Do Gut Reactions Matter? How Individuals With and Without Gastrointestinal Symptoms Respond to Emotional Stimuli

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INTRODUCTION

- Functional gastrointestinal (GI) symptoms result from a complex interplay of the brain and gut wherein emotional stimuli (e.g., fear) influence the gut (e.g., altered motility), amplifying GI pain.
- Deficits in emotional processing are also influenced by this brain-gut axis, but there is limited empirical work investigating emotion processes in individuals with functional GI symptoms.
- We *hypothesized* that, relative to healthy controls, individuals with current GI symptoms would experience greater emotional distress and more severe gut sensations following a series of emotion inductions.

METHOD

- Undergraduate students (N = 52; M_{age} = 19.33; 63.5% White) with (n = 28) or without (n = 24) GI distress completed a *series of virtually administered emotion inductions*. State-based measures of negative affect and gut sensations were administered following each induction.
- Inductions targeted anxiety (speech anticipation task), sadness (film clip depicting themes of loss), and disgust (compilation of disgusting video clips).

RESULTS

- See *Figure 1* for gut symptom severity levels among the GI group.
- Negative affect following the *anxiety induction* was significantly higher among the GI group than the control group, $t(47.13) = -2.09$, $d = 0.57$, $p = .04$. See *Figure 2*.
- Gut symptom severity was significantly higher following the *anxiety* ($t[45.72] = -2.64$, $d = 0.72$, $p = .01$) *and sadness* ($t[39.32] = -2.51$, $d = 0.68$, $p = .02$) *inductions* among the GI group than control group. See *Figure 3*.

DISCUSSION

- Acute anxiety may be particularly salient regarding the experience of negative affect and more severe gut sensations among those with GI distress. Sadness may also affect the experience of GI symptoms.
- Given the frequent co-occurrence of anxiety and depressive disorders among those with functional GI disorders, it is prudent for CBT providers to understand how to *simultaneously target emotional disorders and gut sensitivity* for individuals presenting with GI and/or emotional distress.

The experience of **acute anxiety and sadness**, but not disgust, may play an important role in the experience of negative affect and gut symptom severity among individuals with **gastrointestinal distress**.

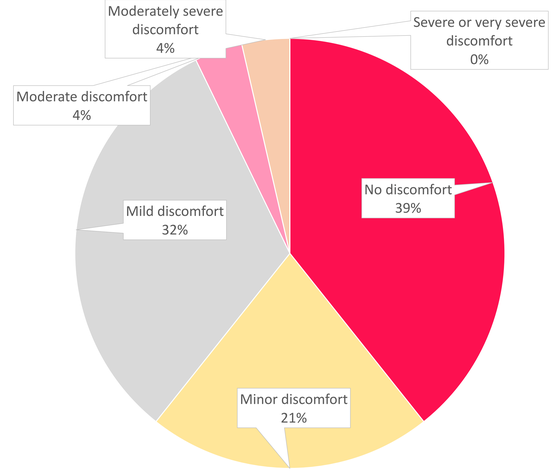

Figure 1. ***Gut symptom severity*** levels within the GI group.

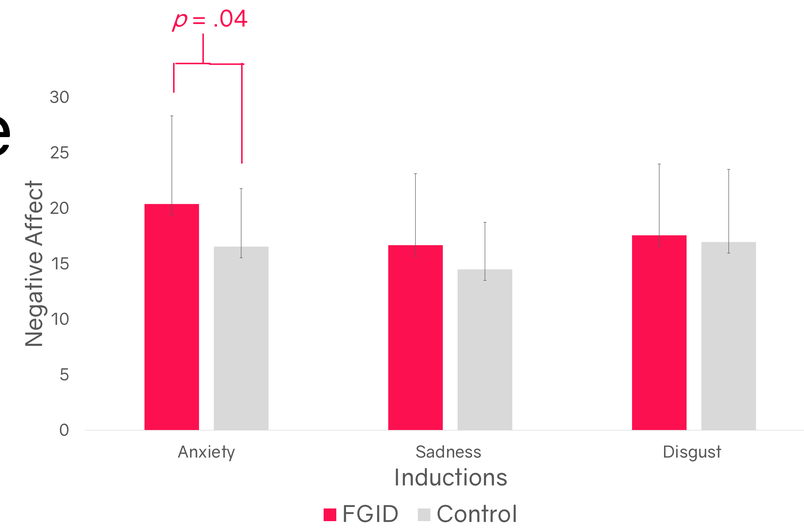

Figure 2. ***Negative affect*** across GI and control groups following emotion inductions.

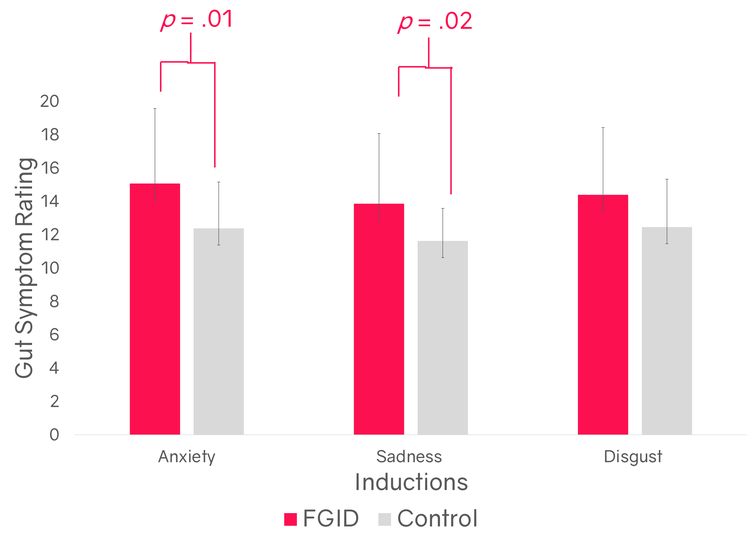

Figure 3. ***Severity of gut sensations*** across GI and control groups following emotion inductions.

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Background: Functional gastrointestinal (GI) symptoms result from a complex interplay of the brain and gut, wherein emotional stimuli (e.g., fear) influence the gut (e.g., altered motility), thereby amplifying visceral pathways to the brain and increasing pain (Drossman, 2016). Dysregulation of this brain-gut axis not only contributes to GI distress, but also deficits in emotional processing including difficulties identifying, understanding, and expressing emotions (Fournier et al., 2018). Despite demonstrable links between the brain and gut, there is limited empirical work investigating emotion processes in individuals with functional GI symptoms. Using an experimental paradigm, we aimed to understand the presence and severity of affect and gut sensations resulting from discrete emotional experiences. We hypothesized that, relative to healthy controls, individuals with current GI symptoms would experience greater emotional distress and more intense gut sensations following a series of emotion inductions.

Method: The sample includes 52 undergraduate students (M_{age} = 19.33; 82.4% female; 63.5% White) with (53.8%) and without (46.2%) current GI distress as assessed by a validated instrument. Experimental study sessions were conducted by videoconference. A series of emotion inductions were conducted to elicit anxiety (speech anticipation task), sadness (film clip depicting themes of loss), and disgust (compilation of disgusting video clips). Immediately following each induction, participants completed state-based measures assessing the presence and severity of negative affect (PANAS) and gut sensations (e.g., stomach ache).

Results: The GI group reported significantly higher negative affect (M = 20.39; SD = 7.94) following the anxiety induction relative to the control group (M = 16.54; SD = 5.24; t(47.13) = -2.09, d = 0.57, p = .04). Additionally, gut symptom severity was significantly higher following the anxiety (t[45.72] = -2.64, d = 0.72, p = .01) and sadness (t[39.32]= -2.51, d = 0.68, p = .02) inductions among the GI group (M_A = 15.07; SD_A = 4.50; M_S = 13.86; SD_S = 4.21) than control group (M_A = 12.38; SD_A = 2.78; M_S = 11.63; SD_S = 1.95). There was a trend towards significance in the disgust induction eliciting higher gut distress in the GI group relative to control group (p = .06); all other group differences were nonsignificant (ps > .05).

Discussion: Data suggest that those with functional GI symptoms may experience greater negative affect relative to healthy controls following acute experiences of anxiety, and that gut sensations may be affected by anxiety- and sadness-provoking stimuli. Through activation of the hypothalamic-pituitary-adrenal axis, anxiety increases visceral signaling and promotes sensitivity to and exacerbation of gut pain (Elsenbruch et al., 2010; Posserud et al., 2004). Additionally, previous research has identified that individuals with functional GI symptoms express sadness to a greater degree than healthy controls (Fournier et al., 2018). Given the frequent comorbidity of GI symptoms and anxiety (30 – 50%; Van Oudenhove et al., 2016), depression (17.4%; Hillila & Farkkila, 2004), and psychopathology more broadly (Singh et al., 2012), it is prudent for CBT providers to understand how to simultaneously target emotional disorders and gut sensitivity for individuals presenting with GI and/or emotional distress.

Measures: Gastrointestinal Symptom Rating Scale; Identification of Physiological Sensations (created for the current study; items based off of GSRS and rating scale based off of S-DERS); Positive and Negative Affect Scale

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