

Analyzing Between-Group Differences in Physiological Arousal During In-Session Weighing for Individuals With Approach and Avoidance Weighing Tendencies

Introduction:

Electrodermal activity (EDA) is a measure of skin conductance from two separate points that demonstrates a level of arousal in response to a specific stimulus. In most cases, using EDA data is a way in which researchers are able to understand an objective response level from the body due to sympathetic activity. This activity links together emotions, as well as some kind of physiological response, as mentioned prior, to some stimuli or at a baseline level to see the change in feedback from the data points (Braithwaite et al., 2013, p. 3) EDA is a dyad; this data will usually consist of parts that can be broken down into tonic EDA and phasic SCRs. According to Braithwaite et al. (2013), tonic-level EDA, "... relates to slower acting components and background characteristics of the signal (the overall level, slow climbing, slow declinations over time)" (p. 4). Skin Conductance Level (SCL) is used to measure tonic-level EDA (Braithwaite et al., 2013, p. 4). To complete the other part of the dyad in EDA, Braithwaite et al. suggests, "The other component is the phasic component and this refers to the faster changing elements of the signal – the Skin Conductance Response (SCR)" (p. 4). These interesting constituents that compose SCRs are non-specific and event-related. With this information, we are able to differentiate an Event-related SCR (ER-SCR) which can be attributed to an autonomic response from a specific stimuli or a Non-specific SCR (NS-SCR) which occurs without an obvious stimuli eliciting a response (Braithwaite et al., 2013, p. 4). Typically, this data can be cleaned and analyzed using the BIOPAC *AcqKnowledge* program. This Microsoft-corresponding program, "...is an interactive, intuitive program that lets you instantly view, measure, transform, replay, and analyze data" (BIOPAC *Systems*, Inc., n.d.). The study at hand will involve cleaning and interpreting EDA data from the carpal region of the body, the E4 Empatica wristband, and an excel spreadsheet.

The EDA data being analyzed in this study is from an experiment involving in-session weighing for Enhanced Cognitive Behavioral Therapy (CBT-E). For individuals suffering from or diagnosed with an eating disorder (ED), individuals may experience a variety of symptoms in conjunction with said disorders. A symptomatology prevalent among Anorexia Nervosa (AN) and Bulimia Nervosa (BN), among others, is consistent weight and body checking. Haase et al. (2010) gives the following details regarding the manifestation and meaning of body-checking:

Body checking is a behavioral manifestation of the over-evaluation of weight and shape that is central to the eating disorder. It includes constant checking of general appearance and specific body parts to assess weight and shape. It can be seen as a safety behavior, reducing anxiety short-term but increasing anxiety and distorted shape/weight cognitions long-term... These cognitions can perpetuate the repetitive, idiosyncratic, and self-maintaining nature of body checking behaviors..." (p. 465).

Body-checking and constant weight-checking can have an obvious influence on an individual suffering from, as well as seeking treatment from, a diagnosed ED. When it comes to ED treatment, there are many resources one may seek out. A common and highly used treatment form for EDs is Cognitive Behavioral Therapy (CBT). A more detailed description to the purpose of using CBT, and in this case, Enhanced Cognitive Behavioral Therapy (CBT-E) is seen in a detailed systematic review of the therapy-type:

On the basis of this updated, transdiagnostic theory, two versions of an "enhanced" cognitive behavioral therapy for eating disorders (CBT-E) were developed. The "focused" version (CBT-Ef) addresses core eating disorder psychopathology and mood intolerance. The "broad" version (CBT-Eb) also addresses one or more of the three additional maintaining processes, as relevant to the patient's individual conceptualization (Atwood & Friedman, 2019, p. 312; Fairburn, 2008).

In CBT and CBT-E sessions for EDs, patients are subject to weekly weigh-in sessions. Weight check-ins can be used for a variety of reasons during weekly CBT sessions for EDs. These reasons include, but are not limited to, monitoring for weight restoration in the patient (if needed) or to reduce the power of the scale for the individual (Warren, 2020). With this being said, the physical act of seeing one's weight during a treatment session may have many feelings accompanied with physical arousal. In this study, I am looking at EDA data in conjunction with physiological arousal, and attempting to discover if there is some sort of correlation between the two.

To better understand this phenomenon, I want to introduce two key concepts in regards to weighing tendencies and the meaning of these concepts as it relates to seeing and knowing one's weight. For individuals that identify as sensitive to reward (SR), these individuals may partake in frequent weight-checking because there is positive reinforcement (PR) upon seeing weight loss. Alongside with this correlation, individuals that fall under the sensitive to punishment (SP) identification, may take an approach to weight checking but side more with negative reinforcement (NR) because they are doing the action to avoid instantaneous anxiety (Kambanis, 2020). For individuals that are identified, through the AAWQ questionnaire (Kambanis et al., 2020), of having an avoidance weighting tendency (WT), they may also be coupled with the SP categorization. This is due to the idea that individuals will avoid checking their weight to avoid momentary and instantaneous anxiety upon knowing and seeing their weight (Kambanis, 2020).

With all of the information I have presented above, I hypothesize that participants that identify as an avoidant weighing tendency will demonstrate higher levels of distress/arousal in comparison to their approach weighing tendency constituents. In addition, I hope that the investigation allows for increased understanding of one's unconscious reactions to seeing and knowing their weight and approaching in-session weighing as something that will benefit clients receiving treatment for EDs, and in turn allow for desensitization to weight, as well as allowing for client-weight restoration throughout treatment.

Methodology

As mentioned in the introduction, this study will involve organizing, cleaning, and analyzing participant EDA data. The organizational aspect, as well as the cleaning aspect, of this study will be completed using an excel sheet. This program takes the recorded E4 Empatica wristband's physiologically-recorded data and uploads it in a form that is workable.

Following the cleaning of this data, a data analysis will be completed using ANCOVA. This process will consist of interpreting the individuals' physiological reactions, as measured by the electrodes, to find a correlation between the physiological arousal and the WT.

Impact of Research

This research can have many future implications in terms of EDs and ED treatment. As mentioned in the introduction, WT are a key concept in a multitude of ED psychopathologies. WT tends to be one of the key symptoms identified in a variety of EDs.

The process in which data is cleaned, analyzed and interpreted is not always an easy job. More common than not, data analysis is quite difficult and can be a time-consuming process for many, leading to research studies and publications to be drawn out over a multitude of months or years. In finding a systemized way of cleaning data, research study completion may be accelerated in the future for investigations similar to this one. Along with in-depth data analysis and understanding of the process by the researcher(s), the scope to which data can be analyzed can be much more profound, allowing for a more comprehensive knowledge of the subject at hand.

Personal Scholarly Development

With my time in the Eating Behaviors Laboratory, I have had the opportunity to gain a variety of skills that I would not have acquired elsewhere. These skills include reading and evaluating completed qualitative and quantitative studies; working with participants in a laboratory setting; operating physiological devices such as heart rate monitors, calorimeters, and electrodermal attachments; and finally, partaking in a variety of ED-related research studies. With this study, I am expanding on my interpersonal and psychophysiological skills. In addition, I am aiding in a graduate thesis under my mentor which has benefited me in innumerable ways. The skills I have acquired within and outside of this research study I hope to have after the study.

Bibliography

Atwood, M. E., & Friedman, A. (2019). A systematic review of Enhanced Cognitive Behavioral therapy (CBT-E) for eating disorders. *International Journal of Eating Disorders*, 53(3), 311–330. <https://doi.org/10.1002/eat.23206>

This source was used to extract information regarding CBT and CBT-E. This article posed information discussing what exactly these therapy types consist of and how that applies to the eating disorder field. I found it beneficial to use the provided therapy definitions for understanding the reader in terms of what direction we were going with in this specific study and how it can be implemented long term.

BIOPAC Systems, Inc. (n.d.). *Acqknowledge Software*. BIOPAC Systems, Inc. Retrieved March 31, 2022, from <https://www.biopac.com/product/acqknowledge-software/>

This website gave a detailed perspective into the purpose of the software itself. The information presented on this website acted as an overview of what the program will do with the collected data. However, I ended up using a calculated formula and excel sheets to organize the data but this can be a viable option for looking at EDA in its raw form.

Braithwaite, J. J., Watson, D. G., Jones, R., & Rowe, M. (2015). *A Guide for Analysing Electrodermal Activity (EDA) & Skin Conductance Responses (SCRs) for Psychological Experiments*. Retrieved April 1, 2022, from <https://www.lancaster.ac.uk/media/lancaster-university/content-assets/documents/psychology/ABriefGuideforAnalysingElectrodermalActivityv4.pdf>

This guide provides an in-depth explanation of measuring and cleaning EDA data. The authors of this article also provide a basis for what EDA consists of and exactly what it assesses on and within the body. This acted as a step-by-step manual for using the *AcqKnowledge* software within this study.

Haase, A. M., Mountford, V., & Waller, G. (2010). Associations Between Body Checking and Disordered Eating Behaviors in Nonclinical Women. *International Journal of Eating Disorders*, 44(5), 465–468. <https://doi.org/10.1002/eat.20837>

This article provided details regarding body checking in women. Women, especially white women, are an overstudied group in terms of eating disorders (EDs) but weight and body checking tendencies are a common pathology. For my research study, I used the information presented in this article to give information regarding the background information for why a study such as this may be created.

Kambanis, P. E. (2020). *Weighing the Benefits: Examining Differences in Response to the Cbt In-Session Weighing Procedure According to Weighing Tendencies* (thesis).

This source was the most useful for the creation of this project. I am using the information presented here, as well as the data collected, to create more conclusions for

the study itself and to establish a systemized structure for data-cleaning. The information presented in this thesis is very beneficial for understanding the processes that occur with different weighing tendencies.

Kambanis, P. E., Bottera, A. R., & De Young, K. P. 2020. Development and validation of a questionnaire assessing weighing tendencies: The Approach/Avoidance of Weighing Questionnaire (AAWQ). From <https://doi.org/10.1080/10640266.2020.1833620>

This source is from a group of researchers, as well as the lab director, in the lab I currently work in. The three of the authors created a questionnaire for the parent study to identify avoidance and approach weighing tendency classification for participants. In this proposal, I used this information to introduce how the participants will be grouped when carrying out my research.

Warren, M. (2020, August 31). *Weighing in on weigh-ins in eating disorder treatment*. The Emily Program. Retrieved April 1, 2022, from <https://www.emilyprogram.com/blog/weighing-in-on-weigh-ins-in-eating-disorder-treatment/>

This website is based off of a program dedicated to working with individuals that suffer from eating disorders and is creating a space for resourceful information for these and other individuals. I used the information from this website, and specifically from a professionally written blog, to give reasoning as to why weigh-in sessions are a part of eating disorder treatment. I included this information because the data analysis in my study is based off of an in-session weighing experiment.