

EGG/COVID-19 and Emotionality

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Chapter 1

Introduction

The EGG and Emotionality

Chapter 2

Study 1 - COVID - About

2.1 Summary

This study will explore the relationship between the global COVID-19 pandemic, somatic symptoms, and psychological stress.

This study will explore the relationship between emotions and somatic symptomatology in the wake of the COVID-19 pandemic, while exploring individual differences in social, environmental, personality, and lifestyle factors which may mitigate or exacerbate the negative psychological impact of this stressor.

The specific aims of this study are to (1) establish a relationship between psychological stress and somatic symptoms as assessed by our newly developed Somatic Symptoms of Negative Affect (somna) questionnaire, (2) investigate the individual differences that might influence the somatic and psychological response to stress (such as early life stress, social support, media consumption, diet and exercise, lifestyle habits, trait variables, etc.), and (3) examine how specific somatic symptoms in the context of stress may relate to mental health.

We will recruit $N = 200$ (minimum 150) adult participants. Participants will be recruited online from the UCLA participant pool in the university term directly after the outbreak of COVID-19. Participants will complete a range of questionnaires assessing current levels of stress, social and emotional support and functioning, physical health symptoms, early life adversity, media exposure and consumption, and lifestyle factors.

2.2 Keywords

stress, emotions, mental health, somatic symptoms

2.3 Background

While we often describe our emotions as “gut feelings”, surprisingly little research has examined how emotions and the gastrointestinal system interact. Given the onset of a global pandemic, the situation provides a unique opportunity to investigate how an emotion inducing real-world event, COVID-19, might influence somatic symptoms and the stress response.

Prior research during public health crises such as the SARS epidemic in 2006 reveal that the stress associated with quarantine during the epidemic was associated with higher symptoms of acute stress disorder and later post traumatic stress symptoms (Bai et al., 2004). However, research also reveals that in the wake of the SARS epidemic, individuals found their friends and family members more supportive (Lau et al., 2006). Similarly, research suggests that social support obtained through social interactions after the events of September 11th, 2001, reduced college students’ symptoms of both depression and physical illness (MacGeorge et al., 2004).

Given that gastrointestinal and mental health problems are highly comorbid, with anxiety five times higher in individuals with irritable bowel syndrome (IBS) than in those with no IBS symptoms (Lee et al., 2009), gastrointestinal and somatic symptoms may serve as a useful indicator of emotional functioning, particularly during this period of heightened awareness of physical health amid the COVID-19 pandemic. For example, stress in early life can affect both emotional and gastrointestinal symptoms and functioning. One study demonstrated that previous adverse care experiences were associated with both increased anxiety and incidence of gastrointestinal symptoms in youth (Callaghan et al., 2019). In addition, early adversity was associated with changes in gastrointestinal microbiome diversity that were correlated with neural activation to emotional faces (Callaghan et al., 2019).

Physiological methods such as heart rate and sweat response are common indicators of emotional arousal, but the electrogastrogram (EGG) is seldom used in psychological research. In one study, researchers found that movie clips capturing emotions of fear, disgust, and sadness, elicited a greater EGG response relative to a neutral condition (Vianna & Tranel, 2006).

Few studies have explored the way that individual differences including early stress, social support, media consumption, and lifestyle factors may mitigate or exacerbate the negative somatic psychological impact of a stressor as well as the way that these variables and emotional functioning may influence the EGG response to negatively emotionally arousing movie clips.

Using questionnaires and electrogastrography, we seek to investigate the relationship between somatic symptoms (particularly gastrointestinal symptoms) gastric myoelectrical activity, and emotional functioning, in the context of a public health crisis as well as during emotionally arousing movie clips. We also hope to explore factors that might influence gastrointestinal responses to emo-

tional arousal, and whether and how physical sensations are associated with emotions and physiological responses. We also hope to evaluate how EGG sits with other physiological measures, such as heart rate and sweat response, in order to explore whether emotional patterning of physiological responses contribute to meaningful differences in emotion regulation, the stress response, and mental health.

2.4 Specific Aims

The study will test several hypotheses.

1. Establish a relationship between COVID-19 stress and somatic symptoms
 - Higher perceived stress during the outbreak of COVID-19 will be associated with greater somatic symptomology on the somna.
 - Increased interoceptive awareness since the onset of COVID-19 will be associated with greater somatic symptomology
 - Increased health anxiety since the onset of COVID-19 will be associated with greater somatic symptomology
2. Examine how specific somatic symptoms in the context of COVID-19 stress may relate to mental health.
 - Somatic symptomology will mediate the relationship between perceived stress and anxiety, depression, and panic.
3. Investigate individual differences that might influence the emotional response to COVID-19 stress (such as early life stress, social support, media consumption, diet and exercise, lifestyle habits, trait variables, etc.).
 - Early life stress will be associated with an increased emotional response to COVID-19 stress.
 - Social support, lifestyle habits (such as sleep, diet, and exercise), personality traits, and media consumption will moderate the association between current stress and emotional response.

Chapter 3

Study 1 - COVID - Methods

3.1 Measures

3.1.1 Information

Title	Name	Description	Reference
info**	Information questionnaire	Assesses demographics, health, and location information	TBD
covid_objective**	Objective impact of COVID-19	Assesses the objective impact of COVID-19 including infection, quarantine, household, social distancing etc.	Ref

3.1.2 Somatic

- Somatic markers of negative affect* (somna)
- Interoceptive awareness (pre-COVID and during)(maia)
 - Not sure about this one as it seems more positive? I feel like we need an awareness one (positive) and a fixation one (negative)

- Health anxiety (pre-COVID and during)
- Somatic symptoms (pre-COVID and during)
- Pennebaker Inventory of Limbid Languidness (pill)
 - Add don't know (don't pay attention to) response
 - Let's modernize a few of these responses?
- Pedsql_gi (maybe pre and during also)
- Medication checklist (add alcohol)(add has this increased or decreased)
- Gastrointestinal disorders
- Rome
- Do we want menstrual_cycle and psst?

3.1.3 Stress

- Coronavirus subjective (concerns questionnaire (CC) - subjective)
- Perceived stress scale (pss)
- Acute stress (stanford acute stress reaction questionnaire) or impact of event scale (ies)
- Early life stress (ctq)(would like to add a duration and impact or frequency and intensity to this)
- Cognitive control and flexibility questionnaire (CCFQ)
- Post-traumatic growth (ptgi)
- leq
- usq

3.1.4 Mental health

- DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure
 - I think maybe we should skip logic this to include the other level 2 dsm questionnaires from online (excluding social, panic, gen, depression, and somatic, which we should get from everyone)
- Social anxiety
- Panic
- General anxiety
- Depression
- State and trait anxiety inventory (stai)
- Depression (bdi_ii)
- Mental health history

3.1.5 Social

- UCLA loneliness scale
- Social craving (may need to adapt substance craving scale)(adapt from food cravings questionnaire - trait and state - may need to also adapt dimensions of social craving)
- Adolescent Social Connection & coping during COVID-19 (ASC3Q)

3.1.6 Personality

- Introversion and extroversion scale
- Tolerance for uncertainty/ambiguity/change (tolerance of ambiguity scale)(intolerance for uncertainty scale)

3.1.7 Lifestyle

- Sleep
- Timeline
- Diet (brief food questionnaire)
- Exercise (adapt the international physical activity questionnaire - pre and during)
- Productivity

3.1.8 Media

- Social media use
- Traditional media consumption
- Public health information consumption
- Use of technology/new media to socialize
- Screen time usage

3.1.9 Qualitative

- Long form qualitative written response (adapted from Pennebaker, 1997)(5-10 minutes timed)

I would like for you to write about your very deepest thoughts and feelings about the way COVID-19 has affected you and your life. I'd like you to really let go and explore your very deepest emotions and thoughts. You might tie your topic to your relationships with others including parents, lovers, friends, or relatives, to your past, your present, of your future, or to who you have been, who you would like to be, or who you are now. All of your writing will be completely confidential. Don't worry about spelling, sentence structure or grammar. The only rule is that you begin writing and keep writing until 5 minutes have passed.

Chapter 4

Study 2 - EGG - About

4.1 Summary

This study will explore the relationship between gastrointestinal activity and emotions utilizing electrogastrography. The specific aims of this study are to (1) establish a relationship between emotionally arousing stimuli and the EGG response, (2) investigate the individual differences that might influence the EGG response to stress (such as early life stress, current stress, trait variables, etc.), (3) examine how the EGG response sits with other physiological indices (such as heart rate and sweat response), and (4) explore the ways in which physical sensations are associated with emotions and physiological responses.

We will recruit $N = 200$ (minimum 150) adult participants. Participants will watch a series of sad, scary, and neutral movies while electrophysiology recordings are made. Then they will complete a range of questionnaires assessing social and emotional functioning, physical health symptoms, early life adversity, and physical health assessments.

4.2 Keywords

egg, stress, emotions, physiology

4.3 Background

While we often describe our emotions as “gut feelings”, surprisingly little research has examined how emotions and the gastrointestinal system interact. Physiological methods such as heart rate and sweat response are common indicators of emotional arousal, but the electrogastrogram (EGG) is seldom used in psychological research. Given that gastrointestinal and mental health problems

are highly comorbid, with anxiety five times higher in individuals with irritable bowel syndrome (IBS) than in those with no IBS symptoms (Lee et al., 2009), gastrointestinal activity may serve as a useful indicator of emotional functioning. In one study, researchers found that movie clips capturing emotions of fear, disgust, and sadness, elicited a greater EGG response relative to a neutral condition (Vianna & Tranel, 2006).

Interestingly, few studies have explored the way that individual differences, such as anxiety, depression, stress, and early adversity might influence the EGG response to these negatively emotionally arousing movie clips. For example, stress in early life can affect both emotional and gastrointestinal symptoms and functioning. One study demonstrated that previous adverse care experiences were associated with both increased anxiety and incidence of gastrointestinal symptoms in youth (Callaghan et al., 2019). In addition, early adversity was associated with changes in gastrointestinal microbiome diversity that were correlated with neural activation to emotional faces (Callaghan et al., 2019).

Using electrogastrography, we seek to investigate the relationship between gastric myoelectrical activity and emotionally arousing movie clips. We also hope to explore factors that might influence gastrointestinal responses to emotional arousal, and whether and how physical sensations are associated with emotions and physiological responses. We also hope to evaluate how EGG sits with other physiological measures, such as heart rate and sweat response, in order to explore whether emotional patterning of physiological responses contribute to meaningful differences in emotion regulation, the stress response, and mental health.

4.4 Specific Aims

The study will test several hypotheses.

1. Establish a relationship between emotionally arousing stimuli and the EGG response.
 - There will be a greater EGG response (i.e. average peak amplitude) for the sad and scary movie condition relative to the neutral movie condition.
 - The intensity of subjective emotion will be positively correlated with EGG response.
2. Investigate the individual differences that might influence the EGG response to stress (such as early life stress, current stress, trait variables, etc.)
 - Increased levels of emotional distress, such as anxiety and depression, will be associated with greater EGG response during the emotionally arousing movie conditions.
 - Early life stress will be associated with greater EGG response in the emotionally arousing movie conditions, relative to individuals who

did not experience early life stress.

- Greater current and perceived stress will be associated with greater EGG response in the emotionally arousing conditions.
3. Examine how the EGG response sits with other physiological indices (such as heart rate and sweat response)
 - The EGG response will be associated with other physiological indices of emotional arousal, such as heart rate and sweat response.
 4. Explore the ways in which physical sensations are associated with emotions and physiological responses
 - Lower interoceptive awareness will be associated with greater physiological responses to emotionally arousing stimuli.
 - Higher somatic symptomology will be associated with greater physiological responses to emotionally arousing stimuli.
 - Distinct dimensions of physical sensations and physiological responding will be positively correlated.
 - Gastrointestinal symptoms will be associated with both greater anxiety and greater EGG response to emotionally arousing stimuli.

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