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Evaluating the ability to follow social cues in ADHD: calibration of a computerised tool (TooN) in children aged from 6 to 10 years



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INTRODUCTION

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 [1]. Studies suggest that these difficulties can be linked to a difficulty in following social cues such as other's gaze [2].

Here, we aim at calibrating a tool (TooN) that would allow psychologists to identify children with ADHD who do not follow non-verbal social cues, in order to refine their cognitive remediation therapy.

METHOD

POPULATION

339 children without disorders

- 169 girls and 170 boys
- Aged from 6 to 10 years old
- From 16 schools of Paris

Age	Number of girls	Number of boys	Total
6 years	37	30	67
7 years	26	43	69
8 years	45	31	76
9 years	33	31	64
10 years	28	35	63
Total	169	170	339

COMPUTERIZED TOOL **TooN**

TooN is based on the attentional orientation paradigm [3], but uses videos of real people gazing or pointing at everyday objects.

Children's task consists in pressing a button as soon as possible when an object appears on the screen, on the right or the left of an individual.

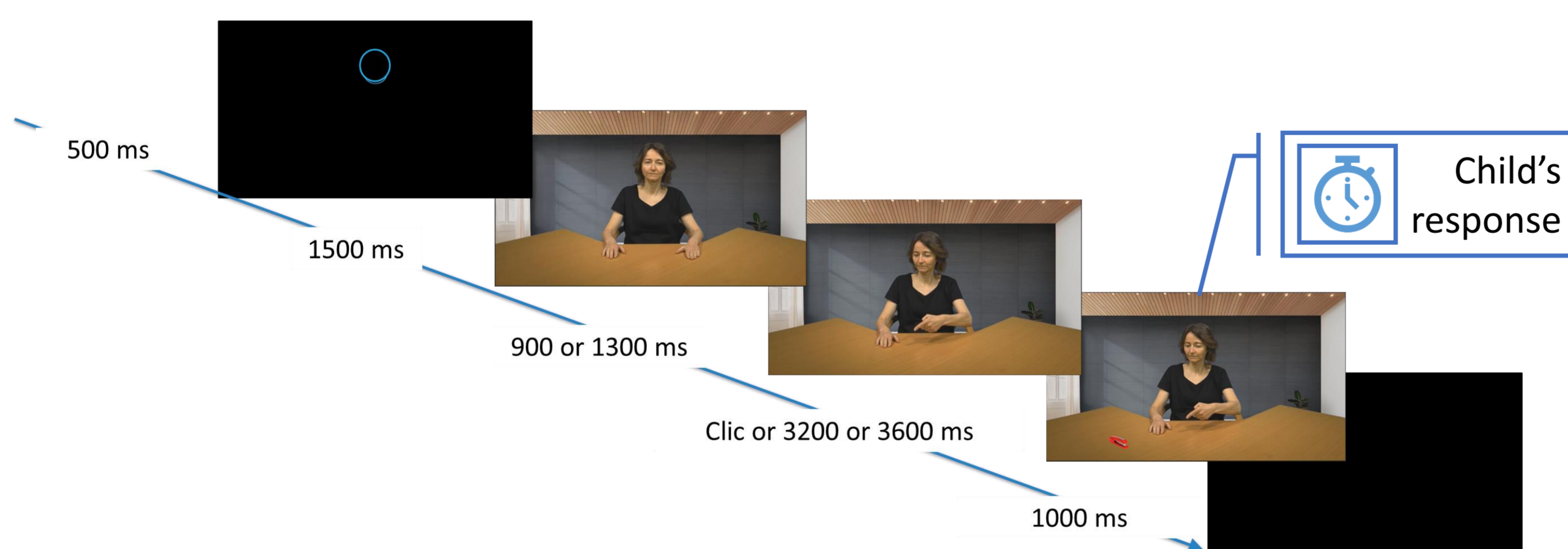


Figure 1: Time course of an experimental trial

2 CONDITIONS

Gaze: the individual deviates her gaze toward the side of the object appearance (i.e., congruent trials) or the other side (i.e., incongruent trials).

Pointing: the individual orients her gaze, finger and head in the congruent or the incongruent direction.

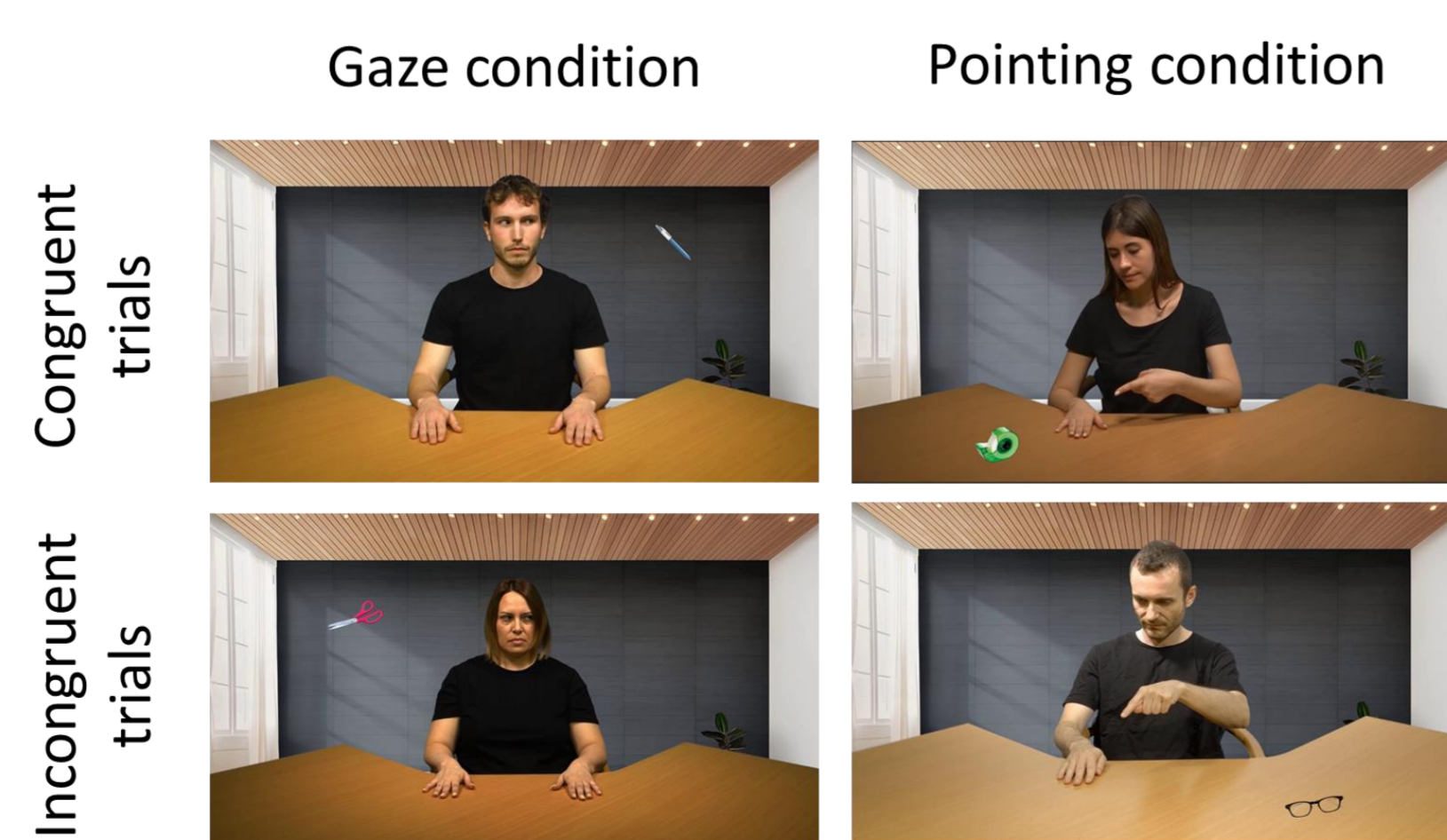


Figure 2: Different conditions of the tool

RESULTS

EFFECT OF SOCIAL CUES

Standard effect sizes for Gaze and Pointing (= reaction time in incongruent trials - reaction time in congruent trials):

- Followed a normal distribution ($0.04 < \text{all } d < 0.16$, all $p > .05$)
- Were significantly higher than 0 (all $t > 2.70$, all $p < .01$). Children were faster in congruent than incongruent trials. Healthy children thus follow social cues.

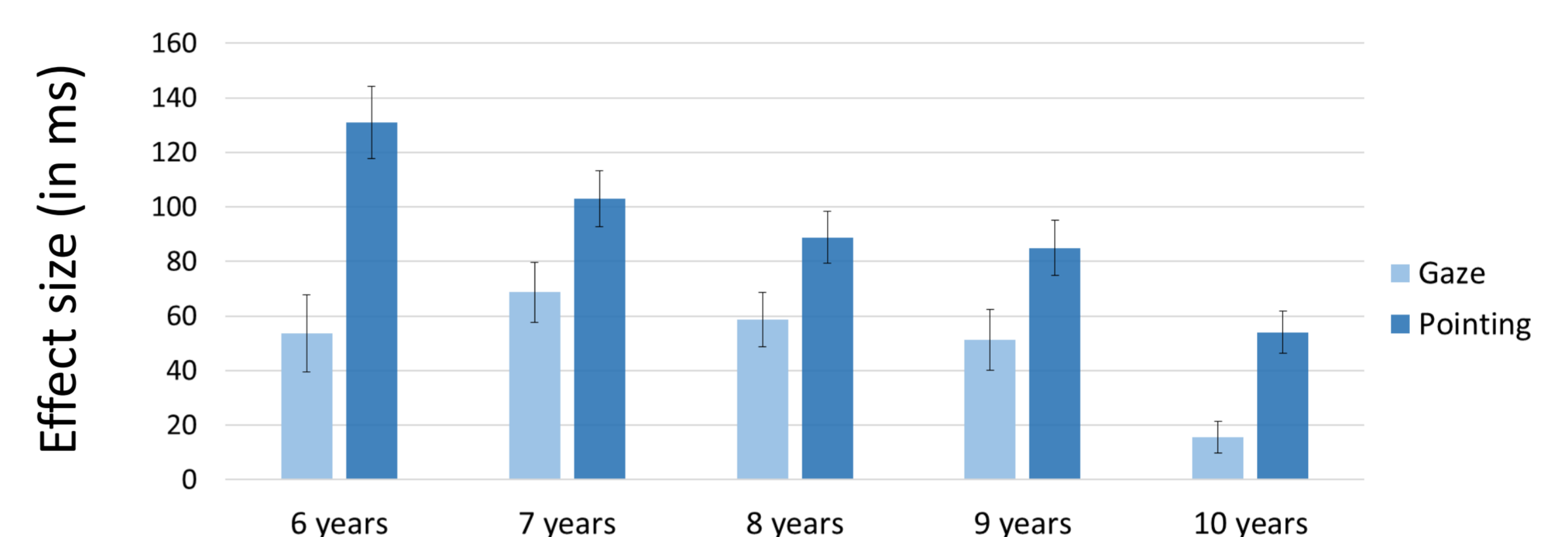


Figure 3: Standard effect sizes for Gaze and Pointing by age range

EFFECT OF AGE

The effect sizes for Gaze ($B = -0.72$, $SE = 0.29$, $p < .05$) and Pointing ($B = -1.43$, $SE = 0.28$, $p < .001$) decreased with age. This may be related to the development of executive functions. In any case, the calculation of the normative data must take this variable into account.

EFFECT OF GENDER

The effect size of Gaze was higher for girls than for boys ($F(1,331) = 8.38$, $p < .01$). This may reflect better capacities of social cognition in girls. Norms must be calculated separately for girls and boys.

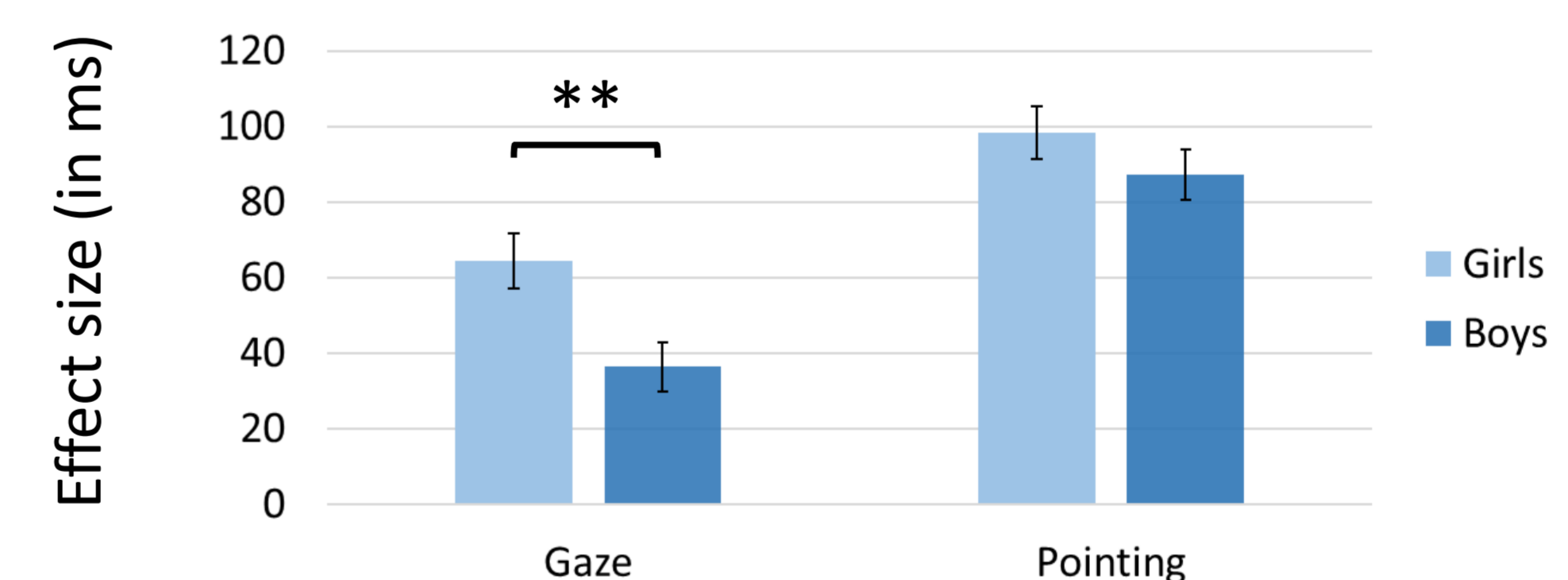


Figure 4: Standard effect sizes for Gaze and Pointing by gender

CONCLUSION

TooN is a sensitive tool that assesses the effects of social cues on attentional orientation.

The calculation of normative data has to take into account age and gender.

TooN will be tested on children with ADHD in order to verify the clinical validity of the tool.

[1] Bora, E., & Pantelis, C. (2015). Meta-analysis of social cognition in attention-deficit/hyperactivity disorder (ADHD): Comparison with healthy controls and autistic spectrum disorder. *Psychological Medicine*, 46(4), 699–716.

[2] Marotta, A., Casagrande, M., Rosa, C., Maccari, L., Berloco, B., & Pasini, A. (2013). Impaired reflexive orienting to social cues in attention deficit hyperactivity disorder. *European Child & Adolescent Psychiatry*, 23(8), 649–657.

[3] Posner, M. I. (1980). Orienting of attention. *Quarterly journal of experimental psychology*, 32(1), 3-25.