

Introduction

Social contagion is brought about by the tendency of individuals to converge behaviorally and emotionally with those around them (Hatfield, Cacioppo, & Rapson, 1994). Mimicking the behaviors of others serves as “social glue” building affiliation with others (Lakin, Jefferis, Cheng, & Chartrand, 2003), and when the behaviors being mimicked convey emotional signals, it is considered a primitive form of empathy (refs); perhaps one that scaffolds more complex forms of empathy (refs). Previous Research has shown that both individuals with Autism Spectrum Disorder (Helt et al., 2010, Senju et al., 2008), and individuals with high levels of Psychopathic Traits (Rundle et al., 2015) are less susceptible to **contagious yawning** (that is, a yawn induced by seeing or hearing another’s yawn; Provine, 1986) than their typical peers. The research indicating empathy deficits amongst individuals with psychopathic traits is consistent. However, the research indicating empathy deficits amongst individuals with ASD traits is mixed; some studies have indicated that deficits in social contagion and other forms of empathy may be secondary to inattention to social stimuli and present when individuals with ASD are fully attending (Kinsbourne & Helt, 2008). Attention to the eye region has been shown to be an important factor for inducing yawn contagion (Provine, 1989) and individuals with ASD tend to turn attention away from the eye region of others (Jones & Klin, 2013, Pelphrey et al., 2005). Therefore, the current study utilized eye tracking to capture the visual attention of the participants while viewing video clips of others yawning to explore the relationship between contagious yawning and eye gaze in both populations. The current study also showed participants video clips of other scratching to induce **contagious itching**. While contagious itching still involves paying attention to the bodily signals of another and taking them on as your own, and may rely on neural regions overlapping those employed in contagious yawning, does not rely on signals transmitted from the face.

Hypothesized Deficits

	Emotional Empathy (instinctive physical embodiment)	Cognitive Empathy (intellectualized perspective taking)
ASD	✓ Intact**	✗ Diminished or Absent
Psychopathy	✗ Diminished or Absent	✓ Intact

**Individuals with ASD respond to emotional stimuli less often; however, if their attention and motivation is explicitly directed, they are likely to provide a socially appropriate response.

Social Deficits Observed in ASD and Psychopathy

	Characteristic Social Interaction Deficit
ASD	Difficulty inferring another’s internal state based on subtle context cues such as body language, or facial expression.
Psychopathy	Diminished negative emotional response to another’s feelings of fear or sadness

Materials and Methods

Participants were students at Trinity College

ASL Desktop Eye Tracking System

- Used to track and analyze eye gaze patterns of participants while viewing stimuli videos featuring a series of individuals yawning or itching



Susceptibility to Contagious Yawn/ Itch

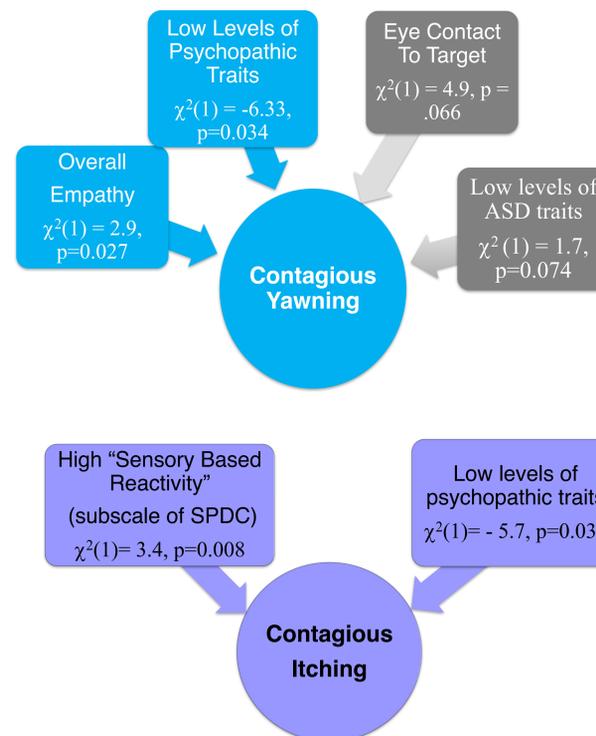
- Participants were recorded while viewing stimuli videos in order to determine whether or not they yawned and/or itched contagiously in response to stimuli videos

Measures

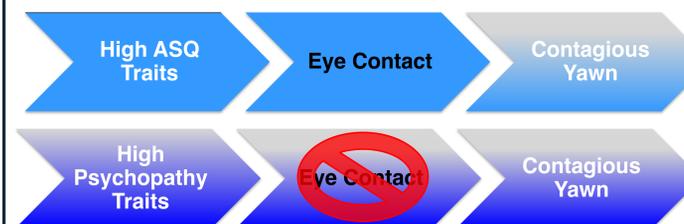
- The Autism Spectrum Quotient
- The Psychopathic Personality Inventory-Revised
- Interpersonal Reactivity Index
- Adult/Adolescent Sensory Processing Disorder Checklist

Results

Positive Predictors of Contagious Yawning and Itching



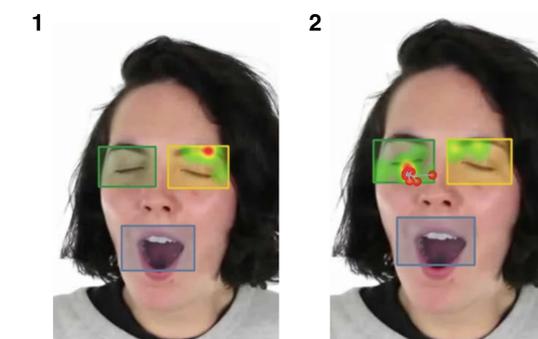
Does eye gaze mediate contagious yawn?



The tendency to yawn contagiously was mediated by eye contact to target in the group with high ASQ traits, but not in the group with high psychopathy traits.

Eye Gaze Patterns of Participants with High levels of ASQ Traits

Eye gaze patterns of two participants mapped onto stimuli video



Areas in red indicate highest concentration of visual fixation

- Both participants 1 and 2 had above average ASQ scores. Participant 2 yawned contagiously, participant 1 did not

- When comparing only trials when individuals with high ASD traits were looking, group differences disappeared.

	Contagious Itching	Contagious Yawning
ASD	Enhanced	Diminished (Influenced by eye gaze)
Psychopathy	Diminished	Diminished (not influenced by eye gaze)

Conclusions

Contagious Yawning was less frequent in those with high ASD and high Psychopathic traits compared to those low in both. However, contagious itching was highest amongst those with high ASD traits and lowest amongst those with high psychopathic traits.

Diminished susceptibility to contagious yawning observed in ASD and Psychopathy occurs through different mechanisms. In ASD, empathy deficits may be secondary result of inattention to the eyes. In Psychopathy, empathy deficits may occur due to a lack of ability to physically embody the person being observed.

Literature Cited

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