5-29-2020

Effect of Solution-Focused Therapy on Resilience in Athletes: An EEG Study

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Effect of Solution-Focused Therapy on Resilience in Athletes: An EEG Study

by

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Presented to the Faculty of the

Graduate School of Clinical Psychology

George Fox University

in partial fulfillment

of the requirements for the degree of

Doctor of Psychology

in Clinical Psychology

Newberg, Oregon

May 29, 2020

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has been approved

at the

Graduate School of Clinical Psychology

George Fox University

as a Dissertation for the PsyD degree

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Abstract

The purpose of this study is to investigate what areas in the brain change activation levels among college athletes following a solution-focused therapeutic intervention, and how these changes are related to levels of resilience. Participants were recruited from three undergraduate psychology classes at a private Christian university with the intervention group (n = 14) consisting of current collegiate athletes, and a control group (n = 12) of non-athletes. The experiment consisted of a pre and post intervention trial spaced approximately seven weeks apart. At the completion of Trial 1, those in the athlete group participated in six weekly sessions of solution focused brief therapy (SFBT) before returning to repeat Trial 2. For each experimental trial, both groups completed self-report measures. For the experiment, electroencephalogram (EEG), heart rate variability (HRV), and galvanic skin responses (GSR) were measured while participants viewed various athletic images. Participants were asked to positively appraise each image regardless of its emotional content. Participants were also asked to rate how each image made them feel. Data analysis included descriptive results, correlations and repeated measures analysis of covariance. Results indicated that athletes' levels of activation on EEG and GSR measures remained relatively stable across trials, while control group activation levels decreased. Those in the athlete group maintained, and slightly increased, relative left frontal asymmetry post intervention, indicating an ability to connect with, and cognitively appraise stimuli in a more positive manner regardless of the emotional content of the stimuli, while relative left frontal asymmetry decreased in controls. Heart rate variability data revealed that HRV output post intervention differed greatly for both groups depending on image. Data showed that athletes had significantly higher overall HRV and temporal lobe activation levels than controls. No significant differences were found for self-report measures with the exception that athletes tended to rate all images more favorably than controls. Finally, for all measures, athletes either maintained, or improved on pre-intervention functioning and coping during Trial 2, while controls showed a consistent decline in performance on measures. Overall, results indicate that SFBT contributes to increased resilience by helping participants engage in and maintain healthy coping over time.

Keywords: Solution-focused Therapy, EEG, HRV, resilience, collegiate athletes

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Chapter 1

Introduction

Resilience

The concept of resilience has been studied in numerous populations throughout the lifespan, including children exposed to adverse circumstances (Bonanno & Diminich, 2013; Rutter, 1985) and older adults struggling with end of life decisions (MacArtney et al., 2015). Athletes are a population that willingly face adversity on a regular basis with the hope of achieving their sporting goals and dreams (Fletcher & Sarkar, 2013). They are not strangers to playing through pain, sacrificing for the good of the team, stepping out of their comfort zone, or stepping onto the field of play again after a recent loss. Almost all successful athletes face pressure, competitive stress, and adversity in and out of their competitive arena. An athlete's ability to display resilience when faced with a stressor is an important indicator of future success (MacNamara et al., 2010a; MacNamara et al., 2010b).

With the rapid advancement of technology, psychologists can gain a greater understanding of how the concept of resilience is indicated neurologically. Obtaining greater insight into the neural underpinnings of resilience may help psychologists implement more targeted and effective interventions when working with athletes.

Resilience in Sport

The construct of resilience has been studied in various contexts and in its simplest form means the ability to recover after facing an adverse condition (Werner & Smith, 1992). Resilience theory states that resilience is a dynamic process that starts when an individual is faced with an adverse situation which activates the person's unique protective and vulnerability factors and leads to either a resilient or a non-resilient outcome (Bolton et al., 2017). Resilience includes the ability to maintain normal levels of functioning after a stressor. Improvements in functioning may occur but are not a pre-requisite to resilience (Bolton et al., 2017).

Though the concept of resilience has been studied in a variety of settings, Luthar and Cichette (2000) suggest the construct could be more accurately understood in domain-specific contexts. In this vein, Fletcher and Sarkar (2012) defined sport specific resilience as "the role of mental processes and behavior in promoting personal assets and protecting an individual from the potential negative effect of stressors" (p. 675).

Researchers have supported taking a qualitative approach to studying resilience in sports (Galli & Vealey, 2008; Machida et al., 2013). Their research emphasizes the importance of individual perception regarding stressors and protective factors. It indicates a complex interplay between personal and environmental factors which contribute to an athlete's appraisal of a stressor and subsequent ability to continue to perform at a normal, or increased, level after facing the stressor.

Using a grounded theory of psychological resilience in Olympic athletes, Sarkar and Fletcher (2014) divided the various stressors athletes face into three primary categories: performance-related, organizational, and personal. Performance-related stressors include, "preparation, injuries, pressure, underperforming, expectations, self-presentation, and rivalry," (Sarkar & Fletcher, 2014, p. 9). Organizational stressors include leadership issues, cultural and team issues, and logistical and environmental issues (Arnold & Fletcher, 2012). Finally, personal stressors include any event not directly related to sport. Regardless of the specific stressor an athlete experiences, the athlete's perception of the situation as adverse is required (Martin-Krumm et al., 2003).

Protective Factors

When studying resilience, it is also important to identify individual protective factors. Important factors correlated with higher resilience include perceived social support (Thoits, 2011), spirituality (Peres et al., 2007), emotional regulation (Gratz, & Roemer, 2004), confidence (Kleiman et al., 2013), and hope (Horton & Wallinder, 2001). These various protective factors are utilized to help individuals cope with adversity.

Grych et al. (2015) proposed a Resilience Portfolio Model which integrates research on resilience, coping, post-traumatic growth, and positive psychology to create a more comprehensive understanding of the role protective factors play in helping people overcome adversity. The model categorizes strengths into the three higher order domains of interpersonal strengths, meaning-making, and self-regulation. These researchers later used the Resilience Portfolio Model to study poly-strengths with results indicating that individuals who have strengths in multiple areas report healthier functioning after facing adversity (Hamby et al., 2018). They suggested that a strengths-based approach is an effective and evidenced-based way to promote resilience after facing adversity, as well as an excellent prevention strategy to boost a person's ability to face adversity in the future.

Neural Underpinnings of Resilience

The advancement of neuroimaging has allowed researchers to gain a more thorough understanding of many psychological concepts. Although research on the neurobiology of resilience is relatively young, a few studies have shed light on what is happening in the brain to promote a resilient state. Regarding resilience, most of the current research focuses on facets of emotional regulation. As noted by Barrett et al. (2007), emotions start with an individual's perception of a stimulus. The individual appraises the emotional importance of the stimulus, which then leads to an affective and physical response to the stimulus. Interventions have increasingly been studied at the appraisal stage of emotional generation as a way to help people alter "the trajectory of an unfolding emotional response by mentally transforming, or reappraising, the meaning of the emotion-eliciting situation," (Pavlov et al., 2014, p. 179).

Cognitive Reappraisal

A meta-analysis of 48 cognitive reappraisal neuro-imaging studies indicated that prefrontal, parietal, and temporal regions are consistently recruited during reappraisal. Specifically, "reappraisal showed recruitment of regions commonly observed in cognitive control tasks including posterior dmPFC (dorsal medial prefrontal cortex), bilateral dlPFC, (dorsal lateral prefrontal cortex), vlPFC (ventral lateral prefrontal cortex), and posterior parietal cortex" (Buhl et al., 2014, p. 2984). The researchers suggested that the dlPFC is associated with working memory, the vlPFC may be involved in selecting and inhibiting appraisal information, and the dmPFC may be associated with supporting self-reflective and affective meaning toward stimuli. In addition, Buhl et al.'s study (2014) "found strong evidence that reappraisal modulates activity in bilateral amygdala, but not other regions related to emotional responding," (Buhl et al., 2014, p. 2986.) They concluded that reappraisal involves cognitive control as a means to regulate semantic representations of emotional stimuli, which then decreases activity in the amygdala.

Cognitive reappraisal often involves the down-regulation of negative emotion or the up-regulation of positive emotion. However, "the overwhelming majority of experimental studies have focused on negative emotions because of their association with psychological and somatic problems, whereas positive emotions have received little or no empirical attention," (Pavlov et al., 2014, p. 179). Buhl et al. (2014) suggested that the majority of the studies included in their meta-analysis examined reappraisal using aversive stimuli, which triggered activity in the amygdala due to the amygdala's role in threat detection. They stated that the pallidum and ventral striatum (portion of the basal ganglia) play an important role in appetitive appraisals and suggested, "it could be the case that reappraisal modulates activity in the ventral striatum and pallidum for positive stimuli and activity in the amygdala for aversive stimuli," (Buhl et al, 2014, p. 2986).

McRae, Ciesielski, Gross and Desteno (2012) studied reappraisal tactics used by 58 undergraduate women at Stanford University. Participants viewed various negative, neutral, or positive images and were given instructions to either react naturally to the images, increase positive emotions, or decrease negative emotions associated with the images. Researchers then had participants explain which reappraisal tactic they used to manage their emotions. Reappraisal tactics were separated into eight categories: explicitly positive, change current circumstances, reality challenge, change future consequences, agency, distancing, technical, and acceptance. Skin conductance and participants' self-reported affect were used as measurements. Results indicated that participants who employed explicitly positive reappraisal strategies, which imagined an improvement in the situation shown in the image, showed greater increases in self-reported positive affect than all other conditions, yet showed smaller decreases in skin-conductance. This indicated that increasing positive affect may not equal a decrease in negative affect as measured by physiological measures, yet it may still be an effective strategy to improve a person's perception of a situation.

Costanzo et al. (2016) studied neural efficiency in athletes exposed to stressful visual stimuli and suggested that athletes were able to respond to emotional challenge with less emotional reactivity than an age-matched, non-athlete control group. As measured through fMRI scans, they displayed neural efficiency in that they showed less responsiveness in the prefrontal cortex as well as lower insula activation, which suggested less emotional reactivity to negative affective events than the control group.

Choi et al. (2016) studied the effects of reappraisal on EEG readings on 102 Japanese college students. Participants viewed 60 images selected from the International Affective Picture System (IAPS), half of which were neutral and half negative. Participants were assigned to three conditions: neutral, negative, or reappraise negative. They were instructed to either "observe" or "reappraise" an image while attached to EEG sensors. Results indicated that participants who were instructed to reappraise showed relatively greater left frontal activity compared with those that observed. Researchers indicated that greater left frontal activity is associated with decreased emotional reactivity to negative stimuli as well as increased positive emotion corresponding with approach motivation (Choi et al., 2016). They concluded that reappraisal is an effective emotion regulation strategy.

Bhanji and Delgado (2014) studied which areas of the brain are involved in individuals who persist toward a goal after encountering uncontrollable stressors. They studied 30 participants from a university who performed a Persistence after Setback (PAS) task for a monetary reward. While connected to an fMRI, participants played many rounds of a decision game asking them to choose a university field of study which required participants to pass exams in their chosen field. The game consisted of a mix of controllable and uncontrollable obstacles. After each setback, participants were asked to either continue with their originally chosen field of study or to choose a different subject. Participants who chose to stick with their originally intended field despite facing setbacks were categorized as persistent. Researchers noted two distinct neural pathways involved in encountering controllable versus uncontrollable obstacles. They noted that increased persistence after controllable setbacks was associated with decreased activity in the ventral striatum. Increases in vmPFC signal change was associated with persistence after uncontrollable setbacks. The study indicated that individuals who persisted after failures were those that appraised their failures as non-life threatening and likely to change in time (Bhanji & Delgado, 2014). In other words, they possessed a sense of control and optimism that they could succeed in the future.

Overall, current research indicates that resilience in the brain is linked to emotional regulation and neural efficiency. A resilient brain is able to ignore non-essential input and increase activity in areas that contribute to cognitive control as a means to regulate semantic representations of emotional stimuli, which then decreases activity in the amygdala. This is intricately tied to the "performer's perception and appraisal of the competitive environment," (Hatfield, 2018, p. 48). Though the reappraisal strategy of up-regulating positive emotions has been studied far less than other forms of reappraisal, McRae and Mauss (2016) stated that "the positive emotions that are enhanced by PR (positive reappraisal) play a crucial positive role in resilience, and that they do so above and beyond decreases in negative emotions associated with NR (negative reappraisal)," (p. 166).

Reappraisal and Cardiovascular Activity

Pavlov et al. (2014) researched the effect of reappraisal on cardiovascular activity. Fifty three men were shown 160 images (32 neutral, 64 negative, and 64 positive) while attached to cardiovascular monitoring sensors. Participants were shown a screen that instructed them to either “Increase,” “Look,” or “Decrease.” Participants were then shown either a negative, neutral, or positive image and followed the instruction on the previous screen. Prior to the start of the experiment, participants were taught how to decrease the effects of negative images by increasing their sense of objective distance. They were also taught how to increase the effects of positive images by increasing “their sense of subjective closeness to pictured events, vividly imaging themselves as involved in viewed actions and try to experience positive emotions together with the people shown in the photos,” (p. 180).

Results indicated that, regardless of the emotional content of a picture (positive, neutral, or negative), trials where respondents were instructed only to look at the picture were associated with decreased HR, decreased cardiac output (CO), decreased mean arterial blood pressure (MBP), and increased stroke volume. Results indicated that reappraising negative images increased cardiac output and decreased total peripheral resistance (TPR). TPR is an “index of contraction versus dilation in the arterial system,” (Pavlov et al., 2014, p. 178).

Results also showed that reappraising positive images was associated with smaller decreases in HR, CO, and MBP as compared to unregulated conditions. Pavlov et al. (2014) referenced the intake-rejection hypothesis (Lacey, 1967) as a possible explanation to their findings. The intake-rejection hypothesis explains the affect that attention and focus have on heart rate. The hypothesis states that attending to external stimuli is associated with decelerated heart rate, while focusing on internal stimuli increases heart rate (Lacey, 1967).

Solution-Focused Brief Therapy

Solution-focused brief therapy (SFBT) may be an optimal choice to promote resilience in athletes. Developed by Steve de Shazer and Insoo Kim Berg, SFBT suggests that change occurs through changing a person’s perception of a situation by focusing on solution-oriented language rather than problem-oriented language (de Shazer, 1991). In SFBT, the therapist follows the lead of clients and helps clients co-construct new meanings to reality and encourages their future hopes through the use of positive language, identification of strengths, recognition of exceptions to problems, and the promotion of protective factors, which are in line with the concept of resilience. Bolton et al. (2017) argues that SFBT could help to increase "the number of protective factors that are activated after adversity and result in resilient outcomes for clients who engage in this model," (p. 12). Meta-analyses of studies on SFBT have shown it to be effective working with people struggling with depression and anxiety (Kim, 2008; Schmit et al., 2016), as well as in working with students in schools (Kim & Franklin, 2009), patients in social service agencies (Gingerich & Peterson, 2013) and medical settings (Zhang et al., 2018).

While many sport performance consultants implement mental skills training into their work with athletes, experienced sport performance consultants shared that mental skills training may not be the best intervention when working with an athlete (Owton et al., 2014; Tod et al., 2009). Sport performance consultants reiterated the importance of a client-centered and flexible approach (Owton et al., 2014; Tod et al.). In addition, several sport performance consultants have stated that an individualized approach which is adapted to the unique concerns of each athlete will provide the athlete the most benefit (Collins et al., 2013; Sharp & Hodge, 2011). Solution-focused brief therapy fits these needs; it is a flexible and individualized therapy that focuses on empowerment and can promote changes in a short amount of time.

The Present Study

The purpose of this study is to investigate what areas in the brain change activation levels among college athletes following a solution-focused therapeutic intervention, and how these changes are related to perceived state anxiety (Sports Anxiety Scale-2), levels of resilience (CD-RISC), and coping strategies utilized (CICS).

Hypotheses

As the goals of solution-focused therapy are to emphasize individual strengths, encourage future-oriented thinking, and to increase participant levels of control and self-efficacy (de Shazer, 1985; Miller & de Shazer, 2000) it is hypothesized:

H1: Athletes will have a significantly higher score on the post-treatment CD-RISC assessment.

H2: Athletes' level of task-approach coping will increase post-treatment as measured by the CICS.

H3: Athletes' level of state anxiety will decrease post-treatment as measured by SAS-2.

H4: Athletes will report higher levels of positive emotions while viewing stimuli during the post-intervention trial.

H5: Post-intervention EEG mean powers will be different in specific brain regions related to emotions for the intervention group (e.g. left frontal, bi-lateral, temporal).

H6: Post square root of the mean standard deviation (RMSSD) scores (heart rate variability) for athletes will indicate more activation of the parasympathetic nervous system following 6 weeks of solution focused therapy.

H7: The intervention group will differ from the control group in all measures post-treatment.

Chapter 2

Methods

Participants

This investigation consisted of two primary groups. Both groups were recruited from three different undergraduate psychology classes at the same private Christian university. Both groups were offered class credit for participation in the study. The first group consisted of the control group and included students who were not currently participating in intercollegiate athletics. The second group was the intervention group, which included students who were eligible student athletes competing on one of the university athletic teams. An initial sample consisted of 14 participants in the control group and 14 in the intervention group. Two participants in the control group did not complete the second half of the study and were not included in the data analysis. Participants in the control group (n = 12; age range 18-24; M = 18.92, SD = 1.83) included 9 females, 3 males, 2 of Latino/a heritage, 1 African American or Black heritage, 1 Bi-racial participant, and 8 of White heritage. Participants in the intervention group (n = 14; age range 17-20; M = 18.29 , SD = .91) included 11 females, 3 males, 3 of Asian heritage, 2 of Native American or Indian heritage, and 9 of White heritage. Participants in the intervention group participated in the following sports: 2 Track and Field, 2 Basketball, 1 cross country, 1 Tennis, 1 Cheerleading, 3 Softball, 3 Soccer, and 1 Football. The study was approved through the university IRB committee.

Measures and Materials

Measures included a demographic questionnaire, the Sports Anxiety Scale 2 (SAS-2; Smith et al., 2006), the Coping Inventory for Competitive Sport (CICS; Gaudreau & Blondin, 2002), and the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003). EEG recordings of brain functioning, as well as a cardiovascular measure were gathered. The demographic questionnaire asked participants their age, gender, ethnicity, and sport.

Sports Anxiety Scale 2 (SAS-2)

The self-report sport anxiety measure is the SAS-2 (Smith et al., 2006). It is a measure of anxiety specific to athletic performance. The SAS-2 is a brief, 15-item measure of cognitive and physiological anxiety symptoms related to one's sport (e.g., "I worry that I will let others down"). Three sub-scales of five items each appraise Somatic Symptoms, Worry, and Concentration Disruption. Responses range from 1 (*Not at all*) to 4 (*Very Much*). Reliability of the SAS-2 ranges from .89 -.93, indicating strong internal consistency, (Smith et al., 2006). Predictive validity for state and trait anxiety ($r = .64$, $p < .001$) is also strong for the SAS-2. In this study, state anxiety, anxiety about an event, will be measured.

Coping Inventory for Competitive Sport (CICS)

Coping skills were measured using the Coping Inventory for Competitive Sport (CICS; Gaudreau & Blondin, 2002). The CICS is composed of 39 items, with 10 sub scales that can be combined into the categories of task-oriented coping (thought control, mental imagery, relaxation, effort expenditure, seeking support, and logical analysis), distraction-oriented coping (distancing and mental distraction), and disengagement-oriented coping (disengagement/ resignation and venting of unpleasant emotions). Test items are scored on a 5-point scale (1 = *does not correspond at all*, 5 = *corresponds strongly*) where athletes rate the extent to which each item represents their actions or thoughts during a stressful competition. Adequate reliability has been demonstrated for the CICS with internal consistency ranging between .67 and .87 (Gaudreau & Blondin, 2002), and support has been provided for the factor validity of the 10-factor model as well as the three higher order dimensions (Gaudreau & Blondin, 2002). Task (α = .82), distraction (α = .68), and disengagement-oriented coping (α = .72) indicated adequate levels of reliability.

Connor-Davidson Resilience Scale (CD-RISC)

The resilience measure was the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003). The CD-RISC was developed and tested to measure resilience, help predict treatment outcome, and mark treatment progress. It includes 25 items and is comprised of five sub scales: personal competence and tenacity (e.g., “Even when things look hopeless, I don't give up”), trust in one's instincts and strengthening effect of stress (e.g., “Having to cope with stress can make me stronger”), positive acceptance of change (e.g., “Past successes give me confidence in dealing with new challenges and difficulties”), control (e.g., “I feel in control of my life”), and spirituality (“When there are no clear solutions to my problems, sometimes fate or God can help”). Participants are instructed to indicate on a five point Likert-type scale (0 - *not at all true to* 4 - *true nearly all the time*) how much they agree with each statement as it applies to their life experience. If an individual has not had a recent experience of an indicated situation, they are asked to indicate how they would normally respond. The range of the total scale is 0–100 with higher totals indicating greater resilience. The CD-RISC has demonstrated good reliability (α = .88 and .89), test-retest reliability (.87), and convergent and divergent validity (Connor & Davidson, 2003; Gucciardi et al., 2011).

EEG Stimuli

Sport specific images were acquired through searching internet databases to find images representing various emotional states including winning, losing, injuries, and active competitive scenes. Initially 21 images were selected and sent to eight independent raters with the instructions, "Imagine you are a part of the scenario shown in each image. After viewing the image, please rate how that image makes you feel using a 5-point scale with 1 meaning *very negative*, 3 indicating *neutral*, and 5 indicating *very positive*." The independent raters included both male and females and ranged in age from 16-55 and were all either current or former athletes who had a minimum of high school level athletic participation. Following these initial ratings, 10 images (3 negative, 4 neutral, and 3 positive) were selected (Appendix J). These images were selected based on their average ratings most closely representing the three categories of negative, neutral, and positive. Average inter rater reliability for these 10 images was high (ICC = .91, $p < .005$).

Physiological Equipment

All physiological measurements were gathered in the neurocognitive lab of the graduate department at the private university. The equipment includes: Electrophysiological Encephalography (EEG). The data were acquired using the Biopac Data acquisition system (http://www.biopac.com/data-acquisition-analysis-system-mp150-system). The system was set with a high pass of .5 hertz and a low pass of 35 hertz with a sample rate of 1000/sec and acquisition length at 3,600 at 2,000 gain.

A 24-channel electrode cap was applied to each participant during the recordings. Two gold ear clips were used for reference grounds. Silver GSR electrodes were attached to the second and third finger of the left hand. Electrode gel was pre-applied on the adhesive of the

GSR and ECT electrodes. Electrode gel was applied to the scalp with a blunt syringe on the following channel electrodes: FP1, FP2, F3, F4, F7, F8, T3, T4, T5, and T6. These channel locations were chosen based on the literature cited for regional activation and anxiety in the brain (Straube et al., 2007).

Acqknowledge (https://www.biopac.com/product/acqknowledge-software/), loaded on a Mac computer, was used to record the physiological measures. The researcher was seated behind the participant with direct sight of the second computer screen on which the visual stimulus was presented to the participant. During the measurement, the researcher completed an event record form to note when each sequence occurred as well as any auditory or visual interruptions.

Procedure

This study utilized a pre- and post-test design control group (Dimitrov & Rumrill, 2003) with an intervention group and a control group. Participants in both the intervention and control group began by completing an EEG session and the self-report measures administered to them. Then, participants in the intervention group participated in six sessions of solution-focused brief therapy (SFBT) with a trained clinical doctoral psychology student. After completing their six sessions for the intervention group, or after six weeks for the control group, both groups completed a second EEG identical to the first EEG session along with completing the self-report measures post treatment.

At the outset of the investigation, the following demographic information was collected using a demographic questionnaire, age, gender, ethnicity, and sport. Finally, a selection of self-report and physiological measures were administered to all participants, including a self-report anxiety measure (SAS-2), a coping strategies measure (CICS), a resilience measure (CD-RISC), a cardiovascular measure (ECG), a neurophysiological measure (EEG), and an electrodermal measure (GSR). The demographic questionnaire asked for information such as age, gender, ethnicity, and sport.

The post-intervention measures were the same as pre-intervention, except for the consent and demographic questionnaire. The procedure was identical between groups with the exception that the only self-report measures the control group was administered was the demographic questionnaire and the CD-RISC.

EEG Procedure

SuperLab software was utilized to facilitate stimulus display. The stimuli presentation sequence was as follows: (a) An initial screen with instructions for the participant to prepare for the measurement, (b) A rest screen timed to 300 seconds (Rest), (c) A screen with the following instructions:

> You will watch a series of sport-related images. Each image will be shown for 30 seconds. Increase your sense of closeness to the image and imagine you are a part of the situation shown in the picture. As you continue to watch each image, increase your sense of connection to the image and imagine yourself experiencing feelings of success appropriate to this situation.

"Click the spacebar." (d) Show image 1 for 30 seconds, (e) A screen displaying the statement, "Rate how this image makes you feel?" 1-5 (1 = *very negative*, 3 = *neutral*, 5 = *very positive*), (f) Steps 3 and 4 were repeated until all 10 images were viewed and rated (images 2-10 were shown in computer-generated random order), (g) A final rest screen timed to 300 seconds.

Data Collection Procedure

Following IRB approval, a presentation was made to three different psychology undergraduate classes at a private Christian university. The students in the classes were informed of the study and asked to sign their name and contact information on a sheet if they were interested in further study. Interested students were then contacted and schedule their initial session for pre-intervention measurement.

Before beginning administration for each athlete, the researchers set up the lab for testing. This included posting a “Quiet please – testing in progress” sign outside the lab door, collecting all materials for testing, sanitizing hands with soap and hot water, and preparing the computers. Each participant spent a total of 45-60 minutes in the lab for each measurement period (pre- and post-intervention). This began at the first session by completing an informed consent (Appendix A) and a demographic questionnaire (Appendix B). The participant was introduced to the application of the physiological electrodes using a script (Appendix F or G). After signing consent, research assistants began the process of applying the EEG cap and GSR patches. The participant was measured from inium to nasium in centimeters to determine height and width from the nasium for placing specific electrode pads for the FP1 and FP2 channels. Next, researchers used alcohol swabs to wipe the forehead, earlobes, and ring and index fingers to eliminate dead skin cells and other debris that may interfere with measurements. Electrode pads for FP1 and FP2 were placed. Gold ear clips were filled with conductive gel and attached to the left and right earlobes of the participant. A Velcro harness was strapped around the participant’s upper torso, starting over the sternum, looping under the armpits, and connecting at the rear deltoid area. The EEG cap was placed on the participant’s head, followed by the connection straps which secure the cap to the harness. Each electrode was filled with conductive gel using a dull syringe from Biopac. Next, the GSR patches were placed on the pad of left middle and ring fingers, just below the first knuckle from the fingertip. These patches were connected to the Biopac system, followed by the gold ear clips and EEG cap cable. The equipment was tested by having the participant relax for 10 seconds, clench their jaw for 5 seconds, blink their eyes 5 times, and relax again for 10 seconds. Irregularities in measurement were addressed before moving forward with the stimulus phases.

The stimulus was presented on a computer screen using Superlab software. The participant was seated in a comfortable chair facing the computer screen, approximately 250cm from the screen. This measurement session provided data points of mean power of the 10 EEG channels and GSR microsiemens (sweat) from the skin.

Confidentiality was maintained by meeting the participant in the neurocognitive lab of the graduate department for the physiological measures. The data for the recordings were kept on password protected computers and a password protected flash drive within a locked lab room. All participants were given an ID code used for all folders on the computers with data and all questionnaires.

Intervention (SFBT)

Solution-Focused Brief Therapy (SFBT) was used as a therapeutic intervention to increase resilience. It is a strengths-based client-led intervention which encourages clients to imagine their future and it helps the client identify solutions to problems and slowly work towards implementing steps toward creating solutions (de Shazer, 1991). Franklin et al. (2017) conducted a systematic review and meta-summary of the SFBT processes of change. They reviewed 102 studies and concluded that SFBT techniques have considerable support across studies with the technique of focusing on the strengths and resources of the client producing the most positive effects. In addition, the review indicated empirical support for linguistic collaboration (using the client's own words) as well as for helping clients co-construct meaning (Franklin et al. 2017).

In this investigation, the student athletes attended six hour-long sessions with an SFBT trained student therapist to address whatever topic the student athlete brought to sessions, with an emphasis on focusing on the athletes' strengths and helping them develop solutions to problems. Masters level student therapist engaged in a 2-hour SFBT training meeting (see Appendix I) with the supervising clinical psychologist before beginning treatment with the participant. The student therapists were supervised by a licensed psychologist and kept confidential records for their own use on TherapyNotes.com, a HIPAA compliant documentation service. Information from sessions were only discussed with the psychologist for supervision purposes. The week following the final session, the student athlete returned for a post session for repeated physiological and self-report measures. This occurred over a seven-week period of time. Following the second measurement session, the participants were debriefed and provided with further support (referral to university counseling) if needed.

Table 1 shows the overall study design as well as which instruments were administered to which group.

Table 1

Study Design and Measures

Measures	Athlete (Intervention)	Control
SAS-2	x	
CICS	x	
CD-RISC	x	x
Image Ratings (9 images = 3 neutral, 3 negative, 3 positive)	x	x
EEG (10 Channels measured)	x	x
HRV (RMSSD)	x	x
GSR	x	x

Note: x indicates the measure was administered to the group in both pre and post occasions.

Data Analysis

Descriptive results were reported for demographic information and all measures. A mixed methods MANOVA was computed with group status as an independent variable. EEG pre and post scores were treated as a repeated measures variable using EEG mean power RMSSD means as dependent variables. Because values for EEG data were extremely small, these values were multiplied by 10^7 to yield variables in the single digit decimal range for analyses.

Chapter 3

Results

Self-Report Measures

A repeated measures ANOVA with one between-subjects factor (treatment group) and one within-subjects factor (time) was conducted on the self-report measures (CD-RISC and image ratings) completed by both the intervention and control group to compare perceived levels of resilience, as well as reported levels of emotion prompted by test images over time and between groups. A paired samples *t*-test was conducted on the self-report measures which were completed by the intervention group (SAS-2 and CICS) to compare levels of anxiety and coping strategies over time.

Connor-Davidson Resilience Scale (CD-RISC)

This study's first hypothesis was that test scores on the CD-RISC would increase significantly for athletes post intervention. Test scores on the CD-RISC were analyzed for both groups pre and post intervention. Though athletes' mean score increased slightly post intervention, and the mean score of the control group decreased slightly from time one to time two, results showed no effects for group ($F_{(1, 24)}$ = .92; NS), time ($F_{(1, 24)}$ = .11; NS), or time by group interaction ($F_{(1, 24)}$ = .33, NS).

Coping Inventory for Competitive Sport (CICS)

The CICS weighs on three major factors: task-oriented coping, distraction-oriented coping, and disengagement-oriented coping. Hypothesis number two postulated that athletes' level of task-oriented coping would increase post-treatment as measured by the CICS. A paired samples t-test was conducted on total scores on the CICS. Total scores increased slightly but did not differ significantly from pre to post intervention; $t_{(12)} = -.321$, $p > .05$. In addition, task-oriented coping increased slightly from pre-intervention to post-intervention, but these results were not statistically significant; $t_{(12)} = -.154$, $p > .05$. Results for distraction-oriented $t(_{12}) = -1.44.$, $p > .05$, and disengagement-oriented coping $t(_{12}) = .81$, $p > .05$ were also not significant.

Sports Anxiety Scale-2 (SAS-2)

Hypothesis three stated that athletes' level of state anxiety will decrease post-treatment as measured by the SAS-2. Although total scores on the SAS-2 decreased slightly post intervention, they were not found to be significantly different when comparing pre to post intervention $t(_{13}) = 1.45$, $p > .05$. The SAS-2 assesses three major factors, somatic anxiety, worry, and concentration disruption. The factors of somatic anxiety $t(_{13}) = .40$, $p > .05$, worry $\mathrm{t}(_{13}) = 1.54$, $p > .05$, and concentration disruption $t(_{13}) = .163$, $p > .05$, were also analyzed using a pair-samples t-test and were not found to be statistically significant.

Self-Report Image Ratings

Hypothesis four stated that the intervention group of athletes will report higher levels of positive emotions while viewing stimuli during the post-intervention trial than the control group. Participants were shown 10 images depicting athletes in various athletic situations. Each image was shown for 30 seconds. After 30 seconds, the participant was asked to choose how that image made them feel on a scale of one to five. All participants were shown the same initial image of track athletes sprinting across a finish line. Self-report data for this image was not included in this data analysis as the first image was considered a "practice" image to help the participants orient to the study. Data analysis on the remaining nine images were conducted by separating the images into three groups of three images categorized by the emotional valence each card was intended to induce (i.e., neutral, negative, or positive emotions).

Results indicated there was a statistically significant difference in how both groups rated the images by valence ($F_{(2, 23)} = 96.89$; $p < .001$, partial eta squared = .894). These results are not surprising as it suggests the images evoked the emotions they were intended to evoke in participants, meaning positive images were rated much higher than negative images, with neutral images rated in the middle. Results indicated no other significant within-subject effects.

A significant between-subjects effect ($F_{(1,24)} = 4.83$, $p = .03$, partial eta squared = .168) was also found. These data show that athletes consistently rated positive, negative, and neutral images higher than controls in both pre and post intervention conditions. Though athletes' self-report ratings increased post intervention regardless of valence, these changes were not statistically significant.

In summary, differences were found between groups in their self-reported perceptions of the EEG stimuli as the athlete group tended to rate all images more positively than the control group did. Self-reported data showed no other significant main or interaction effects except that images used for the EEG procedure showed expected differences in their self-reported emotional significance for both groups. Figure 1 shows pre and post intervention self-report ratings summed by group.

Figure 1 shows the sum of each group's self-report ratings during Time 1 and Time 2. Table 1 summarizes the statistical data for all of the self-report measures.

Figure 1

Sum of Self-Report Ratings During Time 1 and Time 2

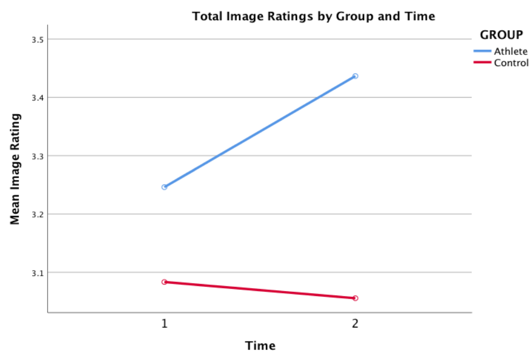


Table 2

Statistics for Self-Report Measures

Occasion	Mean-1/SD	Mean-2/SD	*t*@	Significance	$r_{1,2}$	Cohen's *d**	95% CI**
CDR (Athlete)	76.79/7.95	78.43/11.83	-.42	.672	.67	.162	-9.09/5.83
CDR (Control)	73.58/10.81	73.17/16.76	.07	.944	.84	.029	-10.87/11.69
Image Ratings (Athlete)	31.92/3.80	34.21/4.33	-1.48	.149	.39	.562	-5.30/.72
Image Ratings (Control)	30.58/4.14	29.91/2.96	.44	.658	.32	.186	-2.22/3.54
SAS-2 Total	28.21/7.01	26.93/6.80	1.45	.170	.88	.185	-.63/3.20
SAS-2 (Worry)	12.00/3.93	11.00/4.31	1.54	.146	.83	.242	-.39/2.39
SAS-2 (Distract)	6.85/2.17	6.78/1.92	.16	.873	.68	.034	-.87/1.01
SAS-2 (Somatic)	9.35/3.34	9.14/2.98	.40	.690	.81	.066	-.92/1.35
^CIC Total	117.92/14.10	119.23/16.61	-.32	.754	.55	.085	-10.18/7.50
^*CIC (Disengage)*	16.07/3.09	15.46/3.28	.81	.431	.63	.191	-1.03/2.26
^*CIC (Distract)*	16.92/4.57	18.38/4.80	-1.44	.174	.69	.319	-3.66/.74
^*CIC (Task)*	84.92/12.74	85.38/14.91	-.15	.881	.70	.033	-7.01/6.08

N = 14 for Athletes , N=12 for Controls

^N=13

EEG

Hypothesis five turns from self-report measures to physiological data and stated that post-intervention EEG mean powers will be different in specific brain regions related to emotions for the intervention group (e.g., left frontal, bi-lateral, temporal). To study this hypothesis, MANOVAs were used to examine for differences across occasions, emotional valence, by brain region (frontal, bi-lateral, temporal) and by left and right hemisphere channels; interactions among these also were examined. Each EEG channel has a letter to identify the lobe and a number to identify the hemisphere location. Even numbers refer to electrode positions on the right hemisphere. Odd numbers refer to electrode positions on the left hemisphere. The larger a number is, the farther away from the midline of the brain it is.

For each image a participant viewed, the following EEG data indicate activity levels in specific brain regions as participants imagined themselves experiencing the events portrayed and trying to evoke feelings of success and positivity, regardless of the emotional valence each image was intended to evoke (neutral, negative, positive).

FP1/FP2

The FP channels stand for frontopolar. These channels indicate mean activation in the prefrontal cortex. Channel FP1 measures activity in the left prefrontal cortex, while FP2 measures activity in the right prefrontal cortex. To examine these data, a mixed ANOVA with repeated measures factors was implemented with one between-subjects factor (treatment group) and three within subject factors of time (pre/post), channel (FP1 and FP2) and images (rest one, three neutral images, three negative images, three positive images, and rest two).

Main effects were found for channel ($F_{(1,24)} = 10.22$, $p = .004$, partial eta squared = .299) and image ($F_{(10,15)} = 2.55$, $p = .05$, partial eta squared = .630). A statistically significant two-way interaction was found between time and channel ($F_{(10,15)} = 4.42$, $p = .04$, partial eta squared = .156).

Results indicated a statistically significant three-way interaction between time, channel, and group ($F_{(1,24)} = 5.55$, $p = .02$, partial eta squared = .188). To further analyze the three-way interaction, EEG mean powers were separated by group and channel, and FP1 and FP2 means were totaled and averaged across images. These data indicate that in trial one controls started with more activation in their right prefrontal cortex (FP2) than athletes. Total mean power in FP2 decreased for controls during their second trial, while total mean power in the right hemisphere increased post-intervention for athletes. In addition, total mean power in the control group's left hemisphere (FP1) decreased on their second trial while for the athlete group total mean power in FP1 increased post-intervention.

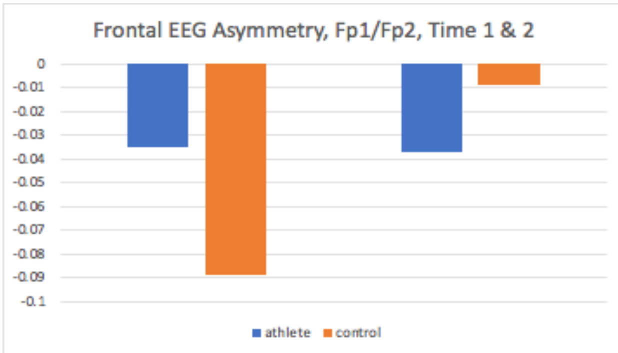
Another way to look at this is to calculate frontal EEG asymmetry on channels Fp1 and Fp2. This is calculated with the equation (right - left)/(right + left), whereas values < 0 indicate relatively greater left-sided activity, and > 0 indicate relatively greater right-sided activity (Papousek et al., 2017). The results are depicted in Figure 2.

The within-subjects main effect between images was analyzed by grouping images by valence (neutral, negative, and positive), and taking the total means of both groups, occasions, and all channels combined and comparing these with their total means by emotional valence.

Figure 3 shows the mean power for FP1 and FP2 by images grouped by valence. These results indicate that across both groups and times (Time 1 and Time 2) the prefrontal cortex was most activated while participants tried to mentally connect and visualize success with the negative images and least activated during the positive images, with the neutral images falling in between.

Figure 2

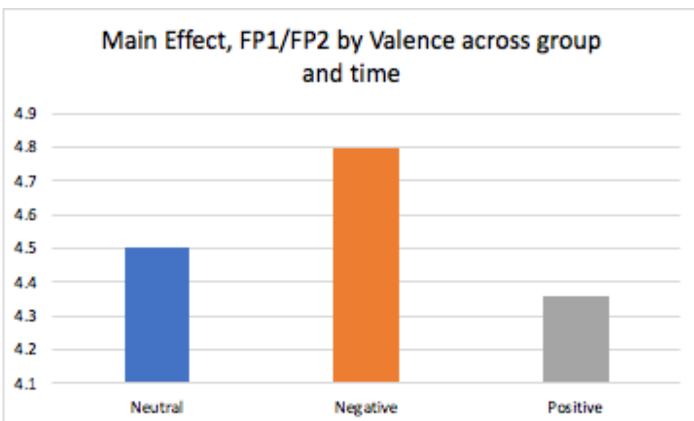
Frontal EEG Asymmetry, Fp1/Fp2, Time 1 & 2



Note. This graph shows pre and post EEG left/right asymmetry for channels Fp1 and Fp2. Lower numbers indicate more left frontal activation in Fp1 compared to right frontal activation in Fp2.

Figure 3

Main Effect, Fp1/Fp2 by valence across group and time



Note. This graph shows total activation in channels FP1 & FP2 in both groups and times separated by emotional valence.

F3/F4/F7/F8

These channels measure mean activity in the frontal lobe. Channels F3 and F4 are located above the middle frontal gyrus (mid-frontal), while channels F7 and F8 have a more lateral posterior frontal location (mid-lateral). These areas are often an indication of impulse control, with F8 in particular associated with emotional regulation. To study effect in these regions, a mixed ANOVA with repeated measures factors was implemented with one between-subjects factor (treatment group) and three within-subject factors of time (pre/post), channel (F3/F4/F7/F8) and images.

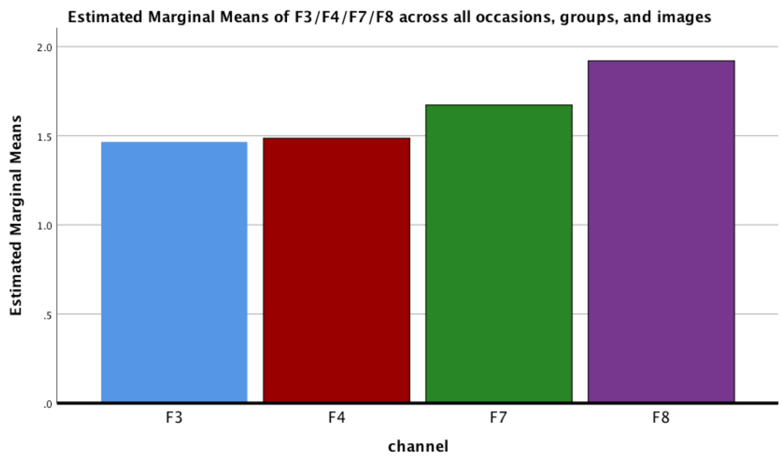
Data indicated a main effect for channel ($F_{(3,22)} = 2.97$, $p = .05$, partial eta squared = .289), and a main within subjects effect for channel ($F_{(3,22)} = 6.50$, $p = .001$, partial eta squared = .213). Figure 3.4 shows the combined mean power of each channel across all images, groups, and occasions with F8 showing the most overall activation and F3 showing the least overall activation. The data indicate more overall activation in the mid-lateral areas than the mid-frontal areas.

T3/T4/T5/T6

These channels are located in the temporal lobe. Channels T3 and T4 are located more in the medial temporal lobe, and are associated with the hippocampus and parahippocampal gyrus, the main emotional and memory structures. Channels T3 and T4 are associated with different functions, the left side is associated with declarative memory, and right side is associated with emotions. Channels T5 and T6 are located in the postural temporal lobe.

Figure 4

Estimated Marginal Means of F3/F4/F7/F8 across all occasions, groups, and images



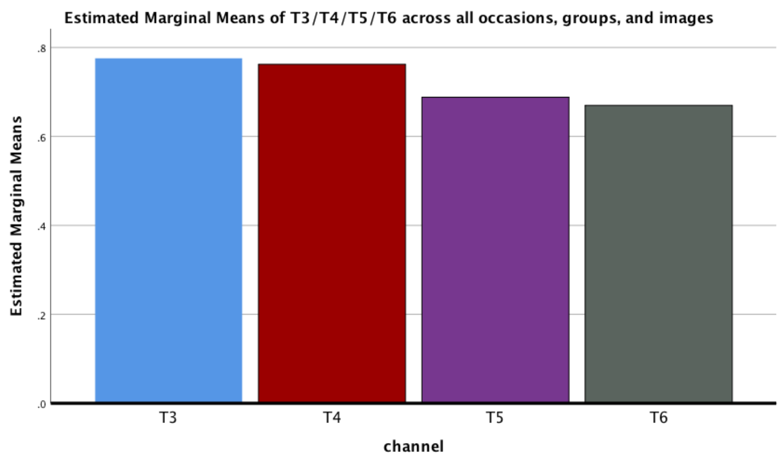
Note. Figure 4 depicts total EEG activation in channels F3/F4/F7/F8 for both groups, occasions, and images

To study these data, a mixed ANOVA with repeated measures factors was implemented with one between subjects factor (treatment group) and three within subject factors of time (pre/post), channel (T3/T4/T5/T6) and images. Results indicated two different main effects, which consisted of one within-subjects main effect of channel ($F_{(3,22)} = 6.45$, $p = .003$, partial eta squared = .468), and one between-subjects effect ($F_{(1,24)} = 6.04$, $p = .02$, partial eta squared = .201).

Figure 5 shows the main effect of channel as indicated by the estimated marginal means of each channel across all occasions, groups, and images.

Figure 5

Estimated Marginal Means of T3/T4/T5/T6 across all occasions, groups, and images



Note. Figure 5 shows the total activation in EEG channels T3/T4/T5/T6 across all occasions, groups, and images.

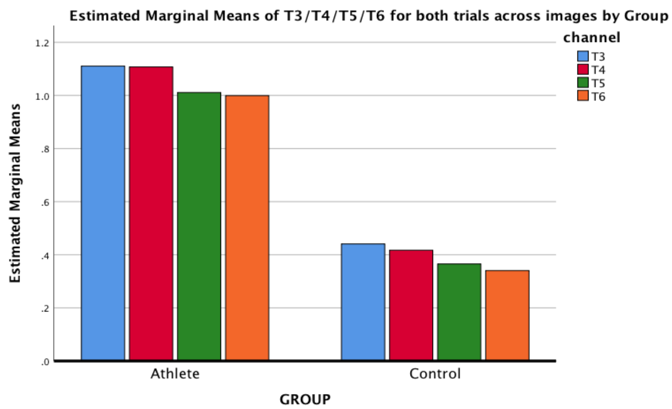
Figure 6 shows the between-groups effect between athletes and controls and indicated that athletes showed significantly more activation in all temporal lobe channels than did the controls.

Heart Rate Variability

Hypothesis six stated that athletes will have more activation of the parasympathetic nervous system following six weeks of solution-focused therapy, as indicated by heart rate variability (HRV). This is measured by the post square root of the mean standard deviation (RMSSD). Heart rate variability is a way to assess each participant's stress activation and level of physiological coping to each image. Higher HRV scores often indicate lower stress levels and greater ability to cope with stressors.

Figure 6

Estimated Marginal Means of T3/T4/T5/T6 for both trials across images by group



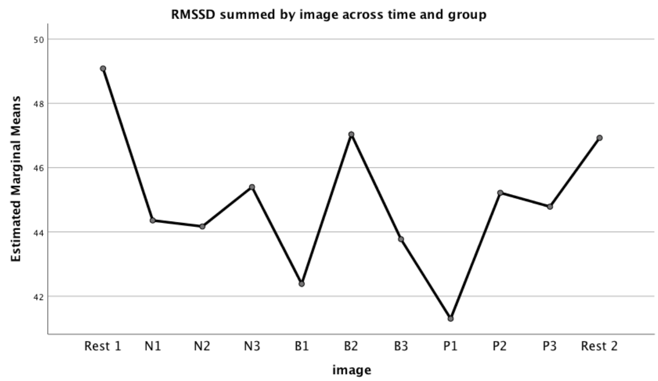
Note. Figure 6 shows total activation in T3/T4/T5/T6 for both trials separated by group

To study this hypothesis, the RMSSD mean of each image was analyzed using a mixed ANOVA with repeated measures factors with one between subject's factor (treatment group) and two within subject factors of time (pre/post), and image. Results showed a main effect for image ($F_{(10,15)}$ = 4.64, p = .004, partial eta squared = .756) and a main within-subjects effect for images ($F_{(10,24)}$ = 2.021, p = .032, partial eta squared = .078). This is shown in Figure 3.7 and shows the variety of RMSSD output by image. No obvious patterns emerged by grouping images by valence, other than the neutral images had the least variability.

There was also an interaction of image by group ($F_{(10,15)}$ = 3.07, p = .025, partial eta squared = .672), depicted in Figure 8. Indicating that reactions to images differed by group. This figure also shows less overall variability in the control group between images.

Figure 7

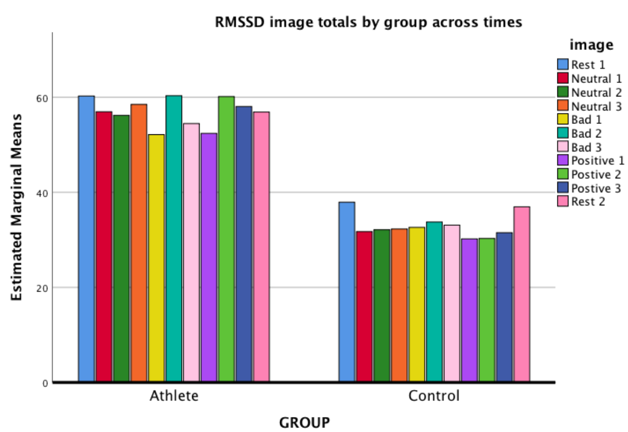
RMSSD summed by image across time and group



Note. Figure 7 shows RMSSD mean output for both groups by image.

Figure 8

RMSSD image totals by group across times

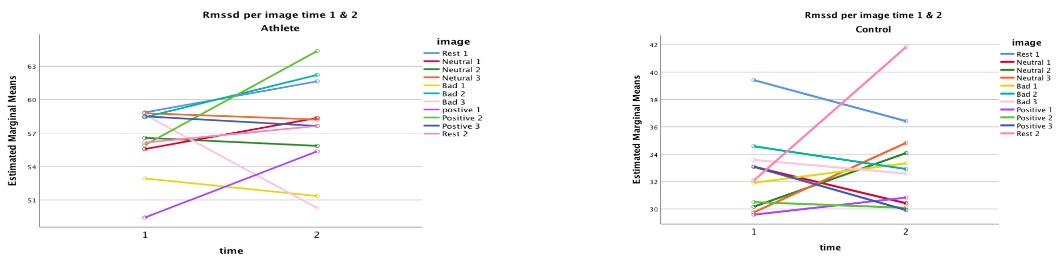


Note. Figure 8 shows RMSSD totals for time 1 & 2 by group and image.

In addition, RMSSD data indicated an interaction of time by image by group ($F_{(10,15)}$ = 3.09, p = .024, partial eta squared = .673) depicted in Figure 9.

Figure 9

RMSSD per image time 1 & 2 for athletes and controls

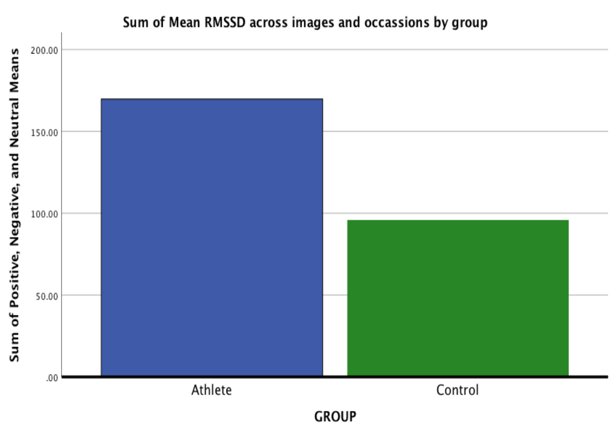


Note. Figure 9 shows RMSSD time 1 & 2 mean output by group and image

Finally a main between subjects effect for groups was found ($F_{(1,24)}$ = 7.61, p = .011, partial eta squared = .241). This difference is illustrated in Figure 10.

Figure 10

Sum of Mean RMSSD across images and occasions by group



Note. Figure 10 shows the sum of RMSSD activation by group across images and occasions.

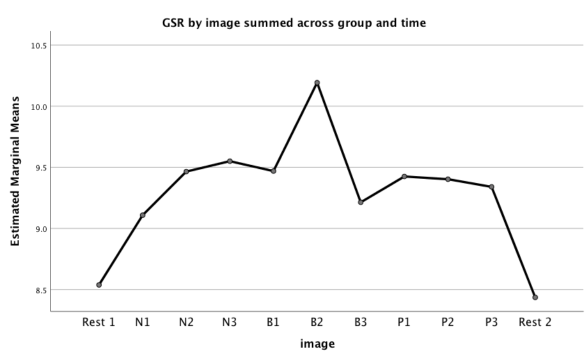
Galvanic Skin Response

Galvanic skin response (GSR) or electrodermal activity (EDA) is an indication of the amount of sweat secretion from sweat glands in skin. When exposed to emotional content, the mean value of the GSR is related to the level of arousal experienced by participants. For this study, data were collected analyzing each participant's minimum, maximum, and mean GSR reading for each image they were presented. To test GSR changes in this study, GSR mean scores were analyzed using a mixed ANOVA with repeated measures factors with one between-subjects factor (treatment group) and two within-subject factors of time (pre/post), and image.

A significant one way interaction was found for image ($F_{(1,10)} = 7.69$, $p < .01$, partial eta squared = .243) indicating that different images evoked different emotional responses in participants. Specifically, image B2, which shows a person clinging by their hands to the edge of a cliff, evoked the highest reading and the two rest periods showed the least activation, as shown in Figure 11.

Figure 11

GSR by image summed across group and time

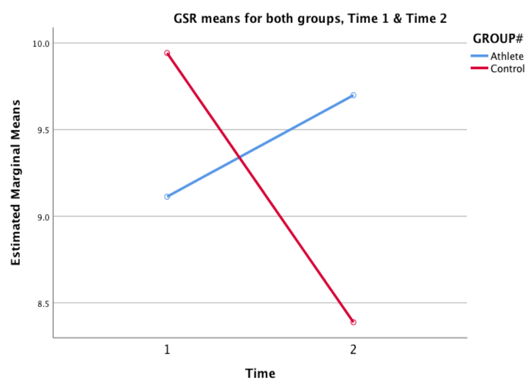


Note. Figure 11 shows mean GSR output by image across both groups and times.

There were no other main effects for GSR. Controls started with higher GSR readings during time one which decreased during time two; athletes started with lower overall readings during time one, and increased on time two, however, these differences were not statistically significant. These differences are illustrated by Figure 12.

Figure 12

GSR means for both groups, Time 1 & Time 2



Note. Figure 12 shows the total mean GSR activation for each group for time 1 & 2.

Chapter 4

Discussion

In summary, self-report results showed no difference between athletes and controls, no changes over time, and no interactions for resilience on the CD-RISC. Athletes showed no changes in task-oriented coping on the CICS or on sports anxiety on the SAS-2 from Time 1 to Time 2. However, both athletes and controls rated the emotional valence of the three sets of stimuli used with the EEG differently; this effect was large, indicating that the emotional impact of the images was as intended. In addition, a small interaction effect was found as athletes tended to rate all the images more favorably than controls.

A summary of biological data as measured by EEG and GSR indicated that athletes' levels of activation on these measures remained relatively stable from Time 1 to Time 2, while the control group's levels of activation decreased. This was evidenced by a statistically significant Time 2 decrease in left-lateralized frontopolar activation in the control group as well as significant decreases in GSR output during Time 2. Though GSR levels for controls decreased during Time 2, these decreases were not statistically significant. Heart rate variability data indicated the most significant intervention effect in that HRV output from Time 1 to Time 2 differed greatly for both groups depending on image. Finally, data showed that athletes had significantly higher HRV levels than controls, as well as significantly more temporal lobe activation throughout trials.

The ability to attend to and appraise situations in a positive manner is one important factor contributing to resilience. Solution-focused brief therapy is an intervention intended to improve a person's ability to identify and focus on positive outcomes and solutions to problems. This study provides insight into what happens neurobiologically when participants intentionally try to appraise emotionally salient imagery by increasing their positive thoughts and feelings toward each image, and whether SFBT has any effect on their ability to do so.

Among all outcomes measured, the strongest indication of intervention effects occurred by analyzing EEG data in the prefrontal cortex as measured by frontal asymmetry in the frontopolar channels. More left lateralized activation is associated with the ability to control emotional responses, which leads to more cognitive flexibility and better adaptive responses to emotionally challenging events (Davidson, 1998; Harmon-Jones et al., 2010). Those in the athlete group maintained, and slightly increased, relative left frontal asymmetry, indicating an ability to connect with, and cognitively appraise stimuli in a more positive manner regardless of the emotional content of the stimuli. On the other hand, the control group decreased their ability to positively appraise stimuli from Time 1 to Time 2.

This could indicate that the control group lost interest in the test stimuli during their second exposure or that the athletic images did not resonate with the control group. However, if anything, EEG results in trial one indicated that the images resonated *more* with the control group than with the athletes as measured by larger relative left frontal asymmetry. Anecdotally, there were no apparent signs that the control group lost interest in the study during the second trial as many participants seemed outwardly engaged and frequently asked questions about the research, with several participants asking if they could view their EEG readings.

Another explanation for these results may be that, apart from image specific HRV, although the intervention did not show statistically significant increases in any area of measurement, SFBT may help contribute to resilience as athletes were able to maintain, or even slightly improve their ability to positively appraise stimuli, whereas the control group was not. An ability to maintain previous levels of functioning after experiencing a stressor is an indication of resilience.

Results in Trial 1 of this study indicated there was overall greater left-lateralized activation in the frontopolar channels across all images and groups with the exception of image B1, which showed a baseball player getting hit in the face with a baseball. For this image, athletes showed greater right-lateralized activation in the prefrontal cortex. The control group did not show this same right-lateralized activation. This may indicate that this specific image resonated more deeply with the athletes than with the controls. The athletes may also be more keenly aware of the pain involved.

Trial 1 data for both groups also indicated overall greater activation in the frontopolar (Fp1, Fp2) areas compared to other areas of the brain, followed by activation in the ventrolateral prefrontal cortex as measured by channels F7 & F8. These data are in line with previous research, which indicates that reappraisal activates cognitive control regions and involves the use of cognitive control to develop semantic representations of an emotional stimulus (Buhle et al., 2014).

Though EEG channels in the ventrolateral prefrontal cortex (F7 & F8) were not as activated as those in the frontopolar area, they did provide interesting data as both groups exhibited overall greater right-lateralization in both trials. It may be unclear as to what this means, however, research into the revised Behavioral Inhibition System (r-BIS) may provide insight (Gable et al., 2018).

Briefly, research into EEG asymmetry often discriminates between approach and withdrawal tendencies. Approach tendencies are strongly correlated with the Behavioral

Activation System (BAS) and increased relative left frontal activity, while withdrawal tendencies were originally associated with the Behavioral Inhibition System (BIS; Coan & Allen, 2003; Harmon-Jones & Allen, 1997). However, the relationship between the BIS and relative right frontal activity has not been well-established (Coan & Allen, 2004). As such, a more recent revised-BIS (r-BIS) was developed expanding the concept of withdrawal to include self-control and emotional regulation (Gray & McNaughton, 2000). These recent studies of r-BIS have linked increased relative right frontal activity with effortful control, inhibition, attentional focus, and conflict monitoring (Gable et al., 2018).

For the present study, increased relative right activation in the ventrolateral prefrontal cortex may indicate increased attentional focus on the visual stimuli which were presented to them, as well as increased behavioral inhibition. For example, participants were asked to increase their levels of connection with an image depicting an action event, such as running or celebrating with teammates, yet these participants were also instructed to try not to move during the experiment. This result might provide an indication that participants were engaged by attending to the visual stimuli and exerting cognitive control by focusing their emotional efforts on trying to up-regulate positive emotions while inhibiting movements.

Other findings included the differences in EEG activation based on the valence of the stimuli. For this study, the prefrontal cortex was more activated while viewing negative stimuli across both groups, and was less activated while viewing the positive stimuli, and neutral stimuli fell in the middle. This indicated that participants were more likely closely attending to negative stimuli. It may also be that it requires more cognitive effort to reappraise a negative situation into something positive than it does to increase positive feelings towards a positive stimulus. These data are in line with previous research which found a bias for increased attention toward negatively valenced stimuli, which may be associated with threat, and a bias away from positively valenced stimuli compared to neutral stimuli (Chick et al., 2020).

Finally, though the channels which measured activity in the temporal lobe were activated the least for both groups, the athlete group showed significantly more activation in this area for both trials that the control group did. Temporal lobe functions are related to memory and emotional management due to their proximity to the amygdala and hippocampus. Temporal lobe activity has also been associated with observation of motion (Puce et al., 2003). As stated previously, this may indicate that the sporting images triggered more memory and emotional processes with the athlete group than the control group. As such, it may be that the athletes were better able to connect with, and imagine themselves experiencing the situations depicted by the sporting images.

HRV and GSR

Both HRV and GSR showed main effects for images indicating that different images evoked different emotional respondents in both groups. When these images were grouped together by valence, there were no statistically significant difference by valence for either measure. Although both HRV and GSR varied across images (images were not all experienced as equally positive or negative), they did not consistently differ by valence.

Both HRV (as measured by RMSSD) and GSR data from Time 1 to Time 2 followed similar patterns revealed by other measures in this study in that HRV and GSR readings improved slightly in athletes and decreased quite a bit in the controls, although differences in overall HRV and GSR output did not meet statistical significance, HRV showed a medium intervention effect from looking at how the groups responded to specific images from Time 1 to Time 2.

In addition, there were several other statistically significant findings regarding HRV. Upon a closer look at this data, it is difficult to identify a clear pattern. Comparing differences in images between groups from Time 1 to Time 2 showed that the groups' reactions were only aligned on 4 out of 11 images. The rest of the time, if one group's Time 2 readings increased, the other's decreased, and vice versa.

These findings may signify what has already been alluded to as a limitation in this study; the fact that the control group did not consist of current athletes likely played an important role in their ability to connect with the athletic images at the same level as the athlete group. Results may have been different had the groups been more similar at the start, or possibly if well tested non-athletic pictures, such as images from the International Affective Picture System, had been used as test stimuli.

Taking this further, the fact that HRV produced no statistically significant effects other than between group differences when grouped by valence, yet produced an abundance of significant results when the images are analyzed individually, is interesting. This likely indicates the subjective nature of each image, regardless of valence, as images likely evoked more personal meaning for some participants than others. Future research may find more consistent results by making the images as personal to each participant as possible, by either asking them to provide meaningful images to use as test stimuli, or, if studying athletes, possibly matching images by sport participants.

An interesting finding, which is very much in line with past research, is the large between groups difference in HRV. Athletes consistently had higher HRV readings which they maintained and slightly increased for time two. Heart rate variability has shown to not only be an important measure of cardiovascular health, it is also a measure of the balance between sympathetic and parasympathetic systems (Thayer & Lane, 2007). An efficient cardiovascular system can respond rapidly to a stressor by activating the sympathetic nervous system, and then it can also quickly return to a resting state through the activation of the parasympathetic nervous system. Higher HRV readings are associated with greater ability to manage stressors (Korobeynikov et al., 2018).

For this study, though the amount of physical activity for groups was not measured, it might be assumed that the athlete group participated more extensively in exercise. Exercise differences likely contributed to higher HRV scores.

Self-Report Measures

Though athletes served as the main focus of this study, the SFBT intervention was not focused directly on athletic performance enhancement; however, the SAS-2 and CICS served as self-report measures which may be correlated with performance enhancement (Smith et al., 2006; Gaudreau & Blondin, 2002). It is interesting to note that although these measures did not improve at a statistically significant level, they did improve slightly for athletes after the intervention. The lack of statistical significance may be due to the sensitivity of the measures, the small sample size, the duration/dosage of the treatment, or the fact that the intervention was not designed to specifically alter the athlete's level of sport-specific anxiety or specific ways they cope in competition. Rather, these measures were intended to measure whether there were indirect sport specific effects of the intervention. Even if these student athletes were not focusing on sport-specific situations, they still showed a trend toward improvements on the sport-specific self-report measures SAS-2 and the CICS.

Results also indicated that compared to the control group, athletes rated all of the images in this study much more positively, regardless of the emotional valence of the image. This may be due to the fact that all of the test stimuli were pictures of people engaging in various athletic situations, which likely registered more positively for athletes than the control group in general. However, it should be noted that 67% of the control group reported that they played sports in high school; two stated they had previously participated in college athletics. As such, it is also likely that these sporting images resonated with many in the control group. Another possibility is that the athletes in this sample had a generally more positive attitude. Indeed, research has shown that increased HRV is associated with decreased negativity bias and increased willingness to approach novel positive stimuli (Shook et al., 2007). Regardless, athletes indicated overall more positive subjective feelings than controls.

Overall, from Time 1 to Time 2 the pattern of responses indicated a difference between groups. Though not meeting significance, on all self-report measures, the SAS-2, the CICS, the CD-RISC, and the self-report image ratings, athletes' scores improved slightly, while scores for controls on self-report measures decreased slightly.

Conclusion

In the two years since the beginning of this study until its completion, there has been growing emphasis on decreasing stigma associated with mental health and athletes (Affleck, 2019). This has led to recent NCAA legislation mandating increased mental health resources to collegiate student athletes, with more and more professional athletes sharing their mental health struggles as well (Mental Health, 2019). This study is timely as it provides insight into how one type of therapy, SFBT, can be an effective means of helping student athletes increase their levels of resilience when faced with adversity, thus promoting positive mental health.

Historically, some of the factors contributing towards the stigma of athletes seeking out mental health services has stemmed from beliefs that it will be perceived as a sign of weakness, or that it may do more harm than good (Breslin et al., 2019). This study indicates just the opposite, as SFBT seemed to be correlated with, at best, increased levels of resilience, and, at worst, slight increases in functioning and self-report measures which did not meet statistical significance and showed small effects. Either way, there was no evidence of decreases in functioning in any measure after SFBT intervention. This was not the case with the control group. Overall, results of this study very much fall in line with the definition of resilience previously mentioned, which notes that improvements in functioning may occur but are not a pre-requisite to resilience, as return to previous performance after adversity also signifies resilience (Bolton et al., 2017).

Results indicated that SFBT was associated with increased coping at the neurobiological level as measured by HRV and left lateralized prefrontal activation. However, the most consistent finding in this study was that SFBT likely proved to be a "sustaining" factor towards maintaining healthy coping. Indeed, the heart of SFBT is not about giving something to clients they do not have, it is about identifying and supporting the strengths they already possess. As such, the participants in this study were relatively healthy college students. Results for SFBT seemed to correlate with helping those students maintain their mental health and cope with adversity throughout their academic semester, while those who did not receive the intervention did not maintain their same levels of functioning.

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Appendix A

Participant Informed Consent

Effect of Solution Focused Therapy on Resilience in Athletes: An EEG Study

I understand that the general purposes of the research are to explore changes that happen with brain waves and resilience and performance changes after 4-6 sessions of solution focused therapy. I understand that I will have an EEG recorded twice. The approximate total time of my involvement will be 6-8 hours (total) over a 6-7 week period. This will be scheduled in ways that will not interfere with the season for my sport.

I understand that my permission is voluntary, and that I can discontinue at any time without penalty or loss of benefits to which I am otherwise entitled. I understand that I will be wearing a cap with electrodes and will have electrodes applied to two fingers, my ear lobes, and my shoulder, and side with a gentle adhesive gel. Gel will be applied to my hair. I will also wear a chest strap (used to hold the cap on tight).

I understand that if I have questions the principle researcher, Lori Napier, or her supervisor, Glena Andrews, PhD, are also available for consultation. Lori can be contacted at lnapier50@gmail.com

All the data gathered from my recordings and my performance will be kept confidential. No notes will be shared from the solution focused therapy sessions. Confidentiality of research results will be maintained by the researcher. Your coach will not be notified of your participation in this study.

A risk of the study is that it can be difficult to remove the gel that is applied to the scalp during the EEG testing. Another potential risk of the study is that you may experience stress viewing sporting images during the EEG procedure.

The potential benefits of the research study are an improved understanding of methods of mental training that will improve the student athlete's ability to bounce back from adversity.

____ ______________

Signature of Participant Date

____

Sport

Please sign one and return it to the researcher.

Questions and comments may be addressed to Glena L. Andrews, Ph.D. Graduate Department of Clinical Psychology, George Fox University, 414 N Meridian St. Newberg, OR, 503-554-2386, gandrews@georgefox.edu

Appendix B

Effect of SFBT on Resilience in Athletes: A Physiological Study

Demographics

Please read the following items and answer as completely as possible.

1. What is your gender?
2. What is your age: ___________________
3. What best describes your ethnicity? ________________________
4. Are you playing a sport at GFU? (If no, skip to q. 10)
5. If yes, which sport?
6. What is your position?____
7. Are you also involved in a second sport at GFU? YES NO
8. If yes, which sport?____
9. Name one skill or statistic in your primary sport that you would like to improve.
10. Did you participate in high school or club sports?
11. Are you a current, or former, member of the military?

Appendix C

Anxiety Measures

Sports Anxiety Scale 2 (Smith, Smoll, Cumming, & Grossbard, 2006).

REACTIONS TO PLAYING SPORTS

Many athletes get tense or nervous before or during games, meets or matches. This happens even to pro athletes. Please read each question. Then, circle the number that says how you USUALLY feel before or while you compete in sports. There are no right or wrong answers. Please be as truthful as you can.

	Before or while I compete in sports:	Not At All	A Little Bit	Pretty Much	Very Much
1.	It is hard to concentrate on the game.	1	2	3	4
2.	My body feels tense.	1	2	3	4
3.	I worry that I will not play well.	1	2	3	4
4.	It is hard for me to focus on what I am supposed to do.	1	2	3	4
5.	I worry that I will let others down.	1	2	3	4
	Before or while I compete in sports:	Not At All	A Little Bit	Pretty Much	Very Much
6.	I feel tense in my stomach.	1	2	3	4
7.	I lose focus on the game.	1	2	3	4
8.	I worry that I will not play my best.	1	2	3	4
9.	I worry that I will play badly.	1	2	3	4
10.	My muscles feel shaky.	1	2	3	4
	Before or while I compete in sports:	Not At All	A Little Bit	Pretty Much	Very Much
11.	I worry that I will mess up during the game.	1	2	3	4
12.	My stomach feels upset.	1	2	3	4
13.	I cannot think clearly during the game.	1	2	3	4
14.	My muscles feel tight because I am nervous.	1	2	3	4
15.	I have a hard time focusing on what my coach tells me to do.	1	2	3	4

Scoring Key. Somatic: Items 2, 6, 10, 12, 14; Worry: Items 3, 5, 8, 9, 11; Concentration Disruption: Items 1, 4, 7, 13, 15.

Appendix D

Connor-Davidson Resilience Scale 25

Connor & Davidson (2003).

Connor-Davidson Resilience Scale 25 (CD-RISC-25) ©

For each item, please mark an "x" in the box below that best indicates how much you agree with the following statements as they apply to you over the last <u>month</u>. If a particular situation has not occurred recently, answer according to how you think you would have felt.

	not true at all (0)	rarely true (1)	sometimes true (2)	often true (3)	true nearly all the time (4)
1. I am able to adapt when changes occur.	☐	☐	☐	☐	☐
2. I have at least one close and secure relationship that helps me when I am stressed.	☐	☐	☐	☐	☐
3. When there are no clear solutions to my problems, sometimes fate or God can help.	☐	☐	☐	☐	☐
4. I can deal with whatever comes my way.	☐	☐	☐	☐	☐
5. Past successes give me confidence in dealing with new challenges and difficulties.	☐	☐	☐	☐	☐
6. I try to see the humorous side of things when I am faced with problems.	☐	☐	☐	☐	☐
7. Having to cope with stress can make me stronger.	☐	☐	☐	☐	☐
8. I tend to bounce back after illness, injury, or other hardships.	☐	☐	☐	☐	☐
9. Good or bad, I believe that most things happen for a reason.	☐	☐	☐	☐	☐
10. I give my best effort no matter what the outcome may be.	☐	☐	☐	☐	☐
11. I believe I can achieve my goals, even if there are obstacles.	☐	☐	☐	☐	☐
12. Even when things look hopeless, I don't give up.	☐	☐	☐	☐	☐
13. During times of stress/crisis, I know where to turn for help.	☐	☐	☐	☐	☐
14. Under pressure, I stay focused and think clearly.	☐	☐	☐	☐	☐
15. I prefer to take the lead in solving problems rather than letting others make all the decisions.	☐	☐	☐	☐	☐
16. I am not easily discouraged by failure.	☐	☐	☐	☐	☐
17. I think of myself as a strong person when dealing with life's challenges and difficulties.	☐	☐	☐	☐	☐
18. I can make unpopular or difficult decisions that affect other people, if it is necessary.	☐	☐	☐	☐	☐
19. I am able to handle unpleasant or painful feelings like sadness, fear, and anger.	☐	☐	☐	☐	☐
20. In dealing with life's problems, sometimes you have to act on a hunch without knowing why.	☐	☐	☐	☐	☐
21. I have a strong sense of purpose in life.	☐	☐	☐	☐	☐
22. I feel in control of my life.	☐	☐	☐	☐	☐
23. I like challenges.	☐	☐	☐	☐	☐
24. I work to attain my goals no matter what roadblocks I encounter along the way.	☐	☐	☐	☐	☐
25. I take pride in my achievements.	☐	☐	☐	☐	☐
Add up your score for each column	0	+ ____	+ ____	+ ____	+ ____

Add each of the column totals to obtain CD-RISC score = ____________________

Appendix E

CICS

Pre-Instructions

This questionnaire contains 39 items. Each of the items represents things that athletes can do or think during a sports competition. For each item, you must indicate the extent to which it corresponds to what you typically or generally do during your competitions. Circle the answers that best correspond to what you generally do during competition. Don't spend too much time on each item. Your answers must be spontaneous and sincere. There are no right or wrong answers. We are interested in what you **generally do during competition** when you participate in your sport.

(Post-Instructions - For each item, indicate the extent to which it corresponds to what you have done in competition in the past 6 weeks.)

1 Does not correspond at all to what I do or think
2 Corresponds a little to what I do or think
3 Corresponds moderately to what I do or think
4 Corresponds strongly to what I do or think
5 Corresponds very strongly to what I do or think

	Not at all	A Little	Moderately	Strongly	Very Strongly
1) I visualize that I am in total control of the situation ……………………………………	1	2	3	4	5
2) I use swear-words loudly or in my head in order to expel my anger …………...………	1	2	3	4	5
3) I distance myself from other athletes ………………………………………...………	1	2	3	4	5
4) I commit myself by giving a consistent effort ………………………………………….	1	2	3	4	5
5) I occupy my mind in order to think about other things than the competition ……….….	1	2	3	4	5
6) I try to interpret the situation in a positive manner ……………………………………..	1	2	3	4	5
7) I ask someone for advice concerning my mental preparation ……………………...…..	1	2	3	4	5
8) I try to relax my body ………………………………………………………………………..	1	2	3	4	5
9) I analyze my past performances ………………………………………………………..	1	2	3	4	5
10) I lose all hope of attaining my goal ……………………………………………………	1	2	3	4	5

11) I mentally rehearse the execution of my movements ………………………………….	1	2	3	4	5
12) I get angry ……………………………………………………………………………...	1	2	3	4	5
13) I retreat to a place where it is easy to think ……………………………………………	1	2	3	4	5
14) I give a relentless effort ………………………………………………………………..	1	2	3	4	5
15) I think about my favorite leisure in order not to think about the competition …………	1	2	3	4	5
16) I try to get rid of my doubts by thinking positively ……………………………………	1	2	3	4	5
17) I ask other athletes for advice ……………………………………………………….	1	2	3	4	5
18) I try to reduce the tension in my muscles ……………………………………………...	1	2	3	4	5
19) I analyze the weaknesses of my opponents ……………………………………………	1	2	3	4	5
20) I let myself feel hopeless and discouraged …………………………………………….	1	2	3	4	5
21) I visualize myself doing a good performance ……………………………………….	1	2	3	4	5
22) I express my discontent ………………………………………………………………..	1	2	3	4	5
23) I keep all people at a distance ……………………………………………………….	1	2	3	4	5
24) I give my best effort ………………………………………………………………………	1	2	3	4	5
25) I entertain myself in order not to think about the competition ………………………...	1	2	3	4	5
26) I replace my negative thoughts with positive ones …………………………………….	1	2	3	4	5
27) I talk to a trustworthy person ………………………………………………………..	1	2	3	4	5
28) I do some relaxation exercises …………………………………………………………	1	2	3	4	5
29) I think about possible solutions in order to manage the situation ……………………..	1	2	3	4	5

30) I wish that the competition would end immediately …………………………………..	1	2	3	4	5
31) I visualize my all-time best performance ………………………………………………	1	2	3	4	5
32) I express my frustrations ……………………………………………………………….	1	2	3	4	5
33) I search for calmness and quietness ……………………………………………………	1	2	3	4	5
34) I try not to think about my mistakes …………………………………………………..	1	2	3	4	5
35) I talk to someone who is able to motivate me …………………………………………	1	2	3	4	5
36) I relax my muscles ………………………………………………………………………..	1	2	3	4	5
37) I analyze the demands of the competition ……………………………………………..	1	2	3	4	5
38) I doubt my ability to attain my goal ……………………………………………………	1	2	3	4	5
39) I think about my family or about my friends to distract myself ……………………….	1	2	3	4	5

Appendix F

Script Read at the Beginning of Study

(Intervention Group)

Thank you for volunteering for this project. We appreciate your willingness and your time. Before we begin with the EEG measurements I want to review the protocol and I will ask you to sign a consent form.

There are three phases to this research. The first is today. You will be fitted with an electrode cap. It looks like a swim cap with spots. This will fit tightly on your head and be secured with a chest band. They are both snug but are not designed to be painful. We have two sizes for the cap and can adjust as we need to. You will be asked to apply an ECG electrode to your left side and near your right shoulder. You will be allowed to do this in a private room with a mirror for placement. You will also have two electrodes on your left hand. The task today is to view a series of sport images while we record your brain waves. Today will take about 45 minutes.

The second phase is to meet with _________ (sports therapist), student counselor for 4-6 sessions of solution focused brief therapy. These are private sessions done in an available room on campus. They will be scheduled about 1 time/week at your convenience. During these sessions _______ (sports therapist) will discuss any topic you wish to discuss with the intent of helping you identify and implement solutions to problems as well as emphasize and help you reinforce what is already going well for you. The first session will be more like an interview so that they can get to know you as an athlete. We would like to have at least 4 sessions but would like to reserve time for a total of 6 if your schedule allows.

The final phase is redoing the EEG recording following your final session with your sport therapist.

It is important for you to know that this is voluntary. Your coach will not be informed by us of your participation. You can withdraw at any point if this becomes uncomfortable. We do not anticipate any negative effects of this study.

If you are willing, please read the consent form and sign it where indicated. Please let me know if you have any questions.

Appendix G

Script Read at the Beginning of Study

(Control Group)

Thank you for volunteering for this project. We appreciate your willingness and your time. Before we begin with the EEG measurements I want to review the protocol and I will ask you to sign a consent form.

There are two phases to this research. The first is today. You will be fitted with an electrode cap. It looks like a swim cap with spots. This will fit tightly on your head and be secured with a chest band. They are both snug but are not designed to be painful. We have two sizes for the cap and can adjust as we need to. You will be asked to apply an ECG electrode to your left side and near your right shoulder. You will be allowed to do this in a private room with a mirror for placement. You will also have two electrodes on your left hand. The task today is to view a series of sport images while we record your brain waves. Today will take about 45 minutes.

The second phase is redoing the EEG recording in approximately six weeks.

It is important for you to know that this is voluntary. You can withdraw at any point if this becomes uncomfortable. We do not anticipate any negative effects of this study.

If you are willing, please read the consent form and sign it where indicated. Please let me know if you have any questions.

Appendix H

Event Record Form

Initials of Participant: ____________ Name of Evaluator: ________________________________

Date: _____________

Time:_____________

Calibration

Note any abnormalities or technical issues:

Rest 1

Beginning time (seconds) of Acqknowledge:_____________

End time of Acqknowledge:_____________

Note any abnormalities or technical issues:

Image 1

Beginning time (seconds) of Acqknowledge:_____________

End time of Acqknowledge:_____________

Note any abnormalities or technical issues:

Image 2

Beginning time (seconds) of Acqknowledge:_____________

End time of Acqknowledge:_____________

Note any abnormalities or technical issues:

Image 3

Beginning time (seconds) of Acqknowledge:_____________

End time of Acqknowledge:_____________

Note any abnormalities or technical issues:

Image 4

Beginning time (seconds) of Acqknowledge:______________

End time of Acqknowledge:______________

Note any abnormalities or technical issues:

Image 5

Beginning time (seconds) of Acqknowledge:______________

End time of Acqknowledge:______________

Note any abnormalities or technical issues:

Image 6

Beginning time (seconds) of Acqknowledge:______________

End time of Acqknowledge:______________

Note any abnormalities or technical issues:

Image 7

Beginning time (seconds) of Acqknowledge:______________

End time of Acqknowledge:______________

Note any abnormalities or technical issues:

Image 8

Beginning time (seconds) of Acqknowledge:______________

End time of Acqknowledge:______________

Note any abnormalities or technical issues:

Image 9

Beginning time (seconds) of Acqknowledge:______________

End time of Acqknowledge:______________

Note any abnormalities or technical issues:

Image 10

Beginning time (seconds) of Acqknowledge:______________

End time of Acqknowledge:______________

Note any abnormalities or technical issues:

Rest 2

Beginning time (seconds) of Aqcknowledge:______________

End time of Acqknowledge:______________

Note any abnormalities or technical issues:

Appendix I

Sports Psychology Research

Solution Focused Brief Therapy (SFBT) Model

The Basic tenets of SFBT:

1. Based on solution building rather than problem solving.
2. The focus is on the student athlete's (SA) desired future rather than on past problems or current conflicts.
3. SAs are encouraged to increase the frequency of current useful behaviors.
4. No problem happens all the time. There are exceptions, such as times when the problem could have happened but didn't. These exceptions can be used by the SA and therapist to co-construct solutions.
5. Therapists help SAs find alternatives to current undesired patterns of behavior, cognition, and interaction that are within the SA's repertoire or can be constructed by therapist and SA.
6. Differing from skill building and behavior interventions, the model assumes that solution behaviors already exist for SAs and can be discovered by conversation between therapist and SA.
7. Small increments of change lead to large increments of change.
8. SAs' solutions are not necessarily directly related to any problem identified by either the SA or the therapist.
9. The conversational skills required of the therapist to invite the SA to build solutions are different from those needed to diagnose and treat the SA's problems.

Adapted from: Lutz, A. (2014). *Learning solution-focused therapy: An illustrated guide (First ed.).* Washington, DC: American Psychiatric Publishing, a division of American Psychiatric Association.

Based on the research of: Franklin, C. (2012). *Solution-focused brief therapy: A handbook of evidence-based practice*. New York: Oxford University Press

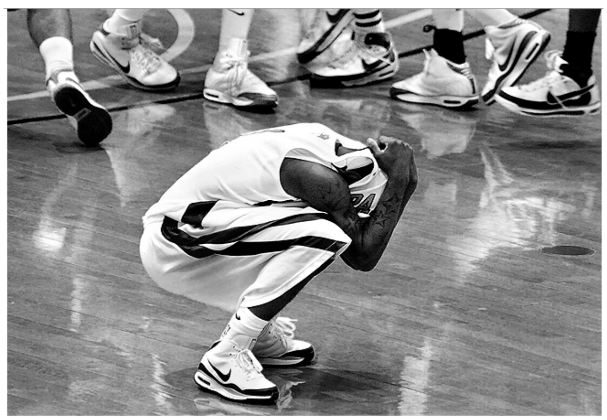
Appendix J

Images

B1

B2

Negative



B3

Positive

P1

P2

P3

Neutral
N3

N1

N2

Image 1

Appendix K

Curriculum Vitae

Lori Napier

422 N. Meridian St., #V 284, Newberg, OR 97132
509-475-1802
lnapier50@gmail.com

EDUCATION

MASTER OF ARTS, Clinical Psychology George Fox University, Newberg, OR 2018

MASTER OF ARTS, Clinical Mental Health Counseling Gonzaga University, Spokane, WA 2015

MASTER OF SCIENCE, Human Performance & Sport Studies Univ. of Tennessee, Knoxville, TN 1998

BACHELOR OF ARTS, Psychology Eastern Washington University, Cheney, WA 1995

SUPERVISED CLINICAL EXPERIENCE

STUDENT ATHLETE COUNSELOR - George Fox University, Newberg, OR 2018-Current

Developed and implemented pilot program integrating a doctoral psychology student into the athletic department

Consulted with coaches, training staff, administration, and university counseling services to coordinate care

Provided psycho-education and outreach to athletic teams regarding performance enhancement and mental health

Provided individual counseling to student athletes exploring a range of mental health and performance enhancement issues

Worked with athletic trainers to provide warm handoffs to student athletes: Immediate behavioral health assessments and interventions

Maintained confidential records

COUNSELING CENTER PRE-INTERN - Pacific University, Forest Grove, OR 2019-Current

Provided individual short term therapy

Conducted weekly 30 minute initial intakes

Managed urgent/walk-in crisis appointments

Co-facilitated a mindfulness group

Participated in campus outreach including suicide awareness and writing for the university newspaper

Maintained confidential records

BEHAVIORAL HEALTH CONSULTANT - Oregon Health & Science University, Portland,OR2017-2019

Federally Qualified Health Center: Provided Behavioral Health services to primarily underserved populations

Worked within a multidisciplinary primary care team including Medical Doctors, Family Nurse Practitioners, Physicians Assistants, Family Medicine Residents and Interns, Psychiatric Mental Health Nurse Practitioners, Registered Nurses, Resources Specialists, Community Outreach Specialists, Social Workers, Medical Assistants, Team Coordinators, Medical Students, and an Eligibility Specialist

Provided behavioral health treatment from a brief and long-term model

Consulted with patients and providers

Worked with providers to coordinate warm hand offs: Immediate behavioral health assessments and interventions

Performed psycho-diagnostic and neuropsychological assessments, as well as assessment interpretation consults

Provided community and social services referrals to patients and families

Conducted risk assessments for harm to self, others, and inability to care for oneself and connected patients with appropriate referrals for safety and support

BEHAVIORAL HEALTH CRISIS CONSULTATION TEAM - Yamhill County, OR 2017-2019

Worked within a multidisciplinary team providing crisis consultation, assessment, and intervention for the Emergency Department at Providence Newberg Medical Center and Willamette Valley Medical Center in Yamhill County

Completed hospital risk-assessments for harm to self, others, and inability to care for oneself

Consulted with physicians and staff, provided recommendations regarding patient risk and discharge plan, documented evaluations in electronic medical records, and coordinated resources with county mental health employees

Case Management Experience: Arranged hospitalizations, contacted respite care facilities, collaborated with Yamhill County Mental Health agencies, contacted and coordinated with drug and alcohol detoxification facilities

CASE MANAGER VOLUNTEER - Anna Ogden Hall (Union Gospel Mission), Spokane, WA 2013–2016

Served as case manager for 10 residents, listening, encouraging, and assisting them in recovery goals

Co-led a women's sexual and relationship addiction recovery group

Performed urine and breath analyses for incoming residents

Facilitated new resident move-ins. Input accurate and complete confidential data for new residents

Led a weekly fitness class, emphasizing physical, as well as mental health

COUNSELING INTERN - Gonzaga University Counseling Center, Spokane, WA 2014–2015

Provided counseling to students experiencing personal adjustment and/or psychological struggles and assisted students in identifying and learning skills to help them effectively meet their educational, life, and relationship goals

Created and managed the development of evidence-based clinical treatment plans

Conducted crisis interventions and suicide assessments

Maintained confidentiality of client records

Prepared and maintained all required treatment records and reports

RESEARCH AND PRESENTATIONS

Rich-Wimmer, N., **Napier, L.**, Shattuck, M., Gibson, E., Spromberg, C., Andrews, G. (July, 2019). *Physiological responses to masculinity and shame: A case study on cultural norms.* Poster presented at the International Neuroscience Society Conference, Rio de Janeiro, Brazil.

Napier, L., Crowl, J., , Colunga-Marin, A., Goodworth, M. (May, 2019). *Assessing Provider Satisfaction with Behavioral Health Services at Six Diverse Primary Care Clinics.* Poster presented at the Oregon Psychological Association, Eugene, OR.

Ghoston, M., Ghoston, L., & **Napier, L.** (March, 2015). *Assessing potential violence: Can we do more?* Presentation given at American Counseling Association National Conference, Orlando, FL.

Napier, L. (November, 2013). *Preventative factors for adolescents with suicidal ideation.* Poster presented at the Washington Counseling Association Annual Conference, Spokane, WA.

Napier, L. (October, 2008). *Gender differences in sport and competition.* Best in the West High School Coaches Clinic, Seattle, WA.

Napier, L. (May, 1998). *Homophobia in sport: Perceptions of sport psychologists and frequency of consulting opportunities.* Unpublished thesis, Department of Human Performance and Sport Studies, University of Tennessee, Knoxville.
Supervisors: Dr. Craig Wrisberg, Dr. Joy DeSensi, and Dr. William Morgan

LEADERSHIP AND TEAM EXPERIENCE

HEAD BASKETBALL COACH - Northwest University, Kirkland, WA 2003–2013

Led program to first ever NAIA top 25 national ranking

Developed the skills of two Conference MVPs and All-Americans, as well as numerous all-conference, all-academic, and Player of the Week award winners

Oversaw and managed the basketball program's yearly $180,000 budget

Coordinated with admissions, financial aid, and various academic departments to help students get admitted and follow an academic plan to earn a bachelor's degree

TEACHING EXPERIENCE

LECTURE CLASS INSTRUCTOR - George Fox University, Newberg, OR Fall 2019

Introduction to Sport Psychology - Fall semester meeting twice per week, 31 students. Created syllabi and content introducing students to the most up to date research and best practices in sport psychology. Topics included: Basic neuropsychology, motivation/mindset, emotional regulation, arousal and stress management, mental skills training, resilience, gender and culture issues, mental health and athletes

LECTURE AND ACTIVITY CLASS INSTRUCTOR - Northwest University, Kirkland, WA 2003–2013

Fitness and Wellness - 18 semesters meeting twice per week, 15-30 students per section. Created syllabi and content mixing lecture and activity to help students gain a greater understanding of how to implement a personalized fitness program

Current Issues in Health - 8 semesters meeting three times per week, 6-12 students per section. Created syllabi and managed all aspects of lecture class encouraging students to think critically about issues pertaining to physical, mental, and emotional health

Aerobics - 18 semesters meeting twice per week, 5-20 students per section. Created class content and led group exercise classes exposing students to a variety of exercise formats including interval training, kickboxing, and step aerobics

LECTURE CLASS INSTRUCTOR - Spokane Falls Community College, Spokane, WA 2001–2003

Health and Wellness - 6 quarters meeting twice per week, 20-30 students per section. Created and managed all aspects of lecture course. Focused on a holistic view of health and encouraged informed decision-making

CPR/First Aid - 2 quarters meetings once per week, 10-20 students per section. Followed American Red Cross guidelines in managing and instructing the night class

LECTURE CLASS INSTRUCTOR - Whitman College, Walla Walla, WA 2000–2001

Gender and Sport - Created syllabi and content encouraging students to think critically about how gender and sport are portrayed in American society

AFFILIATIONS

American Psychological Association 2016-Present

Division 47 Exercise and Sport Psychology 2016-Present

Association for Applied Sport Psychology 2016-Present

PROFESSIONAL DEVELOPMENT AND CERTIFICATES

Interpersonal neurobiology from the inside out - *Mindsight Institute*, Dr. Dan Siegel 2015

Brain fitness: Mindsight skill training and the brain - *Mindsight Institute*, Dr. Dan Siegel 2015

Interpersonal neurobiology and relationships:Neurobiology of we *,Mindsight Institute*, Dr. Dan Siegel 2015

Interpersonal neurobiology for therapists: The mindful therapist - *Mindsight Institute*, Dr. Dan Siegel 2015

Therapeutic approaches to counseling student athletes - *CEU Mental Health*, Dr. Christopher Stankovich2015

Recognition, assessment and treatment of suicidality - *Cascadia Training*, Randi Jensen, MA 2013

Motivational interviewing - *Training Xchange*, Jonnae Tillman 2013

CLINICAL SUPERVISORS

Dr. Joan Fleishman, Oregon Health & Science University, Behavioral Health Clinic and Research Director

Dr. Glena Andrews, George Fox University, Director of Clinical Training, Sport Psychology

Dr. Jamie Young, Pacific University Pre-Intern Supervisor

Dr. Luann Foster, George Fox University, Sport Psychology Supervisor, University Counseling Services