Senior Psychology

Faculty Mentor: Dr. Bradley Ferguson, Health Psychology

Sophia Parmacek

Lincolnshire, IL

## Preliminary report on the effects of propranolol on gastrointestinal symptoms, anxiety, and heart rate variability in autism spectrum disorder

Sophia Parmacek, Samantha Hunter, Kathy Hirst, David Beversdorf, and Bradley Ferguson

Many individuals with autism spectrum disorder (ASD) have co-occurring gastrointestinal (GI) symptoms, but the etiology is poorly understood. Some individuals with ASD have a lowered stress response, while others may have a heightened stress response, also known as the "fight-or-flight" response. The stress response has been shown to be associated with GI problems, especially constipation, in ASD. Some children with ASD can't verbally express their discomfort communicating their discomfort. As such, we are exploring pharmacological treatments that reduce the stress response to look at the effects on GI symptoms because currently there are no effective treatments. The present study explored the effects of propranolol, a beta-adrenergic antagonist with anxiolytic properties, on GI symptoms in children with ASD. We hypothesized that after 12-weeks of propranolol administration, heartrate variability (HRV), a measure of fluctuation in the time intervals between heartbeats which is linked to the balance between parasympathetic and sympathetic branches of the autonomic nervous system, will be negatively correlated with GI symptoms. Participants were those with an ASD diagnosis between the ages of 7-24. Participants took propranolol for 12 weeks in an open label extension trial. The GI Severity Index (GSI) was completed at baseline and again after 12 weeks of taking propranolol. Clinician-rated anxiety severity was also examined after 12 weeks of propranolol. Time-domain HRV measurements were calculated using a 5-minute resting state electrocardiogram (ECG) at baseline and after 12 weeks of taking propranolol. Propranolol significantly reduced anxiety and increased HRV after 12 weeks. However, there were no statistically significant differences between baseline GI symptoms and GI symptoms after 12 weeks of propranolol. There was no statistically significant relationship between HRV and constipation. Further research is needed to suggest pharmacological treatments that may help with ASD and GI symptoms.