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## SPATIAL CUEING EFFECTS OF SOCIAL CUES IN CHILDREN WITH ADHD: DEVELOPMENT OF AN ASSESSMENT TOOL



Belen Haza<sup>1</sup>, Jewel Mersali<sup>2</sup>, Charlotte Pinabiaux<sup>1</sup>, & Laurence Conty<sup>1</sup>

<sup>1</sup>DysCo Lab, Paris Nanterre University, France <sup>2</sup>Konception, Paris, France



Children with attention deficit hyperactivity disorder (ADHD) often have difficulties in different areas of social cognition that affect their relationships with their peers and family<sup>1</sup>. Recent studies suggest that some children with ADHD have a difficulty in following other's gaze and/or pointing finger towards the surrounding space, which can be linked to their relational difficulties in daily life<sup>2</sup>. Our aim is to develop an evaluative tool that will allow neuropsychologists to identify children who do not follow other's gaze or pointing gesture towards the surrounding space, in order to refine their cognitive remediation therapy. For this purpose, we pretested three versions of the tool in typically developing children.

### METHOD

52 children without disorders, aged from 7 to 9 years, were tested on 3 versions (n=19, mean age 8,24 ± 0,54 years, 13 females ; n=18, mean age 8,28 ± 0,54 years, 13 females ; n=15, mean age 8,26 ± 0,46 years, 8 females) of the computerized tool (see figures 1 and 2). All children were asked to press a button as quickly as possible when an object appeared on the screen, at the left or the right of an individual. In two thirds of the trials, the side of the object appearance was cued by the individual either by deviating her gaze or by pointing with her finger (i.e. congruent trials). Depending on the version of the tool, these trials were compared to :

- **Neutral trials** in which the individual did not move before the object appearance.
- **Moving trials** in which the individual pointed her finger towards the children before the object appearance.
- **Incongruent trials** in which the individual gazed or pointed towards the opposite side of the object appearance.

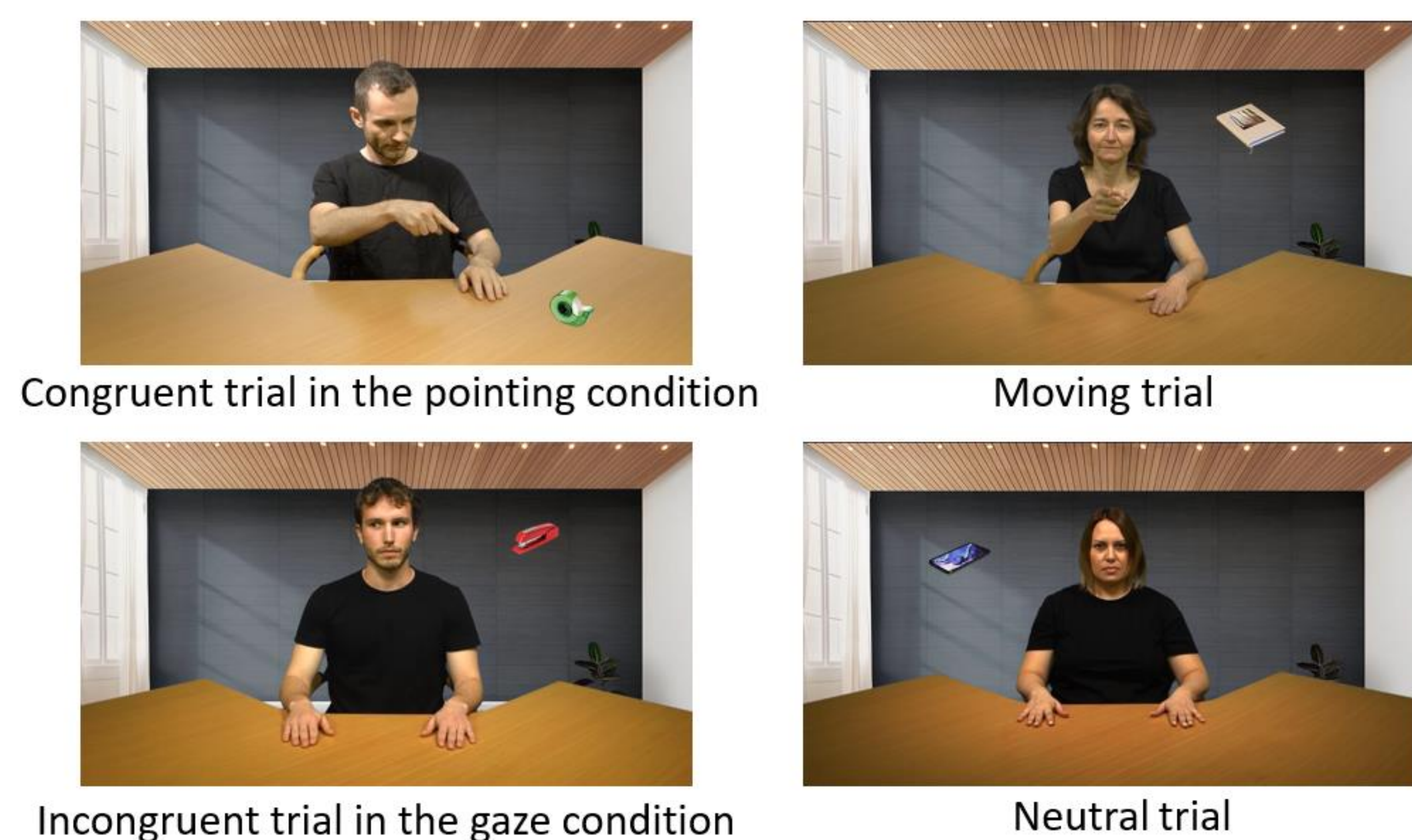


Figure 1: Example of different types of trials of the different versions of the evaluative tool.

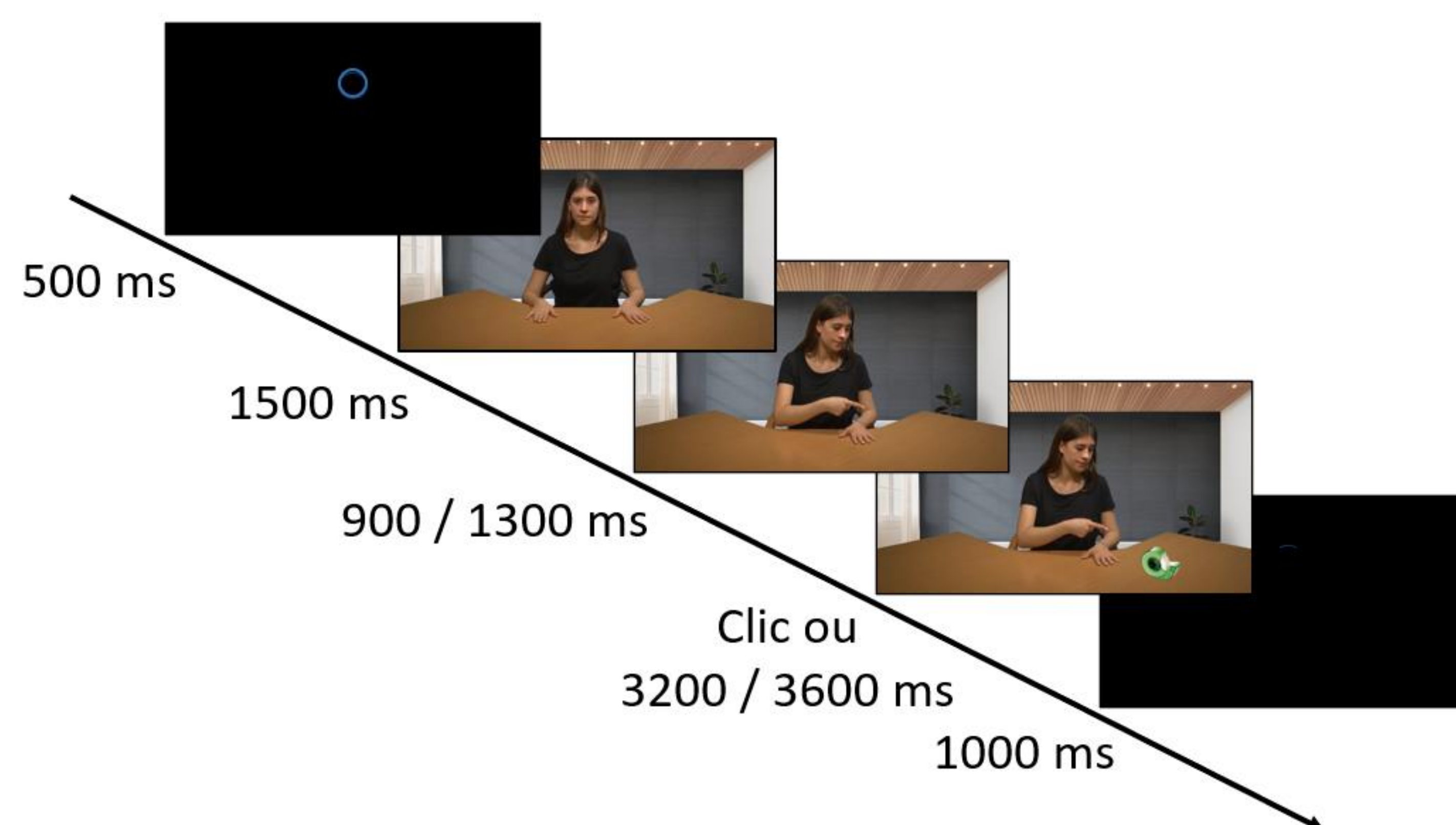


Figure 2: Time course of an experimental trial.

### RESULTS

Standard effect sizes were calculated for pointing and gaze in each version by making the difference between reaction times obtained in incongruent, neutral or moving trials and reaction times obtained in congruent trials (see figure 3).

As expected, pointing finger triggered strong cueing effects in the neutral trials version ( $t(19) = 10,37, p < .001$ ), the moving trials version ( $t(17) = 4,81, p < .001$ ) and the incongruent trials version ( $t(14) = 4,24, p < .001$ ). By contrast, the strength of the gaze cueing effect depended on the comparison trials. In the versions manipulating neutrals trials ( $t(19) = 5,86, p < .001$ ) and incongruent trials ( $t(14) = 3,39, p < .01$ ), gaze triggered strong cueing effects. However, gaze did not trigger strong cueing effects in the moving trials version ( $t(17) = -1,57, ns$ ). This would be explained by the fact that the moving trials elicit a more salient movement than congruent gazing and would alert the participant to the temporal proximity of the object appearance. The version manipulating incongruent trials, which measures strong cueing effects of gaze and pointing, controls for this alerting issue.

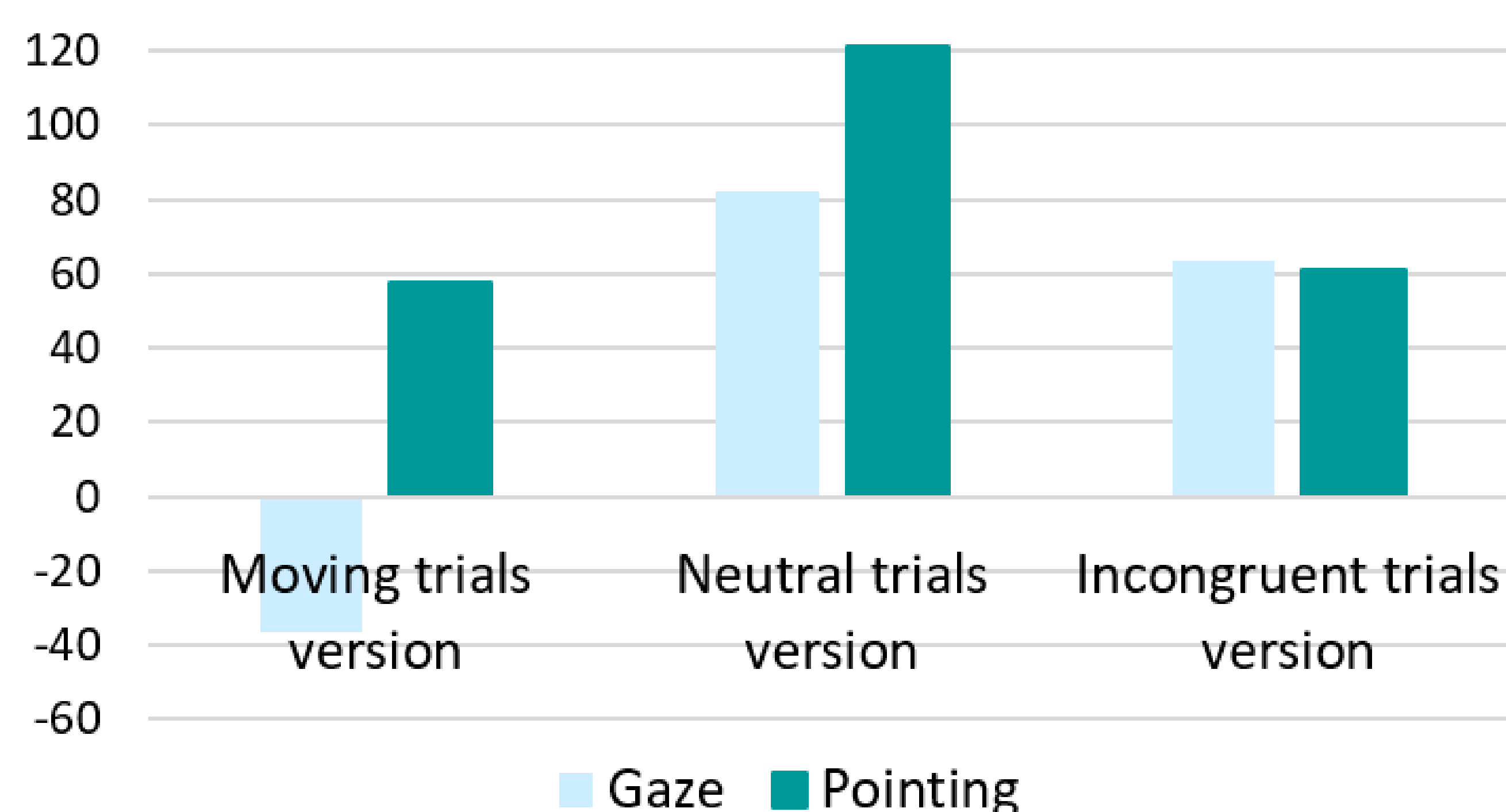


Figure 3: Standard effect sizes (in ms) in the different versions and cueing conditions.

The version manipulating incongruent trials was the most appropriate to measure social cueing effects in children with ADHD and was therefore chosen to be calibrated in a large group of typically developing children.

<sup>1</sup>Uekermann, J., Kraemer, M., Abdel-Hamid, M., Schimmelmann, B., Hebebrand, J., & Daum, I. et al. (2010). Social cognition in attention-deficit hyperactivity disorder (ADHD). *Neuroscience & Biobehavioral Reviews*, 34(5), 734-743. doi: 10.1016/j.neubiorev.2009.10.009

<sup>2</sup>Marotta, A., Casagrande, M., Rosa, C., Maccari, L., Berloco, B., & Pasini, A. (2014). Impaired reflexive orienting to social cues in attention deficit hyperactivity disorder. *European Child & Adolescent Psychiatry*, 23(8), 649-657. doi: 10.1007/s00787-013-wq0505-8