An Exploration of Preferences for Real versus Not-Real Faces in Infants At-Risk for Autism

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Background

Faces capture and hold our visual attention because they provide informational and social cues. From an early developmental age, faces capture the attention of typically-developing infants above any other stimuli (Spezio et al., 2006). In contrast, infants with autism spectrum disorders (ASD) have diminished responsiveness to gaze behaviors, specifically in monitoring faces. Individuals with ASD show diminished gaze towards faces, which correlates to a lack of interest in socially significant information (Riby & Hancock, 2008; Vivanti et al., 2014).

Animated or puppet (non-real) faces often may not have the capacity to convey as much emotional and social information as real human faces. Infants with ASD have shown increased tendencies to look at animated cartoon faces than typically developing infants. Furthermore, animated faces have been used as an intervention to improve facial monitoring for social cues in at-risk infants (Brosnan et al., 2015; Golan et al., 2009). Yet, further exploration is needed to compare attention to real and non-real faces among at-risk infants.

Methods

❖ *Participants:*
 ❖ N= 15 At-risk infants
 ❖ 11 Males & 4 Females
 ❖ 6.7% Black, 73% White, 20% Other
❖ Chronological ages ranged from 3-24 months (*M*= 11.67, *SD*= 5.73)
❖ Two clips were taken from *The Muppets Movie* (2 minutes & 10 seconds) & *Peter Pan* (1 minute & 10 seconds)
 ❖ Both clips consisted of dialogues between characters with minimal background noise.
❖ Infants' proportional gaze duration on faces of real characters (Peter Pan) vs. non-real characters (Muppets) were analyzed using the Tobii Studio T60 eye-tracker.
❖ All analyses were conducted in *SPSS 21.*

Results

A one-sample t-test comparing the mean differences between the amount of gaze towards real vs. non-real faces was conducted. Results indicated *significant* gaze differences between real and non-real facial features of *Peter Pan* and *The Muppets Movie* characters.

Specifically, differences were found between:
❖ **Real eyes**: (*M* = .02, *SD* = .02) vs. **non-real eyes** (*M* = .01, *SD* = .01; t(14) = 3.80, *p* < 0.01)
❖ **Real mouth**: (*M* = .01, *SD* = .02) vs. **non-real mouth** (*M* = .01, *SD* = .02; t(14) = 4.28, *p* < 0.01)
❖ **Real face** (outside of eyes/mouth): (*M* = .13, *SD* = .13) vs. **non-real face** (*M* = .12, *SD* = .10; t(14) = 4.81, *p* < 0.01)

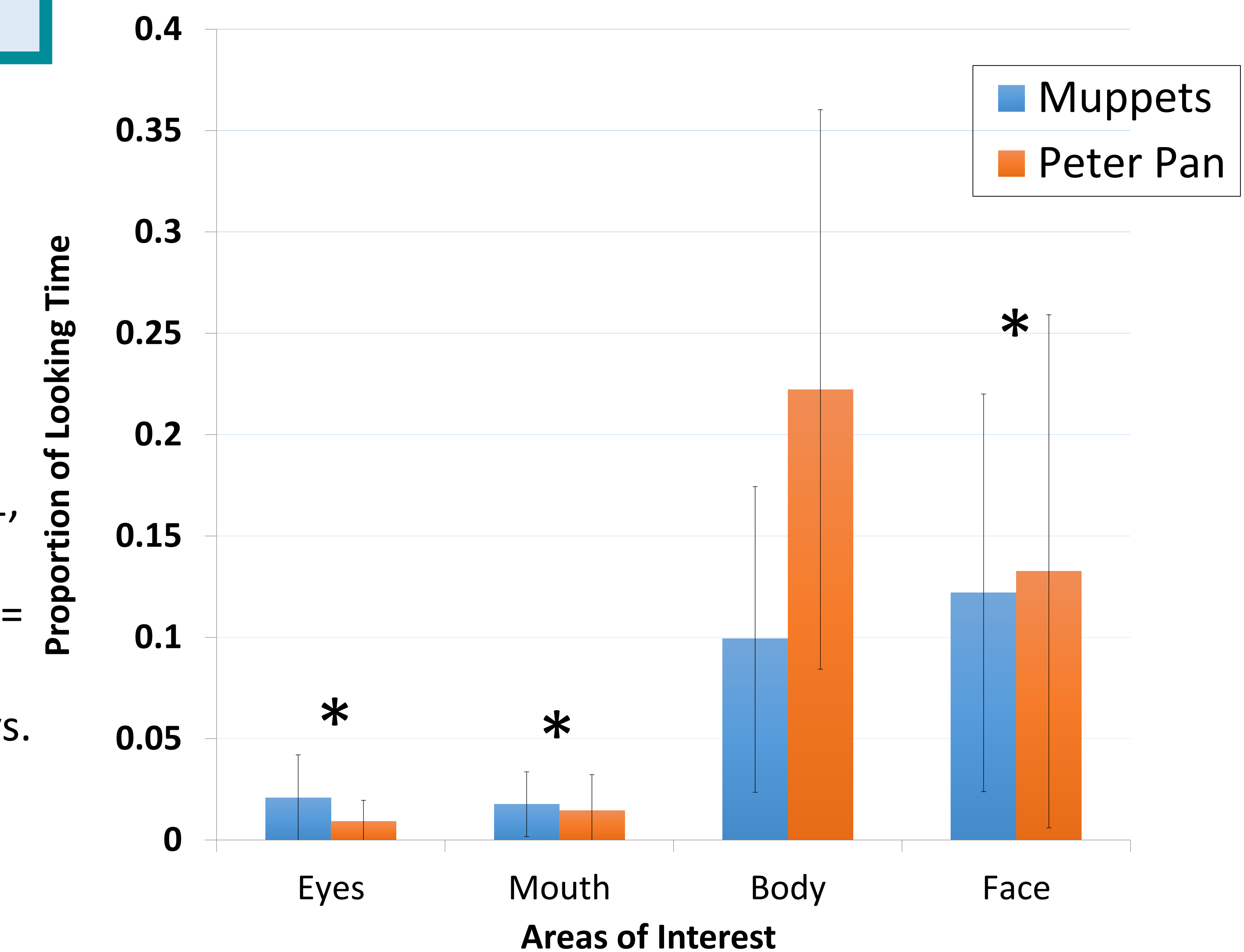*Figure 1.* Heat map of visual fixations of 15 at-risk infants

Figure 2. Average gaze duration for different areas of interest among at-risk infants

Conclusions and Implications

This study contributes to understanding typical versus atypical gaze patterns in infants at-risk for autism. While previous research shows preference for cartoon faces, this study reveals preference for puppet faces and real human faces in at-risk infants.

These findings may inform mechanisms for facial monitoring of social cues, suggesting the use of cartoon characters whose faces convey clear emotional and social information vs. puppet faces. Furthermore, the use of eye-tracking paradigms allow for understanding the attentional processes among a group of at-risk infants beginning in infancy.

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