

EMOTION RECOGNITION IN INDIVIDUALS WITH SOCIAL ANXIETY: LOVING-
KINDNESS AS AN INTERVENTION

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A Thesis Submitted to the Faculty of the University of Tennessee at Chattanooga in Partial
Fulfillment of the Requirements of the Degree of Master of Science

ABSTRACT

Deficits in emotion recognition can often be found in individuals who have elevated social anxiety. Some possible causes for these deficits include: (1) negative biases for ambiguous social stimuli and (2) negatively biased attention in social situations— which can impede an accurate appraisal of how one is being evaluated. Mindfulness-based interventions target attentional awareness, and some have empirical support for treating anxiety-related issues. Loving-kindness meditation (LKM) is a specific subtype of mindfulness aimed at enhancing empathic understanding of emotional and situational awareness and, therefore, shows promise in social anxiety treatment by targeting emotion recognition in self and others. This study assessed the potential impact of a guided LKM induction on subsequent emotion recognition performance, as well as relationships among self-reported trait measures. Participants in the LKM group scored significantly better on the emotion recognition task than participants in a control group. Exploratory analyses indicated moderate correlations between trait social anxiety severity and self-reported alexithymia symptoms.

ACKNOWLEDGEMENTS

I would like to thank my parents for always supporting me and encouraging me to follow my dreams. To my friends, who uplifted me when I struggled. I would also like to thank URACE for granting me the SEARCH Award, which funded this project. To my committee members, David Ross and Kevin Doyle who stood by me for several years. And to my committee chair, Ashley N. Howell, who believed in me and was always willing to lend a hand.

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CHAPTER I

EMOTION RECOGNITION IN STUDENTS WITH SOCIAL ANXIETY: TESTING
ASSOCIATIONS WITH LOVING-KINDNESS VERSUS PROGRESSIVE MUSCLE
INDUCTION

Social anxiety involves the fear of evaluation and social humiliation (Dalbudak et al., 2013) and is necessary for maintaining an adequate status within one's in-groups. However, chronically high social anxiety (HSA) and Social Anxiety Disorder (SAD) can lead to significant distress and major life impairments (Dalbudak et al., 2013; Jazaieri et al., 2015). A common cognitive-affective maintenance factor of HSA and SAD is emotion dysregulation, and by extension poor emotion recognition (Jazaieri et al., 2015).

Emotion Recognition

Emotion recognition is the ability of an individual to correctly identify and comprehend emotions in themselves and others (Blair, 2003; Joormann & Gotlib, 2006; Rutter et al., 2020). Social mammals (human and non-human) unconsciously rely on facial expressions and gestures to identify what others are feeling. This ability usually develops throughout childhood, reaching adult levels by age eleven (Chronaki et al., 2014). The ability to properly read emotional facial expressions may be hampered by anxiety, trauma exposure, and related mood problems, further maintaining the cycle of distorted fear-related beliefs and avoidance/withdrawal that characterize

these disorders (Dalili et al., 2015; Eussen et al., 2015; Fairchild et al., 2009; Gilboa-Schechtman & Shachar-Lavie, 2013).

Difficulties in correctly identifying the emotions of others have been defined in the medical field as *alexithymia*—the problem of identifying, differentiating, and describing the emotions of oneself or others (e.g., see Grynberg et al., 2012, for a review; Hogeveen & Grafmann, 2021). Panayoitou et al. (2020) note that alexithymia has been associated with maladaptive emotion regulation strategies, which could partially explain the lack of self-awareness of emotional states in individuals with social anxiety (e.g., Ertekin et al., 2015). Evidence suggests that alexithymic individuals show deficits in the types of self-knowledge essential for adaptation, efficient emotion regulation, sensory integration, and interoceptive awareness (i.e., theory of mind; Pisani et al., 2021; Khan & Jaffe, 2022; Malykhin et al., 2022). When co-occurring with social anxiety, the effect of alexithymia is magnified (Panayoitou et al., 2020). Furthermore, alexithymia is linked to difficulty identifying the emotional facial expressions of others, regardless of the negative or positive effect of the emotion. Alexithymia appears to correspond with several personality and mood disorders characterized by low social functioning (Grynberg et al., 2012; Lyvers et al., 2017).

Ertekin and colleagues (2015) noted an increase in SAD symptom severity when alexithymia was also present. The relationship might be cyclical, as predictive factor studies have shown that as SAD symptom severity increase, alexithymia severity increased. The two factors may be bidirectional and maintain each other (Buyukbayraktar, 2020). Evidence also suggests alexithymia mediates depression and anxiety, affecting intrapersonal relationships and increasing avoidant behaviors (Radetzki, et al., 2021). When exposed to emotion recognition

training, SAD symptoms can be lessened, highlighting the relationship between the deficit and SAD (Rawdon et al., 2018).

Adults with ADHD have been examined in prior SAD and alexithymia research, and the results indicate alexithymia may be a risk factor for general emotion regulation deficits, with social anxiety severity potentially increasing deficit severity (Edel, et al., 2010). Some data suggest that though socially anxious individuals can have similar accuracy in emotion recognition through facial expression, they require significantly more time appraising the expression to do so. This time may not be available in real life scenarios, and that time limit could be a factor in inaccurate appraisal (Krejtz et al., 2018). Through an inclusive literature review, Machado-de-Sousa et al. (2010) found that, at the time of the review, evidence suggested that individuals with SAD appeared to use abnormal patterns of facial information processing. A bias for negative emotions was also found. These results were corroborated in Baez et al.'s 2023 review, which also found that SAD clinical patients showed impairments in emotion recognition and theory of mind. Thus, alexithymia may be a contributing factor in the decreased ability to accurately label the emotional facial expressions of others in highly socially anxious individuals- leading to possible consequences such as negative attention and interpretation biases.

Attention and Interpretation Biases in HSA/SAD

Potential underlying factors for poor emotion recognition in HSA/SAD include reliably observed (a) negative attentional biases and (b) negative interpretation biases in HSA/SAD.

Negative Attentional Biases

Much research (see Chen, Short & Kemps, 2020 for a review) has supported the theory that individuals with HSA/SAD tend to (a) habitually allocate their attention toward social cues that support negative self-views (e.g., Amin, Foa & Coles, 1998; e.g., "I'm socially inept"; "Others think I'm a loser"), while neglecting social stimuli suggestive of positive or neutral social outcomes. To illustrate, while giving a speech, someone with SAD will likely over-allocate their attention toward details such as their face feeling warm (i.e., negative self-focus) and/or to an audience member who is yawning (i.e., negative others-focus), instead of the good points they are making (i.e., positive self-focus) or to the faces of audience members who are smiling (i.e., positive others-focus).

Negative attention bias as a causal risk factor for SAD. Current evidence points to cognitive biases being influential in the onset of SAD (Henricks et al., 2022). Individuals with higher SAD symptoms may be more prone to stronger biases, which could indicate cognitive biases as a predictor of SAD severity (Klein et al., 2018). This supports other findings, such as those published by Koster et al. (2006), which noted that individuals with higher trait anxiety show increased attentional bias to threatening stimuli. Eye-tracking studies have shown that attentional bias may be an anxiety-specific factor, as depressed individuals do not show the same attention orientation (see Armstrong & Olatunji, 2012, for a review). Biological evidence exists that indicates that the amygdala-prefrontal circuitry system is altered in the brains of anxious individuals, creating this bias of attention to threat (Bishop, 2007).

Negative attention bias as a maintenance factor for SAD. Past data indicate that cognitive biases play a crucial role in the maintenance of social anxiety (Henricks et al., 2022). Socially anxious individuals may have more difficulty disengaging their attention from what they believe to be social threat cues (Amir et al., 2003; see Cisler & Koster, 2011, for a review). SAD individuals tend to stay focused on negative stimuli longer than non-socially anxious individuals (LeMoult & Joormann, 2012). However, they do tend to try to avoid emotional triggers more often than not (Blicher et al., 2020). Some recent models for the maintenance of social anxiety explicitly mention attention biases as a factor of concern (Heeren & McNally, 2016; Wong & Rapee, 2016).

Negative Interpretation Biases

Interpretation biases include the over-interpretation of ambiguous or even positive social events as being negative (Chen et al., 2018; Okajima et al., 2009; Bishop, 2007). For example, if someone with SAD says “hello” to an acquaintance in-passing, but the passerby does not respond, the individual is more likely to think, “They probably do not like me” or “People are only out for themselves,” rather than, “They must not have heard me,” or “Maybe they are having a bad day.”

Negative interpretation bias as a causal risk factor for SAD. Bishop’s 2007 literature review notes that changes in the brain functioning of anxious individuals may explain some of why interpretation biases are such an issue. Highly socially anxious individuals are more likely to endorse threat interpretations, and this interpretation bias can mediate relationships between

perceived negative evaluation and trait social anxiety, indicating a deep intertwining of the bias and SAD (Chen et al., 2018).

Negative interpretation bias as a maintenance factor for SAD. As mentioned previously, Henricks et al. (2022) discussed negative interpretation bias as a maintenance factor for SAD. More importantly, it was noted that interpretation bias led to increased social anxiety over time. Individuals with high social anxiety tend to exhibit more safety behaviors (i.e., behaviors intended to protect an individual from anticipated negative evaluations and experiences) and negative beliefs/interpretations of events than non-socially anxious individuals (Okajima et al., 2009).

Summary: Cognitive Biases in Social Anxiety Disorder and Future Directions

In summary, HSA/SAD populations may report and/or behaviorally demonstrate poorer accuracy in recognizing the emotions and intentions of others (i.e., alexithymia symptoms). This lower accuracy may be rooted, in part, by persistent, habitual tendencies to allocate attention and derive interpretations in ways that maintain core negative beliefs about themselves and others. Developing and/or enhancing interventions that: (a) reduce negative attitudes toward self (e.g., low in worth) and others (e.g., high in judgment and mal-intent) (b) strengthen positive and empathetic attitudes toward self and others; and (c) retrain attentional allocation to include non-negative cues have a strong likelihood of preventing and/or reducing SAD. Indeed, cognitive behavioral therapies (CBTs), which target negative attitudes and interpretation biases through cognitive retraining and therapeutic exposures to feared scenarios, are currently the gold-standard psychotherapies for SAD (Hofmann & Otto, 2018). However, the current success rates

of CBT for SAD (and when provided by highly trained CBT experts in most efficacy and effectiveness trials) range from low success to moderate success in recovery from symptoms (Scaini et al., 2016; Evans, Clark & Leigh, 2020; Yang et al., 2021). Thus, there is a clear need to target additional mechanisms of SAD and interventions that maintain effectiveness when disseminated by mental health providers with various backgrounds. In the past decade, further work has focused on *(b) strengthening positive and empathetic attitudes toward self and others* for treating HSA/SAD. One approach, which has gained notable momentum in clinical training and dissemination, includes the broad category of mindfulness-based therapy.

Mindfulness Meditation

Mindfulness is described as a moment-to-moment awareness of mental states, physical sensations, and thoughts (Creswell, 2017; Hofmann, Grossman & Hinton, 2011). Mindfulness-based interventions have been increasingly emphasized in recent clinical intervention research due to their promising treatment effects (Hofmann et al., 2010). These interventions include *mindfulness-based stress reduction* and *mindfulness-based cognitive therapy*, and they are often used with individuals who have elevated anxiety, depression, and/or traumatic stress. Basso et al. (2019) found that brief (~10-13 minutes), daily guided Journey Meditation over eight weeks significantly improved attention, memory, mood, and emotion regulation in healthy individuals with no background in meditative practices. Journey Meditation is a simple guided meditation through breathing exercises and full-body scans most often used in corporate situations (Developed by Stephen Sokoler; <http://www.journeymeditation.com/>). This mirrors similar results found by Norris et al (2018), where small, single “doses” of mindfulness meditation, around 10 minutes, led to increased focus, reaction time, and attentional deployment. Also,

Menezes and Bizarro (2015) determined that, in general, focused meditation interventions can help improve anxiety symptoms and emotion regulation. They propose that meditation practices, which target attention allocation, help an individual refocus and properly deploy their attention. *Attention allocation* is considered a part of the emotion regulation processes, which may help to explain why meditation has a positive impact on emotion regulation.

Loving-Kindness Meditation

A specific type of mindfulness meditation in contemporary research is Loving-Kindness. *Loving-kindness meditation* (LKM) is derived from *metta*, one of the four Buddhist brahma viharas (the sublime states and core values) and is defined by an unselfish and unconditional kindness to all other beings (The Dalai Lama, 2001; Hopkins, 2001). LKM interventions highlight the concept of *metta* by teaching the individual to contemplate their environments, relationships, and self-concepts as a part of a greater whole (Lama & Culter, 1998). Loving-kindness meditations might be a more enhanced and beneficial intervention than the traditional mindfulness techniques used in psychotherapy, as highlighted in Hofmann et al. (2011) and Grasier & Stangier (2018)'s reviews of empirical literature. One of the studies highlighted by Hofmann et al. was Fazio & colleagues' 1986 experiment, which concluded that LKM improved explicit and implicit positivity towards strangers. Carson et al.'s (2005) work demonstrated positive impacts on physiology from LKM interventions as well. Over an eight-week program, participants saw decreased stress, anger, and pain when compared to a group in standard treatment.

Further supporting the benefits of LKM, Hirshberg et al. (2018) found that individuals exposed to a ~12 minute induction of loving-kindness led to less implicit negative affect when

exposed to a brief stressor. Fredrickson & colleagues (2017) noted that LKM was able to improve positive emotions over a nine-week period. Indonesian nursing students in Mulianda et al.'s (2022) study had a significant reduction of stress during the COVID-19 pandemic. Social connectedness is also affected by participation in LKM- Hutcherson, Seppala, and Gross (2008) found that a brief LKM experience improved positivity toward strangers, as well as improving mood. This implicit and explicit change in attitude toward strangers creates a feeling of connectedness with them, heightening the likelihood that evaluations regarding the stranger will be altered, thus increasing the likelihood that an individual will feel connected to others around them. By increasing social connectedness, loving-kindness interventions may provide welcome positive effects, such as lessened stress in social settings, for those experiencing social anxiety. This effect was seen in Aspy & Proeve's 2017 study, which found that social connectedness was improved in LKM groups when compared to an active control group doing progressive muscle relaxation (PMR) within an openly-recruited college student sample.

Totzeck & colleagues (2020) provided evidence that after participation in five sessions of LKM, university students had a long-term decrease in depression, anxiety, and stress. In Hofmann et al.'s 2015 proof of concept study, two groups of patients with mood disorders were exposed to LKM in a brief session. Results indicated a marked improvement in symptoms of depression and positive emotions. Mantazios et al. (2021) saw a decrease in state anxiety in college students after a single LKM session. This finding bolsters the evidence for positive emotion improvement seen in He et al.'s 2015 study, which demonstrated that after seven LKM sessions over the course of a month, participants showed marked improvement in positive emotional states, as well as feeling more understanding towards others (i.e., empathy). Similar results were seen a year later in a study that administered LKM over the course of six weeks

(Leppma & Young, 2016). More recently, Chen et al. (2021) revealed an improvement in the empathy and communication skills of doctors who underwent an eight-week LKM training intervention, and Csaszar, Curry, & Lastrapes, (2018) found a similar result in student teachers after six weeks of LKM. Further, those who spent more time in active meditation saw greater increases in empathy.

LKM may also provide relief to socially anxious individuals. Stefan & Hofmann (2019) found that LKM appears to aid in improving social connectedness, adaptive self-images, and heightening emotional experiences (Stefan & Hofmann, 2019). Similar findings were reported in a literature review in 2023 by Zheng & colleagues, who found that LKM can reduce anxiety by increasing mindfulness and self-compassion.

Attention modification. *Attention allocation* is considered a part of the emotion regulation processes. Specifically, attention allocation is critical for information processing (Lazarov et al., 2021) which may help to explain why meditation has a positive impact on emotion regulation. It would also explain why individuals with social anxiety struggle with negative cognitive biases, as discussed above because attention allocation is a part of cognitive appraisal and interpretation (Lazarov et al., 2021; see sections on attention and interpretation bias for a review). Basso et al. (2019) found that brief, daily meditation over eight weeks significantly improved attention, memory, mood, and emotion regulation in healthy individuals with no background in meditative practices. This mirrors similar results that Norris et al (2018) found, where small “doses” of mindfulness meditation led to increased focus, lowered reaction time, and focused attentional deployment. Menezes and Bizarro (2015) determined focused meditation interventions can help improve anxiety and emotion regulation. They propose that meditation

practices, which target attention allocation, help individuals refocus and properly deploy their attention.

Summary, Future Directions, and Current Study

As indicated by past literature, LKM shows great promise in several psychological and physical well-being aspects, from state mood to pain management. Of note are the effects on empathy. Empathy involves acknowledging and feeling what others are experiencing and thus falls in line with emotion regulation and recognition as a core part of social interactions. However, literature focusing on how LKM might affect social anxiety symptoms is limited. LKM can increase social connectedness and empathy and reduce stress. These changes could lead to an increase in comfort in a social setting. This is particularly important for emotion recognition, as maladaptive anxiety is associated with negative cognitive biases. As individuals with social anxiety often struggle with emotion recognition in the facial expressions of others and therefore are at risk of interpreting social cues in overly negative ways, it could be possible for LKM to improve this ability.

Future Directions

Past literature does not involve an evaluation of how LKM can influence emotion *recognition*. As noted in this review, deficits in emotion recognition (be it due to recognition ability, in general, or attentional distractions toward non-relevant, potentially threatening stimuli) are common in SAD. LKM has been shown (via limited published research) to benefit socially anxious individuals. Thus, LKM may be a promising intervention to improve emotion recognition ability in SAD populations. However, more is to be understood about the potential

therapeutic mechanisms of LKM for SAD—two of which may be attention retraining and practice with more comprehensive (and empathy-driven) interpretation of others’ emotions and intentions.

Current Study Overview and Hypotheses. This study will address gaps in the literature and arguably needed future directions for enhancing psychosocial interventions for SAD.

Specifically, this study will investigate the potential impact of a single, brief, guided LKM tutorial, versus a guided progressive muscle relaxation tutorial, on subsequent emotion recognition performance and state anxiety, within a sample of individuals with at least “moderate” social anxiety severity (see **Methods/ Procedures**).

Hypothesis 1. It was hypothesized that individuals in the experimental LKM group would demonstrate (a) better performance and (b) faster reaction time on the emotion recognition task, overall compared to the control group.

Hypothesis 2. It was hypothesized that individuals in the experimental LKM group would report lower state anxiety following the GERT than the control group.

Exploratory tests. We explored possible relationships among alexithymia (TAS-20), trait emotional intelligence (TEIQue), social anxiety severity (MINI-SPIN), and difficulties in emotion regulation (DERS).

CHAPTER II

METHODS

A Priori Analysis

Using G*Power (Faul et al., 2007) to calculate sample size for an independent-samples, two-tailed *t*-test, it was determined that 128 participants would be required for moderate effect size ($d = 0.50$), and 52 participants would be needed for a large effect size ($d = 0.80$).

Participants and Recruitment

Participants were recruited through SONA-Systems and flyers on campus (IRB #22-019). Compensation was given in the form of \$10 Amazon gift cards, and SONA credits, depending on registration method. Those who expressed interest via a flyer scanned a QR code that took them to a Qualtrics page requesting contact information and to complete a brief, psychometrically-supported questionnaire assessing social anxiety symptoms (MINI-SPIN; **see self-report measures**, below). Responses were automatically scored after interested individuals submitted the online form. Of the ~40 individuals who scanned the flyer's QR code and completed the survey, only two participants were successfully recruited this way. The remainder came through SONA-systems. A total of 77 participants were scheduled and completed the study (85.7% women; 75.3% White/Caucasian; $M_{age} = 21.03$). Per self-report, 16.9% had a prior SAD

diagnosis, and 35.1% were actively in therapy. MINI-SPIN scores ($M = 11.4$, $SD = 2.5$) indicated moderate to high levels of social anxiety.

Inclusionary Criteria

Participants needed to score a six or higher (out of 12) on the MINI-SPIN, which is psychometrically supported as indicating problems with social anxiety. Participants must also be over the age of 18.

Exclusionary Criteria

Those under the age of 18 and who scored below a six on the MINI-SPIN were excluded from participating.

Procedures

Overview of Procedures

The study took place in the U*MATR lab on UTC's campus. Informed consent was obtained before the study began. Participants were randomly assigned to the control or experimental group via a coin flip before the participant arrived in the lab. The experimenter was unaware of participant demographics before arrival, and the experimenter used a protocol script to ensure similar administration of procedures to all participants. The experimental group was exposed to a brief, pre-recorded induction of Loving-Kindness Meditation (~13 minutes). In contrast, the control group was exposed to a matched pre-recorded neutral activity (Progressive Muscle Relaxation, ~13 minutes). Using headphones, participants sat on a couch, while the room was dimly lit, and the computer monitor was off to remove distractions. They were instructed to

relax and follow the audio instructions, but not to fall asleep. All participants remained awake and attentive for the duration of the experiment.

Once the script was complete, participants alerted the experimenter. Participants were then administered the Geneva Emotion Recognition Task (GERT; see below for additional details) on a desktop computer located in the same room. The experimenter reviewed the instructions with the participant, and three practice questions were completed. Participants were allowed to ask questions about the procedures or terms (i.e., emotion words) used during the task. Afterward, the experimenter stepped out and allowed the participant to complete the GERT independently.

When finished with the GERT, participants were given a battery of self-report questionnaires assessing demographic information, social anxiety severity, positive and negative affect, difficulties in emotion regulation, emotional intelligence, etc (see Self-Report measures, below). The videos alternated between emotions, counterbalancing for the possibility of participants getting used to the task. Once finished, the experimenter debriefed the participants about the purpose of the study.

Geneva Emotion Recognition Task

The Geneva Emotion Recognition Task (GERT; Schlegel, Grandjean, & Scherer, 2014) “is a performance-based test to measure individual differences in people's ability to recognize others' emotions in the face, voice, and body. This ability is considered a central component of emotional competence or intelligence” (Schlegel, Grandjean, & Scherer, 2014; description per the Swiss Center for Affective Sciences, <https://www.unige.ch/cisa/emotional-competence/home/research-tools/gert/>). The GERT is a Qualtrics-based survey that is free for

distribution to researchers by request. Administration of the GERT takes 15-20 minutes. It consists of 83 video clips, wherein ten actors portray one of 14 different negative and positive emotions (e.g., anger, joy). The use of dynamic, multimodal emotion expressions allows for a more ecologically valid measure of emotion recognition ability than static pictures. After offset of each video, participants are asked to select one of 14 emotion words, presented on the screen, that they believe best matches the emotion portrayed in the video (e.g., anger, pride, joy, anxiety, fear, amusement; see Figure 1.). Test-retest score reliability for the GERT is strong, $p = .92$ (Schlegel, Grandjean, & Scherer, 2014). Outcome variables include the accuracy of identifying target emotions (correct/incorrect; averaged across all videos for a total percentage correct, 0%-100%) and response time. Response time for each stimulus was operationalized as duration (in seconds; averaged across all videos) between the offset of each video and initial selection of perceived target emotion. A demonstration of the GERT has been published by the task creators here: https://fpse.qualtrics.com/jfe/form/SV_9y1Dca6EC2FMSQ1

Please select the word that describes best the emotion that the actor tried to express in the previous video.



Figure 1 Visual of selection choices for participants (Schlegel, Grandjean, & Scherer, 2014)

Self-Report Measures

See Appendices A-K. Participants were asked to provide demographic information (e.g., age, gender, race) and to complete a battery of psychometrically supported self-report questionnaires.

Mini-Social Phobia Inventory (Mini-SPIN; Connor et. al, 2001)

The Mini-SPIN is a three-question self-report measure that identifies social anxiety severity using a 0 to 4 Likert scale. Scores are calculated by totaling the points of each question. Scores of six or higher indicate a moderate-to-high level of social anxiety. Internal consistency for the Mini-SPIN is $\alpha = .85$ in treatment-seeking samples and has a 90% accuracy in diagnosis of SAD (Connor et al., 2001; Weeks, Spokas & Heimberg, 2007). The purpose of administering

the MINI-SPIN was to assess the participant's level of social anxiety symptom severity. Higher scores indicate higher levels of social anxiety. Cronbach's Alpha indicated high levels of internal consistency for our data, $\alpha = .75$

The Self-Compassion Scale (SCS; Neff, 2003)

The SCS is a 26-question self-report survey that measures scores on a 1-5 Likert scale. Total scores are calculated using the mean of each question's responses to indicate levels of compassion one has towards themselves (e.g., self-lenience and self-forgiveness). The SCS has strong validity and is strongly correlated with life satisfaction, and negatively correlated with anxiety/depression (Neff, 2003). The purpose of administering the SCS was to see how much compassion participants had towards themselves. Higher scores indicate more forgiveness and compassion towards oneself. Cronbach's Alpha indicated high levels of internal consistency for our data, $\alpha = .88$.

Compassion Scale (CS; Pommier et al., 2019)

This self-report measure is 16-question survey using a 1-5 Likert scale, measuring compassion towards other people. The total score is a mean score of question responses. The CS has good validity and has strong test-retest reliability (Pommier et al., 2019). The purpose of administering the CS was to visualize the participants' overall feelings of compassion towards others. Higher scores indicate more compassionate feelings towards others. Cronbach's Alpha indicated high levels of internal consistency for our data, $\alpha = .86$.

Emotion Regulation Questionnaire (ERQ; Gross & John, 2003)

A 10-question self-report survey using a 1-7 Likert scale. Identifies an individual's capacity for emotion regulation processes. Total scores are found using summation of each questions' points. Test-retest reliability was tested across three month as was strong (Gross & John, 2003). The purpose of administering the ERQ was to analyze how efficient participants were with general emotion regulation ability. Higher scores indicate better ability with regulating one's emotions. Cronbach's Alpha indicated high levels of internal consistency for our data, $\alpha = .82$.

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004)

Identifies problems with emotion regulation in a 36-question questionnaire, using a 1-5 point Likert scale. There are six subscales: non-acceptance of emotional responses, difficulty engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. Total scores are calculated with a summation of all responses, and subscale scores are calculated the same way. Higher scores indicate more problems with emotion regulation. Internal consistency and test-retest reliability is strong, with adequate predictive and construct validity (Gratz & Roemer, 2004). The purpose of administering the DERS was to identify participants' struggles with emotion regulation, which is also why the total score was used in analysis. Cronbach's Alpha indicated high levels of internal consistency for our data, $\alpha = .94$.

Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF; Cooper et al., 2010)

The TEIQue-SF measures inherent emotional intelligence using a 1-7 Likert scale, from which total scores are calculated for the 30-question survey. Currently available psychometrics indicate the TEIQue is a good way to conduct a rapid assessment of trait emotional intelligence (Cooper et al., 2010). Higher scores indicate higher emotional intelligence. The purpose of administering the TEIQue was to evaluate participants' emotional intelligence, which influences emotion regulation and recognition ability. Cronbach's Alpha indicated high levels of internal consistency for our data, $\alpha = .86$.

Toronto Alexithymia Scale-20 (TAS-20; Bagby et al., 1994a; Bagby et al., 1994b)

The TAS-20 is a 20-question survey measuring alexithymia, or problems recognizing the emotional expressions of others. Using a 1-5 Likert scale, a total score is calculated with a summation of all responses. Higher scores indicate more issues recognizing emotional expressions. Evidence suggests that the TAS-20 is internally consistent and has strong validity (Bagby et al., 1994b). The purpose of administering the TAS-20 was to measure alexithymia in participants, which will indicate how much they struggle with emotional expression recognition. Cronbach's Alpha indicated high levels of internal consistency for our data, $\alpha = .86$.

State-Trait Anxiety Inventory (STAI; Spielberger et al., 1977)

The STAI assesses trait and state anxiety, with trait being inherent anxiety and state being anxiety felt at the current moment. This 40-question inventory is divided into subscales (i.e., State Anxiety and Trait Anxiety), with 20 questions for each. Participants took this questionnaire after the LKM/PMR induction and GERT. The purpose of administering the STAI was to

evaluate intrinsic and current anxiety. Higher scores indicate higher anxiety levels for trait and state anxiety. Cronbach's Alpha indicated high levels of internal consistency $\alpha = .96$.

Positive and Negative Affect Schedule (PANAS; Watson et al., 1988)

This scale measures positive and negative affect in a person's mood over a specified period. For this study, affect was assessed for the past week. The PANAS is divided from its 20-question total into two 10-question subscales for positive and negative affect. Scores are calculated with the summation of the 1-5 Likert scale questions in each subscale- Positive Affect and Negative Affect. Both subscales are internally consistent and uncorrelated, which indicates that they represent distinct factors (Watson et al., 1988). The purpose of administering the PANAS was to inspect the participants' overall positive and negative mood experiences. Higher scores indicate someone has experienced more positive/negative affect over the time period. Cronbach's Alpha indicated high levels of internal consistency for our data, $\alpha = .84$.

Experimental and Control Mindfulness Inductions

Experimental Condition: Loving-Kindness Meditation

The experimental group listened to an audio recording of a loving-kindness meditation session developed by Dr. Seppala, the Stanford University's Center for Compassion and Altruism Research and Education director. Dr. Seppala has used LKM frequently in her research and outreach programs (Hutcherson, Seppala & Gross, 2008; Seppala, Hutcherson, Nguyen, Doty & Gross, 2014), and this script is one of the more recent renditions of the induction. The brief session is approximately 13 minutes long. A small excerpt from the scripts is as follows: "*Keeping your eyes closed, think of a person close to you; wholoves you very much. It could be*

someone from the past, or the present. . . Imagine that person standing on your right side, sending you their love”. The full script for this session can be found in the attached appendix.

Control Condition: Progressive Muscle Relaxation

Participants in the Control Induction participated in an approximately 13-minute long Progressive Muscle Relaxation (PMR) session. PMR guides the participant to relax without focusing their attention in the same ways as LKM. Namely, PMR is commonly used as a relaxation strategy (like LKM), however it targets focus on oneself (breath and muscles) and not loving/kindness emotions and thoughts toward others. PMR has been shown to be an effort-equivalent induction and control intervention in past research (Ainsworth, Bolderston & Garner, 2017; Aspy & Prove, 2017). The script for this session can be found in the attached appendix.

CHAPTER III

ANALYSIS AND RESULTS

Preliminary Analyses

Comparisons were made between randomly assigned experimental ($n = 38$) and control ($n = 39$) groups to confirm no significant differences in gender [X^2 ($df = 2, n = 77$) = 1.13, $p = .57$.], age [$t(75) = -.07, p = .94$], trait differences in social anxiety severity (i.e., MINI-SPIN) [$t(76) = .96, p = .34$], or trait differences in alexithymia symptoms (i.e., TAS-20) [$t(74) = .66, p = .51$]. Overall, results indicated that both groups were not statistically different from one another on these variables, ruling out group differences on demographic and key trait variables before the experimental induction was administered.

Hypothesis 1

Hypothesis 1a

To test the hypothesis that LKM group would demonstrate better performance (i.e., percent accuracy across all videos) on the GERT than the PMR group, an independent samples (two-tailed) t -test was conducted. Consistent with hypothesis, the experimental LKM group ($M =$

52.5, $SD = 6.3$) performed slightly, significantly better on the GERT than the control PMR group ($M = 49.1$, $SD = 8.1$), $t(75) = -2.0$, $p < 0.05$. The effect size was moderate ($d = -.50$). See Figure 2.

Hypothesis 1b

An independent samples (two-tailed) t -test was conducted to test if the LKM group demonstrated faster reaction times than the PMR group when selecting which emotion they believed matched the actor's face/audio. Contrary to the hypothesis, reaction times did not significantly differ between the control ($M = .52$, $SD = .57$) and experimental groups ($M = .47$, $SD = .50$), $t(75) = .42$, $p = .67$. The effect size was small, $d = .097$

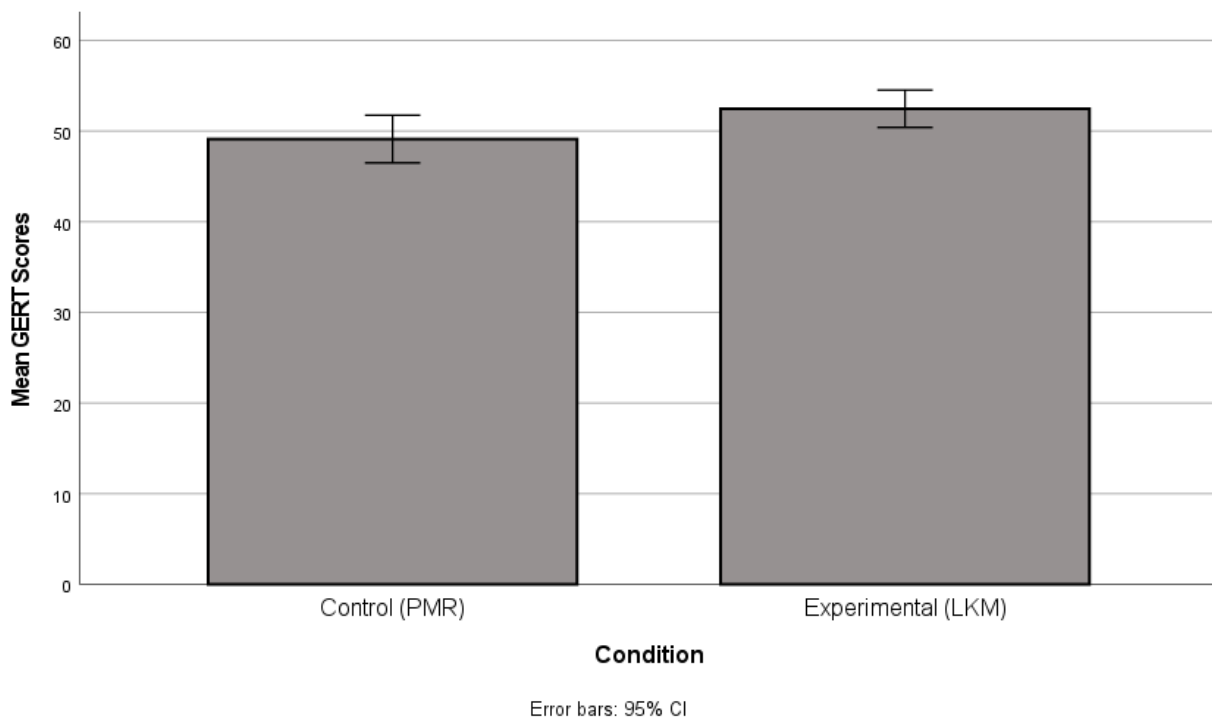


Figure 2 Mean GERT scores between conditions

Hypothesis 2

Using an independent samples (two-tailed) *t*-test to determine if there was a difference in state anxiety (STAI: state anxiety scores) between the groups, following the GERT task, it was found that the control ($M = 44.3$, $SD = 13.1$) and experimental ($M = 44.1$, $SD = 12.5$) groups did not significantly differ, $t(75) = .87$, $p = .93$. The effect size was small, $d = .02$.

Exploratory Analysis

According to a Pearson's *r* analysis, TAS-20 ($M = 48.3$, $SD = 13.3$) scores had a moderate, positive relationships with Mini-SPIN ($M = .5$, $SD = .53$) scores ($r = .48$, $p < .001$) and DERS total scores ($M = 105.6$, $SD = 24.7$) scores ($r = .59$, $p < .001$), as well as a moderate, negative relationship with the TEIQue-SF ($M = 133.7$, $SD = 23.4$), $r = -.65$, $p < .001$. See Table 1.

The Mini-SPIN had a small, positive relationship with the DERS, $r = .36$, $p < .001$. Its relationship with the TEIQue-SF was small, and in a negative direction, $r = -.37$, $p < .001$. The Mini-SPIN had a moderate, negative correlation with the SCS, $r = -.42$, $p < .001$. See Table 1.

The SCS had a moderate, negative correlation with the DERS ($r = -.65$, $p < .001$), and a moderate, positive relationship with the TEIQue ($r = .63$, $p < .001$). Its relationship with the TAS-20 was negative and small, $r = -.25$, $p < .03$. The Compassion Scale (CS) did not have any significant correlational relationships.

Table 1 Correlations

Variable	M	SD	1	2	3	4	5
1. MINI-SPIN	11.4	2.5	---				
2. DERS	105.6	24.7	.36** [.15, .54]	---			
3. TEIQue-SF	133.7	23.4	-.37** [-.55, -.16]	-.76** [-.86, -.63]	---		
4. TAS-20	48.3	13.3	.48** [.28, .63]	-.65** [.42, .72]	-.65** [-.76, -.5]	---	
5. SCS	2.6	.64	-.42** [-.56, -.22]	-.65** [-.76, -.50]	.63** [.47, .75]	-.25* [-.45, -.03]	---

Note. M and SD are representative of mean and standard deviation, respectively. Values in square brackets indicate the 95%

Confidence intervals. MINI-SPIN = Mini Social Phobia Inventory; DERS = Difficulties with Emotion Regulation, TEIQue = Trait Emotional Intelligence Questionnaire, TAS-20 = Toronto Alexithymia Scale, SCS = Self Compassion Scale. ** indicates $p < .001$, * indicates $p < .05$.

CHAPTER IV

DISCUSSION

Prior research has emphasized emotion recognition's important role on the maintenance and development of SAD. While this relationship has been well documented, there was little in the way of how to minimize this deficit therapeutically. We proposed that LKM may fill this void, as it has shown promise as an intervention for SAD and other related disorders. This study tested the following hypotheses: (1a) that individuals exposed to a brief LKM induction will perform better on an emotion recognition test than a control group participating in an active relaxation exercise (PMR), (1b) that the LKM group will have faster reaction times on the emotion recognition test than the control, and (2) that the groups would show a significant difference in state anxiety scores.

Our results support hypothesis 1a, providing evidence that participation in a brief LKM versus a brief PMR exercise may lead to significant differences in emotion recognition ability (at least immediately following the induction). This builds upon the theoretical benefits that LKM could have for treating SAD, as emotion recognition is a core part of our social experience. Past research indicates the important role emotion recognition has in daily quality of life, and that this deficit in ability to recognize emotions can cause symptom severity increase in individuals with SAD (Ertekin et al., 2015; Rawdon et al., 2018). The current study provides preliminary support for the immediate effects of LKM on emotion recognition in a highly socially anxious sample.

While the two groups did not differ in reaction time (Hypothesis 1b) , we hesitate to conclude at this time that LKM is unrelated to reaction time. As our results do not mirror past literature (Krejtz et al., 2018; Norris et al., 2018), it is difficult to surmise that there is no relation at all. This is due to the fact that our results are an outlier compared to the other literature. More research is needed to investigate this particular area.

Contrary to Hypothesis 2, there was no significant difference in state anxiety between groups, following completion of the emotion recognition test. In past research, anxiety levels are correlated with poor emotion recognition ability (Buyukbayraktar, 2020; Radetzki, et al., 2021; Rawdon et al., 2018). The aim of the current study was, to our knowledge, the first to test differences in state anxiety following an emotion recognition task and LKM versus PMR., . Alternatively, lack of significant findings could possibly be explained as an effect using relaxation inductions for both groups, which was a notable limitation and consideration for future research. State anxiety was not assessed *before* the LKM or PMR experience; therefore, we cannot complete pre-post test analyses to determine if either brief induction related to changes in anxiety over time. It is possible that exposure to the relaxation and meditation techniques lowered state anxiety, leading to the lack of supporting evidence.

Using bivariate, two-tailed correlational analyses, we explored possible relationships among the self-report measures of emotional intelligence, emotional regulation difficulty, social anxiety symptom severity, and alexithymia. Results indicated that symptom severity correlated with higher alexithymia scores, as well as difficulties with emotion regulation. As social anxiety severity increased, issues with alexithymia also increased to a moderate degree. Our results seem to mirror past research (i.e., Buyukbayraktar, C.G., 2020; Edel, et al., 2010; Ertekin et al., 2015;

Panayoitou et al., 2020. . .) on the relationship between alexithymia, emotion regulation, and social anxiety severity, further supporting the growing body of literature in this area.

Interestingly, a new line of questioning arises as emotional intelligence was negatively correlated with alexithymia. Emotional intelligence was selected as a self-report measure for this study, because past data (Khan & Jaffe, 2022; Malykhin et al., 2022; Pisani et al., 2021) has indicated that state emotional intelligence is inherently key in the ability to regulate and appraise emotions. Our data aligns with these past findings, for as emotional intelligence was inversely related to alexithymia. However, the exact mechanisms regarding this relationship are unknown. Further research may be helpful for expanding on these mechanisms.

Social anxiety severity had a positive relationship with emotion regulation difficulty, which adds to our current understanding of SAD and how it interacts with emotional processes. Further, social anxiety symptoms held a negative correlation with emotional intelligence. Though the relationship was small in magnitude, it highlights the possibility of SAD interfering with emotion-related processes in the brain. As previously stated, emotional intelligence encompasses many aspects that individuals with SAD struggle with. More research into how the mechanisms play into one another may be warranted.

Trait levels of compassion for others did not produce any significant relationships with the other exploratory variables. Conversely, when we looked at compassion towards *oneself*, there was a positive relationship with emotional intelligence. This result suggests that individuals with higher levels of emotional intelligence tended to report higher compassion toward themselves. Emotional intelligence also includes an understanding of one's emotions, a trait needed to evaluate experiences and even be able to issue that compassion. The negative

relationships self-compassion had with alexithymia, social anxiety, and difficulties with mirror prior findings (Khan & Jaffe, 2022; Malykhin et al., 2022; Pisani et al., 2021; Stefan & Hofmann, 2019; Zheng et al., 2023) on how social anxiety and alexithymia make emotional concepts hard to grasp. If there is a problem with managing emotions, it stands to reason that self-compassion could be impacted.

Limitations

Our study involved a between-groups model of experimental design, and while effective, exactly how much of a difference LKM make individually on GERT scores is unknown. Future replications using a within-groups, before-after mode of experimentation could lead to a better understanding of LKM's effects on an individual. Also, our study used a brief induction of LKM and PMR, meaning results cannot inform the long-term effects. Collecting more data over time, such as having participants participate in LKM daily over a week(s) and highlight the possibilities of LKM as a therapeutic technique beneficial for treating and managing SAD symptoms. This could be tested by either using (a) two psychometrically similar tests at different times, or by (b) spacing the administration of the test out over a few days.

Another consideration is to replicate this study with a time-equivalent, but not effort equivalent, control group. We elected to use an effort-equivalent task (PMR) for the control group, and while effective, results may be stronger with a control group not participating in any exercise at all. Effect sizes may be stronger in this instance.

While our participant population size did fall between the calculated requirements for large and small effect sizes, more participants could have led to more significant differences that

could have been evaluated. In turn this would have given more enriching data to surmise conclusions from. Further, our sample was mainly female-identifying individuals, which lead to a rather homogeneous population. Future studies should expand upon this sample and aim for more non-female participants.

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APPENDIX A

DEMOGRAPHIC QUESTIONNAIRE

1. What is your age? _____
2. What gender do you identify as? Male Female Non-binary/Third gender Prefer not to say
3. What race do you identify as? Caucasian/White Black/African American Hispanic Asian/Pacific Islander Other Prefer not to say
4. Have you been clinically diagnosed with Social Anxiety Disorder (SAD)? Yes No
5. Do you currently see a counselor/therapist for any psychological needs? Yes No

APPENDIX B

SOCIAL PHOBIA INVENTORY (Mini-SPIN)

Participants will Answer in the following Likert Scale: Not at all, A little bit, Somewhat, Very

Much, or Extremely

1. Fear of Embarrassment causes me to avoid doing things or speaking to people
2. I avoid activities in which I am the center of attention
3. Being Embarrassed or looking stupid are among my worst fears.

APPENDIX C

SELF-COMPASSION SCALE [SCS]

HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

- | Almost
never | | | | | Almost
always |
|-------------------------|----------|----------|----------|----------|---|
| 1 | 2 | 3 | 4 | 5 | |
| _____ | | | | | 1. I'm disapproving and judgmental about my own flaws and inadequacies. |
| _____ | | | | | 2. When I'm feeling down I tend to obsess and fixate on everything that's wrong. |
| _____ | | | | | 3. When things are going badly for me, I see the difficulties as part of life that everyone goes through. |
| _____ | | | | | 4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world. |
| _____ | | | | | 5. I try to be loving towards myself when I'm feeling emotional pain. |
| _____ | | | | | 6. When I fail at something important to me I become consumed by feelings of inadequacy. |
| _____ | | | | | 7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am. |
| _____ | | | | | 8. When times are really difficult, I tend to be tough on myself. |
| _____ | | | | | 9. When something upsets me I try to keep my emotions in balance. |
| _____ | | | | | 10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people. |
| _____ | | | | | 11. I'm intolerant and impatient towards those aspects of my personality I don't like. |
| _____ | | | | | 12. When I'm going through a very hard time, I give myself the caring and tenderness I need. |
| _____ | | | | | 13. When I'm feeling down, I tend to feel like most other people are probably happier than I am. |
| _____ | | | | | 14. When something painful happens I try to take a balanced view of the situation. |
| _____ | | | | | 15. I try to see my failings as part of the human condition. |
| _____ | | | | | 16. When I see aspects of myself that I don't like, I get down on myself. |
| _____ | | | | | 17. When I fail at something important to me I try to keep things in perspective. |

- _____ 18. When I'm really struggling, I tend to feel like other people must be having an easier time of it.
- _____ 19. I'm kind to myself when I'm experiencing suffering.
- _____ 20. When something upsets me I get carried away with my feelings.
- _____ 21. I can be a bit cold-hearted towards myself when I'm experiencing suffering.
- _____ 22. When I'm feeling down I try to approach my feelings with curiosity and openness.
- _____ 23. I'm tolerant of my own flaws and inadequacies.
- _____ 24. When something painful happens I tend to blow the incident out of proportion.
- _____ 25. When I fail at something that's important to me, I tend to feel alone in my failure.
- _____ 26. I try to be understanding and patient towards those aspects of my personality I don't like.

APPENDIX D

THE COMPASSION SCALE [CS]

The Compassion Scale (CS)

Instructions: Please read each statement carefully before answering. Indicate how often you feel or behave in the stated manner on a scale from 1 'Almost Never' to 5 'Almost Always.' Please answer according to what really reflects your experience rather than what you think your experience should be.

1. I pay careful attention when other people talk to me about their troubles.
2. If I see someone going through a difficult time, I try to be caring toward that person.
3. I am unconcerned with other people's problems.
4. I realize everyone feels down sometimes, it is part of being human.
5. I notice when people are upset, even if they don't say anything.
6. I like to be there for others in times of difficulty.
7. I think little about the concerns of others.
8. I feel it's important to recognize that all people have weaknesses and no one's perfect.
9. I listen patiently when people tell me their problems.
10. My heart goes out to people who are unhappy.
11. I try to avoid people who are experiencing a lot of pain.
12. I feel that suffering is just a part of the common human experience.
13. When people tell me about their problems, I try to keep a balanced perspective on the situation.
14. When others feel sadness, I try to comfort them.
15. I can't really connect with other people when they're suffering.
16. Despite my differences with others, I know that everyone feels pain just like me.

APPENDIX E

EMOTION REGULATION QUESTIONNAIRE [ERQ]

Instructions and Items:

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree

1. ___ When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about*.
2. ___ I keep my emotions to myself.
3. ___ When I want to feel less *negative* emotion (such as sadness or anger), I *change what I'm thinking about*.
4. ___ When I am feeling *positive* emotions, I am careful not to express them.

5. ___ When I'm faced with a stressful situation, I make myself *think about it* in a way that helps me stay calm.
6. ___ I control my emotions by *not expressing them*.
7. ___ When I want to feel more *positive* emotion, I *change the way I'm thinking about the situation*.
8. ___ I control my emotions by *changing the way I think about the situation I'm in*.
9. ___ When I am feeling *negative* emotions, I make sure not to express them.
10. ___ When I want to feel less *negative* emotion, I *change the way I'm thinking about the situation*.

APPENDIX F

DIFFICULTIES IN EMOTION REGULATION SCALE [DERS]

Difficulties in Emotion Regulation Scale (DERS)

Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item.

1-----2-----3-----4-----5
almost never sometimes about half the time most of the time almost always
(0-10%) (11-35%) (36-65%) (66-90%) (91-100%)

- _____ 1) I am clear about my feelings.
- _____ 2) I pay attention to how I feel.
- _____ 3) I experience my emotions as overwhelming and out of control.
- _____ 4) I have no idea how I am feeling.
- _____ 5) I have difficulty making sense out of my feelings.
- _____ 6) I am attentive to my feelings.
- _____ 7) I know exactly how I am feeling.
- _____ 8) I care about what I am feeling.
- _____ 9) I am confused about how I feel.
- _____ 10) When I'm upset, I acknowledge my emotions.
- _____ 11) When I'm upset, I become angry with myself for feeling that way.
- _____ 12) When I'm upset, I become embarrassed for feeling that way.
- _____ 13) When I'm upset, I have difficulty getting work done.
- _____ 14) When I'm upset, I become out of control.
- _____ 15) When I'm upset, I believe that I will remain that way for a long time.
- _____ 16) When I'm upset, I believe that I will end up feeling very depressed.
- _____ 17) When I'm upset, I believe that my feelings are valid and important.
- _____ 18) When I'm upset, I have difficulty focusing on other things.
- _____ 19) When I'm upset, I feel out of control.
- _____ 20) When I'm upset, I can still get things done.
- _____ 21) When I'm upset, I feel ashamed at myself for feeling that way.
- _____ 22) When I'm upset, I know that I can find a way to eventually feel better.
- _____ 23) When I'm upset, I feel like I am weak.
- _____ 24) When I'm upset, I feel like I can remain in control of my behaviors.
- _____ 25) When I'm upset, I feel guilty for feeling that way.
- _____ 26) When I'm upset, I have difficulty concentrating.
- _____ 27) When I'm upset, I have difficulty controlling my behaviors.
- _____ 28) When I'm upset, I believe there is nothing I can do to make myself feel better.
- _____ 29) When I'm upset, I become irritated at myself for feeling that way.
- _____ 30) When I'm upset, I start to feel very bad about myself.
- _____ 31) When I'm upset, I believe that wallowing in it is all I can do.
- _____ 32) When I'm upset, I lose control over my behavior.
- _____ 33) When I'm upset, I have difficulty thinking about anything else.
- _____ 34) When I'm upset I take time to figure out what I'm really feeling.
- _____ 35) When I'm upset, it takes me a long time to feel better.
- _____ 36) When I'm upset, my emotions feel overwhelming.

APPENDIX G

TRAIT EMOTIONAL INTELLIGENCE QUESTIONNAIRE-SF [TEIQ_{ue}-SF]

TEIQue-SF

Instructions: Please answer each statement below by putting a circle around the number that best reflects your degree of agreement or disagreement with that statement. Do not think too long about the exact meaning of the statements. Work quickly and try to answer as accurately as possible. There are no right or wrong answers. There are seven possible responses to each statement ranging from 'Completely Disagree' (number 1) to 'Completely Agree' (number 7).

	1	2	3	4	5	6	7
Completely Disagree							Completely Agree
1. Expressing my emotions with words is not a problem for me.	1	2	3	4	5	6	7
2. I often find it difficult to see things from another person's viewpoint.	1	2	3	4	5	6	7
3. On the whole, I'm a highly motivated person.	1	2	3	4	5	6	7
4. I usually find it difficult to regulate my emotions.	1	2	3	4	5	6	7
5. I generally don't find life enjoyable.	1	2	3	4	5	6	7
6. I can deal effectively with people.	1	2	3	4	5	6	7
7. I tend to change my mind frequently.	1	2	3	4	5	6	7
8. Many times, I can't figure out what emotion I'm feeling.	1	2	3	4	5	6	7
9. I feel that I have a number of good qualities.	1	2	3	4	5	6	7
10. I often find it difficult to stand up for my rights.	1	2	3	4	5	6	7
11. I'm usually able to influence the way other people feel.	1	2	3	4	5	6	7
12. On the whole, I have a gloomy perspective on most things.	1	2	3	4	5	6	7
13. Those close to me often complain that I don't treat them right.	1	2	3	4	5	6	7
14. I often find it difficult to adjust my life according to the circumstances.	1	2	3	4	5	6	7
15. On the whole, I'm able to deal with stress.	1	2	3	4	5	6	7
16. I often find it difficult to show my affection to those close to me.	1	2	3	4	5	6	7
17. I'm normally able to "get into someone's shoes" and experience their emotions.	1	2	3	4	5	6	7
18. I normally find it difficult to keep myself motivated.	1	2	3	4	5	6	7
19. I'm usually able to find ways to control my emotions when I want to.	1	2	3	4	5	6	7
20. On the whole, I'm pleased with my life.	1	2	3	4	5	6	7
21. I would describe myself as a good negotiator.	1	2	3	4	5	6	7
22. I tend to get involved in things I later wish I could get out of.	1	2	3	4	5	6	7
23. I often pause and think about my feelings.	1	2	3	4	5	6	7
24. I believe I'm full of personal strengths.	1	2	3	4	5	6	7
25. I tend to "back down" even if I know I'm right.	1	2	3	4	5	6	7
26. I don't seem to have any power at all over other people's feelings.	1	2	3	4	5	6	7
27. I generally believe that things will work out fine in my life.	1	2	3	4	5	6	7
28. I find it difficult to bond well even with those close to me.	1	2	3	4	5	6	7
29. Generally, I'm able to adapt to new environments.	1	2	3	4	5	6	7
30. Others admire me for being relaxed.	1	2	3	4	5	6	7

APPENDIX H

STATE-TRAIT ANXIETY INVENTORY-SF (STAI)

SELF-EVALUATION QUESTIONNAIRE STAI Form Y-1

Please provide the following information:

Name _____ Date _____ S _____

Age _____ Gender (Circle) **M** **F** T _____

DIRECTIONS:

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

- | | | | | |
|--|---|---|---|---|
| 1. I feel calm | 1 | 2 | 3 | 4 |
| 2. I feel secure | 1 | 2 | 3 | 4 |
| 3. I am tense | 1 | 2 | 3 | 4 |
| 4. I feel strained | 1 | 2 | 3 | 4 |
| 5. I feel at ease | 1 | 2 | 3 | 4 |
| 6. I feel upset | 1 | 2 | 3 | 4 |
| 7. I am presently worrying over possible misfortunes | 1 | 2 | 3 | 4 |
| 8. I feel satisfied | 1 | 2 | 3 | 4 |
| 9. I feel frightened | 1 | 2 | 3 | 4 |
| 10. I feel comfortable | 1 | 2 | 3 | 4 |
| 11. I feel self-confident | 1 | 2 | 3 | 4 |
| 12. I feel nervous | 1 | 2 | 3 | 4 |
| 13. I am jittery | 1 | 2 | 3 | 4 |
| 14. I feel indecisive | 1 | 2 | 3 | 4 |
| 15. I am relaxed | 1 | 2 | 3 | 4 |
| 16. I feel content | 1 | 2 | 3 | 4 |
| 17. I am worried | 1 | 2 | 3 | 4 |
| 18. I feel confused | 1 | 2 | 3 | 4 |
| 19. I feel steady | 1 | 2 | 3 | 4 |
| 20. I feel pleasant | 1 | 2 | 3 | 4 |

VERY MUCH SO
MODERATELY SO
SOMEWHAT
NOT AT ALL

SELF-EVALUATION QUESTIONNAIRE

STAI Form Y-2

Name _____ Date _____

DIRECTIONS

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

- | | | | | | | | |
|--|---------------------|--|------------------|--|--------------|--|----------------------|
| | ALMOST NEVER | | SOMETIMES | | OFTEN | | ALMOST ALWAYS |
| 21. I feel pleasant..... | 1 | | 2 | | 3 | | 4 |
| 22. I feel nervous and restless | 1 | | 2 | | 3 | | 4 |
| 23. I feel satisfied with myself..... | 1 | | 2 | | 3 | | 4 |
| 24. I wish I could be as happy as others seem to be..... | 1 | | 2 | | 3 | | 4 |
| 25. I feel like a failure | 1 | | 2 | | 3 | | 4 |
| 26. I feel rested | 1 | | 2 | | 3 | | 4 |
| 27. I am "calm, cool, and collected"..... | 1 | | 2 | | 3 | | 4 |
| 28. I feel that difficulties are piling up so that I cannot overcome them..... | 1 | | 2 | | 3 | | 4 |
| 29. I worry too much over something that really doesn't matter..... | 1 | | 2 | | 3 | | 4 |
| 30. I am happy | 1 | | 2 | | 3 | | 4 |
| 31. I have disturbing thoughts | 1 | | 2 | | 3 | | 4 |
| 32. I lack self-confidence..... | 1 | | 2 | | 3 | | 4 |
| 33. I feel secure | 1 | | 2 | | 3 | | 4 |
| 34. I make decisions easily | 1 | | 2 | | 3 | | 4 |
| 35. I feel inadequate..... | 1 | | 2 | | 3 | | 4 |
| 36. I am content | 1 | | 2 | | 3 | | 4 |
| 37. Some unimportant thought runs through my mind and bothers me | 1 | | 2 | | 3 | | 4 |
| 38. I take disappointments so keenly that I can't put them out of my mind..... | 1 | | 2 | | 3 | | 4 |
| 39. I am a steady person..... | 1 | | 2 | | 3 | | 4 |
| 40. I get in a state of tension or turmoil as I think over my recent concerns
and interests | 1 | | 2 | | 3 | | 4 |

APPENDIX I

POSITIVE-NEGATIVE AFFECT SCHEDULE (PANAS)

Positive and Negative Affect Schedule (PANAS-SF)

Indicate the extent you have felt this way over the past week.		Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
PANAS 1	Interested	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 2	Distressed	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 3	Excited	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 4	Upset	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 5	Strong	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 6	Guilty	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 7	Scared	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 8	Hostile	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 9	Enthusiastic	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 10	Proud	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 11	Irritable	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 12	Alert	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 13	Ashamed	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 14	Inspired	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 15	Nervous	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 16	Determined	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 17	Attentive	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 18	Jittery	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 19	Active	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
PANAS 20	Afraid	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

APPENDIX J

TORONTO ALEXITHYMIA SCALE-20 (TAS-20)

T A S – 20

Using the scale provided as a guide, indicate how much you agree or disagree with each of the following statements by circling the corresponding number. Give only one answer for each statement.

Strongly Disagree (1), Moderately Disagree (2), Disagree Nor Agree (3), Moderately Agree (4), and Strongly Agree (5)

1. I am often confused about what emotion I am feeling. 1 2 3 4 5
2. It is difficult for me to find the right words for my feelings. 1 2 3 4 5
3. I have physical sensations that even doctors don't understand. 1 2 3 4 5
4. I am able to describe my feelings easily. 1 2 3 4 5
5. I prefer to analyze problems rather than just describe them. 1 2 3 4 5
6. When I am upset, I don't know if I am sad, frightened, or angry. 1 2 3 4 5
7. I am often puzzled by sensations in my body. 1 2 3 4 5
8. I prefer to just let things happen rather than to understand why they turned out that way.
1 2 3 4 5
9. I have feelings that I can't quite identify. 1 2 3 4 5
10. Being in touch with emotions is essential. 1 2 3 4 5
11. I find it hard to describe how I feel about people. 1 2 3 4 5
12. People tell me to describe my feelings more. 1 2 3 4 5
13. I don't know what's going on inside me. 1 2 3 4 5
14. I often don't know why I am angry. 1 2 3 4 5
15. I prefer talking to people about their daily activities rather than their feelings.

1 2 3 4 5

16. I prefer to watch “light” entertainment shows rather than psychological dramas. 1 2 3 4 5

17. It is difficult for me to reveal my innermost feelings, even to close friends. 1 2 3 4 5

18. I can feel close to someone, even in moments of silence. 1 2 3 4 5

19. I find examination of my feelings useful in solving personal problems. 1 2 3 4 5

20. Looking for hidden meanings in movies or plays distracts from their enjoyment. 1 2 3 4

5

APPENDIX K

LOVING-KINDNESS AND CONTROL INDUCTION

<https://www.youtube.com/watch?v=auS1HtAz6Bs>

LKM

NARRATOR: "Let's begin the loving-kindness meditation. Close your eyes, sit comfortably with your feet flat on the floor and your spine straight. Relax your whole body. Keep your eyes closed throughout the whole meditation, and bring your awareness inward without straining or concentrating. Just relax and gently follow the instructions. Take a deep breath in and breathe out. Keeping your eyes closed, think of a person close to you; who loves you very much. It could be someone from the past, or the present. Someone's still in your life, or who has passed. It could be a spiritual teacher or guide. Imagine that person standing on your right side, sending you their love. That person is sending you wishes for your safety, for your well-being, and happiness. Feel the warm wishes and love coming from that person towards you. Now bring to mind the same person, or another person, who cherishes you deeply. Imagine that person standing on your left side, sending you wishes for your wellness, for your health, and happiness. Feel the kindness and warmth coming to you from that person. Now imagine that you are surrounded on all sides by all the people who love you, and have loved you. Picture all of your friends and loved ones surrounding you. They are all sending you wishes for your happiness, well-being, and health. Bask in the warm wishes and love coming from all sides. You are filled and overflowing with warmth and love. Now bring your awareness back to the person standing on your right side. Begin to send the love that you feel back to that person. You and this person are similar. Just like you, this person wishes to be happy. Send all your love and warm wishes to that person. Repeat the following phrases silently: may you live with ease, may you be happy, may you be free from

pain, may you live with ease, may you be happy, may you be free from pain, may you live with ease, may you be happy, may you be free from pain. Now focus your awareness on the person standing on your left side. Begin to direct the love within you to that person. Send all your love and warmth to that person. That person and you are alike. Just like you that person wishes to have a good life. Repeat the following phrases silently: just as I wish to, may you be safe. May you be healthy, may you live with ease and happiness, just as I wish to. May you be safe, may you be healthy, and may you live with ease and happiness just as I wish to. May you be safe, may you be healthy, and may you live with ease and happiness. Now picture another person that you love- perhaps a relative or a friend. This person, like you, wishes to have a happy life. Send warm wishes to that person. Repeat the following phrases silently; may your life be filled with happiness, health, and well-being. May your life be filled with happiness, health, and well-being. May your life be filled with happiness, health, and well-being. Now think of an acquaintance, someone you don't know very well and towards whom you do not have any particular feeling. You and this person are alike in your wish to have a good life. Send all your wishes for wellbeing to that person, repeating the following phrases silently: just as I wish to, may you also live with ease and happiness. Just as I wish to, may you also live with ease and happiness. Just as I wish to, may you also live with ease and happiness. Now bring to mind another acquaintance toward whom you feel neutral- it could be a neighbor or colleague or someone else that you see around but do not know very well. Send all your good wishes to that person, repeating the following phrases silently: May you be happy, may you be healthy, may you be free from all pain. May you be happy, may you be healthy, may you be free from all pain. May you be happy, may you be healthy, may you be free from all pain. Next, expand your awareness and picture the whole globe in front of you as a little ball. Send warm wishes to all living beings on the globe,

who like you, want to be happy, repeating: Just as I wish to, may you live with ease, happiness, and good health. Just as I wish to, may you live with ease, happiness, and good health. Just as I wish to, may you live with ease, happiness, and good health. Take a deep breath in, and breathe out. And another deep breath in, and let it go. Notice the state of your mind, and how you feel after this meditation, and when you're ready you may open your eyes.”

<https://www.youtube.com/watch?v=Z95gPdFC7GM&t=66s>

PMR

NARRATOR: “And now join me for a progressive muscle Relaxation. This exercise involves systematically, tensing and relaxing different muscle groups. This is a good relaxation exercise for those who have trouble concentrating, or experiencing racing thoughts or other mental distractions. You may leave your eyes open or close them however you prefer. Experiment with how much you tense your targeted muscles, some fine tensing tightly to be most helpful while others use just a small amount of tensing tightening just enough to notice the sensation. Just do whatever works best for you. Start out by taking a few deep Breaths. Into the abdomen. Just noticing the breath. Without making any effort to change the breathing, just noticing, Feeling the inhale as the chest rises, the rib cage expands and the belly inflates, and the exhale when the belly deflates. The ribs collapse and the chest falls noticing the breath moving all through the body. And do a simple check-in of your emotional state and your thoughts. What you may be feeling in the body just notice what's happening. Without judgment or without expectation, just bringing them into your awareness. And now making a fist with your right hand, tense the muscles in your right forearm allowing the rest of the arm to remain relaxed. Noticing those sensations of tension, comparing the tensed muscles to the relaxed ones in the opposite arm and

the rest of the body. Holding the tension and when you're ready take a deep breath in and as you exhale slowly gradually release all the tension. Until every last bit has left the tense muscles. Maybe you imagine this is like a fire hose that was rigid as it was full of water that suddenly becomes more flexible as the water drains out. Or some image like that that works for you. Spending a few moments noticing and appreciating the sensations in the muscles, once they're relaxed. And then moving to the left side of the body, tense the left hand, into a fist, and tense the forearm, allowing the rest of the arm to remain relaxed. Study the sensations of tension compare the tense muscles to the relaxed ones in the opposite arm and in the rest of the body. And when you're ready take a deep breath in and as you exhale slowly... gradually... release all of the tension until every last bit is left the tense muscles. Appreciating the sensations in the muscles once they're relaxed. And raising your right shoulder pin your right upper arm to the side of your body. Tensing the muscles and the right upper arm and shoulder noticing the sensations of tension. Comparing the tensed muscles to the relaxed ones in the opposite arm and in the rest of the body. When you're ready take a deep breath in, and as you exhale slowly, gradually release all of the tension. Until every last bit has left the tense muscle. Maybe finding an image that captures this gradual release of tension. Maybe the Sun is melting ice or pressure is being released from a Valve. Spending a few moments studying and appreciating the sensations in the muscle that is relaxed. And then lifting the left shoulder pinning the left arm to the side of the body. Tensing the muscles in the left upper arm and shoulder. Studying the sensations of tension. Comparing the tensed muscles to the relaxed ones in the opposite arm and in the rest of the body. And when you're ready take a deep breath in and as you exhale slowly, gradually release all of the tension, until every last bit has left the tense muscles. Spending a few moments noticing and appreciating the sensations in the muscles once they're relaxed. With your right leg extended

bend your right foot up at an angle so the muscles of your right calf shin ankle and muscle are tensed. Allow the rest of the leg to remain relaxed, noticing the sensations of tension, comparing the tensed muscles to the relaxed ones in the rest of the leg and in the rest of your body. When you're ready take a deep breath in and as you exhale slowly... gradually... release all of the tension. Until every last bit has left the tense muscles. Spending a few moments noticing and Appreciating the sensations and the muscles once they're relaxed. Extending the left leg bend the left foot up at an angle so the muscles of your left calf, shin, and ankle, and foot are tensed. Allow the rest of the leg to remain relaxed. Noticing the sensations of tension, comparing the tense muscles to the relaxed ones and the rest of the leg and the rest of the body. And when you're ready take a deep breath in and as you exhale slowly... gradually... release all of the tension until every last bit has left the tense muscles. Spending a few moments studying and appreciating the sensations and the muscles once they're relaxed. And now tensing the muscles in the right seat and thigh almost as if you're lifting yourself off of the chair, allowing the remaining muscles in the right leg to remain as relaxed as possible. Notice the sensations of tension, compare the tense muscles to the relaxed ones. And the opposite seat and thigh in the rest of the body. When you're ready take a deep breath in and as you exhale slowly.. gradually.. release all of the tension until every last bit has left the tense muscles. Spend a few moments noticing and appreciating the sensations in the muscles once they are relaxed. And now tensing the muscles on the left seat and thigh, slightly lifting those off of your chair allowing the remaining muscles in the leg to remain as relaxed as possible. Noticing the sensations of tension, comparing the tense muscles to the relaxed ones on the opposite seat and thigh and in the rest of the body. When you're ready take a deep breath in and as you exhale slowly.. gradually... release

all of the tension until every last bit has left the tense muscles. And now pulling the muscles of your abdomen at the same time you're pushing the small of your back against your chair.

Noticing the sensations of tension in the abdomen. Comparing the tense muscles to the relaxed ones and the rest of the body. When you're ready take a deep breath in and as you exhale slowly... gradually.... release all of the tension until every last bit has left the tense muscles.

(Pause)

Spend a few moments studying and appreciating the sensations and the muscles once they're relaxed. And next allow your head to fall forward. Feeling the tension in the muscles in the back of the neck. Noticing the sensations of tension, comparing the tense muscles to the relaxed ones in the rest of the body. When you're ready take a deep breath in and as you exhale slowly... gradually...release all of the tension until every last bit has left the tense muscles pending a few moments studying and appreciating the sensations and the muscles once they're relaxed.

And pushing a tongue against the upper palate purse your lips squint, your eyes, and tighten your jaw, and scrunch up your face. Holding the tension in the face and jaw and studying the sensations of tension comparing the tense muscles to the relaxed ones in the rest of the body.

And when you're ready take a deep breath in and as you exhale slowly... gradually... release all of the tension until every last bit has left the tense muscles. Spending a few moments studying and appreciating the sensations and the muscles once they're relaxed. And now taking a few slow deep breaths allowing yourself to be aware of the sensations throughout the body.

If there's any part that remains tense repeating the exercise there until the tension is gone, and then just allowing the relaxation to move through your body in waves. Allowing yourself to relax more and more and more deeply as you continue to take slow... deep breaths. Maybe even thinking of how gentle waves lap on the sand when you're at the beach. And gradually washing

away any physical emotional or mental tension.... soothing and relaxing. And when you're done... allowing yourself bring your awareness back to your room, getting reoriented... blinking the eyes to take the light in slowly as you adjust to the brightness in your room if your eyes were closed. Spending a moment to enjoy the sensations of relaxation throughout your body. Feeling comfortably relaxed.”

VITA

Audrey Darnbush was born to parents Margaret and Darrell Darnbush. She is the eldest of two children, herself and Nathan Darnbush. She attended various schools in her younger years due to her father's military occupation, starting at Powell Elementary and Barfield Elementary, Christiana Middle School, and Central Magnet School. After graduation, she attended Lee University and became interested in research psychology. She received a Bachelor's of Arts in Psychology in December 2018. In spring of 2020, she accepted a Graduate Assistantship to the University of Tennessee Chattanooga in the Psychological Science program. Audrey will be graduating with a Master's of Science in August 2023.