Visual learning/Social Interaction 2018 (#15654)

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1) Have any data been collected for this study already?

It's complicated. We have already collected some data but explain in Question 8 why readers may consider this a valid pre-registration nevertheless.

2) What's the main question being asked or hypothesis being tested in this study?

Question 1: Do 13-month-old toddlers learn a cue-target contingency more effectively if a geometrical shape (non-social cue) cues a social target (interaction between two people facing each other) compared to a shape predicting a non-interactive control target (two people acting individually while standing back-to-back)?

Question 2: Do 13-month-old toddlers approach a geometrical shape that has previously cued a social target?

3) Describe the key dependent variable(s) specifying how they will be measured.

Question 1:

1. In a visual learning task, we will present one of two geometrical shapes in the center of a screen (non-social cue). Once participants look at this cue, it disappears before one of two different kinds of target videos (social or non-interactive control) appears either on the right or the left side of the cue. As dependent variable, we will measure the saccadic latency (ms) to the cued target region across trials. We define saccadic latency as the time difference between first look at the cue and the first eye movement arriving within the frame of the cued region. We will counterbalance the shape cueing the social target (circle or triangle), the location of the social target (right or left from the central cue), and the order of the first two trials (social-control or control-social) across participants. All remaining trials will appear in a random order, while the same cue will never appear more than 2 times in a row.

Question 2:

2.1. In a forced-choice preferential-looking task, two geometrical shapes will be presented side-by-side on the screen. To control for individual side preferences, the shapes will be shown in both possible arrangements during two successive trials. As dependent variable, we will measure the mean proportional looking time to the shape cueing the social interaction target during the learning phase. We define proportional looking time as the time spent looking at this "social interaction shape" divided by the total looking time at both shapes. We will compute the mean proportional looking time to the social shape over both trials. If a child provides data in only one trial, the data from this trial will be included in the analysis. The task will be conducted twice, namely before (pretest) and after the learning phase (posttest). The positioning of the shapes in the first trial (circle left or right) will be identical for pre- and posttest, counterbalanced across participants.

2.2. In a manual forced-choice task, we will measure participants' manual choice behavior (first touch) while they are simultaneously presented with touchable plush versions of the two geometrical shapes. The manual forced-choice task will take place after the eye tracking phase. We will counterbalance the positioning of the shapes (circle left or right) across participants.

Note that (1) and (2.1.) will be assessed by using eye tracking, (2.2.) by coding the participants' reaching behavior from video recordings. A blind second rater will code a random 25% of the manual choice sessions to check the inter-coder reliability.

4) How many and which conditions will participants be assigned to?

Two conditions will be tested within subjects: social and non-interactive control. In the visual learning task, one shape will consistently cue the appearance of a social video (condition 1), whereas the other shape will cue a non-interactive control video (condition 2). All participants will be presented with 12 gaze-contingent trials per condition (i.e., 24 learning trials in total).

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.

Question 1:

We will conduct a linear model for the saccadic latency to the cued target region, including the interaction between trial (12 trials) and condition (social interaction, non-interactive control).

Question 2:

2.1. We will use two one-sample tests to determine whether the mean relative looking time to the social interaction shape (dependent variable) significantly differs from 50% in the pre- and posttest. Moreover, we will compare the relative looking times to the social interaction shape before and after

the learning phase by using a pair-wise comparison.

2.2. We will conduct a binomial test in order to determine whether participants choose the social shape more often than the non-interactive shape.

6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.

Generally, we will exclude children with neurodevelopmental disorders, premature birth (< 37 weeks of gestation) or visual deficits. With regard to the eye tracking tasks, we will exclude children due to failure or inaccuracy of calibration (evaluated by visual inspection of the data).

Visual learning task:

a) A trial will be discarded from the final analyses if a participant does not look at the gaze-contingent cue during 4 seconds.

b) We will only include trials that contain data on saccadic latencies within 2000 ms after cue onset. Due to the timing of one experimental trial, we assume that saccadic latencies greater than 2000 ms mean that the child is looking away from the screen after having looked at the cue and before looking at the target video.

c) We will only include trials that contain data laying within +/- 3 SD from the individual mean saccadic latency within condition (as in Rose, Feldman, & Jankowski, 2004).

d) We will exclude participants who contribute less than 50% usable trials per condition after being filtered according to criteria a)-c).

Note that the exclusion criteria of the visual learning task are based on visual inspection of the pilot data.

Manual forced choice task:

a) A choice will only be considered if the participant looks at both shapes and at the experimenter before or immediately preceding the touch. Otherwise the behavior will be coded as "no choice" (as in Hamlin & Wynn, 2011).

b) Infants have two minutes to pick one shape. Choices after 2 minutes will not be considered. If a child does not pick one shape within 2 minutes, their behavior will be coded as "no choice" (as in Hamlin & Wynn, 2011).

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

We plan to test as many participants as needed to include valid eye tracking data of N = 32 children (50% female) between 13.0 and 14.5 months in the final analyses of the learning task data. The aimed sample size is based on previous studies (e.g., Wu & Kirkham, 2010), while considering counterbalancing aspects of the current study.

Note that the criteria for "valid eye tracking data" are described in section "Outlier and Exclusions" (subsection "Visual learning task"). Data that has to be excluded from the final analyses due to these criteria will be replaced by additionally tested participants. The same procedure applies to drop-outs that are caused by technical reasons (e.g., eye tracker breaks down), problems with calibration, or because the child does not want to participate.

8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)

Exploratory Analyses:

We aim to explore the posttest forced-choice data further by comparing participants from two groups: Children who were more skilled in learning the cue-target association in the social condition and children who were less skilled. We will divide the sample based on a median split of the beta-coefficient of participants' individual learning function (as Mani & Huettig, 2014). Moreover, we aim to explore the visual learning data further by comparing the mean saccadic latency between the two conditions.

Additional Measure:

At the very end of each testing session, we will include a gaze following task as additional measure to explore the relationship between children's performance in the visual learning task and their gaze following abilities. Each child will be presented with 6 videos during which an actress shifts her gaze to one of two target objects. During half of the trials the actress looks to an object being located to her right side, while she looks to an object located to her left side during the other half of the trials. The order of trials will be randomized for each participant. As dependent variable we will measure the participant's first gaze shift to either of the two objects. We define gaze following as a positive difference score (i.e., greater than zero) being calculated by subtracting the number of incongruent trials (the child looks at the competing object first) from the number of congruent trials (the child first looks at the object that the actress attends). We will run a one sample test against chance level in order to investigate whether the difference score significantly differs from chance level. Moreover, we will explore the correlation between children's gaze following abilities and their performance in the visual learning task. The video stimuli have been created for a previous study by Astor & Gredebäck (2018).

Data Collection:

We have already collected data from 10 participants at the time point of preregistering. Since this study is conducted during a lab visit at another institution, the time period for data collection is limited. To ensure that data collection can be completed within the remaining time of the stay, we have started collecting data prior to finalizing the preregistration of the study. We have not looked at the existing data at the time point of preregistration.