

Anticipated smile holds attention to faces in young children without autism but not in children with autism

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Background

- Disengaging one's attention from another person's face is slower in young children without autism than in children with autism, suggesting weaker attentional engagement by faces in autism.
- It is not clear, however, whether gaze direction or anticipated emotional expression on the face affects attentional disengagement.
- The aim of this study** was to investigate whether gaze direction and anticipated emotional expression affect attentional disengagement.

Methods

Participants.

- Fourteen children with autism (ASD), 13 typically developing children (TD) and 14 with developmental delay (DD) participated in the study.
- The ASD and TD children were matched according to chronological age and the ASD and DD children were IQ matched (Table 1).
- Parents of TD and DD groups did not report strong ASD symptoms (SCQ, Social Communication Questionnaire ≤ 16).

Table 1. Participant info

Group	N (girls)	Age, years	IQ	ADOS-2, Comparison score	SCQ
ASD	14 (2)	4.0 (2.5-5.5)	63 (45-88)	7 (4-9)	
TD	13 (1)	4.2 (2.4-5.7)			3 (1-6)
DD	14 (2)	4.9 (3.5-6.8)	57 (42-79)		8 (2-16)

Design.

- In the practice phase**, participants were shown faces of two persons and two toys and were told which one of the two persons would smile and which one of the two toys would move (Figure 1).

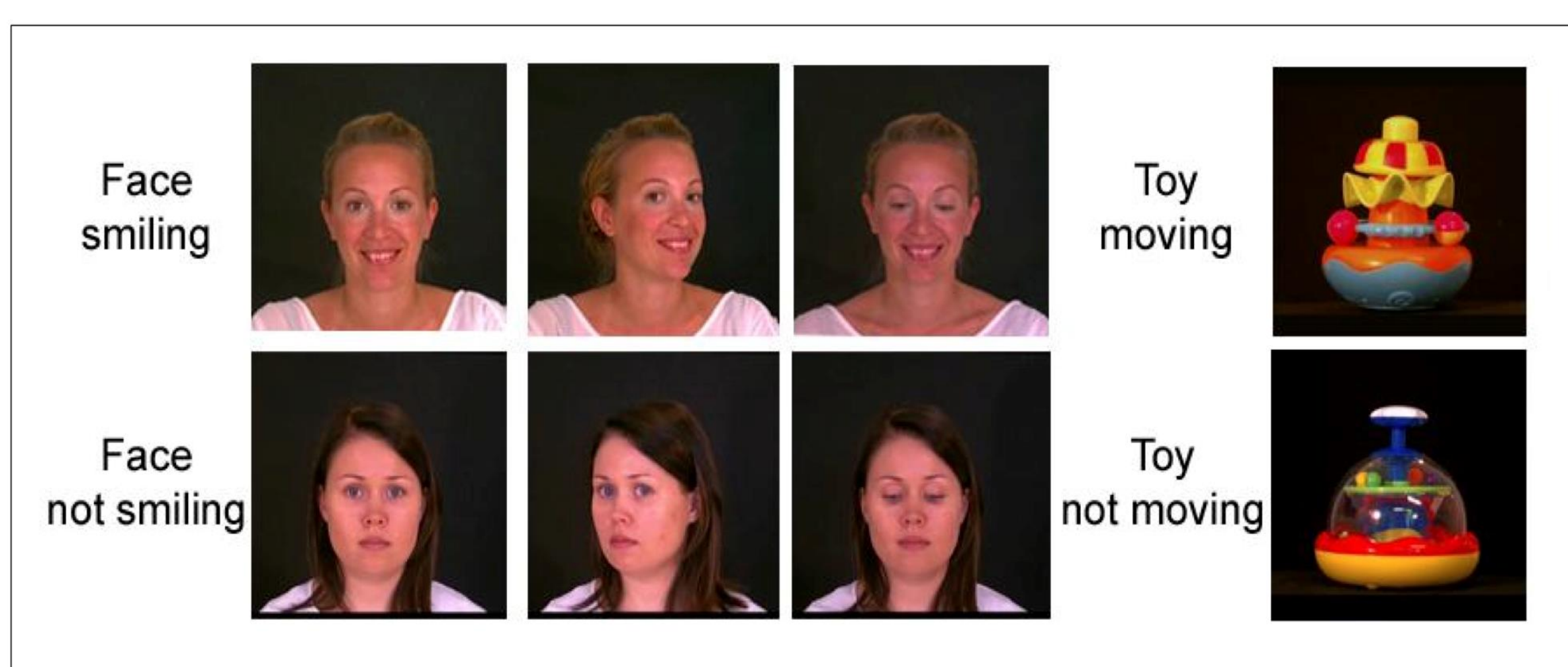


Figure 1. Stimuli in different conditions

- In the actual experiment**, participants were shown a centrally presented video of a neutral face or a still toy, followed by a peripheral distractor (Figure 2). Each face was displayed facing forwards with either a direct gaze or gaze down, or facing slightly sideways but maintaining a direct gaze towards the participant.
- When the participants **re-engaged** their gaze from the distractor back to the central face, the face designated as smiling started gaze-contingently smile whereas the other face did not smile. Similarly in the toy condition, the moving toy started to spin and the other one did not (Figure 2).

Analyses.

- Participants' eye movements were recorded by an eye-tracker (Tobii-TX 300) and by a camera. Disengagement and re-engagement gaze latencies were analysed from the video in order to get as much acceptable trials as possible.

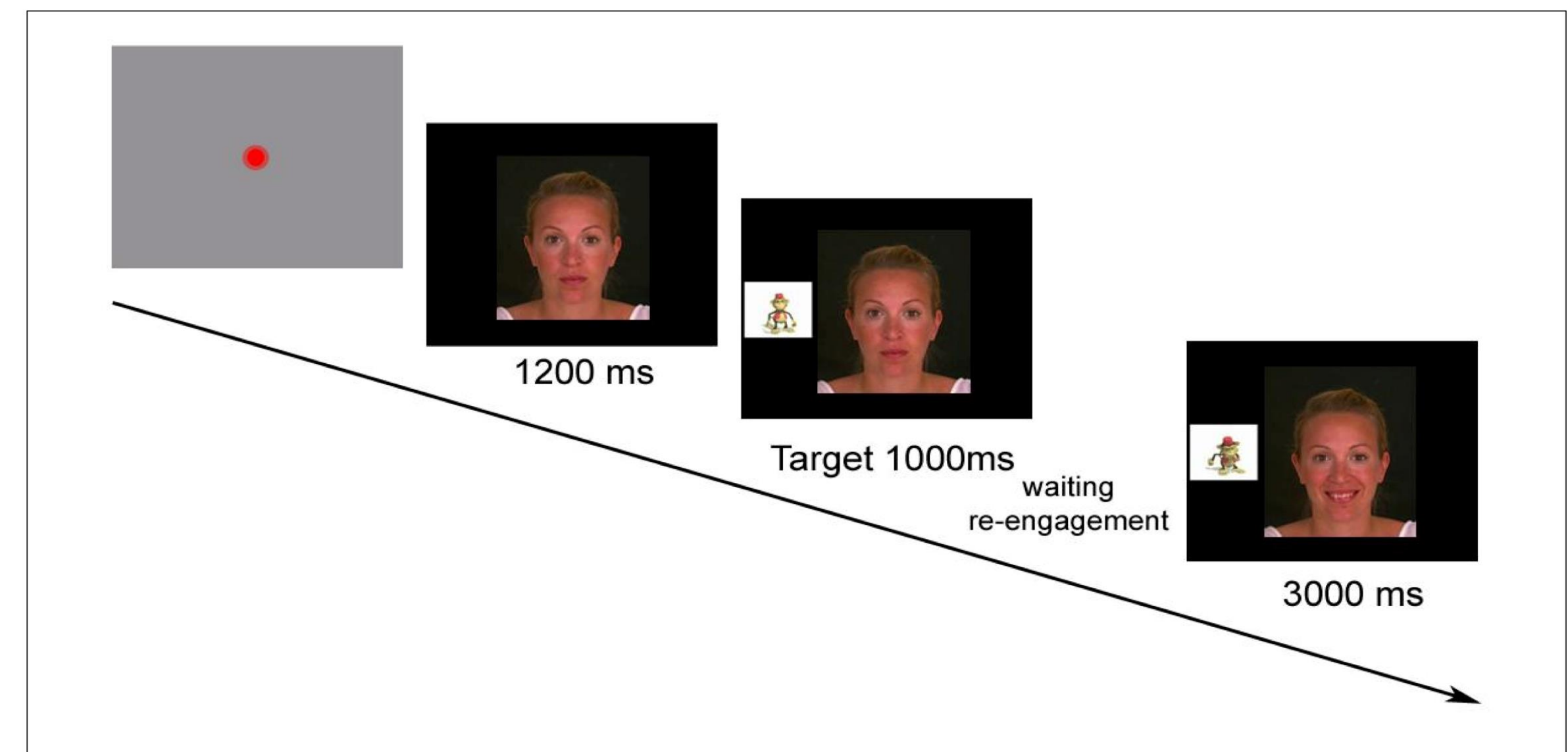


Figure 2. Sequence of events on a single trial

Results

- The disengagement latencies** were significantly longer for a face anticipated to smile compared to the non-smiling face in both groups of children without autism. In contrast, the disengagement latencies were longer to the face that was anticipated non-smiling than to the smiling face in children with autism (Figure 3).

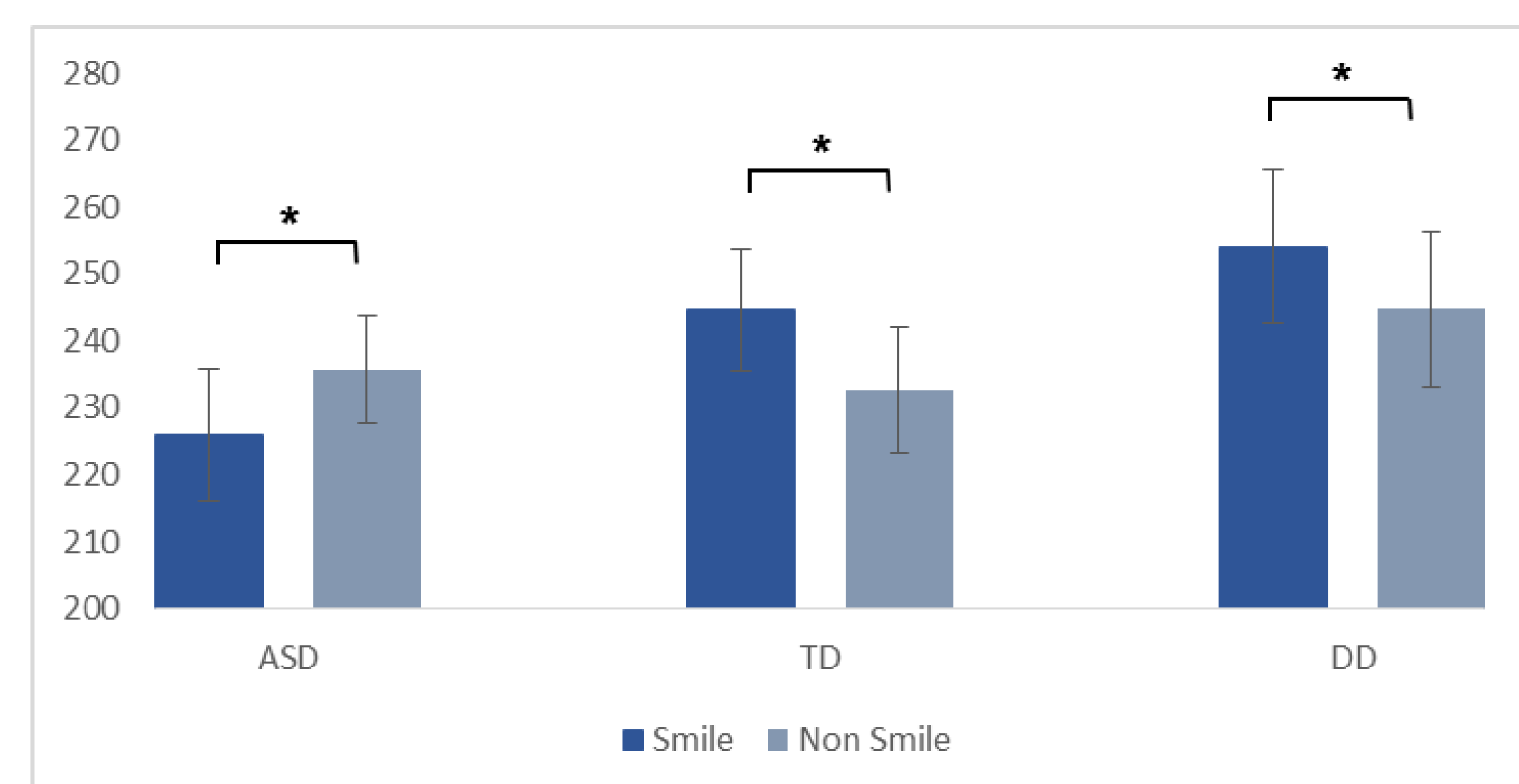


Figure 3. Disengagement latencies for anticipated smiling and non-smiling faces in all groups of children

- The gaze condition** did not affect the disengagement latencies.
- The re-engagement latencies** in all groups tended to be shorter ($p = .075$) for smiling than non-smiling faces.
- There were no significant differences in the disengagement and re-engagement latencies between **the anticipated moving and non-moving toys**. There were also no differences between the three groups in the toy conditions.

Discussion

- The anticipation of smile influenced the disengagement latencies in children without autism. It took longer to shift attention from the central face which was not smiling at the time but was known to start smiling later. This finding shows an attentional bias to emotionally significant socially rewarding stimulus in typical development and also in abnormal development without major difficulties in social development.
- An attentional bias toward anticipated emotional expression was, however, absent in children with autism. The face that was not anticipated to smile held attention for longer compared to a smiling face. These findings seem to indicate that children with autism prefer faces that remain neutral.