Counterbalancing Sheets

Paper: „Direct and Observed Joint Attention Modulate 9-month-old Infants' Object Encoding"

- This counterbalancing document refers to Experiment 2 of the overall study.
- It contains counterbalancing tables with explanations for (1) the test phase (12 trials) and (2) the pretest phase (2 trials).
- To counterbalance the following aspects between the participants, we created six experimental orders in the eye-tracking software. We tested 6 infants per each of the 6 experimental orders (Total *N* = 36 infants).

(1) Counterbalancing Test Phase

					Object Action Phase (12 trials in total) **Red** = object number (each object has an individual numner, see object document) **Blue** = trial 1-6 **Green** = trial 7-12			New object Identity change
Experiment	Trial (per cell)	Objekt in action phase	Dyad	Social Condition	No change	Location change	Identity change	
1	1	top	D1	COM	**1** (1)	**5** (8)	**9** (5)	**13**
	2	bottom	D1	COM	**2** (11)	**6** (4)	**10** (9)	**14**
	1	top	D2	NO COM	**3** (7)	**7** (2)	**11** (10)	**15**
	2	bottom	D2	NO COM	**4** (6)	**8** (12)	**12** (3)	**16**
2	1	top	D1	NO COM	**5** (4)	**9** (1)	**13** (9)	**1**
	2	bottom	D1	NO COM	**6** (7)	**10** (12)	**14** (6)	**2**
	1	top	D2	COM	**7** (10)	**11** (8)	**15** (2)	**3**
	2	bottom	D2	COM	**8** (3)	**12** (5)	**16** (11)	**4**
3	1	top	D1	COM	**9** (8)	**13** (11)	**1** (1)	**5**
	2	bottom	D1	COM	**10** (2)	**14** (5)	**2** (12)	**6**
	1	top	D2	NO COM	**11** (4)	**15** (3)	**3** (9)	**7**
	2	bottom	D2	NO COM	**12** (10)	**16** (7)	**4** (6)	**8**
4	1	top	D1	NO COM	**13** (5)	**1** (9)	**5** (7)	**9**
	2	bottom	D1	NO COM	**14** (12)	**2** (2)	**6** (1)	**10**
	1	top	D2	COM	**15** (3)	**3** (6)	**7** (10)	**11**
	2	bottom	D2	COM	**16** (8)	**4** (11)	**8** (4)	**12**
5	1	top	D1	COM	**1** (12)	**5** (3)	**9** (6)	**13**
	2	bottom	D1	COM	**2** (1)	**6** (7)	**10** (9)	**14**
	1	top	D2	NO COM	**3** (5)	**7** (10)	**11** (11)	**15**
	2	bottom	D2	NO COM	**4** (8)	**8** (4)	**12** (2)	**16**
6	1	top	D1	NO COM	**5** (5)	**9** (11)	**13** (7)	**1**
	2	bottom	D1	NO COM	**6** (10)	**10** (1)	**14** (3)	**2**
	1	top	D2	COM	**7** (2)	**11** (6)	**15** (12)	**3**
	2	bottom	D2	COM	**8** (8)	**12** (9)	**16** (4)	**4**

- The 2 (social context: communicative or non-communicative) x 3 (outcome: no change, location change, identity change) withing-subjects study design resulted in 6 experimental conditions, tested within subjects. Each infant saw two trials per condition, resulting in 12 test trials in total (plus 2 pretest trials, see below for the counterbalancing in the pretest trials).
- The experiment will be designed in a way that each infant saw all 6 conditions in the first half of the experiment (trial 1-6).
- The 12 experimental trials were presented in 4 blocks with 3 trials each. Within a given block, each trial presented a different outcome (location change, no change, identity change). After every block, infants was presented with a 4-second kaleidoscope video with a soothing melody to maintain their attention (see also Reuter, Emberson, Romberg, & Lew-Williams, 2018; Szufnarowska et al., 2015).

Counterbalancing Trial Order

- **First block (trial 1-3):** We counterbalanced the order of outcome and social context conditions during the first block across infants in the way that…
  … an equal number of infants saw an identity change first, no change first, and location change first *(factor outcome).*
  … an equal number of children saw a trial of the communicative condition first or a trial of the non-communicative control *(factor social context).*
- **Remaining blocks (trials 4-12):** The order of outcome and social context conditions in the remaining three blocks was pseudo-randomized. No outcome or social context condition occurred more than twice in a row.

Counterbalancing Objects

We used 16 objects in the trials of the test phase. 12 objects were presented as familiar objects in the action phase, and 4 additional objects as novel objects in the outcome phase of the identity change conditions.

- Each of the 16 objects was presented in all six conditions across participants. In the identity change condition, each object served both as familiar object in the action phase and as new object in the outcome phase across participants. Note: It is not the case that each object appears *equally* often in each condition.

Object Position

- The position of the object in the action phase (up or down) will be counterbalanced within child and factor in a way that each infant saw the object in the action phase equally often at the upper screen position or the lower screen position in all three outcomes and both social contexts.
- Across infants an equal number of infants saw the object in the action phase at the upper screen position on the first test trial and on the lower screen position on the first test trial.

Actors

Every child saw two different dyads of actors (dyad 1 and dyad 2): one dyad performing in all six trials of the two communicative conditions, and the other dyad performing in all six trials of the non-communicative conditions.

- Across participants, each of the two dyads served equally often as communicative dyad and as non-communicative dyad.

(2) Counterbalancing Pretest Phase

Experiment	Trial	Dyad	Social Condition	Object	Object Position
1	1	D1	PRETEST COM	17	top
	2	D2	PRETEST NO COM	18	bottom
2	1	D2	PRETEST COM	17	bottom
	2	D1	PRETEST NO COM	18	top
3	1	D1	PRETEST COM	17	top
	2	D2	PRETEST NO COM	18	bottom
4	**2**	D2	PRETEST COM	17	bottom
	1	D1	PRETEST NO COM	18	top
5	**2**	D1	PRETEST COM	17	top
	1	D2	PRETEST NO COM	18	bottom
6	**2**	D2	PRETEST COM	17	top
	1	D1	PRETEST NO COM	18	bottom

Trial Order Pretest Phase

- We counterbalanced the order of the two social context practice conditions during the pretest phase across infants in the way that an equal number of infants sees the practice trial of the face-to-face pretest condition first or the practice trial of the back-to-back pretest condition.

Objects Pretest Phase

In addition to the 16 objects in the test phase, we will use two additional objects in the videos of the pretest phase.

- Across participants, each of the two objects will occur equally often in the communication practice trial and the non-communication practice trial.

Object Position Pretest Phase

- Each individual infant will see an object at both screen positions during the two pretest trials (upper and lower screen position).
- Across participants, an equal number of infants will see the object at the upper screen position first and at the lower screen position first.
- Within conditions, the object location will be quasi-randomized in a way that the object appears at both screen positions. Note: This is not exactly counterbalanced (com: 4 experiments with top, ncom: 2 experiments with top).

Actors Pretest Phase

The face-to-face dyad in the pre-test phase performs the communicative referential trials in the test trials, and the back-to-back dyad performs the non-communicative referential trials in the test trials (analogously to Yoon et al., 2008).