PROMOTING RESILIENCE TO STRESS IN DEPRESSION

by

Alison Elizabeth Tracy
B.A. Hons., The University of British Columbia, 2016

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF
MASTER OF ARTS
in
THE FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES
(Clinical Psychology)

THE UNIVERSITY OF BRITISH COLUMBIA
(VANCOUVER)
AUGUST 2018

© Alison Elizabeth Tracy, 2018
The following individuals certify that they have read, and recommend to the Faculty of Graduate and Postdoctoral Studies for acceptance, a thesis/dissertation entitled:

Promoting Resilience to Stress in Depression

submitted by Alison Elizabeth Tracy in partial fulfillment of the requirements for
the degree of Master of Arts
in Clinical Psychology

Examinining Committee:

Dr. Joelle LeMoult, Clinical Psychology
Supervisor

Dr. Frances Chen, Health Psychology
Supervisory Committee Member

Dr. David Klonsky, Clinical Psychology
Supervisory Committee Member

Additional Examiner

Additional Supervisory Committee Members:

Supervisory Committee Member

Supervisory Committee Member
Abstract

Depression is one of the most common psychiatric illnesses, and is the leading cause of disability worldwide. Research suggests that stress and subsequent responses to stress play a central role in exacerbating depressive symptoms and prolonging depressive episodes. It is, therefore, important to understand the factors that may be hindering recovery from stress, and to test what can promote effective recovery from stress. One adaptive response to stress is self-compassion. Numerous studies have demonstrated an inverse association between self-compassion and depressive symptoms, with a recent meta-analysis finding a large mean effect size (MacBeth & Gumley, 2012). Subsequently, recent research has suggested that self-compassion may be a resiliency factor that protects against both the development and maintenance of depressive episodes (Ehret, Joormann, & Berking, 2015). The extant literature, however, is limited by its reliance on correlational design and self-report data. The goal of the current study was to extend previous research by looking at the effect of experimentally induced self-compassion on both emotional and biological recovery from stress in depression. Participants experiencing elevated depressive symptoms completed a standardized psychosocial stressor – the Trier Social Stress Test (Kirschbaum, Pirke, & Hellhammer, 1993) – and were randomly assigned to one of two stress-response inductions: self-compassion or a no-strategy control condition. It was hypothesized that the self-compassion induction would be significantly more effective than the control condition at promoting recovery from stress, as indicated by self-report measures of affect and measurements of salivary cortisol, the primary stress hormone. Results suggested that the self-compassion induction was more effective than the control in reducing anxious affect immediately after the induction. However, the self-compassion induction did not have an effect on recovery from stress as measured by levels of depressed affect or salivary cortisol. By
investigating self-compassion, the current study has the potential to improve our understanding of factors that promote psychobiological recovery from stress in depression.
Lay Summary

Depression is the most prevalent mental illness in Canada, and it is associated with substantial costs. Research suggests that stress and responses to stress play a central role in the development and maintenance of depressive episodes. Self-compassion is an adaptive response to stress that is theorized to promote resilience to depression. The goal of the current study was to extend previous research by looking at the effect of self-compassion on both emotional and biological recovery from stress in depression. Results suggested that self-compassion was more effective than the control in reducing anxious affect immediately after the induction. However, self-compassion did not have an effect on recovery from stress as measured by levels of depressed affect or cortisol. By investigating self-compassion, the current study has the potential to improve our understanding of factors that promote psychobiological recovery from stress in depression.
Preface

This thesis is original and unpublished work by the author, A. Tracy. The study was covered by UBC Ethics Certificate number H17-00016 and was conducted in the Depression, Anxiety, and Stress Laboratory at the University of British Columbia. Dr. J. LeMoult was the supervisor on this project and was involved throughout the project in concept formation and manuscript edits.
Table of Contents

Abstract .......................................................................................................................................... iii
Lay Summary ................................................................................................................................... v
Preface............................................................................................................................................ vi
Table of Contents .......................................................................................................................... vii
List of Tables .................................................................................................................................. x
List of Figures ............................................................................................................................... xi
Acknowledgements ....................................................................................................................... xii
Dedication ................................................................................................................................... xiii

CHAPTER 1  Introduction............................................................................................................1
  1.1 Stress and Depression .................................................................................................2
  1.2 Self-Compassion ......................................................................................................4
  1.3 Biological Stress Response in Depression ............................................................6
  1.4 Current Study ..........................................................................................................8
  1.5 Hypothesis ..............................................................................................................9

CHAPTER 2  Method.....................................................................................................................10
  2.1 Participants ................................................................................................ ............10
  2.2 Measures of Stress Reactivity and Recovery .......................................................12
    2.2.1 Depressed and Anxious Affect ....................................................................12
    2.2.2 Salivary Cortisol .......................................................................................12
  2.3 Questionnaires ........................................................................................................13
    2.3.1 Beck Depression Inventory- Second Edition ... ...............................13
    2.3.2 Self Compassion Scale-SF-Trait .........................................................13
    2.3.3 Self Compassion Scale-SF-State .........................................................14
    2.3.4 Health & Demographics ......................................................................14
  2.4 Procedure ..................................................................................................................14
    2.4.1 Prescreening ............................................................................................15
    2.4.2 Main Laboratory Procedure ................................................................15
CHAPTER 3  Results..................................................................................................................22
  3.1 Preliminary Analysis.................................................................................................22
    3.1.1 Anxious Affect Measure ...............................................................................22
    3.1.2 Depressed Affect Measure ............................................................................22
    3.1.3 Cortisol Measure .........................................................................................23
    3.1.4 Demographic and Clinical Characteristics ....................................................24
    3.1.5 Correlation between Affect and Cortisol Reactivity ....................................27
  3.2 Main Data Analysis..................................................................................................27
    3.2.1 Hypothesis 1 ...............................................................................................27
      3.2.1.1 Anxious Affect .................................................................................28
      3.2.1.2 Depressed Affect .............................................................................32
    3.2.2 Hypothesis 2 ...............................................................................................36
  3.3 Exploratory Analysis ...............................................................................................39
    3.3.1 Attention Check ............................................................................................39
    3.3.2 SCS-state Scores ..........................................................................................40
    3.3.3 Stress-Reactive Participants .........................................................................40
    3.3.4 High BDI Participants ..................................................................................43

CHAPTER 4  Discussion .......................................................................................................47
  4.1 Participant Characteristics ....................................................................................48
4.2 Anxious Affect ........................................................................................................50
  4.2.1 Stressor Effectiveness ......................................................................................50
  4.2.2 Stress Recovery .............................................................................................51
4.3 Depressed Affect ..................................................................................................53
4.4 Salivary Cortisol ..................................................................................................55
4.5 Limitations and Future Directions .......................................................................57
4.6 Conclusions .........................................................................................................58

REFERENCES ..............................................................................................................60
APPENDIX A  HSP Pre-Screening Questionnaire .......................................................71
APPENDIX B  Telephone Interview ............................................................................72
APPENDIX C  No-Strategy Control Induction .............................................................82
APPENDIX D  Self-Compassion Induction .................................................................83
APPENDIX E  Debriefing Form ..................................................................................85
APPENDIX F  Debriefing Script ..................................................................................87
APPENDIX G  Wellbeing Resource Sheet .................................................................88
List of Tables

Table 3.1 Descriptive Statistics for Anxious Affect Measurements ...........................................22
Table 3.2 Descriptive Statistics for Depressed Affect Measurements ...........................................23
Table 3.3 Descriptive Statistics for Winsorized Cortisol Measurements .....................................24
Table 3.4 Participant Characteristics ..........................................................................................26
Table 3.5 Paired Samples $t$-test Comparisons of Anxious Affect Scores for the Control Condition ..............................................................................................................30
Table 3.6 Paired Samples $t$-test Comparisons of Anxious Affect Scores for the Self-Compassion Condition .....................................................................................................31
Table 3.7 Paired Samples $t$-test Comparisons of Depressed Affect Scores for the Control Condition ...................................................................................................................34
Table 3.8 Paired Samples $t$-test Comparisons of Depressed Affect Scores for the Self-Compassion Condition .....................................................................................................35
Table 3.9 Paired Samples $t$-test Comparisons of Winsorized Cortisol Levels for All Participants ..............................................................................................................................38
<table>
<thead>
<tr>
<th>Figure Number</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2.1</td>
<td>Procedural Timeline</td>
<td>15</td>
</tr>
<tr>
<td>Figure 3.1</td>
<td>Anxious Affect Ratings</td>
<td>32</td>
</tr>
<tr>
<td>Figure 3.2</td>
<td>Depressed Affect Ratings</td>
<td>36</td>
</tr>
<tr>
<td>Figure 3.3</td>
<td>Winsorized Cortisol Values</td>
<td>39</td>
</tr>
<tr>
<td>Figure 3.4</td>
<td>Anxious Affect Ratings for Participants with Strong Stress Reaction</td>
<td>41</td>
</tr>
<tr>
<td>Figure 3.5</td>
<td>Depressed Affect Ratings for Participants with Strong Stress Reaction</td>
<td>42</td>
</tr>
<tr>
<td>Figure 3.6</td>
<td>Winsorized Cortisol Values for Participants with Strong Stress Reaction</td>
<td>43</td>
</tr>
<tr>
<td>Figure 3.7</td>
<td>Anxious Affect Ratings for Participants with High BDI Scores</td>
<td>44</td>
</tr>
<tr>
<td>Figure 3.8</td>
<td>Depressed Affect Ratings for Participants with High BDI Scores</td>
<td>45</td>
</tr>
<tr>
<td>Figure 3.9</td>
<td>Winsorized Cortisol Values for Participants with High BDI Scores</td>
<td>46</td>
</tr>
</tbody>
</table>
Acknowledgements

First and foremost, I would like to thank Dr. J. LeMoult, who has provided integral support throughout this project. I would also like to thank the members of my thesis committee, Dr. E.D. Klonsky and Dr. F. Chen, who provided valuable feedback during the planning stages. Further, the study would not have been possible without the members of the Depression, Anxiety, and Stress lab who worked hard to run the participants, act as confederates, complete data entry, and assist with other tasks. Specifically, I would like to thank Coral More, Ellen Jopling, Eunice Ip, and the following research assistants: Amarpreet Grewal, Julia Chung, Matt Burke, Oonagh Fogarty, Cris Bude, Claudia Cinotti, Romina Abedi, Lucia Dahlby, Millie Batta, Parky Lau, Steffa Ufnal, and Massih Mortazavi.

This research project was supported by a Frederick Banting and Charles Best Canada Graduate Scholarship from the Canadian Institutes of Health Research (CIHR), a UBC Faculty of Arts Graduate Research Award, and a Psychology Foundation of Canada Student Research Grant awarded to A. Tracy.

Special thanks are also owed to my partner, family, and friends for their ongoing support.
Chapter 1: Introduction

Depression is the most prevalent mental disorder in Canada, and it is associated with substantial personal and societal costs. Approximately 11.3% of Canadian adults- 3.2 million people- report symptoms consistent with depression at some point during their lifetime (Pearson, Janz, & Ali, 2013). Depression is characterized by a period of time in which individuals experience a depressed or down mood, loss of interest or pleasure in activities they used to enjoy, as well as additional physical, emotional, and cognitive symptoms. These symptoms impact every part of an individual’s life, from their relationships and leisure activities, to their education and work. Beyond the distress and impairment at the individual level, society as a whole is greatly impacted by depression. It is estimated that the disorder costs the Canadian economy $32.3 billion per year in productivity loss alone (Stonebridge & Sutherland, 2016).

At its extreme, some individuals who experience depressive symptoms meet criteria for Major Depressive Disorder (MDD) as defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 2013). The DSM provides a categorical classification of depression, which captures clinically significant psychiatric functioning, but does not assess depressive symptoms on a broad spectrum. One major limitation of this categorical classifications is that it does not capture sub-clinical depressive symptoms and traits. For this reason, relying exclusively on the DSM definition of depression has been criticized, and recently researchers have called for a more dimensional view of psychopathologies (e.g., Widiger & Samuel, 2005).

An alternative approach to defining depression is through the use of self-report measures such as the widely used Beck Depression Inventory (BDI; Beck, Steer, & Brown, 1996). Using a self-report measure, like the BDI, can capture a wider range of functioning from healthy to sub-
threshold to clinically significant (Widiger & Samuel, 2005). An individual may not meet the strict criteria required for a diagnosis of MDD according to the Diagnostic and Statistical Manual of Mental Disorders (DSM), and still be suffering a number of symptoms. Individuals experiencing elevated symptoms of depression, without necessarily meeting all of the criteria, are vulnerable to the same types of risk factors as those diagnosed with MDD, and they experience significant health decline (Ayuso-Mateos, Nuevo, Verdes, Naidoo, & Chatterji, 2010). Thus, it may be particularly important to define depression using the BDI, in order to capture a wider range of individuals experiencing depressive symptoms.

1.1 Stress and Depression

An extensive body of research has provided empirical evidence for the role of stress in the onset, maintenance, and recurrence of depression. Research suggests that most depressive episodes are preceded by stressful life events (Hammen, 2005). In fact, amongst studies assessing community samples, it was determined that stressful life events preceded 80% of depression cases (Mazure, 1998). Of greatest relevance to the current study, is the role that stress and subsequent responses to stress play in the exacerbation of symptoms and the prolonging of depressive episodes (Hammen, 2005). Consequently, research is increasingly focused on how reactions to stress may sustain negative affect and dysregulation for those experiencing depressive symptoms.

Importantly, there are different types of stress and not all types are equally likely to lead to, or exacerbate, depression. The strongest line of research has focused on interpersonal loss as a stressor and its unique relationship to depression. Research suggests that stressors involving relationships are very commonly reported among depressed individuals, particularly depressed women (Tennant, 2002; Kendler, Walters, Neale, Kessler, Heath, & Eaves, 1995). This research
on interpersonal loss has been expanded to include a related concept: loss of self-esteem (Brown & Dutton, 1995; Finlay-Jones & Brown, 1981). Most interpersonal events that cause stress can be viewed as “dependent” in nature—meaning the person has in some way contributed to the occurrence of the event. These “dependent” types of stressors often contribute to self-esteem and research has shown that they are more predictive of depression than independent types of stressors (Kendler, Karkowski, & Prescott, 1999).

Therefore, when studying the relationship between stress and depression it may be most pertinent to study stress that is interpersonal and dependent in nature, and more specifically stress that could negatively affect self-esteem. For this reason, a particularly effective stress induction is the Trier Social Stress Test (TSST; Kirschbaum et al., 1993), a psychosocial stressor in which individuals must perform a speech and math task in front of a panel of confederates trained to give no positive verbal or non-verbal feedback. The TSST is the gold-standard among laboratory stressors and it effectively mirrors the stress and fear associated with interpersonal rejection and loss of self-esteem that is so salient to depression (Coyne, 1976).

Furthermore, the way in which individuals recover from stressful events plays an important role in their subsequent risk for depression (Mitchell, Cronkite, & Moos, 1983). Effective stress recovery is vital in protecting against the development and exacerbation of depression. Therefore, it is important to examine factors that could promote effective recovery from stress. One factor that has been increasingly examined in connection to depression is self-compassion.
1.2 Self-Compassion

Recently, the construct of self-compassion has been proposed as an adaptive means of relating to oneself (Neff, Kirkpatrick, & Rude, 2007). Further, it has been suggested that self-compassion may be a resiliency factor that protects against both the development and maintenance of depressive episodes (Ehret et al., 2015). Self-compassion is made up of three different facets: 1) self-kindness – being kind and understanding to oneself instead of being judgmental and self-critical; 2) common humanity – understanding that everyone suffers, and identifying with universal suffering; and 3) mindfulness – being aware of painful thoughts and feelings without over-thinking them (Neff, 2003a). In order to test the construct empirically, the Self-Compassion Scale (SCS) was created to measure the extent to which people use these strategies when relating to themselves (Neff, 2003b). Although the field of self-compassion research is relatively new and still developing, findings suggest that this construct is strongly related to psychopathology and could add important information to our understanding of how negative moods can be shortened in depression.

Numerous studies have demonstrated an inverse association between self-compassion and depressive symptoms, with a recent meta-analysis finding a large mean effect size ($r = -.51$) (MacBeth & Gumley, 2012). Multiple studies assessing participants with depression have shown that they possess lower levels of self-compassion than control groups of participants who have never been depressed (Ehret et al., 2015; Krieger, Altenstein, Baettig, Doerig, & Holtforth, 2013).

One limitation of the research on self-compassion mentioned above is its reliance on correlational design. However, there are exciting recent developments in assessing self-
compassion using experimental design. Raes (2011), for example, examined the impact of self-compassion scores on the development of depression symptoms by assessing participants at two time-points spaced five months apart. Results showed that high levels of self-compassion at baseline significantly predicted either a smaller increase or a greater reduction of depressive symptoms at follow-up. In another study, researchers showed that a brief training program in self-compassion techniques reduced biopsychological responses to the TSST in women (Arch et al., 2014). Although this study did not use a depressed sample or assess depression, their finding that self-compassion has an impact on responses to stress could be especially relevant to depressed individuals who are vulnerable to a dysregulated stress response.

A study by Diedrich and colleagues was the first to examine the impact of a self-compassion induction on subsequent mood ratings in participants with depression (Diedrich, Grant, Hofmann, Hiller, & Berking, 2014). In this study, researchers assessed the effectiveness of self-compassion compared to a no-strategy control condition and compared to two other adaptive means of responding to stress (cognitive reappraisal and acceptance) on depressed mood in a group of depressed participants. They found that inducing self-compassion significantly reduced depressed mood compared to a no-strategy control condition. Further, no significant differences in depressed mood were found between the self-compassion condition and the reappraisal or acceptance conditions. These findings suggest that self-compassion could be an adaptive strategy for regulating affect. However, there are significant limitations to this research. The first is that the researchers used a within-subject design, meaning each participant received all four inductions: self-compassion, cognitive reappraisal, acceptance, and a no-strategy control condition. There are a number of consequences of within-subject design. Participants may become tired or bored after receiving four inductions and completing
assessments before and after each one. Further, there are likely major cross-over effects between trials, meaning that earlier inductions may have lingering effects and make it difficult to discern effects due to the current induction tested. The second major limitation of this study is that depressed mood was induced using “low mood inducing music” and by reading statements on a screen that contained “depressing content.” There was no stress induction and the method of inducing depressed mood is not very salient or related to real life. Another limitation of this study is that they relied exclusively on self-report outcome measures. While self-report measures are important and provide vital insight into the affective experience of the participant, they do not capture the entirety of the stress response. The human stress response is not just a psychological phenomenon, as stress is also experienced physically in the body. Thus, it is also important to assess the biological stress response. One of the most commonly used markers of the biological stress response in depression is the hypothalamic-pituitary-adrenal (HPA) axis.

1.3 Biological Stress Response in Depression

The HPA axis plays a central role in preparing humans to respond to stress. It is critically involved in stress responses by activating physiological changes, for example, increased blood pressure, heart rate, and respiration, which prepare people to cope with acute stress (Gunnar, Connors, & Isensee, 1989). The HPA axis involves multiple systems working together. The hypothalamus releases corticotrophin-releasing hormone (CRH), which is transported by blood vessels to the pituitary gland and triggers the release of adrenocorticotropic hormone (ACTH). ACTH is transported by the blood to the adrenal gland where it rapidly stimulates biosynthesis of the glucocorticoid hormone, cortisol. Cortisol is the primary stress hormone, and primary marker of HPA axis activity. Cortisol has been examined intensively in the literature because it is an excellent marker of the HPA response and it plays a very important role in not only the stress
response, but also normal physiological functioning in systems including metabolism and cardiovascular functioning (McEwan et al., 1997; Bhattacharyya, Molloy, & Steptoe, 2008).

Cortisol is released spontaneously throughout the day (Lovallo & Thomas, 2000) and also in response to stress. Stress induces significant increases in cortisol over and above baseline levels and then recovery from stress involves cortisol levels returning to baseline. In stress studies, cortisol reactivity and recovery levels post-stress are contrasted with a baseline period. In regard to acute stress reactivity, a meta-analysis found that, compared to non-depressed controls, depressed participants showed similar cortisol levels at baseline and in response to a stressor (Burke, Davis, Otte, & Mohr, 2005). However, they found that, across many studies, depressed participants had much higher cortisol levels across the recovery period when compared to the non-depressed controls. Altogether, findings suggest that there is considerable variability in cortisol responses to stress in depression, but importantly, consistent evidence shows that depression is associated with slower cortisol recovery post-stress compared to non-depressed individuals.

Whereas moderate cortisol levels and responses to stress represent an adaptive and necessary response to environmental changes, excess cortisol production can be problematic (McEwen, 2008). Chronic high levels of cortisol can disrupt individuals’ ability to regulate emotions and cope effectively with stress. Moreover, increasing evidence demonstrates substantial consequences of HPA axis dysregulation on cardiovascular health, immune functioning, and cognition (Hinkelmann et al., 2009; Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002). Given the negative consequences of delayed recovery from stress, as indicated by higher cortisol levels through the recovery period, it is important to identify the factors that contribute to this problem as well as factors that could mitigate the deleterious effects.
It is clear that salivary cortisol levels provide an important objective assessment of the response to stress. Moreover, using salivary cortisol levels to supplement self-report measurements can greatly benefit our knowledge of the stress response (Hellhammer, Wüst, & Kudielka, 2009). Currently, the use of biological markers of stress, such as salivary cortisol, are not being utilized to study the effects of self-compassion on stress in individuals with depression. Thus, in the current study, self-compassion was examined as a strategy that could be adaptive by aiding in depressed individuals’ recovery from stress.

1.4 The Current Study

The goal of the current study was to extend previous research by looking at the effect of self-compassion on both emotional and biological recovery from stress in depression. This study extends the research in two important ways. First, it was the first study to randomly assign people with depression to one of two different conditions: self-compassion and a no-strategy control condition. Second, it was the first study to examine the effects of experimentally induced self-compassion on both self-report and biological markers of wellbeing. Research assessing cortisol levels is important as prolonged cortisol secretion can indicate a maladaptive response to stress (Pariante & Lightman, 2008). Moreover, the use of biological markers supplements self-report measures of affect and stress to give a more complete picture of the stress response. In order to assess the impact of self-compassion on recovery from stress in depression, we recruited a sample of individuals who endorsed elevated depressive symptoms as measured by the BDI. Participants completed the Trier Social Stress Test, a standardized psychosocial stressor (Kirschbaum et al., 1993), and were then randomly assigned to receive either a no-strategy control induction or a self-compassion induction. Participants’ levels of affect and salivary
cortisol were measured at baseline, immediately following the stressor, and throughout the recovery period.

1.5 Hypothesis

It was expected that the self-compassion induction would be significantly more effective than the no-strategy control condition at promoting recovery from stress, as indicated by self-report measures of affect and biological measurements of salivary cortisol. Specifically, it was expected that participants in the self-compassion condition would 1) report lower ratings of anxious and depressed affect through the recovery period, compared to participants in the control condition; and 2) show a greater decrease in level of salivary cortisol through the recovery period, compared to participants in the control condition.
Chapter 2: Methods

2.1 Participants

Adults with elevated depressive symptoms were recruited from the University of British Columbia (UBC) Human Subject Pool (HSP) system and the greater Vancouver community. Both undergraduate students and community volunteers were recruited in order to maximize the generalizability of the sample to the general population, as has been done in other studies (e.g., Panaite, Whittington, Hindash, & Haley, in press). UBC students were recruited through HSP system advertisements and received 3 HSP credits towards an eligible psychology course as compensation. Community participants were recruited via flyers posted in public places on and off campus (e.g., bulletin boards, coffee shops) and advertisements posted online (e.g., kijiji.ca and craigslist.ca); community participants were paid $15 per hour.

Eligible participants were between the ages of 18-65 inclusive, fluent in English, and received a score of 14 or greater on the Beck Depression Inventory-Second Edition (BDI). The cut-off score of 14 was chosen based on cut-off scores from the Manual for the Beck Depression Inventory-II (Beck et al., 1996). A BDI score of 14-19 indicates mild depression, 20-28 indicates moderate severity of depression, and 29-63 indicates severe depression (Beck et al., 1996).

Participants were excluded if they had a history of severe head trauma, psychotic symptoms, manic/hypomanic episodes, or alcohol or substance use disorder in the past 6 months. Further, participants were excluded if they were currently taking corticosteroids (including glucocorticoids), oral or inhaled steroids, or depot neuroleptics, as there is evidence to suggest that these medications can alter HPA activity (Burke et al., 2005; Cohen, Doyle, Turner, Alper, & Skoner, 2003). Because physical activity, use of nicotine and caffeine, and food/beverage intake affect the cortisol response, participants were asked not to eat or drink, use nicotine, or
exercise in the 2 hours leading up to the study (Carpenter, Shattuck, Tyrka, Geracioti, & Price, 2011; LeMoult & Joormann, 2014). Additional variables that affect the HPA axis, such as menstrual cycle, sleep/wake cycle, comorbid psychological diagnoses, other medication use (e.g., birth control), and BMI, were assessed and controlled for when needed (Burke et al., 2005; Kirschbaum, Kudielka, Gaab, Schommer, & Hellhammer, 1999).

In order to maximize the likelihood that participants would meet the BDI cut-off score at the time of study participation, I recruited persons who reported experiencing symptoms of depression in the last two weeks. Participants who signed up through the HSP system completed a pre-screening questionnaire that assesses DSM criteria of symptoms for Major Depressive Disorder (Appendix A). These questions were adapted from the DSM-5 (American Psychiatric Association, 2013) and parallel a multi-step screening process used in other studies recruiting depressed participants (e.g., Hakstian & McLean, 1989). For members of the community, initial eligibility criteria were assessed via a telephone based interview (Appendix B) that assesses DSM-5 criteria of symptoms for Major Depressive Disorder as well as their physical and mental health. The telephone interviews were conducted by a trained research assistant and overseen by the principle investigator. These questions were adapted from the Structured Clinical Interview for DSM-5 (SCID; First, Williams, Karg, & Spitzer, 2015) and have been used in numerous studies (e.g., Foland-Ross, Behzadian, LeMoult, & Gotlib, 2016; LeMoult, Chen, Foland-Ross, Burley, & Gotlib, 2015; LeMoult & Joormann, 2012). Individuals who endorsed at least five of the nine symptoms of depression, one of which must have been depressed mood or anhedonia, via the self-report questionnaire or telephone interview, were invited to participate. Use of the phone screen and the initial selection criteria was intended to maximize the chances that participants would meet the BDI cut-off score of 14 or greater.
2.2 Measures of Stress Reactivity and Recovery

In order to assess participants’ reaction to and recovery from stress, participants rated their depressed and anxious affect at 5 time points and provided 6 cortisol samples throughout the study (see Figure 2.1). These procedures are described in detail below.

2.2.1 Depressed and anxious affect

Participants were asked to report their level of depressed and anxious affect by answering the questions, “How depressed are you feeling at the moment?” and “How anxious are you feeling at the moment?” Participants rated their depressed and anxious affect using a Likert scale ranging from 0 (“Not at all”) to 10 (“Extremely”). Similar single-item measures of mood have been used to assess responses to a psychosocial stressor in other studies (e.g., Yoon & Joormann, 2012).

2.2.2 Salivary Cortisol

Salivary cortisol samples were collected as a measure of neuroendocrine functioning in response to stress. Samples were collected from participants at 6 time points: after a 15-minute rest period at the beginning of the study (immediately before the stressor), immediately after the stressor, and at 10, 25, 40, and 55 minutes after the end of the stressor (See Figure 1). Cortisol collection times were decided based on results from several recent meta-analyses, showing that cortisol levels reach a peak approximately 38 minutes after the onset of the stressor (Goodman, Janson, & Wolf, 2017), and return to baseline 41-60 minutes after stressor offset (Dickerson and Kemeny, 2004). Cortisol sample 4 was collected 25 minutes after the end of the stressor and should have captured approximate peak cortisol levels. The last sample was taken 55 minutes after stressor offset and should have been sufficient to capture cortisol decline post stressor.
Saliva was collected using Salivettes (Sarstedt, Germany), and biochemical analyses of cortisol from saliva samples was performed at Dresden LabService in Dresden, Germany.

2.3 Questionnaires

Participants completed several clinical and demographic questionnaires. These questionnaires were designed to assess baseline levels of depression and anxiety, and to collect demographic and health information.

2.3.1 Beck Depression Inventory- Second Edition

Participants completed the Beck Depression Inventory-II (BDI; Beck et al., 1996), a 21-item measure used to assess severity of depression. Participants were asked to indicate the extent to which they have experienced a number of depressive symptoms in the past two weeks. Items include symptoms that reflect DSM-5 criteria of MDD, such as sadness, loss of interest, irritability, appetite, fatigue, concentration, guilt, and suicidal thoughts. Other symptoms that are common in Major Depressive Disorder but not DSM criteria are also included, such as perceived appearance, crying, and (loss of) interest in sex. Participants responded according to a Likert scale ranging from 0 to 3, and item responses from the 21 questions were added to provide a composite score ranging from 0 to 63. The BDI was normed on a clinical sample of depressed participants and has shown good reliability and validity (Beck et al., 1996). The BDI showed good internal reliability with my sample, $\alpha = .767$.

2.3.2 Self-Compassion Scale - Short Form - Trait

Participants completed the Self-Compassion Scale – Short Form (SCS-SF; Raes, Pommier, Neff, & Van Gucht, 2011), a measure used to assess an individual’s trait level of self-compassion. The Short Form version of the measure includes 12 items of the 26 that make up the original measure (Neff, 2003b), but has a near perfect correlation with the long scale (Raes et al.,
The SCS-SF includes items that assess all three facets of self-compassion, as well as their negative counterparts: self-kindness versus self-judgement, common humanity versus isolation, and mindfulness versus over-identification. When completing the SCS-SF, participants were asked to think about how they typically act towards themselves. Participants responded to items such as, “I try to be understanding and patient towards those aspects of my personality I don’t like”, and “I try to see my failings as part of the human condition” on a Likert scale that ranged from 1 (almost never) to 5 (almost always). The total SCS-SF-trait score was computed by first reverse scoring the negative subscale items and then computing a total mean. The SCS-SF-trait scale showed moderate internal reliability with my sample, \( \alpha = .561 \).

2.3.3 Self-Compassion Scale - Short Form - State

In order to assess a state level score on the SCS-SF, I changed the wording of the instructions by asking participants to think about how they responded to themselves since listening to the audio recording (either the self-compassion induction or the no-strategy control induction) when completing the questionnaire. The items and scoring were identical to what was used for the SCS-SF-trait version. The SCS-SF-state showed excellent internal reliability with my sample, \( \alpha = .908 \).

2.3.4 Health & Demographics

Participants completed an in-house questionnaire to assess demographic and health behaviours known to affect cortisol levels or responses to stress. Specifically, participants provided information on their gender, use of medications, recent food consumption, recent exercise, and caffeine/alcohol intake.

2.4 Procedure

Participants completed a multi-step protocol, first completing a telephone or
questionnaire based prescreening. Eligible participants then completed the main laboratory procedure: acclimation, stressor, stress-response induction, recovery period, questionnaires, and debrief (as depicted in Figure 2.1). Each section is described in detail below.

2.4.1 Prescreening

After either completing pre-screening questions on HSP (university students; Appendix A), or completing a telephone interview (community volunteers; Appendix B), participants who endorsed symptoms of depression were invited to schedule a laboratory session. Prior to the session, participants received instructions to refrain from eating, drinking anything besides water, using nicotine, brushing their teeth, and exercising in the two hours prior to the lab session, as these activities can alter neuroendocrine markers.

2.4.2 Main Laboratory Procedure

![Figure 2.1. Procedural timeline. Saliva samples: T1, T2, T3, T4, T5, & T6; affect ratings: T1, T2, T3, T4, & T5](image)

2.4.3 Acclimation Period

After completing the interview and questionnaires, participants were instructed to rest and watch a calming 15-minute nature video. The purpose of this rest period was for mood and biological levels to reach a baseline before beginning the stressor. A 15-minute baseline period
was chosen based on recommendations from a recent meta-analysis (Goodman et al., 2017) which suggests that the acclimation period should be a minimum of 15 minutes to allow for cortisol levels to return to baseline.

2.4.4 Psychosocial Stressor

Participants then completed the Trier Social Stress Test (TSST; Kirschbaum et al., 1993), a standardized and well-validated psychosocial stressor. The TSST was conducted as follows: immediately following the baseline period, participants were told they were going to give a 5-minute speech to committee members, who would be rating the quality of their speech. Participants were given 3 minutes to prepare for their speech, after which time three confederates acting as the committee entered the room. Participants were then instructed to give their speech, during which the confederates maintained a neutral facial expression and provided no feedback. Confederates occasionally asked questions if time remained. After the speech, participants were then asked to complete a 5-minute mental math task, in which they serially subtracted the number 13 from 1022. The participant was told that their performance was being video recorded in line with standard protocol of the TSST. In reality, their performance was not recorded.

2.4.5 Stress-Response (SR) Induction

After completing the stressor, participants were randomly assigned to receive one of two stress-response (SR) inductions: self-compassion or a no-strategy control condition. Both SR conditions began in the same way, with participants being instructed to think about the kinds of thoughts and feelings they were experiencing as a result of the speech and math task. In the no-strategy control condition (Appendix C), participants were then instructed to sit in silence for 7 minutes. In the self-compassion induction (Appendix D), participants received instructions that
were intended to help them achieve a more self-compassionate perspective of their performance, consistent with previous work in this area (Neff, 2003a, 2003b; Deidrich et al., 2014).

2.4.6 Recovery Period

Following the SR induction, participants were instructed to sit quietly for 30 minutes (until 40 minutes after stressor offset). The duration of this recovery period is consistent with previous work in the field (e.g., Burke et al., 2005) and was based on meta-analytic evidence suggesting that cortisol levels take 40 to 60 minutes following stressor offset to return to baseline (Dickerson & Kemeny, 2004). During the recovery period, self-reported affect was assessed at 3 time points- 10, 25, and 40 minutes following the end of the stressor (see T3 through T5 in Figure 2.1). Salivary cortisol was assessed at the same 3 time points, as well as an additional time point at 55 minutes post-stressor (see T3 through T6 in Figure 2.1).

2.4.7 Questionnaires and Debrief

Following the recovery period, participants filled out questionnaires (SCS-SF- state and trait). Following this, participants received a debrief form (Appendix E) which outlined the objective and hypotheses of the study and were debriefed by a research assistant who followed a debriefing script (Appendix F). The research assistant explained to the participant that the verbal tasks they were asked to complete were designed to be stressful. Further, the research assistant reassured them that they performed very well considering the high-stress circumstances. Every participant received a Wellbeing Resource Sheet with school and community resources for mental health and well-being (Appendix G). At exactly 55 minutes after the end of the stressor, the sixth and final saliva sample was taken. The study was completed in one laboratory session and took approximately 180 minutes.
2.5 Data Analytic Approach

2.5.1 Power Analysis

Power analyses were conducted using G*Power statistical power analysis software (Faul, Erdfelder, Lang, & Buchner, 2007) for each of the three main analyses. Power analysis for an ANOVA with two conditions and five measurements of depressed affect was conducted to determine a sufficient sample size. An effect size was drawn from work by Diedrich et al. (2014), as the methods of the current study are similar to their study assessing the effects of a self-compassion induction on depressed mood. Diedrich and colleagues reported a medium effect size from a repeated measures ANOVA evaluating the interaction of stress response induction, including self-compassion, and time on depressed affect ($\eta^2 = 0.13$). This translates to a Cohen’s $f$-value of approximately 0.39. Given an alpha of 0.05, a power of 0.95, and a Cohen’s $f$-value of 0.39, a minimum sample size of 36 (18 participants per condition) is required to detect the hypothesized stress response induction by time interaction.

No one has looked at the effect of a self-compassion induction on anxious affect; however, Britton et al. (2014) looked the effects of a related construct, mindfulness training, on levels of anxious affect in response to the Trier Social Stress Test. Britton and colleagues reported a medium effect size from a repeated measures ANOVA evaluating the interaction of mindfulness training (vs. control) and time on anxious affect ($\eta^2 = 0.13$). This translates to a Cohen’s $f$-value of approximately 0.39. Power analysis for an ANOVA with two conditions and five measurements on anxious affect was conducted to determine a sufficient sample size using an alpha of 0.05, a power of 0.95, and a Cohen’s $f$-value of 0.39. Given these parameters, a minimum sample size of 36 (18 participants per condition) is required to detect the hypothesized stress response induction by time interaction effects.
No one has looked at the effect of a self-compassion induction on salivary cortisol. Thus, for salivary cortisol, an effect size was drawn from work by Polheber and Matchock (2014), that assessed levels of salivary cortisol in response to the Trier Social Stress Test between participants exposed to either a dog or a human friend. They reported a medium effect size from a repeated measures ANOVA evaluating the interaction of condition and time on salivary cortisol ($\text{partial } \eta^2 = 0.127$). This translates to a Cohen’s $f$-value of approximately 0.38. Power analysis for an ANOVA with two conditions and six measurements of salivary cortisol was conducted to determine a sufficient sample size using an alpha of 0.05, a power of 0.95, and a Cohen’s $f$-value of 0.38. Given the above parameters, a minimum sample size of 32 (16 participants per condition) is required to detect effects.

2.5.2 Preliminary Analysis Plan

Prior to the main analyses, descriptive statistics were checked for each variable to identify outliers by using the Median Absolute Deviation (MAD) method (Leys, Ley, Klein, Bernard, & Licata, 2013). Participants with missing data (i.e., those who missed one or more affect ratings) were not included on an analysis-by-analysis basis. This was done in order to keep as much data as possible, and is discussed further in section 3.2. The assumptions required for ANOVA and MANOVA were assessed. Assumption of normality were checked with assessment of skewness and kurtosis values, and ±2 indices were used as acceptable limits (Trochim & Donnelly, 2006; Field, 2000 & 2009; Gravetter & Wallnau, 2014). Sphericity was assessed through a Mauchly’s Test of Sphericity, and a Greenhouse-Geisser correction was used where sphericity was violated.

Important demographic, health, and clinical characteristics were examined to ensure that participants did not differ on these variables between the two conditions. Paired samples $t$-tests
were conducted to assess differences between conditions in baseline clinical characteristics (self-reported anxiety, depression, and self-compassion scores), demographic variables (age), and variables that are known to affect the cortisol response (use of nicotine, physical exercise, eating/drinking in the 2 hours prior to the experiment, BMI, and caffeine consumption). In addition, chi squared tests were conducted to assess differences across conditions in race, proportion female, years of education, income, medication use, and comorbid psychiatric disorders.

2.5.3 Hypothesis 1

To examine whether the stress-response induction condition influenced affective recovery from stress, I examined self-reported anxious affect and self-reported depressed affect. To examine the influence of the stress-response induction condition on anxious affect, a repeated-measures ANOVA was performed on self-reported anxious affect with stress-response induction condition (self-compassion versus no-strategy control) as the between-subject factor and time (T1-T5) as the within-subject factor. In order to test that the stressor elicited a significant stress response, a paired samples t-test on anxious affect at T1 compared to anxious affect at T2 was conducted. To examine the influence of the stress-response induction condition on depressed affect, a repeated-measures ANOVA was performed on self-reported depressed affect with stress-response induction condition (self-compassion versus no-strategy control) as the between-subject factor and time (T1-T5) as the within-subject factor.

2.5.4 Hypothesis 2

To examine whether the response-styles condition affected cortisol recovery from stress, a repeated-measures ANOVA was performed on salivary cortisol with stress-response induction
condition (self-compassion versus no-strategy control) as the between-subject factor and time (T1-T6) as the within-subject factor.

Participants in the self-compassion and control conditions are expected to not differ significantly in affect or cortisol levels at baseline (T1) or peak stress (T2). In contrast, participants in the self-compassion condition are expected to show lower levels of anxiety and depressed affect and cortisol during the recovery period (T3 through T5) in comparison to participants in the control condition.
Chapter 3: Results

3.1 Preliminary Analysis

3.1.1 Anxious Affect Measure

For anxious affect, there were two participants who missed one or more affect rating and were not included in analysis, resulting in a total of 46 participants (see Table 3.1 for descriptive statistics by condition). There were no outliers on the anxious affect measures and all five measurements of anxious affect (T1-T5) were normally distributed.

Table 3.1

<table>
<thead>
<tr>
<th></th>
<th>All Participants (N = 46)</th>
<th>Self-Compassion Condition (N = 24)</th>
<th>Control Condition (N = 22)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>T1 Anxious</td>
<td>3.00</td>
<td>2.21</td>
<td>2.76</td>
</tr>
<tr>
<td>T2 Anxious</td>
<td>6.81</td>
<td>3.00</td>
<td>6.58</td>
</tr>
<tr>
<td>T3 Anxious</td>
<td>4.96</td>
<td>2.68</td>
<td>4.08</td>
</tr>
<tr>
<td>T4 Anxious</td>
<td>4.13</td>
<td>2.62</td>
<td>4.04</td>
</tr>
<tr>
<td>T5 Anxious</td>
<td>3.04</td>
<td>2.39</td>
<td>2.76</td>
</tr>
</tbody>
</table>

3.1.2 Depressed Affect Measure

There were five participants who missed one or more depressed affect rating and were not included in the data analysis run on affect, resulting in a total of 43 participants. The descriptive statistics for depressed affect are presented by condition in Table 3.2. There were no outliers on the depressed affect and all five measurements of depressed affect (T1-T5) were normally distributed.
### Table 3.2

**Descriptive Statistics for Depressed Affect Measurements**

<table>
<thead>
<tr>
<th>Time</th>
<th>All Participants (N = 43)</th>
<th>Self-Compassion Condition (N = 22)</th>
<th>Control Condition (N = 21)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>T1 Depressed</td>
<td>2.28</td>
<td>1.73</td>
<td>2.32</td>
</tr>
<tr>
<td>T2 Depressed</td>
<td>4.08</td>
<td>2.92</td>
<td>3.27</td>
</tr>
<tr>
<td>T3 Depressed</td>
<td>4.00</td>
<td>2.67</td>
<td>3.17</td>
</tr>
<tr>
<td>T4 Depressed</td>
<td>3.72</td>
<td>2.90</td>
<td>3.31</td>
</tr>
<tr>
<td>T5 Depressed</td>
<td>3.28</td>
<td>2.67</td>
<td>3.16</td>
</tr>
</tbody>
</table>

#### 3.1.3 Cortisol Measure

There were 11 participants whose cortisol data was not ready for analysis at the time of writing. There were 2 participants who were missing data from T6 and were removed from the analysis. Therefore, data analysis was conducted on the 35 participants with complete cortisol data (see Table 3.3 for descriptive statistics). Raw cortisol measurements from all six time points were positively skewed, which is typical in the literature (Granger et al., 2012). There were also nineteen outliers across the six time points. In order to normalize the data, cortisol values were winsorized. This involved replacing outlying values with a value equal to the highest cortisol level below 3 standard deviations from the mean. The winsorized cortisol data at each time point (T1-T6) were normally distributed and there were no outliers. Another common way of normalizing positively skewed distributions of cortisol is to apply a log (n +1) transformation (e.g., Mehta, Welker, Zilioli, & Carré, 2015; Wu, Eisenegger, Zilioli, Watson, & Clark, 2017). I also tried the log transformation method on the cortisol data, but it was not as effective in that the data remained slightly skewed. Further, analyses carried out on the log transformed data did not differ from results using winsorized values. Moreover, analyses carried out on the raw cortisol...
values also did not differ from results using winsorized values. Thus, the winsorized values were used in all reported analyses.

**Table 3.3**

*Descriptive Statistics for Winsorized Cortisol Measurements*

<table>
<thead>
<tr>
<th></th>
<th>All Participants (N = 35)</th>
<th>Self-Compassion Condition (N = 18)</th>
<th>Control Condition (N = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>T1 Cortisol</td>
<td>4.00</td>
<td>2.71</td>
<td>4.26</td>
</tr>
<tr>
<td>T2 Cortisol</td>
<td>5.46</td>
<td>4.13</td>
<td>6.02</td>
</tr>
<tr>
<td>T3 Cortisol</td>
<td>9.78</td>
<td>8.28</td>
<td>10.80</td>
</tr>
<tr>
<td>T4 Cortisol</td>
<td>9.26</td>
<td>8.43</td>
<td>9.44</td>
</tr>
<tr>
<td>T5 Cortisol</td>
<td>6.93</td>
<td>5.91</td>
<td>7.27</td>
</tr>
<tr>
<td>T6 Cortisol</td>
<td>5.65</td>
<td>4.19</td>
<td>5.92</td>
</tr>
</tbody>
</table>

### 3.1.4 Demographic and Clinical Characteristics

Descriptive statistics are presented by condition in Table 3.4. Participants did not differ significantly on age between the two conditions, \( t(46) = 0.22, p = .823 \). It is important to note that the sample is quite young (\( M = 20 \) years old), which is consistent with the predominantly university-age sample. Levels of depressive symptoms, assessed via the BDI, were very similar to other clinically depressed samples, which have ranged from 23.00 (Sanchez, Vazquez, Marker, LeMoult, & Joormann, 2013) to 28.38 (Joorman, Hertel, LeMoult, & Gotlib, 2009). Although participants in the control condition had slightly higher BDI scores than participants in the self-compassion condition, the two conditions did not differ significantly in their BDI scores, \( t(46) = 1.54, p = .130 \). Trait levels of self-compassion were assessed through the SCS-SF-trait, and the two conditions did not significantly differ on their scores, \( t(46) = 0.44, p = .666 \). A chi squared test revealed no significant differences between the two conditions in terms of racial identity, \( \chi^2 (7, N = 48) = 10.41, p = .167 \). The majority of participants in both the control condition and the self-compassion condition identified as Asian, which is consistent with the
racial make-up of the community. There was also no significant difference in proportion who were female across the two conditions, $\chi^2 (1, N = 48) = 0.03, p = .864$. The proportion who were female in this sample, 86.4% in the control condition and 84.6% in the self-compassion condition, is much higher than would be expected by chance. However, this is consistent with the high proportion of female students in the UBC Department of Psychology, and subsequently in the UBC HSP subject pool, from which the majority of the participants were recruited. Self-reported household income did not differ by condition, $\chi^2 (6, N = 48) = 2.79, p = .835$, and participants were relatively evenly distributed across the seven income brackets for both conditions.

There were also no significant differences found between the two conditions on variables known to influence the cortisol response. Responses on the health questionnaire indicated that the proportion of participants who endorsed using asthma medication did not differ between the two conditions, $\chi^2 (1, N = 48) = 0.002, p = .962$. The proportion of participants who reported eating or drinking within the last two hours did not differ by condition, $\chi^2 (1, N = 48) = 2.16, p = .141$. The number of participants who endorsed using nicotine was very low (2 participants in each condition) and the proportion who endorsed did not differ by condition, $\chi^2 (1, N = 48) = 0.03, p = .861$. The proportion of participants who regularly engaged in physical exercise was quite evenly split within both conditions (45.5% in the control condition and 50% in the self-compassion condition positively endorsed physical exercise). The proportion who engaged in physical exercise did not differ between conditions, $\chi^2 (1, N = 48) = 0.10, p = .753$. The mean body mass index score for both conditions was in the “normal or healthy weight” range (Health Canada, 2003), and did not differ between conditions, $t(41) = 1.11, p = .272$. The proportion of participants who consumed caffeine the day of the study did not differ significantly between the
two conditions, $\chi^2 (1, N = 48) = 0.60, p = .05$, nor did the number of caffeinated drinks consumed significantly differ between the two conditions, $t(20) = 1.23, p = .235$.

**Table 3.4**

**Participant Characteristics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Condition (N = 22)</th>
<th>Self-Compassion Condition (N = 26)</th>
<th>$t$ or $\chi^2$</th>
<th>df</th>
<th>$P$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>20.41 (2.87)</td>
<td>20.23 (2.63)</td>
<td>0.22</td>
<td>46</td>
<td>.823</td>
</tr>
<tr>
<td>BDI score</td>
<td>28.09 (7.53)</td>
<td>24.77 (7.37)</td>
<td>1.54</td>
<td>46</td>
<td>.130</td>
</tr>
<tr>
<td>SCS-SF-trait score</td>
<td>3.02 (0.52)</td>
<td>2.96 (0.37)</td>
<td>0.44</td>
<td>46</td>
<td>.666</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td>10.41</td>
<td>7</td>
<td>.167</td>
</tr>
<tr>
<td>Aboriginal and White</td>
<td>0%</td>
<td>3.8%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>63.6%</td>
<td>38.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian and White</td>
<td>9.1%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian and Other</td>
<td>0%</td>
<td>3.8%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black and White</td>
<td>4.5%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>18.2%</td>
<td>30.8%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White and Hispanic or Latino</td>
<td>0%</td>
<td>3.8%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>4.5%</td>
<td>19.2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion Female</td>
<td>86.4%</td>
<td>84.6%</td>
<td>0.03</td>
<td>1</td>
<td>.864</td>
</tr>
<tr>
<td>Household Income</td>
<td></td>
<td></td>
<td>2.79</td>
<td>6</td>
<td>.835</td>
</tr>
<tr>
<td>Less than 30,000</td>
<td>19%</td>
<td>18.2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between 30,000 and 50,000</td>
<td>9.5%</td>
<td>9.1%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between $50,001$ and $70,000$</td>
<td>14.3%</td>
<td>9.1%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between $70,001$ and $90,000$</td>
<td>19%</td>
<td>18.2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between $90,001$ and $110,000$</td>
<td>4.8%</td>
<td>18.2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between $110,001$ and $130,000$</td>
<td>14.3%</td>
<td>18.2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greater than $130,001$</td>
<td>19%</td>
<td>9.1%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asthma Medication Use</td>
<td>22.2%</td>
<td>23.1%</td>
<td>0.002</td>
<td>1</td>
<td>.962</td>
</tr>
<tr>
<td>Eaten in Last 2 Hours</td>
<td></td>
<td></td>
<td>2.16</td>
<td>1</td>
<td>.141</td>
</tr>
<tr>
<td>Yes</td>
<td>22.7%</td>
<td>7.7%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7.7%</td>
<td>92.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>77.3%</td>
<td>92.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of Nicotine</td>
<td></td>
<td></td>
<td>0.03</td>
<td>1</td>
<td>.861</td>
</tr>
<tr>
<td>Yes</td>
<td>9.1%</td>
<td>7.7%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7.7%</td>
<td>92.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>90.9%</td>
<td>92.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Exercise</td>
<td></td>
<td></td>
<td>0.10</td>
<td>1</td>
<td>.753</td>
</tr>
<tr>
<td>Yes</td>
<td>45.5%</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>50%</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>54.5%</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>22.30 (3.35)</td>
<td>23.62 (4.49)</td>
<td>1.11</td>
<td>43</td>
<td>.272</td>
</tr>
<tr>
<td>Caffeine Consumption</td>
<td></td>
<td></td>
<td>0.28</td>
<td>1</td>
<td>.594</td>
</tr>
<tr>
<td>Yes that day</td>
<td>50%</td>
<td>42.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>50%</td>
<td>57.7%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Caffeinated drinks that day</td>
<td>1.36 (0.67)</td>
<td>1.09 (0.30)</td>
<td>1.23</td>
<td>20</td>
<td>.235</td>
</tr>
</tbody>
</table>
3.1.5 Correlation between Affect and Cortisol Reactivity

Cortisol reactivity to the stressor was calculated by subtracting each participant’s baseline cortisol level (at T1) from participant’s cortisol level at T3, when cortisol levels peaked. Self-reported depressed and anxious affect reactivity to the stressor was calculated by subtracting each participant’s baseline score at T1, from their score at T2, when affect scores peaked. For all participants, regardless of condition, cortisol reactivity was not significantly correlated to anxious affect reactivity, $r = -.14, p = .401$, or depressed affect reactivity, $r = -.22, p = .189$. For participants in the control condition, cortisol reactivity was not significantly correlated to anxious affect reactivity, $r = -.37, p = .131$, or depressed affect reactivity, $r = -.36, p = .135$. For participants in the self-compassion condition, cortisol reactivity was not significantly correlated to anxious affect reactivity, $r = .09, p = .710$, or depressed affect reactivity, $r = .06, p = .827$.

3.2 Main Data Analysis

3.2.1 Hypothesis 1

It was expected that the self-compassion induction would be significantly more effective than the no-strategy control condition at promoting recovery from stress. Specifically, it was expected that participants in the self-compassion condition would report lower ratings of anxious affect and lower ratings of depressed affect through the recovery period, compared to participants in the control condition. To test this, I conducted two repeated-measures ANOVAs with stress-response induction condition (self-compassion versus no-strategy control) as the between-subject factor and time (T1-T5) as the within-subject factor. The first ANOVA was
performed on ratings of anxious affect and the second was performed on ratings of depressed affect.

In order to retain as much data as possible, participants were included in any analyses for which they provided complete data. For example, if participants had complete anxious affect data but did not have complete depressed affect or cortisol data, they were still included in the ANOVA and follow-up tests run on anxious affect. The same was rule applied with those participants that had complete depressed affect data. The decision to keep participants on an analysis by analysis basis was made in order to keep as many participants as possible in the analysis. Importantly, regardless of the sub-sample (those with complete anxious affect data, those with complete depressed affect data, and those with complete cortisol data) the control and self-compassion condition did not significantly differ on any of the demographic, health, or clinical characteristics, and the pattern of group differences reported above did not differ.

3.2.1.1 Anxious Affect

Mauchly’s Test of Sphericity indicated that the assumption of sphericity had been violated for anxious affect, $\chi^2(9) = 57.34$, $p < .001$, and therefore, a Greenhouse-Geisser correction was used. There was a significant main effect of time on anxious affect, $F(2.60, 114.51) = 33.48$, $p < .001$, $\eta^2 = .432$ (see Figure 3.1). There was not a significant main effect of condition on anxious affect, $F(1, 44) = 1.82$, $p = .184$, $\eta^2 = .040$. However, there was a significant order 4 time by condition interaction for anxious affect, $F(1, 44) = 12.47$, $p < .001$, $\eta^2 = .221$ (see Figure 3.1).

Before conducting follow-up tests designed to better understand the nature of the significant time by condition interaction, a paired samples $t$-test was conducted on anxious affect
between T1 and T2 in order to ensure that the stressor elicited a significant stress response. This test revealed that anxious affect significantly increased from baseline (T1) to immediately after the stressor (T2), \( t_{\text{paired}}(45) = 7.62, p < .001 \). Further, this increase in anxious affect did not differ significantly between the no-strategy control condition and the self-compassion condition, \( t(45) = 0.10, p = .920 \). This test served as the manipulation check to show that the stressor elicited a significant stress response that was equivalent between the two conditions (see Figure 3.1).

Next, to better understand the significant time by condition interaction, within-group and between-group follow-up tests were conducted. First, paired samples \( t \)-tests were conducted on anxious affect separately within the control and self-compassion conditions. Within the control condition, paired samples \( t \)-tests revealed that anxious affect scores at each time point were significantly different from the time point that came before. Anxious affect significantly increased from baseline (T1) to immediately after the stressor (T2), \( t_{\text{paired}}(21) = 5.06, p < .001 \). Scores then significantly decreased from immediately after the stressor (T2) to after the stress-response induction (T3), \( t_{\text{paired}}(21) = 3.72, p = .001 \), from after the stress-response induction (T3) to halfway through the recovery period (T4), \( t_{\text{paired}}(21) = 5.63, p < .001 \), and from halfway through the recovery period (T4) to the end of the recovery period (T5), \( t_{\text{paired}}(21) = 2.66, p = .015 \). After the stress-response induction (T3), anxious affect scores were still significantly different from baseline (T1), \( t_{\text{paired}}(21) = 3.54, p = .002 \). By T4, anxious affect scores did not significantly differ from baseline, \( t_{\text{paired}}(21) = 1.24, p = .230 \). (see Table 3.5 for differences between all time points).
Table 3.5

Paired Samples t-test Comparisons of Anxious Affect Scores for the Control Condition – t values

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>5.06***</td>
<td>3.54**</td>
<td>1.24</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td></td>
<td>3.72**</td>
<td>6.33***</td>
<td>5.81***</td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td></td>
<td></td>
<td>5.63***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td></td>
<td></td>
<td></td>
<td>2.66*</td>
<td></td>
</tr>
</tbody>
</table>

NOTE. * p < .05; ** p < .01; *** p < .001

When assessing just the self-compassion condition, paired samples t-tests revealed a slightly different pattern. Anxious affect significantly increased from baseline (T1) to immediately after the stressor (T2), \( t_{\text{paired}}(23) = 5.62, p < .001 \). Scores then significantly decreased from immediately after the stressor (T2) to after the stress-response induction (T3), \( t_{\text{paired}}(23) = 5.65, p < .001 \). Although anxious affect did not significantly decline from immediately after the induction (T3) to halfway through the recovery period (T4), \( t_{\text{paired}}(23) = 0.12, p = .910 \), anxious affect did significantly decrease from halfway through the recovery period (T4) to the end of the recovery period (T5), \( t_{\text{paired}}(23) = 3.65, p = .001 \). Anxious affect scores were significantly different from baseline (T1) after the stress-response induction (T3), \( t_{\text{paired}}(23) = 2.84, p = .009 \) and halfway through the recovery period (T4), \( t_{\text{paired}}(23) = 2.59, p = .017 \). By the end of the recovery period (T5), however, the anxious affect ratings of the self-compassion condition were not significantly different from baseline (T1), \( t_{\text{paired}}(23) = 0.32, p = .752 \) (see Table 3.6 for differences between all time points).
Table 3.6

*Paired Samples t-test Comparisons of Anxious Affect Scores for the Self-Compassion Condition – t values*

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>5.62***</td>
<td>2.84**</td>
<td>2.59*</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>5.65***</td>
<td>4.15***</td>
<td>6.42***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td></td>
<td>0.12</td>
<td>3.72**</td>
<td></td>
<td>3.72**</td>
</tr>
<tr>
<td>T4</td>
<td></td>
<td></td>
<td>3.65**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE. * p < .05; ** p < .01; *** p < .001

Second, between-condition follow-up tests were conducted to determine whether the conditions differed at each time point on anxious affect. The self-compassion condition and control condition did not differ significantly at baseline (T1), $t(44) = 0.93$, $p = .359$, immediately after the stressor (T2), $t(44) = 0.86$, $p = .396$. The two conditions differed at T3; the self-compassion condition reported significantly lower anxious affect at the post-induction measurement (T3), $t(44) = 2.57$, $p = .012$. The two conditions did not differ significantly halfway through the recovery period (T4), $t(44) = 0.18$, $p = .858$, or at the end of the recovery period (T5), $t(44) = 0.80$, $p = .427$. 
Figure 3.1: Anxious Affect Ratings for the Control and Self-Compassion Conditions across all Five Time Points.

3.2.1.2 Depressed Affect

Mauchly’s Test of Sphericity indicated that the assumption of sphericity had been violated for depressed affect, $\chi^2(9) = 53.15$, $p < .001$, and therefore, a Greenhouse-Geisser correction was used. There was a significant main effect of time on depressed affect, $F(2.66, 109.09) = 7.54$, $p < .001$, $\eta^2 = .155$ (see Figure 3.2). There was not a significant effect for condition on depressed affect, $F(1, 41) = 2.32$, $p = .318$, $\eta^2 = .053$. However, there was a significant quadratic time by condition interaction for depressed affect, $F(1, 41) = 8.04$, $p = .007$, $\eta^2 = .164$ (see Figure 3.2).

To better understand the significant time by condition interaction, both within and between follow-up tests were conducted. First, paired samples $t$-tests were conducted on
depressed affect separately within the control and self-compassion conditions. Within the control condition, paired samples $t$-tests revealed differences between each time point, except between T2 and T3. The control condition experienced a significant increase in depressed affect scores from baseline (T1) to immediately after the stressor (T2), $t_{paired}(20) = 3.28, p = .004$. Depressed affect remained elevated at T3 and there was no significant difference from immediately after the stressor (T2) to after the stress-response induction (T3), $t_{paired}(20) = .34, p = .738$. Depressed affect then decreased from after the stress-response induction (T3) to halfway through the recovery period (T4), $t_{paired}(20) = 2.31, p = .032$, and from halfway through the recovery period (T4) to the end of the recovery period (T5), $t_{paired}(20) = 2.80, p = .011$. After the stress-response induction (T3), depressed affect scores were still significantly different from baseline (T1), $t_{paired}(20) = 3.66, p = .002$. At T4, the anxious affect scores of those in the control condition were still significantly different from baseline, $t_{paired}(20) = 2.58, p = .018$. By the end of the recovery period (T5) the anxious affect ratings of the self-compassion condition were not significantly different from baseline (T1), $t_{paired}(20) = 1.53, p = .142$ (see Table 3.7 for differences between all time points).
Paired samples t-tests on depressed affect scores for the self-compassion condition revealed a very different pattern from the control condition. Like with the control condition, depressed affect scores of the self-compassion condition increased significantly from baseline (T1) to immediately after the stressor (T2), $t_{paired}(21) = 2.13, p = .045$. However, depressed affect scores then remained elevated and did not decrease significantly between any other time points. Depressed affect did not significantly differ between immediately after the stressor (T2) to after the stress-response induction (T3), $t_{paired}(21) = 0.11, p = .917$, from after the stress-response induction (T3) to halfway through the recovery period (T4), $t_{paired}(21) = 0.32, p = .750$, or from halfway through the recovery period (T4) to the end of the recovery period (T5), $t_{paired}(21) = 0.36, p = .724$. The depressed affect scores at T3, T4, and T5 are not significantly different from baseline (see Table 3.8 for differences between all time points).
Table 3.8

Paired Samples t-test Comparisons of Depressed Affect Scores for the Self-Compassion Condition – t values

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td></td>
<td>2.13*</td>
<td>1.95</td>
<td>1.80</td>
<td>1.88</td>
</tr>
<tr>
<td>T2</td>
<td>0.11</td>
<td></td>
<td>0.14</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>0.32</td>
<td>0.12</td>
<td></td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td></td>
<td></td>
<td>0.36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE. *p < .05; **p < .01; ***p < .001

Between-condition tests were conducted to determine whether the conditions differed at each time point on depressed affect. Although the self-compassion condition and control conditions’ depressed affect ratings did not differ significantly at baseline (T1), t(41) = 0.12, p = .908, the control condition had higher ratings at the post-stressor time point (T2) on a trend level, t(41) = 1.95, p = .059. The control condition also had significantly higher depressed affect ratings at the post-induction time point (T3), t(41) = 2.31, p < .05. The two conditions did not differ significantly from each other halfway through the recovery period (T4), t(41) = 1.09, p = .284, or at the end of the recovery period (T5), t(41) = 0.31, p = .760.
Figure 3.2: Depressed Affect Ratings for the Control and Self-Compassion Conditions across all Five Time Points.

3.2.2 Hypothesis 2

The second hypothesis was that the self-compassion induction would be significantly more effective than the no-strategy control condition at promoting cortisol recovery from stress. Specifically, it was expected that participants in the self-compassion condition would show a greater decrease in level of salivary cortisol through the recovery period, compared to participants in the control condition. To test this, I conducted a repeated-measures ANOVA on salivary cortisol measurements with stress-response induction condition (self-compassion versus no-strategy control) as the between-subject factor and time (T1-T5) as the within-subject factor (see Figure 3.4). Mauchly’s Test of Sphericity indicated that the assumption of sphericity had been violated, $\chi^2(14) = 190.60, p < .001$, and therefore, a Greenhouse-Geisser correction was
used. The repeated-measures ANOVA revealed a significant main effect of time on cortisol levels, $F(1.66, 54.78) = 14.33, p < .001, \eta^2 = .303$. There was no main effect of condition, $F(1, 33) = .22, p = .641, \eta^2 = .007$, and no condition by time interaction $F(1.66, 54.78) = .16, p = .812, \eta^2 = .005$.

When interpreting cortisol data, it is important to take into account the delay in salivary cortisol levels. Cortisol levels typically reach their peak between 21 to 40 minutes after the onset of a stressor (Dickerson & Kemeny, 2004). This anticipated peak in cortisol values was captured at the third time-point in this study, immediately following the induction, which was 25 minutes after stressor onset.

To better understand the significant main effect of time, follow-up tests were conducted. Paired samples $t$-tests were conducted on winsorized cortisol levels between each time point and the time point that followed. Cortisol levels significantly increased from baseline (T1) to immediately after the stressor (T2), $t_{paired}(34) = 3.66, p = .001$, and they also increased significantly from immediately after the stressor (T2) to after the stress-response induction (T3), $t_{paired}(34) = 4.64, p < .001$. This pattern of cortisol increasing up until T3 point is consistent with what one would expect due to delays in salivary cortisol. Thus, cortisol levels observed at T3 likely reflect cortisol response to the stressor rather than the stress-response induction. Cortisol levels did not significantly change from after the stress-response induction (T3) to halfway through the recovery period (T4), $t_{paired}(34) = 0.57, p = .571$. Cortisol levels then decreased significantly from halfway through the recovery period (T4) to the end of the recovery period (T5), $t_{paired}(34) = 4.30, p < .001$, and again from the end of the recovery period (T5) to the last saliva sample taken at 55 minutes post-stressor (T6), $t_{paired}(34) = 3.20, p = .003$. Cortisol levels taken at T2 through T6 all differed significantly from baseline levels (T1), and the significant
difference between T1 and T6, \( t_{paired}(34) = 2.69, p = .011 \), indicates that levels did not return to baseline by the end of the study (see Table 3.9 for differences between all time points).

**Table 3.9**

*Paired Samples t-test Comparisons of Winsorized Cortisol Values for the All Participants – t values*

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td></td>
<td>3.66**</td>
<td>4.53***</td>
<td>4.16***</td>
<td>3.39**</td>
<td>2.69*</td>
</tr>
<tr>
<td>T2</td>
<td>4.37***</td>
<td>3.66**</td>
<td>2.10*</td>
<td>0.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>0.57</td>
<td>3.45**</td>
<td>4.19***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td>4.30***</td>
<td>4.09***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.20**</td>
<td></td>
</tr>
</tbody>
</table>

*NOTE. * \( p < .05 \); ** \( p < .01 \); *** \( p < .001 \)
3.3 Exploratory Analysis

The analyses discussed above were planned a priori and conducted as planned. In contrast, the analyses run in this section are exploratory in nature because they were not planned in advance. The following exploratory analyses were conducted in order to better understand the results of the main analyses.

3.3.1 Attention check

In order to check that participants were paying attention and carefully and accurately answering questionnaire items, two “attention check” items were interspersed among the questionnaires. The attention check items were the following: “Please type in the word "dog" for this question” and “Please type in the word "mug" for this question.” Every participant responded to both items correctly.
3.3.2 Self-Compassion-State Scores

It was not planned a priori to measure the amount that participants were using self-compassion techniques during the recovery period (i.e., state self-compassion). It was only towards the end of data collection that I realized that this measure would allow us to observe whether the self-compassion induction was successful in prompting participants to use self-compassion techniques. I implemented the measurement of state levels of self-compassion by testing participants on the SCS-SF-state (as discussed in section 2.3.3). Because this measure was added towards the end of data collection, only 11 participants completed it. The analysis run on these 11 participants suggested that the two conditions did not significantly differ on their SCS-SF-state scores, \( t(9) = 0.56, p = .592 \). However, this finding should be interpreted with caution due to the small sample size.

3.3.3 Stress Reactive Participants

To explore the possibility that the self-compassion induction was only effective for participants who reacted to the stressor, stress reactivity scores were calculated by subtracting the anxious affect score at T1 from the anxious affect score at T2. The median stress reactive score (T2-T1) was 4.00. Analyses were re-run on only participants with a stress reactive score equal to or greater than the median. This approach of using a median split to examine difference between groups high and low in a specific variable has been used in similar studies (Bluth et al., 2016; Campbell, Labelle, Bacon, Faris, & Carlson, 2012; Pace et al., 2009, 2010).

The repeated-measures ANOVA run on anxious affect suggested that participants with a strong stress reaction score followed the same pattern as the complete sample. Specifically, there was still a significant main effect of time, \( F(2.44, 51.29) = 50.83, p < .001, \eta^2 = .078 \), no significant main effect of condition, \( F(1, 21) = 2.17, p = .155, \eta^2 = .094 \), and a significant order
4 time by condition interaction, $F(1, 21) = 9.46, p = .006, \eta^2 = .310$ (see Figure 3.4).

Importantly, as was the case with the complete sample, the two conditions only differed at T3; the self-compassion condition reported significantly lower anxious affect at the post-induction measurement (T3), $t(22) = 3.18, p = .004$.

![Figure 3.4: Anxious Affect Ratings for Participants Who Experienced a Strong Stress Reaction.](image)

The repeated-measures ANOVA run on depressed affect suggested that participants with a strong stress reaction score followed the same pattern as the complete sample. Specifically, there was still a significant main effect of time, $F(1.97, 35.53) = 11.68, p < .001, \eta^2 = .394$, nonsignificant main effect of condition, $F(1, 18) = 3.87, p = .065, \eta^2 = .177$, and a significant quadratic time by condition interaction, $F(1, 18) = 20.18, p < .001, \eta^2 = .529$ (see Figure 3.5).

Importantly, as was the case with the complete sample, the control condition reported much higher depressed affect ratings immediately after the stressor (T2), $t(22) = 3.99, p = .001$. 
When including only participants with a strong stress reaction, the repeated-measures ANOVA conducted on salivary cortisol produced the same pattern of results as the repeated-measures ANOVA conducted on the complete sample. There was still a significant main effect of time on cortisol levels, $F(1.89, 30.02) = 7.17, p = .003, \eta^2 = .309$, but no main effect of condition, $F(1, 16) = 0.01, p = .939, \eta^2 = .000$, and no condition by time interaction $F(1.88, 30.02) = 0.76, p = .468, \eta^2 = .045$. 

*Figure 3.5: Depressed Affect Ratings for Participants Who Experienced a Strong Stress Reaction.*
To explore the possibility that the self-compassion induction was only effective for participants who scored higher on the BDI, participants were divided into two groups—those who scored below the sample median BDI score, and those who scored equal to or above the BDI median. All analyses (ANOVA’s on anxious affect, depressed affect, and salivary cortisol, as well as follow-up tests) were re-run on participants who scored equal to or above the median BDI score, which was 25.5.

The repeated-measures ANOVA run on anxious affect suggested that participants with a high BDI score followed the same pattern as the complete sample. Specifically, there was still a significant main effect of time, $F(2.22, 44.40) = 13.88, p < .001, \eta^2 = .410$, no significant main effect of condition, $F(1, 20) = 0.01, p = .938, \eta^2 = .000$, and a significant order 4 time by
condition interaction, $F(1, 20) = 14.11, p = .001, \eta^2 = .414$ (see Figure 3.7). Although it appears in Figure 3.7 that the two conditions differed at T3 and T4; the conditions did not significantly differ at the post-induction measurement (T3), $t(22) = 1.64, p = .115$, or halfway through the recovery period (T4), $t(22) = 0.78, p = .445$. This differs from the pattern seen between the two conditions with the complete sample, which differed significantly at T3.

Figure 3.7: Anxious Affect Ratings for Participants with High BDI Scores.

When including only participants with high BDI scores, results from the repeated-measures ANOVA run on depressed affect were similar to the results from the complete sample. There was a significant main effect of time, $F(2.27, 40.88) = 5.42, p = .006, \eta^2 = .232$, and there was not a significant effect for condition, $F(1, 18) = 0.00, p = .995, \eta^2 = .000$. However, in contrast to the complete sample, participants with a high BDI did not show a significant time by
condition interaction, $F(2.27, 40.88) = 0.82, p = .463, \eta^2 = .043$. Further, unlike the results from the complete sample which showed significant differences between conditions at T3, participants with high BDI scores did not show significant differences between conditions at any time point, $ps > .05$.

![Figure 3.8: Depressed Affect Ratings for Participants with High BDI Scores.](image)

The repeated-measures ANOVA conducted with participants with high BDI scores on cortisol levels produced the same pattern of results as the ANOVA conducted with the complete sample. There was still a significant main effect of time on cortisol levels, $F(1.55, 26.30) = 6.14, p = .010, \eta^2 = .265$, but no main effect of condition, $F(1, 17) = 0.44, p = .514, \eta^2 = .025$, and no condition by time interaction $F(1.55, 26.30) = 0.17, p = .793, \eta^2 = .010$. Paired samples t-tests conducted on high BDI participants also produced the same pattern of results as the complete
sample. Cortisol levels increased significantly from T1 to T2 and T2 to T3, levels did not change significantly between T3 and T4, and then levels decreased significantly from T4 to T5 and T5 to T6.

Figure 3.9: Winsorized Cortisol Levels for Participants with High BDI Scores.
Chapter 4: Discussion

Self-compassion is an adaptive means of relating to oneself, that could promote effective recovery from stress and act as a resiliency factor against the development of depression. Recent research has identified a large negative correlation between self-compassion and depression, which indicates that individuals who are depressed are not utilizing self-compassion techniques to the same degree as their non-depressed counterparts. The goal of the current study was to extend previous research by using an experimental design to test the effectiveness of a self-compassion induction in promoting effective recovery from stress in a depressed sample.

Participants completed a psychosocial stressor and were then randomly assigned to either a self-compassion induction or a no-strategy control induction. Psychological and biological stress reactivity and response was assessed by measuring depressed and anxious affect as well as levels of salivary cortisol at baseline, immediately following the stressor, and throughout the recovery period. The primary goal of this study was to investigate the hypothesis that the self-compassion induction would be significantly more effective than the control condition at promoting recovery from stress as indicated by lower levels of depressed and anxious affect and greater recovery of salivary cortisol through the recovery period.

Across conditions, participants experienced significant psychological and biological responses to the stressor, as indicated by a significant increase in both anxious affect and level of salivary cortisol from pre-stressor to post-stressor. The self-compassion induction was significantly more effective at reducing anxiety scores from post-stressor to post-induction, compared to the control condition. However, the anxious affect scores of the self-compassion condition did not differ significantly from those of the control condition in the middle and at the end of the recovery period. Surprisingly, depressed affect ratings showed that the control
condition reported significantly higher levels of depressed affect compared to the self-compassion condition in response to the stressor (at a trend level) and immediately following the stress-response induction. The self-compassion induction was not more effective than the control at reducing levels of depressed affect through the recovery period. The self-compassion induction did not have an effect on recovery from stress as measured by levels of salivary cortisol. Each of these findings is discussed below.

4.1 Participant Characteristics

Before assessing the results on each outcome variable, it is important to examine participant characteristics that may have influenced these results. In order to better understand average trait levels of self-compassion in both depressed and non-depressed samples I examined mean scores on the SCS across different samples in the literature. Unfortunately, there were a number of studies in the literature that did not report on the mean self-compassion score of their samples. These studies included both clinical samples (e.g., Diedrich et al., 2014; Shapira & Mongrain, 2010) and non-clinical samples (e.g., Tanaka et al., 2011; Neff, Kirkpatrick, & Rude, 2007). There was also one study that used a unique response scale, making it difficult to compare scores (Johnson & O’Brien, 2013). The mean score is important information that allows one to compare across samples and therefore should be reported consistently in future studies assessing self-compassion.

Of the handful of studies that do report on the mean SCS scores of their sample, research suggests that the mean SCS score for non-depressed samples ranges from 3.00 (Neff et al., 2005) to 3.25 (Leary, Tate, Adams, Batts Allen, & Hancock, 2007). Unsurprisingly mean scores on the SCS for depressed samples are lower, ranging from 2.2 (Van Dam et al., 2011) to 2.74 (Körner et al., 2015). In the study conducted by Körner and colleagues, the participants were diagnosed
with MDD, but they did not report on BDI scores so it is not clear if their sample’s level of depressive symptomatology was similar to my sample. In the study by Van Dam and colleagues, the mean BDI score of the sample was 26, which is similar to the mean BDI score of the current sample (26.29). Interestingly, the trait-level self-compassion scores of my sample (M = 2.99, SD = .44) was much closer to scores found in non-depressed samples (3.00-3.25), then to a sample with a matched level of depression (2.2). This finding suggests that participants in the current study may have had higher self-compassion scores than would be expected of a depressed sample. This may have affected the extent to which the self-compassion induction was effective. It could be that participants in both the control and the self-compassion condition already had greater self-compassion skills than average, which could have led to a ceiling effect, where both conditions practiced self-compassion naturally after the stressor, which is why the self-compassion induction was not as effective at promoting recovery as expected.

As outlined in the Methods and Results section, I assessed trait-level self-compassion scores of every participant by asking them to respond to the questionnaire by thinking about how they typically act towards themselves. After data collection had begun, I realized the importance of assessing the amount participants were using self-compassion following the stressor (i.e., state SCS). Thus, for a subset of participants, I asked about state levels of self-compassion by asking them to complete the questionnaire at the end of the study by reflecting on how they acted towards themselves since they listened to the audio recording (either the self-compassion induction or the no-strategy control). I expected that the participants in the self-compassion condition would report significantly higher use of self-compassion during the recovery period than the control condition, which would indicate that the self-compassion induction was effective. Surprisingly, however, the mean state self-compassion score of the self-compassion
condition (M = 2.73) did not significantly differ from the mean of the control condition (M = 2.54). This is interesting because it casts doubt that the self-compassion induction was effective in causing participants to use self-compassion techniques. This finding is important to consider when interpreting my results. This lack of significant difference in the reported use of self-compassion between the two conditions, could explain the null findings discussed below. There is, however, one important caveat to assessing the state-level self-compassion scores: I only implemented this measure towards the end of data collection, so the data comes from just 11 participants. This sample is too small to adequately power analyses and therefore it would be difficult to find a statistically significant difference, even if there was one.

The mean BDI score of the sample, 26.29, indicates moderately severe depression (Beck et al., 1996). The minimum score in the sample was 14, which is the lower threshold of mild depression, and the maximum score was 43, which is indicative of severe depression. Therefore, all of the participants in my sample have BDI scores consistent with at least mild depression, with scores ranging from mild to severely depressed. The mean age of the sample, 20.31, indicates that the sample was quite young but it is consistent with a university student population. Although I recruited from the general community, the majority of the participants for this study were recruited from the student population of UBC.

### 4.2 Anxious Affect

#### 4.2.1 Stressor Effectiveness

I expected that participants in both the self-compassion condition and the no-strategy control condition would experience an increase in anxious affect in response to the stressor. Self-reported anxious affect was measured immediately prior to the stressor and immediately after the stressor. As expected, there was a significant increase in anxious affect in both conditions from
pre- to post-stressor, and importantly, the increase in anxious affect did not differ significantly between those in the self-compassion and control conditions. These data suggest that the stressor was effective in producing a significant stress response as measured by self-reported anxious affect, that did not differ between the two conditions. This suggests that the random assignment to conditions was effective and resulted in two groups who did not differ on propensity for stress response. The effectiveness of the stressor in producing a response is not surprising given that the Trier Social Stress Test (TSST) is considered the gold-standard in experimental, psychosocial stressors. Since its introduction over two decades ago, it has been used effectively across a multitude of populations including healthy adult males (Kirschbaum et al., 1995) and females (Kirschbaum, Wust, & Hellhammer, 1992), clinically depressed adults (Young, Lopez, Murphy-Weinberg, Watson, & Akil, 2000), depressed and non-depressed adolescents (Harkness, Stewart, & Wynne-Edwards, 2011) and children (Gilissen, Bakermans-Kranenburg, van Ijzendoorn, & Linting, 2008). Research has consistently shown the TSST to be successful in producing both psychological and biological stress responses in participants (e.g., Kudielka, Buske-Kirschbaum, Hellhammer, & Kirschbaum, 2004; Dickerson and Kemeny, 2004; Burke, et al., 2005). In summary, as would be expected given previous research, I found that the TSST was effective in producing a stress response in my sample, and that the strength of this stress response was equivalent across the two conditions.

4.2.2 Stress Recovery

I expected that the self-compassion condition would be more effective than the no-strategy control condition at improving recovery from stress, as evidenced by participants in the self-compassion condition reporting significantly lower anxious affect than those in the control condition throughout the recovery period. The results showed a significant difference in anxious
affect ratings between the two conditions immediately after the stress-response induction (T3). However, there were not significant differences between the self-compassion and control condition at the next two time points: in the middle of the recovery period (T4) and at the end (T5).

It is encouraging that we see a difference between conditions immediately after the stress-response induction; this finding suggests that the self-compassion induction had an effect on promoting recovery from stress. It is important to examine reasons why the initial anxiety reduction effect of the self-compassion induction was no longer seen during and at the end of the recovery period. One explanation is that the induction was simply not long enough or in-depth enough to produce a lasting change. It is possible that participants in the self-compassion condition were using some self-compassion skills just after the induction, but that they did not continue to use these strategies during the recovery period. It is also possible that they began to engage in more maladaptive emotion regulation strategies, such as rumination, which is common in depressed individuals (Nolen-Hoeksema, 2000).

However, the data shed doubt on this interpretation. The results showed that, for the self-compassion condition, levels of anxious affect declined from immediately before to immediately after the stress-response induction (i.e., from T2 to T3), and then remained fairly constant between T3 and T4 before declining between T4 and T5. In contrast, participants in the control condition did not show a significant decline in their anxious affect until halfway through the recovery period (T4), at which point anxious affect levels did not differ between participants in the self-compassion and control conditions. This pattern of results suggests that a more comprehensive explanation for the data is that the self-compassion induction prompted a slightly faster decline in levels of anxiety.
4.3 Depressed Affect

The TSST was designed to produce a stress response anxiety and not designed to target depressed affect. Most studies that use the TSST to measure psychological responses to stress measure perceived stress and levels of anxiety, and do not assess depressed mood. Of the studies that indicated in the methods section that they measured depressed mood in response to the TSST, most do not report any results of the effects on depressed mood (e.g., Heinrichs, Baumgartner, Kirschbaum, & Ehlert, 2003; Kelly et al., 2008; Kudielka & Wüst, 2008; Creswell et al., 2005). Compared to participants in the self-compassion condition, participants in the control condition reported a greater increase in depressed affect in response to the stressor (at a trend level). The reason this finding is so surprising is that this difference between conditions occurred before the induction, so participants in both conditions were treated exactly the same way up to this point. The most reasonable explanation for this difference is that the randomization was not effective and participants in the two conditions differed in some important way prior to starting the study. However, I assessed many important demographic, clinical, and health measures and the two conditions did not significantly differ on any of them. Conditions did not differ on self-reported anxiety or self-compassion scores, age, use of nicotine, physical exercise, eating/drinking in the 2 hours prior to the experiment, BMI, or caffeine consumption (see Section 3.1.4 for analyses). Moreover, baseline measurements of depressed affect (T1) did not differ significantly between participants in the control condition and those in the self-compassion condition.

While I was not anticipating a particularly large increase in depressed affect in response to the stressor, I was expecting the self-compassion induction to promote more effective recovery in terms of lower levels of depressed affect compared to the control condition. Surprisingly, the
difference in depressed affect scores between conditions that I was expecting during the recovery, instead occurred in response to the stressor. Because participants in the control condition showed markedly greater reactivity to the stressor as measured by depressed affect, it is difficult to draw conclusions on the recovery between the two conditions. Neither the self-compassion condition nor the control condition experienced a decrease in depressed affect from before the SR induction to afterward. However, while participants in the control condition experienced a significant reduction in depressed affect during the recovery period, participants in the self-compassion condition did not experience any reduction in depressed affect at any time point after the stressor. One could argue that this finding is evidence that the self-compassion induction actually prevented sufficient recovery of depressed affect. It is possible that some element of the induction made participants feel worse rather than better. A relevant line of research has examined the ability of individuals to retrieve positive autobiographical memories in an effort to repair negative moods (Joormann & Siemer, 2004). Findings suggest that people experiencing a depressed mood state have more difficulty using mood-incongruent recall to improve sad mood (Joormann & Siemer, 2004). This is in line with research that has shown that depressed individuals have more difficulty improving their mood when it is negative (e.g., Nolen-Hoeksema, 1991; Nolen-Hoeksema & Morrow, 1993). This research is relevant to self-compassion and in particular, the self-compassion induction used in this study. In the induction, participants are asked to use love and kindness towards themselves (see Appendix C). One possibility is that the self-compassion induction was not effective because depressed individuals in my sample found it very difficult or were not able to use self-compassion techniques and this was discouraging. However, this is not the most compelling argument when taking into account the pre-induction difference between the two conditions. The most plausible explanation for the
markedly different responses in depressed affect between the two conditions is that randomization failed and the conditions differed in some fundamental aspect.

4.4 Salivary Cortisol

Salivary cortisol was measured in order to supplement self-report measures and provide a more complete picture of the stress response. As such, I expected the salivary cortisol data to correspond to changes in affect, in that a decrease in anxious affect would show up as a decrease in cortisol levels. The stressor was highly effective in producing a biological response as evidenced by participants in both conditions experiencing a significant increase in levels of salivary cortisol from pre- to post-stressor. As noted in the results section, it is important to take into account the delay in salivary cortisol levels. A meta-analysis found that typically cortisol levels reach their peak between 21 to 40 minutes after the onset of a stressor (Dickerson & Kemeny, 2004). This anticipated peak in cortisol values was captured at the third time-point in my study, immediately following the induction, which was 25 minutes after stressor onset. Further, cortisol levels typically return to baseline between 41 to 60 minutes after stressor onset (Dickerson & Kemeny, 2004). The last saliva sample, collected 55 minutes after stressor onset, captured participants return to baseline cortisol levels, as levels at this time-point did not significantly differ from baseline levels.

I expected that participants in the self-compassion condition would show a greater decrease in level of salivary cortisol through the recovery period, compared to participants in the control condition. Surprisingly, there were no significant differences between conditions at any time-point. This could be explained by simply inferring that the self-compassion induction had no effect on stress recovery. However, this explanation does not account for the difference in anxious affect between the two conditions that was found post-induction. The self-compassion
condition reported significantly lower anxious affect post-induction (T3) than the control group. Based on this finding, one would expect to see the self-compassion condition experience significantly lower cortisol levels compared to the control group at Time 4 (because of the delay in cortisol secretion this would correspond to affect data collected at T3). Instead, the cortisol values at Time 4 do not significantly differ from values collected at the previous time-point, and the cortisol values of the self-compassion and control condition do not significantly differ at this time point.

It could be that participants in the self-compassion condition experienced a decrease in anxious affect immediately after the stress-response induction, as was suggested by the self-reported anxious affect data, but did not experience a corresponding change in biological recovery (as measured with cortisol). Although it has been assumed for several decades throughout the research literature that affective and physiological stress systems are coherent with one another (Mauss et al., 2005), relatively little research has explicitly tested this assumption (Campbell & Ehlert, 2012). According to a meta-analysis conducted to assess the association between psychological and biological stress responses to the TSST, the association is weaker than has been assumed (Campbell & Ehlert, 2012). While some studies have found that psychological stress responses are closely associated to biological stress responses (e.g., Schlotz et al., 2008 and Oldehinkel et al., 2010), other researchers have not found the same association in response to the TSST (e.g., Schedlowski et al., 1992; Cohen et al., 2000; Hjortskov et al., 2004). The results of the meta-analysis found that only 25% of the studies they reviewed showed a significant correlation between cortisol responses and perceived emotional stress variables (Campbell & Ehlert, 2012). Thus, it is not entirely surprising that the affect reactivity of the participants in my study do not correlate to their cortisol reactivity. Self-report measures of
affective experience and biological measures of physiological activity provide different information, that both shed light on the human stress response.

4.5 Limitations and Future Directions

It is important to acknowledge the limitations to this research, and to identify areas for future research to be conducted. The first limitation is that there are data that call into question the effectiveness of the self-compassion induction in encouraging participants to use self-compassion techniques. This may be due to the short nature of the study. In the future, studies could assess inductions that are longer and more in-depth. Another area for future research is assessing the impact of more long-term training programs in self-compassion, and testing responses to stress after multiple training sessions. Promising findings came from one study that employed a self-compassion training program over 3 consecutive days. Participants who received the self-compassion training showed diminished sympathetic (salivary alpha-amylase), cardiac parasympathetic, and subjective anxiety responses, although they did not show diminished salivary cortisol responses to the TSST (Arch et al., 2014).

A second limitation is that the participants in this sample had higher self-compassion scores at baseline than would be expected of a depressed sample. I may have seen stronger effects if I had assessed a clinically depressed sample, or a sample with a higher BDI cut-off score. However, when analyses were re-run on a subset of the sample that had high BDI scores, the general pattern of results remained the same. Specifically, participants in the self-compassion condition did not show faster stress recovery in terms of anxious affect, depressed affect, or levels of cortisol.

Third, the sample size, while adequate enough to satisfy power analyses conducted prior to data collection, may not have been large enough to detect effects in this experiment. If the effects
of self-compassion on the outcome variables are smaller than anticipated, a larger sample is required to detect effects. Thus, future research should recruit larger samples in order to test similar hypotheses.

Fourth, there are certain limitations inherent with university student participants, one is that because they are receiving course credit instead of a monetary incentive, they may be less attentive or careful in their participation. However, every participant correctly answered every attention check question (as outlined in section 3.3.1), which suggests that the sample was paying attention and reading each question carefully before answering. Nevertheless, future research would likely benefit from recruiting a more diverse sample, including participants outside of a university community.

4.6 Conclusions

The current study is an important addition to the burgeoning literature examining self-compassion as it relates to stress and depression. This study extends the research in several ways. It was the first to randomly assign people with depression to a self-compassion condition. Further, it was the first study to examine the effects of experimentally induced self-compassion on both self-report and biological markers of wellbeing. Although it was observed that the self-compassion induction resulted in lower anxious affect scores immediately after the induction, compared to the no-strategy control induction, I did not observe the expected effects of the self-compassion induction on depressed affect or salivary cortisol. Given the discrepant results, further research is needed to determine whether self-compassion is an effective technique for promoting effective recovery from stress. If supported in future research, existing treatments for depression might benefit from additional emphasis on the theory and practice of self-compassion. Self-compassion could aid in recovery from stressful events as measured by self-
reported anxious affect, but it might not have the far-reaching benefits that were originally anticipated.
References


between the serotonin transporter polymorphism and children's attachment representation. Developmental Psychobiology, 50(6), 615-625.


Appendix A: HSP Pre-Screening Questionnaire

Q1. Within the past month, think back to the 2 weeks in a row when you felt the most depressed or down. Please indicate whether you had either of these experiences during that 2-week time period (check all that apply): Note: If you felt the same all of the weeks of the month, please focus on the last 2 weeks.

Depressed mood most of the day, nearly every day (e.g., felt sad, empty, hopeless). (1)

Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day. (2)

Q2. Please continue to think about that same 2-week period, and indicate which of the following additional experiences you had (check all that apply):

Significant weight loss when not dieting or weight gain (e.g., a change of more than 5% of body weight in a month), or decrease or increase in appetite nearly every day. (1)

Insomnia or hypersomnia (sleeping too much or too little) nearly every day. (2)

Being slowed down or excessively restless nearly every day. (3)

Fatigue (tiredness) or loss of energy nearly every day. (4)

Feelings of worthlessness or excessive or inappropriate guilt nearly every day. (5)

Diminished ability to think or concentrate, or indecisiveness, nearly every day. (6)

Recurrent thoughts of suicide. (7)
Appendix B: Telephone Interview

PHONE SCREEN INTRODUCTION

DATE: ___________________  SCREENER: _______________________________

Initial Contact Script

Hi, this is _______, calling from UBC. May I please speak with _________?

[If person’s not there: Leave lab phone number, but do NOT mention that you are calling specifically about the Stress & Resilience Study or from the Depression, Anxiety, and Stress Lab.]

I’m calling about the Stress and Resilience study at UBC that you had expressed interest in. May I take a few minutes to describe our study? [If NO, reschedule]

Great! We really appreciate your interest in helping our research. Our study is a project in the Department of Psychology at UBC. We are looking at how different people cope with stress. Our main goal is to gain a better understanding of the factors that may help some people cope better with stress than others.

To start off we would first conduct a phone interview with you to see if the study is a good fit. This could take anywhere from 20 to 30 minutes. If it is a good fit, we will invite you to come to UBC to complete the study, which would last approximately 3 hours. You should know that you will not be paid for this initial screening interview. It is used only to determine whether you are eligible for the paid portion of the study. However, you do not have to answer anything you do not want to and you have the right to withdraw from the study at any time. You should know that this study is being conducted by Dr. Joelle LeMoult at the University of British Columbia. The study has been reviewed and received ethics clearance through the Behavioural Research Ethics Board at UBC. The final decision about participation is yours. All of the information you provide – during the phone interview as well as during the in-person study—will be kept strictly confidential. However, there is one exception- if, during the interview, you tell me that you are going to harm yourself or others, or that you have knowledge of ongoing child abuse, I may need to break confidentiality to keep you or others safe.

If you have any questions, concerns, or complaints about this study, you can let us know at any time and we will provide you contact information for the principal investigator as well as the UBC ethics board which is separate from our research team.

[If participant asks who will have access to their information] Only researchers belonging to our lab, each of whom have completed training in the principles of confidentiality, will have access to your information.

[If not already clear] How did you find out about our study? ________________________________

[If relevant] Where was the advertisement posted? ________________________________

Would you be interested in finding out whether you would qualify for our study?

If yes and you are phone screen trained: Great. Do you have time right now for our phone interview? It will take 10-20 minutes. [If yes: go to page 2.]

If no: Is there a good time for someone to call you to talk for 20-30 minutes? [Consult the calendar and schedule the person during a time you are available. Make sure to note the result in the Excel file (and the calendar if applicable)]. Okay, we will give you a call on _____Date at _____Time. Thank you.
Phone Screen

Thank you so much! The brief interview you are about to begin will be used solely for the purpose of determining if you are a good fit for this study. If you agree to participate in this phone interview, you will be asked detailed information about your mental health and alcohol use. You don’t have to answer anything you don’t want to.

<table>
<thead>
<tr>
<th>GENERAL QUESTIONS</th>
<th>Question</th>
<th>Answer</th>
<th>Eligibility Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is your date of birth?</td>
<td>/ /</td>
<td></td>
<td>Ages 18-65 (1952-1999) [IF 65 OR OLDER, INELIGIBLE]</td>
</tr>
<tr>
<td>Are you a native English speaker?</td>
<td>YES NO</td>
<td></td>
<td>Native English speaker [If NO, and communicating in English over the phone is problematic, INELIGIBLE]</td>
</tr>
<tr>
<td>Where were you born?</td>
<td>Place (country) of birth:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How long have you lived in Canada?</td>
<td>Years of Residence:</td>
<td></td>
<td>Must be able to legally live and work in Canada.</td>
</tr>
<tr>
<td>Do you have any definite plans to move away from the Vancouver Area?</td>
<td>YES NO</td>
<td></td>
<td>[If YES ask for details to find out if this is likely to interfere with scheduling the participant for an appointment, if it will (happening in next month) INELIGIBLE.]</td>
</tr>
<tr>
<td>Are you color-blind?</td>
<td>YES NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you wear glasses?</td>
<td>YES NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you ever been diagnosed with any learning disabilities?</td>
<td>YES NO</td>
<td></td>
<td>No dyslexia, other reading difficulties, or visual processing problems [If YES and it is severe enough to interfere with reading and answering questionnaires, INELIGIBLE]</td>
</tr>
<tr>
<td>Details:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you ever received an injury or trauma to your head?</td>
<td>YES NO</td>
<td></td>
<td>IF YES: ask when it occurred, and duration of Loss of Consciousness INELIGIBLE if LOC &gt; 5 min w/in past 12 months OR LOC &gt; 1 hr if beyond 1 year.</td>
</tr>
<tr>
<td>Details:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For the following questions, eligibility will be assessed on a case-by-case basis unless otherwise noted.
<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you ever been diagnosed with any neurological disorder, such as Alzheimer’s Disease, Parkinson’s Disease, Huntington’s Disease?</td>
<td>YES</td>
<td>NO</td>
<td>IF YES: what kind and duration:</td>
</tr>
<tr>
<td>Have you ever been diagnosed with an endocrine disorder such as Addison’s Disease or Cushing’s Disease?</td>
<td>YES</td>
<td>NO</td>
<td>IF YES: INELIGIBLE</td>
</tr>
<tr>
<td>Do you have a diagnosis of hypo/hyperthyroidism?</td>
<td>YES</td>
<td>NO</td>
<td>IF YES: Are you taking medication for it? Is it well managed via the medication?</td>
</tr>
<tr>
<td>Do you have high blood pressure or hypertension?</td>
<td>YES</td>
<td>NO</td>
<td>IF YES: Are you taking medication for it? Is it well managed via the medication?</td>
</tr>
<tr>
<td>Do you have a history of cardiovascular disease?</td>
<td>YES</td>
<td>NO</td>
<td>IF YES: Are you taking medication for it? Is it well managed via the medication?</td>
</tr>
<tr>
<td>Have you ever had a stroke, hemorrhage, or brain tumor?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Have you ever had brain/neural surgery or brain radiation treatment (e.g. for brain tumor)?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Do you have seizures or Epilepsy?</td>
<td>YES</td>
<td>NO</td>
<td>IF YES: Ask about severity, frequency and medication</td>
</tr>
<tr>
<td>The next question is asked of all participants to avoid making assumptions about sex and/or gender based on name or voice:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you ever menstruated?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>The next 3 questions are only for participants who endorse menstruation:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are you currently pregnant, breastfeeding, or having fertility treatments?</td>
<td>YES</td>
<td>NO</td>
<td>IF YES: INELIGIBLE</td>
</tr>
<tr>
<td>IF OVER 30: Have you begun menopause?</td>
<td>YES</td>
<td>NO</td>
<td>IF YES: INELIGIBLE</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
<td>Eligibility Criterion</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>--------</td>
<td>---------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Do you (otherwise) have a normal menstrual cycle?</td>
<td>YES</td>
<td>IF NO: Do you know the cause?</td>
<td></td>
</tr>
<tr>
<td>Do you currently smoke cigarettes?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>If YES, how much in a typical week?</td>
<td>NO</td>
<td>Need to determine if they can go 5 hours without smoking. IF NOT: INELIGIBLE.</td>
<td></td>
</tr>
<tr>
<td>IF ENDORSE SMOKING MULTIPLE TIMES EACH DAY: Do you find it difficult to go 5-6 hours without smoking?</td>
<td>Details:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much alcohol do you drink, on average, per week?</td>
<td>Estimated amount:</td>
<td>If seems excessive (e.g., more than 3 drinks per day at least 3 days per week), ask Alcohol Abuse follow-up questions (below).</td>
<td></td>
</tr>
<tr>
<td>In the past six months, have you ever had five or more drinks on one occasion?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>In the past six months have you become dependent on a prescription medication?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>IF YES: Did your drinking cause problems for you or did other people comment on it?</td>
<td>NO</td>
<td>Recurrent use resulting in failure to fulfill obligations, in legal problems or in social or interpersonal problems or use in physically hazardous situations = INELIGIBLE.</td>
<td></td>
</tr>
</tbody>
</table>

**SUBSTANCE/ ALCOHOL USE & TREATMENT**
<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>Details:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you currently in treatment for the misuse of any substances (e.g., alcohol)?</td>
<td>YES</td>
<td>NO</td>
<td>Details:</td>
</tr>
<tr>
<td>If endorse symptoms of current substance abuse: INELIGIBLE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you received treatment for the misuse of alcohol or substances in the past?</td>
<td>YES</td>
<td>NO</td>
<td>Details:</td>
</tr>
<tr>
<td>TREATMENT FOR EMOTIONAL/PSYCHIATRIC PROBLEMS &amp; MEDICATION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are you currently in treatment for any emotional problems?</td>
<td>YES</td>
<td>NO</td>
<td>Note: Listen for evidence of bipolar disorder, psychotic symptoms, schizophrenia (RULE-OUT’s) in past 6 months</td>
</tr>
<tr>
<td>Why did you seek treatment?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were you offered a diagnosis?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you received treatment for any emotional problems in the past?</td>
<td>YES</td>
<td>NO</td>
<td>Comorbidity of non-study diagnoses (e.g. GAD, SAD, OCD, phobias, etc.) OK</td>
</tr>
<tr>
<td>What was going on then? When?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were you offered a diagnosis?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are you currently taking any medications on a daily basis?</td>
<td>*Don’t need to ask about daily dosage or reason for taking birth control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Med 1 ___________________________</td>
<td>Daily dosage 1 (mg)_______</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Med 2 ___________________________</td>
<td>Daily dosage 2 (mg)_______</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Med 3 ___________________________</td>
<td>Daily dosage 3 (mg)_______</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Med 4 ___________________________</td>
<td>Daily dosage 4 (mg)_______</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Med 5 ___________________________</td>
<td>Daily dosage 5 (mg)_______</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corticosteroids, oral or inhaled steroids, or depot neuroleptics =INELIGIBLE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reason 1 ________________</td>
<td>Reason 2 ________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reason 3 ________________</td>
<td>Reason 4 ________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reason 5 ________________</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCHOTIC SYMPTOMS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Now I am going to ask you about some strange or unusual experiences people sometimes have:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Has it ever seemed like people were talking about you or taking special notice of you? | YES | NO | Determine with further questioning if the participant has ever had psychotic symptoms. 
We would not exclude if the symptoms happened just once, unless it lasted several days.

2. Have you ever seen or heard things that other people didn’t notice? | YES | NO |

3. Have you ever heard conversations when no one was around or received special messages? | YES | NO |

4. What about feeling that other people were going out of their way to test you or hurt you so that you felt that you had to be on your guard constantly? | YES | NO |

5. Have you ever felt that you had special powers? | YES | NO |

**MANIC OR HYPOMANIC EPISODE**

| MANIA | Have you ever experienced a period of several days or more when you were feeling so good, “high,” hyper, or excited that other people thought you were not your normal self? Did anyone say you were manic? Was that more than feeling good? | YES | NO | A distinct period of abnormally and persistently elevated, expansive, or irritable mood and abnormally and persistently increased goal-directed activity or energy, lasting at least 1 week and present most of the day, nearly every day (or any duration if hospitalization is necessary). If YES to either, check how long it lasted.

| IRRITABLE MANIA | If NO: What about a period of time when you were so irritable that you found yourself shouting at people or starting fights or arguments? (What about with people you didn’t really know?) | YES | NO | If YES to either, check how long it lasted.

| DURATION | If YES for EITHER of above: How long did it last? Did it require hospitalization? | NO |

If endorse either mania or irritable mania **for more than 4 days** - CONTINUE
<table>
<thead>
<tr>
<th>SELF-ESTEEM</th>
<th>How did you feel about yourself during that time? (More self-confident than usual?)</th>
<th>YES</th>
<th>NO</th>
<th>During the period of mood disturbance and increased energy or activity, three (or more) of the following symptoms (four if the mood is only irritable) are present to a significant degree and represent a noticeable change from usual behavior. If Criteria is met for a Hypomanic or Manic Episode = INELIGIBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTIVITY/RESTLESSNESS</td>
<td>How did you spend your time? Were you physically restless?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>SLEEP</td>
<td>Did you need less sleep than usual? Did you still feel rested?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>TALKATIVE</td>
<td>Were you much more talkative than usual?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>RACING THOUGHTS</td>
<td>Did you feel that your thoughts were racing?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>DISTRACTION</td>
<td>Were you easily distracted?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>IMPAIRMENT</td>
<td>At that time, did you have serious problems at home or at work (school) because you were (hyper/irritable)?</td>
<td>YES</td>
<td>NO</td>
<td>Sufficiently severe to cause marked impairment in social/occ functioning or hospitalization</td>
</tr>
</tbody>
</table>

**DEPRESSION (MDD)**

<table>
<thead>
<tr>
<th>DEPRESSED MOOD</th>
<th>In the last month… Has there been a period of time when you were feeling depressed or down most of the day nearly every day? (When did that start?) How long did it last? (As long as two weeks?)</th>
<th>YES</th>
<th>NO</th>
<th>NOTE: YES requires 2-week period of nearly continuous depressed mood (at least 10 of 14 days).</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>START 2 Wks: ____________ END 2 Wks: ____________ # days depressed/down: _____ Details:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANHEDONIA</td>
<td>…have you lost interest or pleasure in almost all of your daily activities? (What activities? Was there anything you still enjoyed?) Was it nearly every day? As long as two weeks?</td>
<td>YES</td>
<td>NO</td>
<td>NOTE: YES requires 2-week period of markedly diminished interest or pleasure. (at least 10 of 14 days).</td>
</tr>
<tr>
<td></td>
<td># days lost interest/pleasure: _____ Details:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IF ENDORSE either depressed mood or anhedonia > 2 weeks, CONTINUE
<table>
<thead>
<tr>
<th>Symptom</th>
<th>Question</th>
<th>Answer</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPETITE</td>
<td>During these two weeks: How was your appetite? Did you lose or gain any weight?</td>
<td>YES NO</td>
<td>Significant weight loss or gain or +/- appetite nearly every day (&gt;= 10 days)</td>
</tr>
<tr>
<td></td>
<td># days lost appetite: ______ Details:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>SLEEP</strong> How were you sleeping?</td>
<td>YES NO</td>
<td>Insomnia or hypersomnia nearly every day (&gt;= 10 days)</td>
</tr>
<tr>
<td></td>
<td># days slept too much: ______ too little: ______ Details:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>PSYCHO-MOTOR</strong> Were you fidgety or restless? What about the opposite; talking or moving slowly?</td>
<td>YES NO</td>
<td>Psychomotor agitation or retardation nearly every day (&gt;= 10 days)</td>
</tr>
<tr>
<td></td>
<td># days psychomotor: ______ Details:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>ENERGY</strong> What was your energy like?</td>
<td>YES NO</td>
<td>Fatigue or loss of energy nearly every day (&gt;= 10 days)</td>
</tr>
<tr>
<td></td>
<td># days lost energy: ______ Details:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>SELF-WORTH/GUILT</strong> How did you feel about yourself? IF OK: Did you feel guilty about anything you had or had not done? (What did you feel guilty about?)</td>
<td>YES NO</td>
<td>Feelings of worthlessness or excessive or inappropriate guilt nearly every day</td>
</tr>
<tr>
<td></td>
<td># days worthless/guilt: ______ Details:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>THINKING/CONCENTRATION/DECISIONS</strong> Did you have trouble concentrating? IF NO: Did you have trouble making decisions about everyday things? (Examples?)</td>
<td>YES NO</td>
<td>Trouble thinking or making decisions nearly every day (&gt;= 10 days)</td>
</tr>
<tr>
<td></td>
<td># days trouble: ______ Details:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>IMPAIRMENT</strong> [Only ask if not already clear] Has this (episode) made it hard for you to do your work, take care of things at home, or get along with other people?</td>
<td>YES NO</td>
<td>Needs to be impairment.</td>
</tr>
<tr>
<td></td>
<td>Details:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>BEREAVEMENT</strong> Shortly before this episode began did someone close to you pass away? IF YES: Do you think that this loss could have contributed to your symptoms?</td>
<td>YES NO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Details:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ILLNESS/MEDICATION

<table>
<thead>
<tr>
<th>Shortly before this episode began did you experience a major sickness, or a change in your medication? IF YES: Do you think that this change in your health/medication could have contributed to your symptoms?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Details:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Need to endorse at least three of these if they endorsed both questions (anhedonia and mood), or four if they endorsed only anhedonia or mood > 5 TOTAL including anhedonia and mood.

FINISHING THE INTERVIEW:

If the participant is not eligible, say:

Thank you very much for your time and for answering these questions. I am just looking over the interview now, and unfortunately it looks as though you are not going to be eligible for this particular study. If, however, you are interested in research in general, we would love to keep your name and number for future studies done here at UBC. Would that be okay with you?

If participant wants more information about why they are not eligible:

Explain that there is not any ONE thing that makes them ineligible. Say that we are looking for very specific profiles across a host of different criteria and unfortunately their profile is not a match with any of the detailed profiles that we are looking for.

*Do not give out any specific information about what makes them (or anyone) eligible or ineligible.

If they are not satisfied, you can always tell them that you will refer them to your supervisors and then pass off to Ali.

In unclear cases, say:

I want to thank you VERY MUCH for your time and for answering all of these questions. I will have my supervisor go over the protocol, and then I will give you a call in the next few days to let you know whether or not you are eligible for this particular study.

For qualifying participants, say:

Thank you very much for answering all of these questions. I would like to invite you to come to UBC to participate in more detailed interviews. Is it okay if someone contacts you soon to schedule your first session?

If participant would like to call back, give them our phone number.

**Note--For any participants who may be interested in seeking treatment or who appear distressed, Give them appropriate referrals from referral list.

If the interview reaches the 30-minute mark:

I realize that we've been talking for about a half hour now, and I'd like to check in with you. Because this portion is unpaid, I want to be especially conscientious of your time. At this point, we're about XX% of the way through the interview, so it could take another XX minutes. We can either complete the interview today, or we can schedule a time when I could call you back another day when it works for you.
DAS Lab Phone Screen

| Potential Participant’s Name: __________________________ | Date: ___/___/____ |
| Phone Number: __________________________ | Screened by: __________________________ |

**Outcome (circle one)**
- Eligible – MDD
- Ineligible  Why: ____________________________________________________________

**Summary/Notes:**

**Recommendations/Questions about eligibility:**

**FINAL STEPS:**
- Scheduled for Lab Session: ______________________________________________________
  (Name of the person to conduct Lab Session) (Date)
- Promised to call back to YES _________ NO N/A
- Schedule Lab Session:
  If ineligible, informed YES _________ NO N/A
  of ineligibility?

**Other (specify):** ______________________________________________________________

*** Make sure to update the Excel file (Participant tracking) and the Gmail calendar ***
Appendix C: No-Strategy Control Induction

Think back to the speech and math task that you just performed.

What kind of thoughts and feelings did this performance bring up for you?

Is there some aspect of your personality, or perhaps some mistake you made, a failure, that bothers you?

Something that perhaps you’re now criticizing yourself for, or has made you feel inadequate in some way?

Whatever this trait or action is, try to get in touch with your feelings about it.

How do you feel when you think about this inadequacy?

Note: Italicized text appears in both self-compassion and no-strategy control condition.
Appendix D: Self-Compassion Induction

Think back to the speech and math task that you just performed.

What kind of thoughts and feelings did this performance bring up for you?

Is there some aspect of your personality, or perhaps some mistake you made, a failure, that bothers you?

Something that perhaps you’re now criticizing yourself for, or has made you feel inadequate in some way?

Whatever this trait or action is, try to get in touch with your feelings about it.

How do you feel when you think about this inadequacy?

See if you can locate the sensations of this inadequacy in your body. Perhaps a tightness in your throat, a heaviness in your heart, tension in the shoulders, what emotions do you feel when you think about this mistake or inadequacy? Where are those emotions felt in the body? Just allow them to be there, these natural feelings that arise when we judge ourselves. Just notice them. What am I feeling? Where are the emotions in my body?

Get in touch with the feelings that arise from our self-judgement, our fears of not being good enough. Some of our greatest distress caused at our own hands, by the belief that somehow we should be perfect.

Now try to bring mindful awareness to the fact that thinking about your inadequacies or shortcomings is uncomfortable. Maybe you can say to yourself “this is hard right now” or “I’m struggling.” Try to find some language that speaks to you.

Now remind yourself that distress is a part of our common humanity- it is a part of life. And again, find language that speaks to you. Something like, “it’s not out of the ordinary to feel this way, many people are going through similar situations.” The degree of distress may be different, the type of distress may be different, but distress is a part of life, a part of being human.

So, what we’ll do now is repeat some phrases. Loving-kindness phrases to help you feel compassion for the fact that you’re an imperfect being. You try your best but no one on this planet is perfect, we’re all inadequate in some way, we all make mistakes, we all fail. This is the human experience, it’s okay.

I’ll say a few phrases out loud and then you can repeat them back to yourself.

May I be safe.
May I be peaceful.
May I be kind to myself.
May I accept myself as I am.
Repeat these phases silently, really trying to get in touch with the intention behind these words. The intention to offer yourself kindness, compassion, acceptance.

May I be safe.
May I be peaceful.
May I be kind to myself.
May I accept myself as I am.

Give yourself the same kindness, support and acceptance that you would give to a friend, who is feeling bad about themselves.

Remember all your fellow humans that feel self-judgement the way that you do. Remember that everyone is in the same boat. Everyone feels inadequate in some way, everyone makes mistakes, and everyone fails. This is the human condition, this is normal. This is something we all share, it’s okay.

May I be safe.
May I be peaceful.
May I be kind to myself.
May I accept myself as I am.

**Note:** Italicized text appears in both self-compassion and no-strategy control condition.
Appendix E: Debriefing Form

Research Title: Stress & Resilience

How do people cope with stress? The main purpose of this research is to better understand the link between stress, adaptive stress-response strategies and symptoms of depression.

Historically depression research has focused on risk factors, but an exciting new approach is to identify resiliency factors that lessen the duration or severity of depressive episodes. Self-compassion is an adaptive way of responding to stress and oneself that is theorized to promote resilience in depression. Our primary hypothesis is that using self-compassion will promote recovery from stress, as indicated by self-report measures of mood and measurements of salivary cortisol. The predictor variable in our study is the type of stress-response strategy used (self-compassion versus no-strategy control); the outcome variables are measures of mood and cortisol.

To examine this possibility, in this study, you were asked to complete two stressful verbal tasks. The verbal tasks that you completed – presenting a speech and performing a mental math task – were designed to induce a stress response. These tasks were deceptive in that we did not analyze the quality of your speech and you were not filmed- the main purpose of the task was to produce a stress response.

After participating in the verbal tasks, you were randomly assigned to receive either a) self-compassion instructions, or b) no-strategy control instructions. You then reported on your mood and gave saliva samples throughout the study. You were also asked to fill out a number of self-report questionnaires in order to measure variables that could influence your response to stress.

We predicted that the self-compassion induction would be more effective than the no-strategy control condition at promoting recovery from stress, as indicated by self-report measures of mood and measurements of salivary cortisol.

Because we randomly assigned participants to receive different levels of the independent variable (stress-response strategy) this study employed an experimental design.

Contact Information about the Experiment

This experiment is being conducted under the supervision of Dr. Joelle LeMoult, the principal investigator. Please call Dr. LeMoult if you have questions about this study. Dr. LeMoult may be reached at 604-822-3095.

More Information about the Experiment

For more information on the relationship between self-compassion and psychopathology:

For more information on a similar study:

Appendix F: Debriefing Script

Okay, so you’ve now completed the session. Do you have any questions?

<If so, write down questions on session form. Tell the participant you will give them more information in a moment.>

Did anything seem odd about the study? <Write down comments on the session form.>

Did anyone talk to you about the speech beforehand? <Write down comments on the session form.>

Have you done a task like the speech and math task before (in an experiment)? <Write down comments on the session form.>

Which part was most stressful? <Write down comments on the session form.>

Now I just want to give you a bit more information about our study.

The main purpose of our study is to look at how people cope with stress and how certain emotion regulation strategies impact the stress response. So in order to analyze the stress response, it was necessary to create a minor stress response. To do this, we had you perform a speech and mental math task and told you that the quality of your speech was being rated. We also told you that your speech was being filmed for later analysis. This was deceptive because we did not actually film you, there’s no memory card in the video camera. Further, we were not interested in the quality of your speech, the sole purpose of the task was to create a stress response.

You should know that both the speech and math tasks are difficult tasks, that are designed to be stressful. You should also know that the committee was following a strict protocol in how they could respond to you, which included not providing you any positive feedback. Everyone struggles with these tasks and you actually did really well considering the circumstances.

We really appreciate your participation in this study.

How are you feeling right now that you learned more about our study? Write down comments on the session form.

If they are ok: Your participation really helps us understand responses to stress and coping strategies better, and we are really thankful that you participated.

If they are upset or have questions: Discuss further and offer relaxation tapes if participants seem anxious or nervous. (If the participant was in the control condition, offer them the chance to listen to an SR Response induction). If the participants have any questions or comments, please ask them to contact Joelle LeMoult
Appendix G: Wellbeing Resource Sheet

UBC Health Services and Additional Well-Being Resources

Access and Assessment Centre  604 675-3700  24 Hrs
Walk in: Joseph & Rosalie Segal Family Health Centre
Level 1 East Entrance
803 West 12th Avenue, Vancouver, BC V5Z 1M9
The AAC offers short term treatment on-site, by telephone and by mobile response. Clinical staff provide 24/7 support, stabilization and crisis management to clients.
Services are limited to City of Vancouver residents ages 17+

UBC's Health Services - 604-822-9836
Student health services offers a variety of health care services, including those related to mental health. Services are available to all registered UBC students, students of another institution who are visiting UBC or attending for a semester or a single course, students of UBC-affiliated colleges (e.g. Regent College), and students of the English Language Institute

Family Services of Greater Vancouver, Counselling Program - 604-87 4-2938
http://www.tsgv.ca/programpages/counsellingsupportservices/counsellingprogram.html
Counselling fees based on household income. Master's-level therapists. Program has a dedicated intake worker who can also refer to other counselling services or groups. Offices in Vancouver, Richmond, Burnaby, New Westminster and Surrey.

Family Services of Greater Vancouver, Service Options - 604-731-4951

Family Services of the North Shore - 604-988-5281
http://www.familyservices.bc.ca Professional counselling for residents of the North Shore.
Sliding Scale.

Oak Counselling - 604-266-5611
http://oakcounselling.org/ Reduced fee. Secular counselling services provided at the Vancouver Unitarian Centre by supervised volunteers with Master's degrees in psychology or psychology-related fields. Individual, couples and family counselling.

Adler Centre - Counselling Clinic - 604-742-1818
http://www.adlercentre.ca/clinic.html Sliding scale individual and couples counselling. Counselling provided by counselling psychology graduate students at the Adler Centre, supervised by an experienced clinician.

Scarfe Counselling - UBC - 604-827-1523
http://ecps.educ.ubc.ca/cnps/scarfe-counselling-clinic Free. Counselling provided by counselling psychology graduate students, supervised by a psychologist. Clinic runs from September to April.
UBC Psychology Clinic - 604-822-3005  
http://clioic.psych.ubc.ca/  Counselling services provided by doctoral student interns, supervised by registered psychologists. $15-$50 per hour.

New Westminster UBC Counselling Centre - 604-525-6651  
http://ecps.educ.ubc.ca/clinical-instructional-resources/newwestminster-ubccounselling-centre/  
Free counselling for the general public by counselling psychology graduate students, supervised by a psychologist.

Broadway Plaza Psychology  
601 West Broadway  
Phone: 778-846-4362 Fee: $85/hour

Emergency Services

Car 87 – Mental Health Car  
- Car 87 can be reached via the Mental Health Emergency Services (MHES) 24-hour crisis line at (604) 874-7307 or via 911.

Mental Health Emergency Services (MHES)  
- Services are offered daily from 11 am to 1 am. Services can also be accessed through the Richmond Hospital Emergency Department or the Chino Crisis Line (604-279-7070).

Crisis Lines in BC

Province-Wide: Provincial Suicide Helpline  1-800-SUICIDE (784-2433) 24 Hrs  
Crisis Centre Online Chat http://crisiscentreforchat.ca/  Noon-1a.m. B.C. and Yukon

Vancouver Coastal:  
Access and Assessment Centre  604 675-3700  24 Hrs  
Walk in: Joseph & Rosalie Segal Family Health Centre  
Level 1 East Entrance  
803 West 12th Avenue, Vancouver, BC V5Z 1M9  
The AAC offers short term treatment on-site, by telephone and by mobile response. Clinical staff provide 24/7 support, stabilization and crisis management to clients. Services are limited to City of Vancouver residents ages 17+

Crisis Intervention & Suicide Prevention Centre of BC, Toll free: 1-866-661-3311 
Regional Distress Line TTY: 604-872-0113 24 Hrs  
1-866-872-0113  
Serves Vancouver, North Vancouver, Bowen Island, West Vancouver  
Toll Free number serves Powell River, Sunshine Coast, Squamish, Whistler, Pemberton, & Howe Sound
<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Numbers</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHIMO Crisis Services (Richmond)</td>
<td>604-279-7070</td>
<td>9 am - midnight</td>
</tr>
<tr>
<td>Serves Richmond, South Delta,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tsawwassen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.U.C.C.E.S.S. Chinese Help</td>
<td>Cantonese: 604-270-8233</td>
<td>10 am – 10 pm</td>
</tr>
<tr>
<td>Lines</td>
<td>Mandarin: 604-270-8222</td>
<td></td>
</tr>
</tbody>
</table>