INTRODUCTION

Anorexia nervosa (AN) has the highest mortality rate of any psychiatric disorder, yet its underlying neurobiology is not well understood. AN is characterized by food restriction, low body weight, fear of gaining weight and distorted body image.1 Dopamine (DA) is thought to be important in the pathophysiology of AN. Studies suggest that AN individuals have reduced DA levels in and response DA receptors increase in sensitivity or number; thus, they may be hypersensitive to salient stimuli.2 Given that research suggests low DA levels in AN, researchers sought to replicate these findings using spontaneous eyelink rate (SBR)—a measure of DA activity.3,4 Researchers have also used acoustic startle to behaviorally measure DA receptor sensitivity.3,5 The results of these studies have been inconsistent, which may be due to some researchers not considering effects of medication and comorbid diagnoses on the DA system.6,7

Objectives:
1. To replicate previous SBR and startle studies and consider effects of comorbidity and medication.
2. To determine whether prediction error (PE) response—evoked when reward is unexpectedly received or omitted—is associated with brain DA levels, and heighted DA receptor sensitivity to salient stimuli.
3. Individuals with AN and anxiety disorders will have a higher percent change of blink amplitude during the acoustic startle task then individuals with AN and mood disorders.
4. PE response will be positively correlated with SBR and startle response as they are indirect measures of DA.

RESULTS

Table 1: Demographic and behavioral measures in AN, but not in HC.

Table 2: SBR and startle response correlated to behavioral measures in AN, but not in HC.

Figure 2: A partial correlation revealed a significant positive correlation between SBR and sensitivity to punishment (SP; Fig. 2A). Mean amplitude change from baseline was positively correlated with HA and SP (Fig 2B). Speakers’ correlation revealed a significant positive correlation between PE and SBR or startle response.

DISCUSSION

• Contrary to previous studies, there were no differences in SBR and startle response between AN individuals and HC. Researchers have suggested altered serotonin (5-HT) activity in AN, which can have opposing effects on DA activity.1 Thus, startle response may be more complex in AN because the pathway of startle response involves both DA neurons and S-HT neurons. There is no established neurocircuitry of SBR, so it is possible that alterations of S-HT activity in AN may have similar effects on SBR. Future research should seek to identify the neurocircuitry of SBR to help better understand inconsistencies in SBR research.
• Consistent with previous studies, AN individuals with high harm avoidance (HA) have greater startle responses.2 Because HA and SP are related, it makes sense that higher SP results in a greater startle response.2 It is important to note that HA may be related to DA and S-HT function; thus, S-HT alterations in AN may be mediating inconsistent findings in the SBR.
• In the present study, higher avg. baseline amplitude was associated with greater PE response in AN, but avg. baseline amplitude was not correlated to any behavioral measures. Previous research has not reported on avg. baseline amplitude; thus, it is important to replicate this study using a higher power sample.
• Lack of a correlation between SBR and startle response with PE may be a result of the potential role of S-HT in SBR and startle response.

References: