. **Instruct parent to pull up the sidebar again to see experimenters:**
    1. Say: "If you see a bar up top that says "talking" hover over it, and click the stacked squares on the far right, this should bring up all of the other experimenters"

2. **Ask parent to pin your video & confirm that your video is in full view:**
    1. Say: "Will you hover over the box that says my name, INSERT NAME, and then click the blue box that shows up when you hover over my name box, then > click "pin"

(If they say that this is not an option they may need to go to the top right of the screen, hit "view" then> "standard view" if this is not an option, click "gallery view", then, they should be able to hover over your name and get to the blue dotted box, then pin your video)

Make sure the parent can see your video full screen.

Ask them to minimize the side bar if necessary
Say: "Will you hover over the top of the boxes with our videos, and there should be a little bar that looks like a minus sign, click that to minimize the videos of the other experimenters"

3. **Ask parent to cover keyboard**
a.   Say: "Will you please grab the towel and completely cover the keyboard with it?"

4. **Share Screen (Make sure sound is shared)**
 .   If the screen goes back to split screen so your face and the video are showing side by side, instruct the parent to get it full screen, say: "you will need to put the view in standard again by going to the top right corner, and clicking view>standard view, so my shared video should be full and you should not see any faces"

5. **Once your video is in full screen:**
a.   Say: "Please sit with your infant facing close enough to touch the screen while still sitting securely. Please turn your head 90 degrees toward your phone with your infant still facing the screen and close your eyes, we will let you know when you can turn back. We will be playing a video, and after I let you know that the video has started, please keep your head turned and verbally let us know if you don't hear (if you do hear it, just say nothing)"

6. **Choices begin**

Choice 4
Only choice, 1 per session

Note: f the infant messes with the towel or the Zoom screen to where the video changes (is minimized, something else obstructs it) ask parent to fix it and re-do that choice prompt

        Choice Prompt 1
                1. Play the video entitled "**G CHOICE 4"** (Yellow puppet should be on the right side of the screen)

    2. Say "the video is starting now" (when you hit the play button)

    3. Mute yourself
        1. When videos are playing don't hover the mouse over the video until it is done as this will block puppets
            1. Once tertiary says, "got the choice," close the video and move to break
            2. When the video stops playing, if tertiary has not confirmed a choice (as the video includes a 10-second pause) move to choice prompt 2

Choice Prompt 2
1. Replay the video
2. Once tertiary says, "got the choice," close the video and move to break
        1. When the video stops playing, if tertiary has not confirmed a choice (as the video includes a 10-second pause) move to choice prompt 3

Choice Prompt 3
    1. Replay the video
    2. Once tertiary says, "got the choice," close the video and move to break
    3. When the video stops playing, if tertiary has not confirmed a choice, it will be recorded as no choice - move to break

Secondary: When choice is done

Say: "That's it for the choices, parent, you can open your eyes and face the screen"

End of Session
Primary will end the session

Tertiary Experimenter Task Analysis
Infant Virtual Task Analysis

Materials

Experimenter One (Primary): Box Familiarization Video**,** Phone Setup Diagram, EL Choice Videos

Experimenter Two (Secondary): Choice Videos, Methods Table

Experimenter Three (Tertiary): Choice Data Sheets, Steps to Recording Video

Infant Choice Session

Tertiary/Video Recorder:
Make sure no profile picture is present and that your video is turned off
- Pull up document titled "Steps to recording video"

Primary:
Video Set-Up
- When primary says, "As discussed in the previous meeting, we will be recording today's session and we will begin recording now."

Tertiary/Video Recorder:
Start recording now
- Refer to "Steps to recording video"

Primary:
1. Box Familiarization
2. Puppet Show Videos

Choice Measures
Session 1

Secondary:
Choice video setup

Tertiary:
1. **Pin participant's video of the back view**
a.   Hover over the video you want to pin- if it was already pinned, click: "remove pin"
b.   Hover over the video that you want to pin again and click "pin" to see the back view in full screen
c.   Alternatively, go to "View" and click "Swap Shared Screen" so that you see the full video of the participant, not the choice video
                  i.   If you cannot see the full screen, please alert the Primary

Choice 1
Only choice, 1 per session

Choice Prompt 1
1. Record choice as the first puppet the infant looks at and reaches toward at the same time
1. Record both color and side reached for on choice data sheet
2. Confirm with Primary by unmuting and saying "Got the choice"
1. If you are unsure of where the infant was reaching, but it looked close enough to a choice, note that on the data sheet by writing "unsure- double check"
2. If there is no choice, don't say anything or record anything on the choice data sheet
3. If the infant chose a puppet, the choice session is done

Choice Prompt 2
1. If no choice during Choice Prompt 1, record choice as the first puppet the infant looks at and reaches toward at the same time
1. Record both color and side reached for on choice data sheet
2. Confirm with Primary by unmuting and saying "Got the choice"
1. If you are unsure of where the infant was reaching, but it looked close enough to a choice, note that on the data sheet by writing "unsure- double check"
2. If there is no choice, don't say anything or record anything on the choice data sheet
3. If the infant chose a puppet, the choice session is done

Choice Prompt 3
1. If no choice during Choice Prompt 2, record choice as the first puppet the infant looks at and reaches toward at the same time
1. Record both color and side reached for on choice data sheet
2. Confirm with Primary by unmuting and saying "Got the choice"
1. If you are unsure of where the infant was reaching, but it looked close enough to a choice, note that on the data sheet by writing "unsure- double check"
2. If there is no choice, don't say anything
3. If the infant chose a puppet, the choice session is done
    1. If the infant still does not make a choice after prompt 3, record as "no choice"

Tertiary: When choice is done, mute yourself

Primary:
1. Break 1
2. Puppet Show Videos

Choice Measures
Session 2

Secondary:
Choice video setup

Tertiary:
1. **Pin participant's video of the back view**
    1. Hover over the video you want to pin- if it was already pinned, click: "remove pin"
    2. Hover over the video that you want to pin again and click "pin" to see the back view in full screen
    3. Alternatively, go to "View" and click "Swap Shared Screen" so that you see the full video of the participant, not the choice video
        1. If you cannot see the full screen, please alert the Primary

Choice 2
Only choice, 1 per session

Choice Prompt 1
1. Record choice as the first puppet the infant looks at and reaches toward at the same time
1. Record both color and side reached for on choice data sheet
2. Confirm with Primary by unmuting and saying "Got the choice"
1. If you are unsure of where the infant was reaching, but it looked close enough to a choice, note that on the data sheet by writing "unsure- double check"
2. If there is no choice, don't say anything or record anything on the choice data sheet
3. If the infant chose a puppet, the choice session is done

Choice Prompt 2
1. If no choice during Choice Prompt 1, record choice as the first puppet the infant looks at and reaches toward at the same time
1. Record both color and side reached for on choice data sheet
2. Confirm with Primary by unmuting and saying "Got the choice"
1. If you are unsure of where the infant was reaching, but it looked close enough to a choice, note that on the data sheet by writing "unsure- double check"
2. If there is no choice, don't say anything or record anything on the choice data sheet
3. If the infant chose a puppet, the choice session is done

Choice Prompt 3
1. If no choice during Choice Prompt 2, record choice as the first puppet the infant looks at and reaches toward at the same time
1. Record both color and side reached for on choice data sheet
2. Confirm with Primary by unmuting and saying "Got the choice"
1. If you are unsure of where the infant was reaching, but it looked close enough to a choice, note that on the data sheet by writing "unsure- double check"
2. If there is no choice, don't say anything

3. If the infant chose a puppet, the choice session is done
1. If the infant still does not make a choice after prompt 3, record as "no choice"

Tertiary: When choice is done- Mute yourself

Primary:
1. Break 2
2. Puppet Show Videos

Choice Measures
Session 3

Secondary:
Choice video setup

Tertiary:
1. **Pin participant's video of the back view**
    1. Hover over the video you want to pin- if it was already pinned, click: "remove pin"
    2. Hover over the video that you want to pin again and click "pin" to see the back view in full screen
    3. Alternatively, go to "View" and click "Swap Shared Screen" so that you see the full video of the participant, not the choice video
        1. If you cannot see the full screen, please alert the Primary

Choice 3
Only choice, 1 per session

Choice Prompt 1
1. Record choice as the first puppet the infant looks at and reaches toward at the same time
1. Record both color and side reached for on choice data sheet
2. Confirm with Primary by unmuting and saying "Got the choice"
1. If you are unsure of where the infant was reaching, but it looked close enough to a choice, note that on the data sheet by writing "unsure- double check"
2. If there is no choice, don't say anything or record anything on the choice data sheet
3. If the infant chose a puppet, the choice session is done

Choice Prompt 2
1. If no choice during Choice Prompt 1, record choice as the first puppet the infant looks at and reaches toward at the same time
1. Record both color and side reached for on choice data sheet
2. Confirm with Primary by unmuting and saying "Got the choice"
1. If you are unsure of where the infant was reaching, but it looked close enough to a choice, note that on the data sheet by writing "unsure- double check"

2. If there is no choice, don't say anything or record anything on the choice data sheet
3. If the infant chose a puppet, the choice session is done

Choice Prompt 3
1. If no choice during Choice Prompt 2, record choice as the first puppet the infant looks at and reaches toward at the same time
1. Record both color and side reached for on choice data sheet
2. Confirm with Primary by unmuting and saying "Got the choice"
1. If you are unsure of where the infant was reaching, but it looked close enough to a choice, note that on the data sheet by writing "unsure- double check"
   b. If there is no choice, don't say anything
3. If the infant chose a puppet, the choice session is done
a. If the infant still does not make a choice after prompt 3, record as "no choice"

Tertiary: When choice is done, mute yourself

Primary:
1. Break 3
2. Puppet Show Videos

Choice Measures
Session 4

Secondary:
Choice video setup

Tertiary:
1. **Pin participant's video of the back view**
   1. Hover over the video you want to pin- if it was already pinned, click: "remove pin"
   2. Hover over the video that you want to pin again and click "pin" to see the back view in full screen
   3. Alternatively, go to "View" and click "Swap Shared Screen" so that you see the full video of the participant, not the choice video
      1. If you cannot see the full screen, please alert the Primary

Choice 4
Only choice, 1 per session

Choice Prompt 1
1. Record choice as the first puppet the infant looks at and reaches toward at the same time
1. Record both color and side reached for on choice data sheet
2. Confirm with Primary by unmuting and saying "Got the choice"

1. If you are unsure of where the infant was reaching, but it looked close enough to a choice, note that on the data sheet by writing "unsure- double check"
2. If there is no choice, don't say anything or record anything on the choice data sheet
3. If the infant chose a puppet, the choice session is done

Choice Prompt 2
1. If no choice during Choice Prompt 1, record choice as the first puppet the infant looks at and reaches toward at the same time
1. Record both color and side reached for on choice data sheet
2. Confirm with Primary by unmuting and saying "Got the choice"
1. If you are unsure of where the infant was reaching, but it looked close enough to a choice, note that on the data sheet by writing "unsure- double check"
2. If there is no choice, don't say anything or record anything on the choice data sheet
3. If the infant chose a puppet, the choice session is done

Choice Prompt 3
1. If no choice during Choice Prompt 2, record choice as the first puppet the infant looks at and reaches toward at the same time
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1. If you are unsure of where the infant was reaching, but it looked close enough to a choice, note that on the data sheet by writing "unsure- double check"
2. If there is no choice, don't say anything
3. If the infant chose a puppet, the choice session is done
1. If the infant still does not make a choice after prompt 3, record as "no choice"

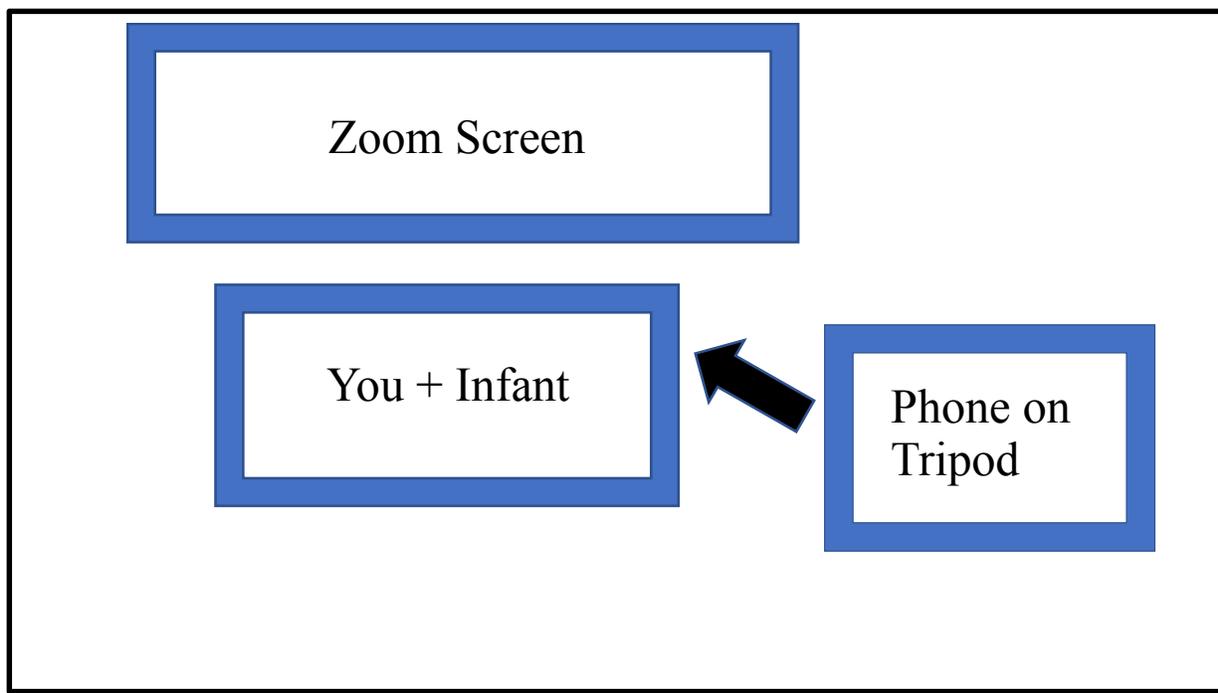**Tertiary:** When choice is done- Mute yourself

End of Session
Primary will end the session

Post-Session

Tertiary:
1. Immediately upload the choice data sheet onto the Google Drive under "participant choice data sheets"
   1. Data sheet labeled: "DATE of Session_Choice Data"
2. When the video is done recording, put the video into the "participant videos" folder
   1. Video labeled: "DATE_EXP3 Video"

APPENDIX C: PHONE SET UP DIAGRAM

APPENDIX D: SEQUECNE OF STUDY

| Infant views puppet shows 5 x each (5 helping/5 hindering) | → | Infant makes choice | → | Optional break | → | Infant views puppet shows 1 x each | → | Infant makes choice | → | Optional break | → |

| Infant views puppet shows 1 x each | → | Infant makes choice | → | Optional break | → | Infant views puppet shows 1 x each | → | Infant makes choice |