THE EFFECTS OF AN OCEAN SURFING COURSE INTERVENTION ON SPIRITUALITY, DEPRESSION, ANXIETY, AND QUALITY OF LIFE

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ABSTRACT

Although research on the psychological aspects of ocean surfing is scarce, at least two correlational studies have demonstrated that ocean surfers report more positive mental health characteristics in terms of less anxiety and depression than normative samples (Levin & Taylor, 2011; Amrhein, Barkhoff, & Heiby, in press). However, no experimental studies have been found that examined whether these mental health outcomes are an effect of surfing. The current study, using a pretest-posttest quasi-experimental design, aims to examine the effects of a surfing course intervention on spirituality, depression, anxiety, and quality of life. Fifty-four participants (46 “new surfers” and 8 “regular surfers”) were recruited from four sections of a one credit surfing course at the University of Hawai‘i at Hilo. Participants were asked to complete a baseline assessment at the beginning of the course examining demographics, spirituality, depression, anxiety, and quality of life. Participants were also asked to complete a follow-up assessment at the end of the course consisting of the same measures along with a scale of spiritual surfing experiences and other surfing habits. “New surfers” demonstrated a significant increase in overall levels of spirituality from baseline to follow-up. Additionally, reported scores from the entire sample on their subjective, spiritual surfing experiences were positively correlated with overall levels of spirituality. No significant changes were observed from baseline to follow-up on measures of depression, anxiety, or quality of life. The results suggest that participating in a surfing course may contribute to an individual’s development of overall spirituality, which holds important clinical and research implications. The potential for developing culturally-tailored interventions that incorporate surfing is discussed, as are limitations and future research directions.
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CHAPTER 1. INTRODUCTION

There is a great deal of anecdotal information regarding the mental health benefits of ocean surfing (e.g., Taylor, 2007), but a dearth of objective clinical research involving surfers as participants. Two previous correlational studies have yielded a significant relationship between participation in ocean surfing and lower levels of depression and anxiety than the general population (Levin & Taylor, 2011; Amrhein, Barkhoff, & Heiby, in press). Amrhein et al. also found that surfers report somewhere between fair and high levels of spirituality. Spiritual development has been deemed to be one index of mental health (e.g., D’Souza, 2007; Baker, 2003; Tanyi, 2002). However, there is currently no known research exploring whether ocean surfing itself may contribute to positive mental health characteristics as opposed to ocean surfing being a sport to which mentally healthy people are drawn. This study aimed to address this deficit in the research by comparing participants’ levels of spirituality, depression, anxiety, and quality of life before and after completing a surfing course intervention. The results of this study have important implications for increasing our understanding of the relationship between the mental health benefits previously associated with surfing and participating in the sport itself. This study also suggests that further investigation is warranted to assess the potential of creating intervention programs that utilize surfing as a means to increase mental health, particularly in culturally-relevant contexts.

Ocean Surfing – Definition, Prevalence, and History

Ocean surfing is an activity which involves standing on a surfboard while riding waves as they break. While there are many different forms of recreational wave riding, surfing will be defined in this study as the act of paddling on one’s stomach on a surfboard as an ocean wave
approaches and pushing one’s self into a standing position as the wave begins to break and the momentum of the wave begins to propel the surfboard and surfer. Attempting to learn this style of wave riding was the primary goal of the course intervention in the present study, thus excluding other forms of wave riding recreation (i.e. windsurfers, boogie boarders, etc.).

Surfing, as defined above, emerged as a recreational pastime in the Hawaiian Islands around the year 1,200 C.E., and it quickly became enmeshed in the Hawaiian culture. Surfing was practiced across all social classes and became intertwined with sex, politics, religion, and entertainment (Finney, 1959). It was an intricate part of the Makahiki harvest festival, which was celebrated in honor of the Hawaiian god Lono, a god of fertility, peace, and music (Finney, 1959).

Despite surfing’s steady importance in the Hawaiian culture for hundreds of years, the arrival of American Calvinist missionaries in the early nineteenth century nearly eradicated the sport, which was seen to violate their own view of organized religion (Finney, 1960). The push for the adoption of Western religion and values by these early missionaries caused many Hawaiian traditions and customs to suffer, and surfing, which was generally practiced in the nude and had close ties to sexual activities, was no exception (Finney, 1960). The spiritual and sexual nature of surfing was seen as inconsistent with the dogma of Calvinism and was therefore repressed (Finney, 1960).

Despite these setbacks, surfing experienced a revival at the beginning of the twentieth century. At this time, the sport began to reemerge as a part of the Hawaiian culture, supported in large part by the Olympic gold medalist swimmer Duke Kahanamoku, who became an ambassador of the sport. By performing surfing exhibitions on beaches in Australia and the
continental United States, Kahanamoku exposed surfing to new groups of people outside of the Hawaiian Islands (Finney, 1960). The 1930’s and 1940’s saw surfing slowly assimilate into the Californian culture, but still only a few thousand people around the world participated in the sport (Warshaw, 2010). However, during the late fifties and sixties, technological advancements in surfboard design and wetsuits made surfing more accessible and enjoyable for a larger population. Around this time, iconic movies such as Gidget and The Endless Summer cemented surfing’s place in the American culture, and spurred the transformation of the sport into a multi-billion dollar a year industry (Warshaw, 2010). While the exact number is not known, estimates from the early 2000’s of the total number of surfers worldwide ranged from five million to 23 million (Warshaw, 2005).

**Psychological Correlates of Surfing**

The psychological literature on surfing is scarce, but several studies have been conducted examining the motivations and mental health benefits of the sport. The literature review was completed through the use of the PsycINFO, EBSCOHost, and Google Scholar databases. Keywords used to conduct the search included surf, surfing, ocean, surfers, surfing psychology, and surfing sports psychology. Publications containing at least one of these keywords from all years to date (February 2016) were accepted and reviewed. Published articles examining an aspect of psychology in surfers and/or surfing are included in this literature review.

Farmer (1992) investigated the motivations for surfing across six domains. The results of this study showed that 50 male surfers rated vertigo, which refers to the thrill or high accompanying an activity which may include the experience of self-transcendence or loss of self, as the highest motivating factor for surfing. Aesthetic and cathartic motivations consistently
received high ratings, while social, health/fitness, and competition motivations were rated the lowest by this sample of surfers.

In terms of personality characteristics, surfers have been found to score higher on sensation seeking and openness to experience scales than athletes participating in the lower-risk sport of golf (Diehm & Armatas, 2004). Surfers were also found to report higher levels of intrinsic motivation and similar levels of extrinsic motivation when compared to golfers (Diehm & Armatas, 2004).

Surfers have described having experiences with and becoming dependent on flow states that occur during surfing (Partington, Partington, & Olivier, 2009). Csikszentmihalyi (1975) describes flow as an optimal state of experience in which an individual feels a sense of complete control as well as a fusion between self and environment. Flow experiences provide individuals with a sense of growth and intrinsic enjoyment. During a flow state, the individual is said to be living completely in the moment and has a narrowed, intense focus on the activity at hand (Csikszentmihalyi, 1975). Partington et al. (2009) investigated the flow experiences of “big wave” surfers and found through qualitative evidence that they reported improved mood states, better surfing performance, and higher self-esteem and fulfillment as a result of these experiences. Surfers also reported an “addiction” to these feelings which led to their continued involvement in big wave surfing regardless of family commitments and potential serious injuries or death (Partington, et al., 2009).

Surfing has also been recently linked to mental health benefits. Levin & Taylor (2011) found that a sample of 100 predominantly Caucasian surfers (73% of the participants self-identified their ethnicity as Caucasian, 15% as Asian, and 6.1% as “other”) in California reported
significantly fewer symptoms of depression and anxiety than the general population (i.e., normative samples). Amrhein et al. (in press) replicated these results with a multi-ethnic sample of 100 surfers from Hawai`i and the East Coast of the United States, establishing some generalizability across ethnic identities and geographic regions of the United States. Additionally, they found that surfers report between fair and high levels of spirituality, and that an individual’s overall level of spirituality was significantly correlated to the perceived spirituality of the surfing experience. Results also indicated that individuals who surfed more days per month on average reported higher levels of spiritual-specific surfing experiences than those who surfed less frequently.

Research has also assessed the utility of surfing as a preventative approach to social and health problems in at-risk children (Morgan, 2010). Sunset Surfers is a program that teaches surfing to children in a disadvantaged, urban neighborhood in Australia. The children in this neighborhood are at high risk for child abuse and neglect. Preliminary qualitative evidence from the children, parents, and staff members suggest that the children who engaged in surfing demonstrated increased self-esteem and a new enthusiasm for overcoming and mastering challenges (Morgan, 2010). One reported case study also suggested that surfing could be an effective intervention for polytrauma, which refers to concurrent brain and other physical injuries that can result in psychosocial and cognitive impairments (Fleischmann et al., 2011). Results from this case study suggested that learning to surf was associated with reductions in physical pain and depressive symptoms, as well as better general well-being and stress levels (Fleischmann et al., 2011). A recent feasibility study and a separate qualitative study have similarly suggested benefits of a surfing intervention with combat veterans with PTSD (Rogers, Mallinson, & Peppers, 2014; Caddick, Smith, & Phoenix, 2015).
Mental Health Benefits of Exercise and Sport

As a physically demanding sport, surfers may experience mental health benefits due to exercising. Exercise has consistently been linked to positive mental health outcomes over multiple domains. Through an examination of 27 narrative reviews and six meta-analytic views, Landers and Arent (2001) found that the effect sizes for exercise on anxiety ranged from 0.15 to 0.56, and the effect sizes for exercise on depression ranged from 0.53 to 0.72. Similar studies have also supported a negative correlation between exercise and depression (Mutrie 2000; Dishman, Washburn, & Heath, 2004). Lawlor and Hopker (2001) conducted a meta-analysis on randomized controlled trials with patients reporting clinical levels of depression. Results of this analysis demonstrated that exercise was significantly more effective than no treatment in reducing depressive symptoms and that it was equally as effective as cognitive therapy. Exercise as an intervention is commonly used as a component in cognitive-behavioral therapies, and it is sometimes offered as a stand-alone treatment (Weinberg & Gould, 2011).

While the evidence supporting the mental health benefits of exercise is robust, consensus on the underlying mechanism of this phenomenon has yet to be reached. Some theories have suggested that psychological factors may be responsible for the association. Evidence suggests that a sense of mastery and self-confidence can result from regular exercise, as well as increases in self-esteem and self-concept, all of which may reduce feelings of depression and anxiety (Landers & Arent, 2001; Mutrie, 2000; Sonstroem, 1998). Biological factors have also been implicated as a causal mechanism for the mental health benefits of exercise. Research has shown that brain-derived neurotrophic factor (BDNF) levels increase with exercise (Van Hoomissen, Chambliss, Holmes, & Dishman, 2003). BDNF supports the growth and survival of neurons and synapses in cognitive, sensory, and motor regions of the brain (Cotman & Engesser-Cesar,
BDNF has also been shown to reduce levels of depression (Siuciak, Lewis, Wiegand, & Lindsay, 1997). Endorphins have also been theorized to account for the effects of exercise on mood as they have been shown to be secreted during aerobic exercise (Hoffman, 1997), and some studies have observed a calming influence of endorphins on animal and human behavior (Daniel, Martin, & Carter, 1992; Dishman, Washburn, & Heath, 2004).

In addition to reductions in depression and anxiety, exercise has been related to other psychological benefits. It has been associated with improved cognitive performance, as individuals who engage in more exercise demonstrate better performance on tasks that measure reaction time, memory, reasoning, and academic achievement (Etnier et al., 1997). Research has also found evidence indicating that exercise is associated with reduced psychosocial stress responses and reactivity (Crews & Lander, 1987; Taylor, 2000). More exercise is also associated with increased self-esteem and physical self-concept (Leith, 1994; Spence, McGannon, & Poon, 2005; Fox, 2000). Finally, physical activity has been related to positive outcomes in quality of life, including domains of physical functioning, subjective well-being, and stress management (Berger, Pargman, & Weinberg, 2007).

While the research demonstrates some mental health benefits from many forms of exercise, certain types of physical activity appear to be more beneficial than others. One narrative literature review examined the effects of physical activity in outdoor, natural settings as compared to physical activity indoors. The results of this systematic review indicated that, when compared to physical activity in indoor settings, exercising in outdoor, naturalistic settings was associated with more positive mental health outcomes. Specifically, physical activity in outdoor settings was associated with greater feelings of engagement, revitalization, and energy, as well as reduced tension, anger, and depression (Coon et al., 2011). Nature-based exercise has been
linked to benefits in mood and self-esteem across a range of environments (Barton & Pretty, 2010), with the presence of water in the environment being associated with the greatest gains in these psychological areas.

Although research is sparse in this domain, interventions involving outdoor physical activity/recreation have demonstrated evidence of positive mental health outcomes. Exposure to a ropes course activity as an adjunct to individual therapy has shown statistically and clinically significant changes in individuals with anxiety when compared to individuals who did not receive this additional intervention (Wolf & Mehl, 2011). Similarly, outdoor recreation interventions have been implemented to target PTSD symptoms in combat veterans. Results from a pilot study showed significant and sustained decreases over a 6 week follow-up in negative mood states, anxiety, depression, and somatic symptoms of stress (Vella, Milligan, & Bennett, 2013).

Other physical activities which, like surfing, typically include elements of mindfulness and spirituality have shown positive mental health effects above and beyond those of other forms of exercise. A meta-analysis of 40 studies examining the mental health effects of Tai Chi demonstrated that the activity is associated with reductions in stress, anxiety, depression, and mood disturbance, even when compared to other exercise controls (Wang et al., 2010). Tai Chi also appears to be related to higher levels of self-esteem (Wang et al., 2010). Yoga is another activity which has shown positive effects greater than other forms of exercise. One randomized control trial found that participants with chronic lower back pain who completed a comprehensive yoga program showed greater reductions in anxiety, depression, and pain than participants who completed physiotherapy exercises (Tekur et al., 2012). A meta-analysis on the psychological effects of yoga on cancer patients demonstrated that yoga is associated with lower
levels of anxiety, depression, distress, and stress when compared to waitlist control groups or supportive therapy groups (Lin et al., 2011).

**Outcome Variables in the Current Study**

Spirituality has been associated with surfing, both anecdotally (Taylor, 2007) and in previous research (Amrhein et al., in press). Spirituality has been shown to be an important component of the human experience. It is an integral part of being human, and it can provide individuals with answers to common existential issues, such as purpose and sense of direction in one’s life (D’Souza, 2007). Baker (2003) argues for a number of benefits of spirituality including stronger identity development, higher perceived quality of life, more capable coping abilities, and a tool of empowerment to overcome obstacles. Spirituality can also provide people with a sense of meaning, peace, and connectedness (Tanyi, 2002).

Individuals conscious of their own spirituality demonstrate positive mental health outcomes. Spirituality has been significantly correlated with lower levels of depression and anxiety, and higher levels of quality of life (Kandasamy et al., 2011). Several studies have demonstrated the effectiveness of spiritually-oriented psychotherapies in treating a number of psychological issues, including depression, anxiety, and anger management difficulties (Richards & Worthington, 2010).

While a consensus definition of spirituality has yet to be established (Tanyi, 2002), in this study spirituality is defined in terms of five cognitive and emotional components, as agreed upon by Amrhein et al. (in press). First, there is a sense of connectedness within the individual with nature or the environment, other living beings, and a higher power. Second, there is a feeling of heightened self-awareness. Third, there is an awareness of a transcendent reality beyond the
normal confines of time and space. Fourth, it provides the individual with feelings of inner peace and harmony and a sense of meaning and purpose in life. Fifth, it includes the belief that consciousness persists after physical death.

Depression and anxiety are common indicators of mental health, as they are experienced widely by the population (American Psychiatric Association, 2013). As outlined above, exercise has been associated with reduced levels of depression and anxiety. Additionally, previous studies have found a relationship between surfing and levels of depression and anxiety, although a causal relationship has yet to be established (Levin & Taylor, 2011; Amrhein, Barkhoff, & Heiby, in press). The association of depression and anxiety with exercise in general, and surfing specifically, warrants their inclusion as variables in this study.

Quality of life also was assessed in this study. Quality of life encompasses multiple domains of general functioning. In this study, the variable covers domains of physical health, psychological functioning, social relationships, and the individual’s environment. As a variable of overall functioning, quality of life may capture broader changes in functioning than the specific variables of depression, anxiety, and spirituality used in this study. Quality of life is used frequently as an outcome variable in psychological intervention research (Rehse & Pukrop, 2003; Osborn, Demoncada, & Feuerstein, 2006) and will therefore be included in this study.

**The Current Study**

Given the evidence supporting the mental health benefits of exercise, particularly activities which take place outdoors or involve a mindfulness component, surfing should be explored as a potential intervention. Ocean surfing is a sport that combines elements of exercise and mindfulness/spirituality, and it takes place in an outdoor, nature-based environment. Based
on the research supporting the psychological benefits of each of these elements individually, the combination of them in the sport of surfing could lead to an effective intervention for psychological problems and disorders. As noted above, research has already linked surfing with mental health benefits in domains such as spirituality, depression, and anxiety (Levin & Taylor, 2011; Amrhein et al., in press), and it has been implemented as an intervention strategy with at-risk youth and individuals with polytrauma for which preliminary, qualitative evidence has been promising (Morgan, 2010; Fleischmann et al., 2011). This study is the first to the author’s knowledge to establish quantitative pretest-posttest quasi-experimental evidence for the possible utility of ocean surfing as a mental health intervention with these outcome variables.

The following three hypotheses were tested. The first hypothesis was the primary objective of this project. The second and third hypotheses were tested for exploratory purposes.

1. The primary hypothesis of this project is that participants who are exposed to a surf class intervention without prior “regular” surfing experience, or “new surfers,” will report positive mental health outcomes, including higher levels of spirituality, lower levels of depression and anxiety, and higher levels quality of life at post-test compared to baseline.

2. The surfing experience, both in terms of the subjective, spiritual surfing experiences and the objective frequency of surfing measured at post-test, will be positively associated with post-test levels of spirituality, negatively associated with post-test levels of depression and anxiety, and positively associated with post-test levels of quality of life for all participants.

3. Participants who surf “regularly” prior to starting the course, or “regular surfers,” will report higher levels of spirituality, lower levels of depression and anxiety, and higher levels quality of life than “new surfers” at the baseline assessment. While the primary hypothesis is that “new surfers” will report significant changes along these domains from baseline to post-test,
it is also hypothesized that “regular surfers” will report higher levels of spirituality, lower levels of depression and anxiety, and higher levels of quality of life than “new surfers” at post-test measures.
CHAPTER 2. METHODS

Participants

Participants were recruited over two semesters from students enrolled in four sections of KES145, which is a surfing activity course offered through the Kinesiology and Exercise Sciences Department to fulfill graduation requirements at the University of Hawai‘i at Hilo. The final sample included 54 participants out of 71 student volunteers. Only participants who completed both the baseline and post-test measures were included for the study. Volunteers who only completed the baseline but not the post-test measures (or vice versa) were excluded. Participants ranged from ages 18 to 63, with the mean age being 23.59 ($SD = 7.43$) years old. The sample was 57.4% female ($n = 31$) and 42.6% male ($n = 23$). In terms of ethnicity, 33.3% of the participants self-identified as being Caucasian, 27.8% as being mixed ethnicity, 9.3% as Japanese, 9.3% as Hispanic, 5.6% as Hawaiian or part-Hawaiian, 3.7% as Chinese, 3.7% as Filipino, 3.7% as Korean, 1.9% as Pacific Islander, and 1.9% as Portuguese.

In this sample, 42.6% ($n = 23$) of participants reported having surfed at least once before the course, while 57.4% ($n = 31$) reported never surfing before the course. In terms of more consistent participation in surfing, 14.8% ($n = 8$) of participants indicated that they have surfed “regularly” prior to the start of the course, while 85.2% ($n = 46$) denied surfing “regularly.” Surfing outside of the course meeting time was optional (not a requirement of the course). During the duration of the course, 40.7% ($n = 22$) of participants reported surfing outside of the designated course time, while 59.3% ($n = 32$) denied doing so. Of those participants who did surf outside of the course time, participants reported a range between 0-4 days of surfing per week in addition to the course, with a mean of .46 ($SD = .79$) additional days surfed per week.
Measures

**Demographic Questionnaires.** The baseline demographic questionnaire (Appendix A) was used to identify participants’ identification code, age, sex, and ethnicity. It was also used to assess participants’ surfing habits (if any) prior to the class as well as other exercise habits beyond surfing. The post-test demographic questionnaire (Appendix B) was used to obtain the participant’s generated code, as well as information pertaining to surfing and exercise habits outside of the KES145 course.

**Spirituality.** The level of spirituality in participating surfers was assessed through the Spirituality Assessment Scale (SAS; Howden, 1992) during baseline and post-test. The SAS is a self-report measure containing 28 items rated on a scale from 1 (*strongly disagree*) to 6 (*strongly agree*). Possible scores on the SAS range from 28-168, with higher scores reflecting more endorsement of spirituality. Recommended cutoff scores were created to identify varying degrees of spirituality with 140-160 indicating strong, positive spirituality, 84-112 indicating fair or mixed positive and negative spirituality, and 28-56 representing weak or negative spirituality (Howden, 1992). Other investigators have labeled SAS scores from 113 to 139 as between fair and high degrees of spirituality (e.g., Briggs & Shoffner, 2006). The mean test score in the initial normative sample of 189 predominantly white/Caucasian (94.7%) adults between the ages of 40 and 60 living in the southwestern United States was 139.18 (*SD = 14.30*) (Howden, 1992). The SAS was chosen because of its relatively short administration and relatively strong psychometric support.

Reliability of the SAS has been assessed by measuring the internal consistency of the scale. The results of this analysis yielded a Cronbach’s alpha correlation coefficient of .92,
indicating that the items are highly inter-related (Howden, 1992). No other forms of reliability were established. Therefore, the stability of scores over time is unknown. Construct validity was established through factor analysis. The results of this analysis produced six factors with a factor loading criteria of .40 and a minimal loading of three items on a single factor (Howden, 1992). The six factors produced were innerness expressed as harmony and relationship with a supreme being, innerness utilized for guidance and strength, connectedness to others, connectedness to life and the world, meaning and purpose in life, and transcendence (Howden, 1992). These six factors correspond to the proposed definition of spirituality in this study, and the items in the measure appear to capture each of the components of the definition as indicated above. While these six factors have been established, responses on the SAS are scored with one total score.

Divergent validity was demonstrated through correlations with two measures of behaviors deemed to be weakly positively related or unrelated to spirituality. Scores on the SAS showed a significant, yet weak, positive relationship with religiousness, as measured by a single item designed by Howden which asked participants to rate themselves on a scale in terms of their overall level of religiousness from 1 (not at all) to 4 (very religious) \((r = .24)\), and religiousness accounted for approximately six percent of the variance in SAS scores \((r^2 = .06)\). Scores on the SAS were not significantly correlated with frequency of attendance at religious events, as measured by another single item designed by Howden which asked participants to rate their frequency of attending religious events on a scale from 1 (at least once a week) to 4 (not at all) \((r = .06)\), and frequency of attendance at religious events accounted for .36% of the variance in SAS scores. These divergent validity estimates indicate that the SAS is measuring spirituality in a way that is largely independent of religious beliefs or practices.
Depression. The Beck Depression Inventory-II was used to measure the level of depressive symptoms among participating surfers during baseline and post-test (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is a self-report instrument containing 21 items rated on a scale from zero to three, with a minimum total score of zero and a maximum of 63. Higher scores reflect more endorsement of depressive symptoms. Recommended cutoff scores were created to identify varying degrees of depression, with 0-13 indicating minimal depression, 14-19 indicating mild depression, 20-28 indicating moderate depression, and 29-63 indicating severe depression (Beck et al., 1996). A predominantly white/Caucasian sample of 120 college students with a mean age of 19.58 (SD = unknown) years was administered the test to serve as a comparative normal group (Beck et al., 1996). This sample yielded a mean test score of 12.56 (SD = 9.93) (Beck et al., 1996). In a separate normative study, the non-depressed group in a sample of 127 adults seeking therapy from the University of Pennsylvania yielded a mean score on the BDI-II of 7.65 (SD = 5.90) (Beck et al., 1996). The BDI-II was selected for this study because of its relatively short administration time and strong psychometric support (Beck et al., 1996).

Reliability of the BDI-II has been established through internal consistency and test-retest analyses. Internal consistency analysis of the scores from a sample of 500 outpatients yielded a Cronbach’s alpha correlation coefficient of .92 (Beck et al., 1996). Analysis of the scores from a sample of 120 college students yielded a Cronbach’s alpha correlation coefficient of .93 (Beck et al., 1996). These estimates indicate that the items are highly inter-related. Test-retest reliability in a sample of 26 outpatients over a one week interval had a correlation of .93 (Beck et al., 1996), suggesting the scores are stable across seven days. Construct validity was documented through factor analysis of the scores from a sample of 500 outpatients. The analysis yielded the
two factors of somatic-affective and cognitive symptoms (Beck et al., 1996). Criterion and construct validity were established with several other scales. The BDI-II was significantly correlated with the Scale for Suicide Ideation \((r = 0.37;\) Beck, Kovacs, & Weissman, 1979) and the Hamilton Psychiatric Rating Scale for Depression \((r = 0.71;\) Hamilton, 1960), indicating that the BDI-II is similar to other measures of depression and depressive symptoms (Beck et al., 1996). The BDI-II was also significantly correlated with the Hamilton Rating Scale for Anxiety \((r = 0.47;\) Hamilton, 1959) and the Beck Hopelessness Scale \((r = 0.68;\) Beck & Steer, 1988), indicating that the BDI-II is related to theoretically similar measures (Beck et al., 1996). A study with 127 students yielded a 93% true positive rate and an 18% false positive rate (Beck et al., 1996).

**Anxiety.** The level of anxiety symptoms among participating surfers was assessed through the Beck Anxiety Inventory during baseline and post-test (BAI; Beck & Steer, 1993). The BAI is a self-report instrument containing 21 items rated on a scale from zero to three with a minimum total score of zero and a maximum score of 63. Higher scores reflect more endorsement of anxiety symptoms. Recommended cutoff scores were created to identify varying degrees of anxiety, with 0-7 indicating minimal anxiety, 8-15 indicating mild anxiety, 16-25 indicating moderate anxiety, and 26-63 indicating severe anxiety (Beck & Steer, 1993). Three non-clinical samples were administered the BAI to serve as normative comparison groups. Among the normative comparison groups, 65 college students had a mean test score of 11.08 \((SD = 9.1)\), 142 medical students had a mean test score of 8.89 \((SD = 7.30)\), and 36 non-student adults had a mean score of 7.78 \((SD = 5.65)\) The BAI was selected for this study because of its relatively short administration time and strong psychometric support (Beck & Steer, 1993).
Reliability of the BAI has been established through internal consistency and test-retest analyses. Internal consistency analysis of scores on the BAI in adult samples yielded Cronbach’s alpha correlation coefficients ranging from .92 to .94, indicating high inter-relatedness of the items (Beck & Steer, 1993). Test-retest reliability during a one week interval was .75, indicating stability of scores over a seven day period (Beck & Steer, 1993). Criterion validity was established through correlations with two scales designed to measure anxiety. The BAI was significantly correlated with the Hamilton Anxiety Rating Scale ($r = 0.51$; Hamilton, 1959), the mean anxiety ratings over a seven day period in the Weekly Record of Anxiety and Depression ($r = .54$; Barlow & Cerny, 1988), and both the Trait ($r = 0.47$) and State ($r = 0.58$) subscales of the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970; Beck & Steer, 1993).

**Quality of Life.** The level of quality of life among participants was assessed through the World Health Organization Quality of Life Assessment – Brief Instrument (WHOQOL-BREF; WHO, 1998) during baseline and post-test. The WHOQOL-BREF consists of 26 items rated on a scale of one to five with a minimum score of 26 and a maximum score of 130. Items which are negatively phrased (#3, #4, & #26) are reversed scored, and higher scores on the WHOQOL-BREF indicate higher quality of life. Items on the WHOQOL-BREF measure multiple domains, including physical health, psychological health, social relationships, and personal environment (WHO, 1998). The WHOQOL-BREF was selected for this study because of its relatively short administration time and strong psychometric support.

The WHOQOL-BREF is a 26-item derivation of the WHOQOL-100 version (WHO, 1998), consisting of 100 items. Psychometric properties of the WHOQOL-BREF have been established through a survey of adults ($n = 11,830$) in 23 different countries (Skevington, Lotfy, & O’Connell, 2004). The sample consisted of individuals from the general population, hospital
settings, rehabilitation centers, and primary care settings. Reliability was examined through the use of Cronbach’s alpha in assessing internal consistency within each of the four scale domains. Across the sample, Cronbach’s alpha was acceptable for the domains of physical health \((r = .82)\), psychological \((r = .81)\), and environment \((r = .80)\). Cronbach’s alpha for the social relationships domain was .68, which is indicative of marginal support. This domain consists of only three items, while the others are comprised of six to eight items, which may account for the lower internal consistency estimate (Skevington, Lotfy, & O’Connell, 2004). Coefficient alpha analyses were also conducted through the systematic removal and replacement of each individual item. The results of these analyses demonstrated that each item made a significant contribution to the variance in the WHOQOL-BREF, indicating that all items should be included in the instrument (Skevington et al., 2004). Test-retest reliability was not examined.

Validity estimates were determined through discriminant validity, construct validity, and factor analysis. To examine discriminant validity, scores were compared between “well” individuals from the general population and “sick” individuals who were currently seeking physical or psychological treatment. For the entire sample, scores by “well” participants were significantly higher than scores by “sick” participants, on each of the four domains including physical \((t(11828) = 39.2; p < .01)\), psychological \((t(11828) = 19.9; p < .01)\), social \((t(11828) = 13.0; p < .01)\), and environment \((t(11828) = 7.6; p < .01)\). In terms of construct validity, the WHOQOL-BREF was significantly associated with a single variable representing overall quality of life and health \((R^2 = .52)\), and each domain was a significant factor (Physical – \(\beta = .32\); Psychological – \(\beta = .26\); Social – \(\beta = .1\); Environment - \(\beta=.17\)). Factor analyses conducted with four subsets of the data (two random split half samples with \(n = 5133\) in Sample A and \(n = 5118\) in Sample B; a “sick” sample with \(n = 3313\); and a “well” sample with \(n = 3862\) supported the
A four-factor model of the WHOQOL-BREF, with Comparative Fit Indexes ranging from .86 to .87 and Root mean square error approximations consistently at .07 across all four sample subsets (Skevington, Lotfy, & O’Connell, 2004).

**Spiritual Surfing Experience.** During the post-test assessment, each participant was asked to identify how frequently he or she experiences the sensations of 13 typical descriptors of surfing experiences on the Spiritual Surfing Experience Questionnaire (Amrhein, Barkhoff, & Heiby, in press; SSEQ; Appendix C). Several modifications were made to the SSEQ for this study, including changing the item of experiencing “Flow” to “Flow/being ‘in the zone’” and deleting three descriptors (“Frightening,” “Time Speeding Up,” and “Aggressive”), as reliability analysis in SPSS indicated that these were potentially poor items given that removing these items improved the overall internal consistency of the scale. Responses to each item ranged from 1 (very rarely) to 5 (very often). Possible scores on this scale range from 13-65, with higher scores reflecting more endorsement of surfing-specific indicators of spirituality. Additionally, participants were also asked to provide a qualitative description of their experiences “while riding a wave or trying to ride a wave.” These qualitative responses were not included in the data analysis in this study, and instead were used for exploratory purposes to discuss the findings and provide direction for future research.

Internal consistency of the original SSEQ was estimated at .72 using Cronbach’s alpha (Amrhein et al., in press). However, when removing the three descriptors that were deleted for this study, Cronbach’s alpha was estimated at .79, indicating some heterogeneity in the spiritual aspects of surfing. Test-retest reliability estimates of the SSEQ are unknown as they have not been examined. The SSEQ appears to be content valid, as the descriptors were deemed to provide surfing-specific indicators of spirituality by three investigators (Amrhein et al., in press).
Additionally, scores on the SSEQ have yielded a significant, positive correlation with overall levels of spirituality as measured by the SAS ($r = 0.55; p < 0.01$), providing evidence for construct validity insofar as these two variables are overlapping but not equivalent. In terms of divergent validity, scores on the SSEQ were not significantly associated with the BDI-II scale for depression ($r = -.00; p = 0.99$) or the BAI scale for anxiety ($r = -.07; p = 0.5$).

**Procedure**

Prior to data collection, the study was approved by the University of Hawai‘i Committee on Human Studies Institutional Review Board. Participants were recruited from four total sections of the KES145 course over a full academic year (in both a fall and spring semester). Recruitment took place during the course's scheduled meeting time, with the instructor's permission, and recruitment information included details about the purpose of the study and eligibility criteria (i.e. 18 years or older, enrolled in KES145), to allow for self-screening. Interested participants then completed the baseline assessment packet and were approached again during the course meeting time at the end of the semester to complete the follow-up assessment packet. Participants were offered one bar of surfboard wax in exchange for their participation.

All four sections of the surfing course were taught by the same experienced surfer and licensed ocean lifeguard who had taught the course previously at the University of Hawai‘i at Hilo. The primary goals of the course were to teach the fundamentals of surfing and provide an opportunity for surfers of various levels to safely improve their surfing skills. The course also promoted learning related to surfing etiquette, water safety, personal growth, appreciation for the ocean, and creating a healthy lifestyle. The course ran over the length of a semester, which equates to eighteen weeks.
The first three meetings of the course took place in the classroom, with time spent introducing the class, organizing car rides to the beach, gathering contact information, and reviewing ocean safety and awareness information (i.e. riptides, formation of waves, potential marine hazards). Additionally, students completed a pool swimming test. The fourth course meeting time consisted of an ocean swimming test, which was a requirement before students were permitted to attempt surfing. The course met once per week for 90 minutes, but, due to an estimated 30 total minutes of transportation to and from the beach, the class typically would spend one hour at the beach each meeting. The primary grading system for the course was based on attendance, with additional course points awarded for reflection logs and extra credit assignments. Each section of the course consisted of twenty total students, and the instructor estimated that attendance for the majority of classes was at least fifteen students. Variability in an individual’s attendance to the course meeting time was not measured in this study.

Following the initial four course meetings described above, the remainder of the classes were held at Honoliʻi Beach Park in Hilo, Hawaiʻi, which was chosen due to its proximity to the University of Hawaiʻi at Hilo’s campus, consistent waves, and lifeguards. Six surfboards were available to the students due to limited resources, and students would rotate turns in the water. On average, it was estimated by the instructor that each student typically spent 15-20 minutes attempting to surf each course period, although the amount of time spent in the water varied across students.

After agreeing to participate, participants were asked to complete an initial baseline survey, which was estimated to take approximately 15 to 20 minutes to finish. Participants received the survey packet which included, in this order, an informed consent form, the baseline demographic questionnaire, the Spirituality Assessment Scale (Howden, 1992), the Beck
Depression Inventory-II (Beck, Steer, & Brown, 1996), the Beck Anxiety Inventory (Beck & Steer, 1993), and the World Health Organization Quality of Life Assessment – Brief Instrument (WHO, 1998). Signed consent forms were removed from completed surveys and kept in a locked filing cabinet separate from the completed questionnaires. Follow-up assessment questionnaires included the post-test demographic questionnaire and the following instruments in this order: the Spiritual Surfing Experience Questionnaire (Amrhein, Barkhoff, & Heiby, in press), the Spirituality Assessment Scale, the Beck Depression Inventory-II, the Beck Anxiety Inventory, and the World Health Organization Quality of Life Assessment – Brief Instrument.

The name of the participant was not recorded on the questionnaire packet, but the participant did generate an ID code (using the first three letters of his/her mother’s maiden name and the month/day of his/her birthday) that was used to code his/her responses. All completed surveys were kept in a locked filing cabinet. The author was the only researcher with a key to access the surveys. Data entry was conducted solely by the author.
CHAPTER 3. RESULTS

Missing Data

Missing data comprised .001% of all possible responses in the entire questionnaire packet. No individual item on any of the questionnaires was missing more than 1.9% of possible responses. To determine if data were missing systematically or at random, Little’s Missing Completely at Random test was conducted (Little, 1988). Results of the test indicated that the null hypothesis should be accepted, which suggests that the missing data were not systematic, $\chi^2 (2038, N = 54) = .0, p = 1$. Single imputation procedures using the expectation maximization algorithm can improve statistical power and provide unbiased parameter estimates when a small percentage of data values are missing (Scheffer, 2002; Enders, 2001). Therefore, single imputation procedures were used to fill the missing data through the Missing Values Analysis within SPSS.

Internal Consistencies

Coefficient alphas were computed for all instruments to determine internal consistency estimates. For the SAS, Cronbach’s alpha was .90 at baseline and .94 at post-test. Cronbach’s alpha for the BDI-II was .89 at baseline and .95 at post-test. On the BAI, Cronbach’s alpha was .89 at baseline and .90 at post-test. On the WHOQOL-BREF, Cronbach’s alpha was .85 at baseline and .90 at post-test. Finally, on the SSEQ, which was administered only on post-test, Cronbach’s alpha was .74.
Changes in Spirituality, Depression, Anxiety, and Quality of Life

The first and primary hypothesis of this study was that “new surfers” would report positive mental health outcomes, including higher levels of spirituality, lower levels of depression and anxiety, and higher levels of quality of life at post-test compared to baseline. To address this hypothesis, data from participants who reported that they did not surf “regularly” ($n = 46$) prior to the course (“new surfers”) were analyzed. Students who reported that they did surf “regularly” ($n = 8$) prior to the course (“regular surfers”) were excluded from this section of the data analysis, as it was hypothesized that these participants may already possess mental health outcomes as a result of their surfing habits (see Hypothesis #3). Power analysis conducted through G*Power software program (version 3.1.9.2) prior to data collection indicated that a total sample size of 34 would be sufficient for a two-tailed, paired sample t-test when $\alpha$ error probability is set to 0.05, power (1- $\beta$ error probability) is set to 0.80, and estimated effect size is set to 0.5. This result is consistent with the rule of thumb proposed by Van Voorhis and Morgan (2007) that a sample of approximately 30 provides adequate power for paired sample t-tests. Based on this information, testing this hypothesis with the data from the 46 participants who were labeled as “new surfers” appears to be adequate.

To determine whether any significant changes in these domains occurred from the beginning of the surf course to its termination, responses from “new surfers” on the SAS, BDI-II, BAI, and WHOQOL-BREF at baseline and the follow-up assessment were compared through the use of paired sample t-tests. The results indicated a significant increase, $t(45) = 2.99, p < .01$, in the total scores on the SAS from baseline ($M = 128.98, SD = 16.47$) to follow-up ($M = 133.8, SD = 18.7$). The effect size was calculated using Cohen’s $d$ statistic (correlation between means = .81), with $d = .45$. This effect size falls within the medium range (Cohen, 1992). This result
indicates that overall levels of spirituality significantly increased from the beginning of the surfing course to the end in “new surfers.”

No significant changes were found in total scores on the BDI-II, \( t(45) = -1.33, p = .19 \), from baseline (\( M = 10.28, SD = 8.12 \)) to follow-up (\( M = 8.5, SD = 10.33 \)). The effect size was calculated using Cohen’s \( d \) statistic (correlation between means = .54), with \( d = -.2 \), which is considered to be a small effect size (Cohen, 1992). Similarly, no significant changes were observed on the total scores on the BAI, \( t(45) = -.75, p = .46 \), from baseline (\( M = 7.84, SD = 7.15 \)) to follow-up (\( M = 7.15, SD = 7.91 \)). The effect size was calculated using Cohen’s \( d \) statistic (correlation between means = .65), with \( d = -.11 \), which is considered to be a negligible effect size (Cohen, 1992).

Finally, no significant changes were found in the total scores on the WHOQOL-BREF, \( t(45) = -1.33, p = .19 \), from baseline (\( M = 99.65, SD = 10.84 \)) to follow-up (\( M = 98.91, SD = 13.65 \)). The effect size was calculated using Cohen’s \( d \) statistic (correlation between means = .6), with \( d = -.07 \), which is considered to be a negligible effect size (Cohen, 1992). Analyses were also conducted on the four domains within the WHOQOL-BREF to determine if any significant changes occurred within the participants’ physical health, psychological health, social relationships, and personal environment. Similar to the total scores on the WHOQOL-BREF, no significant changes were observed on any of these domains, including physical health, \( t(45) = .67, p = .51 \), from baseline (\( M = 27.54, SD = 3.48 \)) to follow-up (\( M = 27.17, SD = 3.32 \)), psychological health, \( t(45) = -.56, p = .58 \), from baseline (\( M = 22.59, SD = 3.36 \)) to follow-up (\( M = 22.87, SD = 4.54 \)), social relationships, \( t(45) = -.26, p = .8 \), from baseline (\( M = 11.04, SD = 2.44 \)) to follow-up (\( M = 11.13, SD = 3.15 \)), and personal environment, \( t(45) = 1.7, p = .09 \), from baseline (\( M = 30.5, SD = 3.73 \)) to follow-up (\( M = 29.54, SD = 3.91 \)). These results indicate that
no significant changes were observed from baseline to post-test in levels of depression, anxiety, or quality of life in “new surfers.”

Association between the Surfing Experience and Mental Health Outcomes

The second hypothesis of the proposed study was that the surfing experience, both in terms of the subjective, spiritual surfing experiences and the frequency of surfing measured at post-test, would be associated with post-test mental health levels for all participants in the study. Correlational analysis between the SSEQ, administered at post-test, and the post-test scores on the SAS, BDI-II, BAI, and WHOQOL-BREF were performed with the total sample (n = 54) to determine if there were any significant relationships between the subjective, spiritual surfing experience and these mental health outcomes. The results indicated a significant, positive relationship between scores on the SSEQ and post-test scores on the SAS (r = .49, p < .01). Conversely, no significant relationships were observed between the SSEQ and the BDI-II (r = -.08, p = .55), the BAI (r = -.01, p = .95), or the WHOQOL-BREF (r = .24, p = .08).

Correlational analysis was also conducted between the frequency of surfing (average days per week) outside of the course meeting time and scores on the SAS, BDI-II, BAI, and WHOQOL-BREF. In the study, 40.74% of participants (n = 22) reported engaging in surfing outside of the course meeting time, while 59.26% (n = 32) denied surfing outside of the course. Overall, participants reported surfing an additional .46 days on average (SD = .79) per week beyond the course meeting time. The reported range of days surfed outside of the course was 0-4 days per week. No significant correlations were found between the average number of days surfed outside of the course meeting time and post-test scores on the SSEQ (r = .11, p = .42), the
SAS ($r = .08, p = .59$), the BDI-II ($r = .17, p = .23$), the BAI ($r = .01, p = .94$), or the WHOQOL-BREF ($r = -.1, p = .48$).

Comparisons between “Regular Surfers” and “New Surfers”

The third hypothesis was that “regular surfers” (those who reported surfing “regularly” prior to the start of the course) would report higher levels of spirituality, lower levels of depression and anxiety, and higher levels of quality of life than “new surfers” at both the baseline and follow-up assessments. As noted above, “regular surfers” comprised 14.8% ($n = 8$) of the sample, while “new surfers” accounted for 85.2% ($n = 46$) of the sample. In terms of surfing characteristics, “regular surfers” reported surfing for an average of 7.06 years ($SD = 6.82$) with a reported range from .5 to 20 years. In regards to average days surfed per month, 62.5% ($n = 5$) of “regular surfers” reported surfing between 0-4 days per month, 25% ($n = 2$) reported surfing between 5-9 days per month, and 12.5% ($n = 1$) reported surfing between 10-14 days per month.

Independent sample t-tests were performed comparing scores on the SAS, BDI-II, BAI, and WHOQOL-BREF from “regular surfers” to “new surfers” at both baseline and post-test assessment points. No significant differences were found on the SAS at baseline, $t(52) = .25, p = .8$; or post-test, $t(52) = .04, p = .97$, or on the BDI-II at baseline, $t(52) = -1.61, p = .11$; or post-test, $t(52) = - .69, p = .49$. Similarly, no significant differences were found on the BAI at baseline $t(52) = -.39, p = .7$; or post-test, $t(52) = -.65, p = .52$, or on the WHOQOL-BREF at baseline $t(52) = -.19, p = .85$; or post-test, $t(52) = .73, p = .47$. Finally, no significant difference was observed between the two groups on the SSEQ at post-test, $t(52) = 1.61, p = .11$. 

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CHAPTER 4. DISCUSSION

The results of this study demonstrated that “new surfers” experienced a significant increase in reported levels of spirituality after being exposed to a surf class intervention. This finding holds noteworthy clinical and research implications. Clinically speaking, spirituality has been correlated with positive mental health outcomes, such as feeling connected with others, having a sense of meaning and purpose in life, stronger identity development, and lower levels of clinical symptoms, such as depression and anxiety (Baker, 2003; D'Souza, 2007; Kandasamy et al., 2011). Given the positive characteristics associated with spirituality, identifying activities that promote development in this area are important for increasing an individual’s overall well-being. The results of this study indicate that surfing may be an activity that contributes to these positive mental health outcomes. Additionally, this result holds implications for better understanding the previous finding that surfers report fewer symptoms of depression and anxiety than the general population (Levin & Taylor, 2011; Amrhein et al., in press), as a growth in spirituality may account, at least in part, for these positive mental health characteristics. Future research should investigate this possible mediating relationship directly.

While ethnic and cultural differences were not tested in this study due to small $n$ sizes across many ethnic groups in the sample, this study may have implications for developing and implementing culturally-sensitive mental health interventions in the future. Evidence suggests that Native Hawaiian individuals may benefit from culturally-tailored interventions (Hurdle, 2002). As many Western mental health interventions were developed by and for predominantly white (i.e., of European descent) populations living on the continental United States, creating and evaluating treatment approaches which infuse local cultures is a necessary endeavor (Castro, Barrera, & Steiker, 2010). As a traditional Hawaiian activity, surfing may be an avenue for
Native Hawaiians and other local populations in Hawai‘i to access culturally-sensitive mental health services that appreciate and incorporate their cultural history and experience. The ocean has been considered a spiritual and sacred place for Native Hawaiians, and surfing may therefore provide an avenue for spiritual growth and connection in a way that infuses an individual’s cultural identity and values (Oneha, 2000). The findings of this study encourage further research to begin developing a foundation of culturally-sensitive mental health interventions, which could include surfing among other culturally-relevant activities, for this population.

Limitations of the design of this study should be acknowledged when considering possible implications of the relationship between participating in a surf class intervention and spirituality. Due to methodological issues, it cannot be determined whether or not the change in spirituality can be attributed to the act of surfing itself in this study. For example, participants in this study engaged in surfing as a “group,” that is, they participated with a consistent group of classmates throughout the semester. Given that a component of our proposed definition of spirituality includes feeling a connection with others, having a shared experience with peers may have contributed to an increase in reported spirituality.

Conversely, surfing in a group environment may influence the spiritual experience in other ways, such as reducing the connection experienced with nature or a higher power, as an individual’s attention may have focused on the group experience. Future research should compare the effects of participating in surfing in a group versus solitary environment. Furthermore, it is possible that components which contribute to the surfing experience, such as mindfulness or exercise, may be contributing to the effects found in this study. Future research is encouraged to develop adequate control groups to address these issues, such as control conditions that include other mindfulness-based activities (such as meditation groups) and other
physical activities (such as running or other sports-based groups). Studies should also address the potential impact of participating in an outdoors, nature-based sport. Future research should have control groups to compare surfing to other nature-based physical activities, such as swimming in the ocean.

With these limitations in mind, regardless of whether the increase in spirituality can be attributed to the act of surfing itself, the fact that surfing is associated with an increase in spirituality and is a culturally-relevant activity is important to note in its own right. As discussed above, more research that supports these findings could encourage surfing to be incorporated into a culturally-sensitive prevention and treatment approach with Native Hawaiian and other local populations in Hawai‘i, either in conjunction with other treatment components or possibly as a stand-alone intervention if future evidence is strong enough to support such an approach.

While a significant increase in reported levels of spirituality was observed, no significant changes were found in regard to depression, anxiety, and overall quality of life or any of the four domains of physical health, psychological health, social relationships, and personal environment for “new surfers.” It should be noted that a small effect size (Cohen’s $d = .2$) was found in the non-significant decrease in reported levels of depression from baseline to post-test. The effect sizes for changes on the BAI and WHOQOL-BREF were negligible.

While it is important to acknowledge the possibility that being exposed to a surf class intervention without prior “regular” surfing experience does not lead to changes in these mental health areas, a second possible explanation for the lack of changes found in this study could be attributed to a floor effect in the sample. Given that the participants were comprised of students enrolled in a college course, they may demonstrate more favorable mental health characteristics
than a typical clinical population. Along these lines, the ranges reported at baseline on the BDI-II (obtained range = 0-32; possible scale range = 0-63), BAI (obtained range = 0-29; possible scale range = 0-63), and WHOQOL-BREF (obtained range = 70-122; possible scale range = 26-130) were relatively truncated, and the means tended to fall on the less clinically severe ends of each scale. For example, the means at baseline on the BDI-II ($M = 10.28, SD = 8.12$) and BAI ($M = 7.84, SD = 7.15$) fell within the scales’ “minimal” and “mild” range of symptoms, respectively (Beck, Steer, & Brown, 1996; Beck & Steer, 1993). Given this limitation in the methodology of this study, future research should examine whether participating in surfing leads to significant changes in reported symptoms with clinical populations, such as individuals who meet DSM-V criteria for a mood or anxiety disorder (American Psychiatric Association, 2013).

Furthermore, given that the course met once per week, several course meeting times did not involve surfing, and the time spent in the ocean each course meeting was limited to an estimated average by the instructor of 15-20 minutes per student per course meeting, the “dosage” of the intervention may have been insufficient to promote significant changes in depression, anxiety, or quality of life. While this study was limited by the course parameters and requirements, future research should experiment with varying “doses” of a surfing intervention. For instance, surfing more days per week, extending the duration of each surf session, and implementing a learn to surf program over a longer time frame may contribute to more significant changes on these mental health outcomes.

The second hypothesis of this study, that the surfing experience, both in terms of the subjective, spiritual surfing experiences and the frequency of surfing, would be positively associated with post-test levels of spirituality, negatively associated with post-test levels of depression and anxiety, and positively associated with post-test levels of quality of life, was
Participants’ reported subjective, spiritual surfing experiences were partially supported. Participants’ reported subjective, spiritual surfing experiences were correlated with overall spirituality at post-test, which converges with previous findings (Amrhein et al., in press) and indicates that individuals who perceive the surfing experience to contain elements associated with spirituality report a higher overall degree of spirituality. Conversely, levels of subjective, spiritual surfing experiences were not significantly related to depression, anxiety, or quality of life at post-test.

Similarly, no significant correlations were observed between the number of days surfed outside of the course meeting time and reported levels of spirituality, depression, anxiety, or quality of life. This result may be due to the lack of variability in the sample, as the range of reported days surfed weekly on average outside of the scheduled course time was 0-4 days per week, with an average of .46 days surfed outside of the course meeting time ($SD = .79$). This limited variability makes it challenging to draw conclusions about the relative influence of surfing more or fewer days per week on mental health outcomes. As discussed above, future research should address whether surfing more days per week leads to changes in mental health outcomes by comparing the results of distinct groups assigned to surfing a specific number of days per week (for example, a control group surfing one day and an experimental group surfing five days per week).

While qualitative data were gathered only for exploratory purposes and were not included in the data analysis, several themes appeared to emerge from reviewing responses to the open-ended question on the SSEQ asking participants to describe their experience while riding a wave or attempting to ride a wave. Some participants described the activity as providing a sense of peace and happiness. One participant noted that it was, “A fun rush of freedom and connection with the ocean.” Another described feeling, “Very empowered/at peace when riding waves.”
Other participants reported experiencing a “thrill” and that the experience was “amazing.” For example, one participant stated that, “Riding a wave is exhilarating. It gives me a sense of freedom,” while another commented that, “After riding a wave, my mentality changes. A sensation of joy is accompanied by a second wind of energy.” Finally, some participants also described some of the challenges and frustrations that accompanied surfing or attempting to surf. One participant described the experience as, “A little frustrating and nervous but rewarding and fun after.” Similarly, a different participant stated that, “Trying to ride a wave is frustrating. It’s like trying to ride a bike for the first time. But when I finally was able to stand and ride a wave, it felt…amazing.” Many of the participants’ experiences appeared to coincide with our proposed definition of spirituality, which may provide insight into the significant, positive correlation between their reported subjective, spiritual surfing experiences and overall levels of spirituality observed in this study. Future research should systematically analyze qualitative data to ascertain if any patterns are observed, particularly between qualitative experiences of surfing or attempting to surf and overall levels of spirituality.

The third hypothesis of this study, that “regular surfers” would report higher levels of spirituality, lower levels of depression and anxiety, and higher levels of quality of life than “new surfers,” was not supported in these results. A limitation of the study was that the prior experience of surfing among participants was not controlled for, so the number of participants who would have “regular” surfing experience prior to data collection was uncertain. Therefore, this hypothesis was included in the study as an exploratory analysis. In the sample, eight participants reported surfing “regularly” prior to the course, while 46 surfers denied surfing “regularly” prior to taking the course. Given the unbalanced number of participants in each group, it is challenging to draw any meaningful conclusions from these results. In the future, it
will be important to systematically recruit a more balanced sample between “regular surfers” and “new surfers,” so that the above hypothesis can be explored sufficiently. Additionally, defining this group by those who self-reported surfing “regularly” prior to the course is subjective. Future studies should seek to establish participants’ previous surfing experience more objectively in terms of frequency.

**Limitations and Future Directions**

While some limitations have been acknowledged above, several others in this study should be addressed. No control group was used, and participants were not randomly assigned to the experimental condition. It is possible that a self-selection bias of participants choosing to enroll in this surfing course could have influenced the results, in that those interested in the course may be more prone to experience positive benefits from surfing than college students who choose not to take the course. Conversely, individuals more prone to depression and anxiety may be less likely to have participated in this course, and it is also possible that these individuals may have responded differently to surfing, such as reacting with more fear. Also, while this study provides the first quantitative evidence, to the author’s knowledge, of the connection between surfing and increased spirituality, causation cannot be concluded from these results due to the lack of a full experimental design. Similarly, the order of the measures was not counterbalanced at baseline or post-test, making it possible that the consistent order of the measures influenced the results. For example, earlier scales may have primed responses on the later scales, and fatigue may have also influenced results on the measures at the end of the questionnaire packet.

This study also fails to address individual and personality differences, such as sensation seeking or openness to experience, which may indicate the participants who are more likely to
perceive the surfing experience as spiritual. Another limitation is that participants’ exercise habits before and during the course were not controlled for, making it uncertain how the overall amount of exercise may have impacted the results. There are also limitations associated with the notion of a surfing intervention itself, as not everyone has access to the ocean and/or waves conducive to surfing. Similarly, ocean and wave conditions are unpredictable, making it more challenging than other physical activities (such as running, hiking) to engage in the activity on a regular basis. Furthermore, it is unknown if students participating in this course had access to surfing outside of course time, as they may have lacked a means of transportation to the beach or personally-owned surfboards. Finally, no data were collected on individual participant’s attendance in the course, so it is possible that some participants were exposed more to the surfing course than others. Not accounting for the potential differences in participation may have influenced the final results due to variation in dosage of the surfing intervention.

As discussed above, future research should seek to build upon the findings in this study and address the aforementioned limitations. In order to more firmly establish causality between surfing and an increase in spirituality, future studies should implement randomized controlled trials so that more definitive conclusions about the relationship between surfing and spirituality can be drawn. Research should also explore the possibility of using surfing as an intervention for clinical populations. Also, surfing should be examined as a possible culturally-appropriate intervention for the Native Hawaiian population and those who adhere to their cultural values and practices. While the current study was conducted in a university setting in the Hawaiian Islands, only a small percentage (5.6%) of participants identified their ethnicity as “Hawaiian or part-Hawaiian,” suggesting that future surfing studies should make explicit efforts to conduct research with this population. The role of cultural identity should also be examined as a possible
variable that accounts for differences in the mental health benefits experienced from surfing. Cultural identity may also be examined as an outcome variable, in that participating in surfing may strengthen one’s cultural identity, particularly with the Native Hawaiian population and other local populations in Hawai‘i. Finally, future research should address other individual and personality differences, such as sensation seeking, which may lead certain individuals to benefit more from surfing, as well as other mental health outcomes that may be influenced by participating in surfing.
APPENDIX A
Pre Demographics

Directions: Please answer the following questions in regards to your demographics. All responses will be kept confidential. Please mark the appropriate response or fill in the blank for each question.

1. In order to create a code to accompany your responses, please provide the first three letters of your mother’s maiden name:

[___] [___] [___]

2. Also in order to create a code to accompany your responses, please provide the month and day of your birthday:

[___] [___] [___] [___]

3. What is your sex (check one)? a) Male _____ b) Female_____ c) Other_____

4. What is your age (in years)? _______

5. What is the ethnic background with which you most identify?
   a. African American
   b. Caucasian
   c. Chinese
   d. Filipino
   e. Hawaiian or Part Hawaiian
   f. Japanese
   g. Korean
   h. Pacific Islander
   i. Portuguese
   j. Asian other than listed above (please specify)______________________
   k. Hispanic (please specify)______________________
   l. Other (please specify)______________________
   m. Mixed (please specify)______________________

6. Do you do any regular exercise or physical activity besides surfing?
   a) Yes _____ b) No ______
      a. If yes, please specify what kind of exercise/exercises ______________________
      b. On average, how many days in a week do you do this exercise/these exercises?
         __________________
      c. On average, how many minutes do you do this exercise/these exercises?
         __________________

7. Have you ever surfed before this class? a) Yes _____ b) No_______

8. If you answered “Yes” to #7, did you surf regularly? a) Yes _____ b) No_______

9. If you answered “Yes” to #8, for how many years have you been surfing? _______

10. If you answered “Yes” to #8, on average, how many days in a month do you surf?
    a) 0-4 _____ b) 5-9 _____ c) 10-14 _____ d) 15-19 _____ e) 20 or more _______
APPENDIX B
Post Demographics

Directions: Please answer the following questions in regards to your demographics. All responses will be kept confidential. Please mark the appropriate response or fill in the blank for each question.

1. In order to create a code to accompany your responses, please provide the first three letters of your mother’s maiden name:
   
   |___|  |___|  |___|

2. Also in order to create a code to accompany your responses, please provide the month and day of your birthday:
   
   |___|  |___|  |___|  |___|

3. Since the start of this class, have you surfed outside of the weekly class meeting?
   a) Yes_____ b) No_____

4. If you answered “Yes” to #3, how many days have you surfed each week on average outside of the normal class meeting? ______

5. Have you started any new or additional physical activities or exercises since starting this surf class?
   a) Yes _____ b) No ______
      a. If yes, please specify what kind of exercise/exercises ______________________
      b. On average, how many days in a week do you do this exercise/these exercises?
          ______
      c. On average, how many minutes do you do this exercise/these exercises?
          ______

6. If you participated in other physical activities or exercises before taking this surf class, did you continue to do so?   a) Yes_____ b) No_____
APPENDIX C

SSEQ

In a few words, please describe your experiences while riding a wave or trying to ride a wave:

______________________________________________________________________________
______________________________________________________________________________

Directions: Please indicate your response by circling the answer which best describes how frequently you experience each sensation while riding or trying to ride a wave, with “Very Rarely” being the least frequent and “Very Often” being the most frequent. All of your answers will remain confidential.

1. Fun
   Very Rarely  Rarely  Sometimes  Often  Very Often
2. Blissful
   Very Rarely  Rarely  Sometimes  Often  Very Often
3. Heightened focus
   Very Rarely  Rarely  Sometimes  Often  Very Often
4. Time slowing down
   Very Rarely  Rarely  Sometimes  Often  Very Often
5. Connection with nature
   Very Rarely  Rarely  Sometimes  Often  Very Often
6. Connection with God
   Very Rarely  Rarely  Sometimes  Often  Very Often
7. Connection with the universe
   Very Rarely  Rarely  Sometimes  Often  Very Often
8. Meditative
   Very Rarely  Rarely  Sometimes  Often  Very Often
9. Smooth
   Very Rarely  Rarely  Sometimes  Often  Very Often
10. Stimulating
    Very Rarely  Rarely  Sometimes  Often  Very Often
11. Less concerned with the outside world
    Very Rarely  Rarely  Sometimes  Often  Very Often
12. Flow/being “in the zone”
    Very Rarely  Rarely  Sometimes  Often  Very Often
13. Rush
    Very Rarely  Rarely  Sometimes  Often  Very Often
APPENDIX D
KES145 Course Syllabus

UH Hilo Spring 2015 Surf Class Syllabus  KES 145

COURSE DESCRIPTION- The purpose of surf class is to teach the fundamentals of board surfing and to
provide beginning, intermediate and advanced surfers the opportunity to safely improve their surfing
skills. The course will emphasize surfing etiquette, water safety, personal growth and improvement, and
appreciation for surfing and the ocean environment, and the relationship between fitness and health-
related topics to improve, maintain, and to be part of a healthy lifestyle.

COURSE OBJECTIVES- Upon completion of this course students will have the knowledge of being able to:

- Distinguish between various styles of surfboards including longboards and short boards and their components
- Recognize swell direction, tides and currents
- Execute balanced paddling strokes
- Catch a wave, stand up, and ride the board to the right and left
- Demonstrate an understanding of wave selection
- Demonstrate an understanding and knowledge of ocean safety
- Define and understand basic surfing terminology
- Thoughtfully consider membership in and support for ocean and environment-friendly organizations (e.g. Surf Rider Foundation etc.)

SWIMMING REQUIREMENTS- To surf safely one must be a competent and confident swimmer. Only
those who satisfactorily complete the mandatory swim tests will be permitted to take the class.

Test #1- Swim in pool 20 min non-stop. A non-stop, unassisted swim for 15 min (any stroke permitted)
immediately followed by treading water for 5 min for a total of 20 min in the water without stopping to
rest or holding on to any object for support.

Test #2- Ocean swim. Meet at our regular beach park, Honolū. The test will consist of swimming
through the surf line approximately 100 yards offshore and back to the beach in under 15 min. Water
safety will be provided.

GRADING- Class will be held regardless of inclement weather or surf conditions. If the surf is not
surfable (this will be my decision), we will do one or a combination of the following: paddle, run, pick
up beach litter, and/or engage in a variety of beach-oriented activities. Surf or weather conditions are
never a reason to miss or be late to class.

Listed below are surf class rules and regulations on which a significant portion of your grade will be based:

1. Be present for roll call.
2. Adhering to the no alcohol and all other drugs (including tobacco) policy.

3. Advanced and intermediate surfers assisting in teaching beginning surfers.

4. Adhering to proper written, oral and accepted class protocol and behavior including doing what the instructor asks and following all instructions and directions.

5. Surfing where your instructor gives you permission to surf.

TARDIES/ABSENCES/ILLNESS-On-time attendance is essential for your participation in surf class. Be EARLY. Once you have a total of three unexcused or non-notification absences your grade will be dropped. If you know in advance that you will be missing a class notify me. You are required to send an email or leave a voicemail or text explaining your situation. If there is a physical, medical or personal reason why you don't want to or can't surf on any particular day but you feel well enough to go to school, you are expected to show up on-time and participate in as many activities as possible.

CELL PHONES- Using cell phones and other electronic devices are prohibited in class. EXTRA CREIT/MAKE-UPS- Absences can be made up by

1. Membership in a surf/environment related organization.

2. Attending a meeting or event related to the ocean/environment and writing a two page summary of what was discussed.

3. Reading a book or article on an aspect of surfing and writing a two page summary of what you learned.

CHRONIC INJURY, ILLNESS OR DISABILITY- At the first class meeting students are required to notify me if they have any pre-existing medical condition(s) that could become a medical emergency.

SAFETY & HEALTH RISKS- Safety is priority #1! You are participating in the UHH Surf Class with the full knowledge of the hazards and risks associated with surfing and the activities conducted a part of this class. Surfing can be a hazardous sport with numerous inherent risks. As with all athletic activities that are physical in nature, surfing can lead to moderate to severe injuries including abrasions, cuts, dislocations, stings, fractures, head, neck, back, and spinal injuries, paralysis, drowning, and even death. All accidents or injuries, whatever their severity, must be reported immediately to me or a lifeguard. NEVER surf in conditions that are beyond your ability.

EQUIPMENT- Surfboard, body board, fins, leash, wax, wetsuit, sunscreen, towel, booties, hat, mask, snorkel.

PERTINENT WEBSITES- usla, noaa, and wetsands.
REFERENCES


