The influence of anticipatory processing and social anxiety on physiological responding

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Introduction

Social anxiety disorder is the fear of negative evaluation, which can interfere with day to day life (Turk et al., 2001). In order to better understand and help those with SAD, more research is needed on cognitive and physiological responses to anxiety. A cognitive area that is seems to be encouraging is anticipatory processing, which involves thinking about an upcoming situation negatively and repeatedly (Clark & Wells, 1995), and seems specific to individuals high in SAD symptoms (HSAs).

A common method of measuring psychophysiology of SAD is heart rate variability (HRV; e.g., Pittig et al. 2012; Wong & Moulds, 2011). HRV is an important aspect of the body's regulation system; physiological variability allows the body to a sustain homeostasis and regulate emotions. Individuals with anxiety tend to have lower HRV in response to stress (e.g., Hoehn-Saric & McLeod, 2000; Porges, 2007), suggesting physiological rigidity and poor emotion regulation.

Although promising research exists for both anticipatory processing and HRV, the physiological effects of anticipatory processing have not been studied much in the recent past. However, because physiology is important in social anxiety, (e.g., Clark & Wells, 1995), there is clear need to examine this topic. Measuring such effects on the body allow researchers to enhance their understanding of SAD, and including anticipatory processing can further enhance our knowledge in this area. Therefore, the purpose of this study is to examine the relationship between physiology and social anxiety in relation to anticipatory processing. This will inform us on whether or not anticipatory processing can influence physiological responding for socially-anxious individuals.

Method

These were taken from a larger study examining attention bias in social anxiety. The current study included 52 Oklahoma State University undergraduates ranging in age from 18 to 25 (*M* = 19.27, *SD* = 1.4). Most (*N* = 29; 55%) were female and 23 (45%) were male. Most were Caucasian (*N* = 45; 86.5%), while 2 (3.8%) identified as Native American, 3 (5.8%) as Latino/Latina, and 2 (3.8%) as Asian. The Social Interaction Anxiety Scale (SIAS; Mattick & Clark, 1998) was administered to participants in order to differentiate between HSA and low social anxiety (LSA) participants. There were 27 HSA participants with scores of 34 or higher on the SIAS and 23 LSA participants with scores of 18 or lower on the SIAS. HRV was assessed using electrocardiograph (ECG) sensors located on participants' torsos.

Procedure: Participants completed a series of trials that went in the order of Relaxation task → Baseline attention task → **Relaxation task** → Manipulation (social threat followed by anticipatory processing or distraction) task → **Second Attention task** → Memory task.

During the manipulation, all participants were told they would be engaging in a social interaction later in the study, and then they were randomly assigned to either engage in an anticipation task or a distraction task. For the current study, we were only interested in changes between the pre-manipulation relaxation task (Time 1) and the second attention task (Time 2).

Anticipatory Processing Instructions

1) Think about a social situation that you felt did not go well, where you felt uncomfortable or felt that others formed an unfavorable impression of you.
2) Think about how you appeared in that situation: how did you look to others?
3) Imagine how you will appear during the upcoming social interaction.
4) Analyze in as much detail as possible what could go wrong during the social interaction,
5) Anticipate the worst thing that could happen during the social interaction
6) Think about what you would have to do if you made a fool of yourself.

Hypotheses

We expected that those in the AP condition would have a larger decrease in their HRV measures compared to those in the distraction condition.

We expected HSAs to have lower HRV than LSAs throughout the study.

We expected a significant interaction such that HSAs in the anticipation processing condition would have the lowest HRV of all four groups.

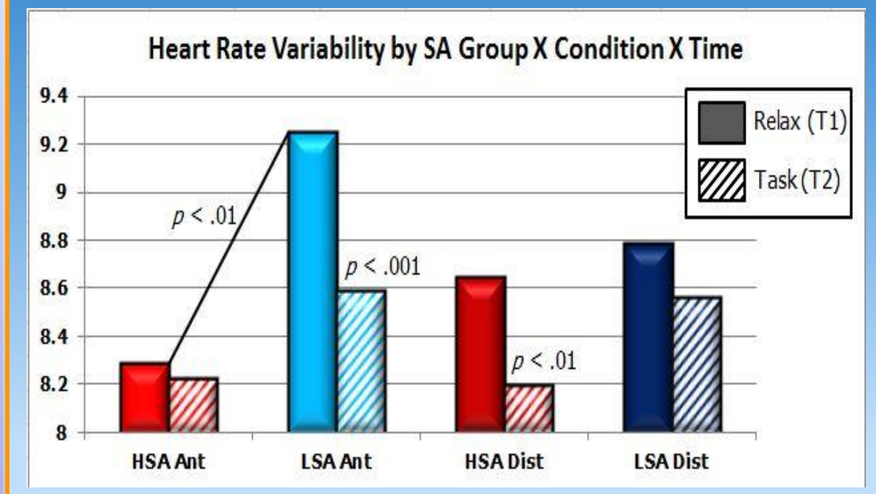

Table 1. Cell means and SDs

		Relaxation	Attention Task
LSA	*Anticipation*	9.25 (.86)	8.59 (.68)
	Distraction	8.78 (.66)	8.56 (.42)
HSA	*Anticipation*	8.29 (.96)	8.23 (.85)
	Distraction	8.64 (.83)	8.19 (.75)

Table 2. Main effect means and SDs

HSA	LSA	*p*
8.34 (.73)	8.79 (.73)	.04*
Anticipate	**Distract**	***p***
8.59 (.74)	8.55 (.73)	.84
Relaxation	**Attn. Task**	***p***
8.71 (.89)	8.37 (.70)	< .001*

Results

The data were analyzed using a 2 (Time; Manipulation, Attention Task) by 2 (SA Status; HSA, LSA) by 2 (Condition:; Anticipation, Distraction) repeated measures ANOVA on HRV. Results found that HSAs in the Anticipation condition had no change in HRV from relaxation to the task ($F[1, 45] = 0.2$, $p = .66$), but LSAs had a significant reduction from relaxation ($M = 9.25$, $SD = 0.86$) to the task ($M = 8.56$, $SD = 0.68$; $F[1, 45] = 18.40$, $p < .001$; Figure 1; Table 1). During the task, HSAs and LSAs in this condition had equivalent levels of anxiety ($p = .21$). HSAs had significantly lower HRV than LSAs during relaxation ($p < .01$). HSAs in the Distraction condition had a significant drop in HRV from relaxation ($M = 8.64$, $SD = 0.83$) to the task ($M = 8.19$, $SD = 0.75$; $F[1, 45] = 10.18$), but LSAs did not experience a change ($p = .15$; Figure 1; Table 1).

There was an overall drop between relaxation ($M = 8.71$, $SD = 0.89$) and the task ($M = 8.37$, $SD = 0.70$; $F[1, 45] = 22.72$, $p < .001$). HSAs ($M = 8.34$, $SD = 0.73$) had lower overall HRV than LSAs ($M = 8.79$, $SD = 0.73$; $F[1, 45] = 4.68$, $p < .05$. There was no main effect of condition ($p = .84$; Table 2).

Discussion

As expected, HSAs had lower HRV than LSAs, which is consistent with other findings about anxiety disorders being associated with lower HRV (Hoehn-Saric & McLeod, 2000; Porges, 2007).

The three way interaction suggested that HSAs were experiencing similar levels of anxiety throughout both time points, but the anticipation manipulation resulted in the LSAs experiencing an increase in anxiety during the task. This drop for LSAs resulted in their HRV being similar to that of HSAs. Similarly, LSAs in the Distraction condition did not experience a significant drop in HRV like the LSAs in the Anticipation condition, suggesting that anticipatory processing was influential for the LSAs in the Anticipation condition. We also found that HSAs in the Distraction condition experienced a significant drop in HRV, suggesting that the attention task was particularly anxiety-provoking for them.

Limitations include using a sample of undergraduates, who may or may not have clinical levels of SAD. Future studies could use clinical interviews to assess level of social anxiety. This methodology would increase the generalizability of our results. Also, only two of several time points were examined in this study.

Nonetheless, these new findings show that anticipatory processing may result in LSAs experiencing similar physiology to that of the HSAs.

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