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## Heart Rate Variability: The Effects of Self-Compassion

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Heart Rate Variability: The Effects of Self-Compassion

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## Abstract

Psychologists are interested in self-compassion and its effects on our biopsychological well-being. A common method found throughout much research in assessing this is through heart rate variability. In the present study, we attempt to see whether or not self-compassion has an impact on one's heart rate variability as a higher HRV indicates one is better able to adapt to stress. Self-compassion was measured through a self-compassion survey and we hypothesized that heart rate variability would then be prone to change across three 5-minute test intervals. We unfortunately found no significant change in HRV predicted by our hypothesis. Given the results of previous research in this area and our lack of a larger number of participants however, there is still reason to be looking into the effects of self-compassion on heart rate variability.

Social evaluative stressors are a part of everyday life that humans face as we are constantly being evaluated by others. Whether it's just by our peers or through job and academic performance appraisals, people must sometimes face harsh criticisms that can result in harming both our biological and psychological well-being. This has led to a growing amount of research focusing on self-compassion as it has been shown to help one overcome the evaluative stresses we face on a day to day basis. Self-compassion has been described as compassion turned inward and refers to how we relate to ourselves in instances of perceived failure, inadequacy, or personal suffering (Neff, 2016). Neff also describes it to have a positive and negative pole that represents self-kindness versus self-judgment (2016). Self-kindness is the more ideal side of the spectrum as it allows one to be more supportive and understanding toward oneself while self-judgment makes one critical of oneself for any personal shortcomings. One who is more self-kind would more likely be able to overcome evaluative stressors. The self-compassion scale has been used in a significant amount of research that attempts to assess trait levels of self-compassion. The scale was designed to explicitly represent the thoughts, emotions, and behaviors that are linked with the various components of self-compassion (Neff, 2016).

The self-compassion scale consists of Self-kindness items, self-judgment items, common humanity items, isolation items, mindfulness items, and over-identified items (Neff, 2003). Subscale scores are computed by calculating the mean of subscale items responses. In order to compute a total self-compassion score, negative subscale items must be reversed scored before calculating subscale means and then one can compute a grand mean of all six subscale means.

Other means of self-compassion training such as meditation has been used in other research in order to reduce social evaluative threat responding (Arch, Brown, Brown, Dean, Landy, & Laudenslager, 2014). In their studies, Arch, Brown, Brown, Dean, Landy, and

Laudenslager investigated whether brief training in self-compassion moderated biopsychological responses to the Trier Social Stress Test in women. Their results showed that in comparison to the no-training control conditions, the self-compassion training helped participants minimize negative biopsychological responses.

Other research has looked more into the relation between self-compassion and psychophysiological measures. Binder, Dundas, Nordby, Osnes, Schanche, Sorensen, Svendsen, & Visted looked at the relation between self-compassion and heart rate variability (2016). A heart rate variability that is described to be high indicates healthy heart function and is suggested as a physiological index of emotion regulation capacity, which allows for one to effectively adapt to stressful situations (Binder, Dundas, Nordby, Osnes, Schanche, Sorensen, Svendsen, & Visted, 2016). The researchers found that higher levels of self-compassion predicted higher levels of vagally mediated heart rate variability (vmHRV).

Although a good amount of research has been done in the area, there is still much more to be studied as Silvia, Jackson, and Sopko question whether or not heart rate variability truly does reflect stable positive emotionality due to past research finding non-linear effects (2014). The researchers in this study had participants complete a wide range of measures that reflected positive psychological functioning and followed through with measuring heart rate variability that was quantified using multiple common HRV metrics. Results showed neither linear nor non-linear effects suggest that the cross-sectional relationship between heart rate variability and positive experience needs more attention and meta-analytic synthesis (Silvia, Jackson, and Sopko, 2014).

In the present study, we tested whether a self-compassion survey would have an effect on heart rate variability over the course of three 5-minute test intervals. We predicted that based on

the previous research mentioned, with self-compassion training having some influence on heart rate variability, the survey would change one's level of heart rate variability depending on whether or not the participant was more self-kind or self-judgmental. Therefore, we hypothesized that heart rate variability would change across the three test intervals of five minutes.

## **Method**

### **Participants**

Participants included 4 males and 8 females for a total of 12 undergraduate college students from the College of Saint Benedict and Saint John's University. Participants were required to take part in the research as part of a lab through a Physiological Psychology course.

### **Materials**

Participants were asked to take part in an experiment that measured heart rate variability through a Biopac Machine (Model MP150). Three electrodes were used and attached to the participant's body with the use of gel from the Biopac Machine. A self-compassion survey was also used and administered online through surveymonkey.com. This was taken in individual testing cubicles before heart rate variability measurement for some participants and after for others. The total amount of time to complete both was about 30 minutes.

### **Procedure**

The experiment ran by first having participants come into the testing room and attach three electrodes to their bodies. One on the left side just below the collar bone, one on the right side just below the collar bone, and one on the left side just below the rib cage. Participants were then instructed to sit down and have the electrodes sit for a minimum of 5 minutes before going forward with the experiment. After the 5 minutes, the experimenter then instructed the

participant to remain seating and stay still as a data file was started at the beginning of data collection through the use of the Biopac Machine and a computer. A new data file was started at the end of each 5-minute segment for a total of 15 minutes. Throughout this 15-minute period, the participant is sitting in the room with other participants present who in turn will also have their heart rate variability measured as all participants collected data from each other. Some of the participants completed the self-compassion survey before the heart-rate variability testing while others completed it after. Surveys were taken online in individual cubicles within a testing room. After saving data files at the end of each 5-minute segment for each participant, all data identifiers were removed after the data was collected.

### **Results**

Two different measures of heart rate variability were computed, the root mean squared standard deviation and the ratio of high frequency and low frequency output which represents autonomic balance. We analyzed totals and subscale totals for all the surveys. The root squared standard deviation was computed for each of the three 5-minute test intervals. Researchers ran a repeated measures ANOVA using SPSS and correlated an F statistic ( $F(2,16) = 0.12$ , n.s.). This showed that we did not find any significant difference between the test intervals. A Pearson's Correlation was used to find a correlation between the self-compassion scale and heart rate variability. The results showed ( $r(8) = -.633$ ,  $p = .09$ , n.s.). This also showed no significance in finding a correlation between the two.

### **Discussion**

We hypothesized that heart rate variability would change across the three 5-minute time intervals. Although our results did not show a significant change between the test intervals to support this prediction, there was potential if not due to a small number of participants. It can be

safe to say that our results could have been significant given a bigger sample population to work with. Therefore, it can be assumed that a larger amount of people would have helped to replicate the past research showing that a higher amount of self-compassion results in a larger heart rate variability.

A concern with the study that may have affected the results is whether participants took the self-compassion survey right before having their heart rate variability measured or some time after. There was no solid structure with this part of the research as participants simply volunteered to go first or later when it came to measuring HRV or taking the survey. Future studies could examine other methods of measuring self-compassion such as through meditations or repeating positive words of encouragement.



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