

# The Effect of a Blue Mind Intervention on College Student Well-Being

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## Abstract

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*Being around water can make people happier by inducing a semi-meditative state called the “Blue Mind” (Nichols, 2014). The current purpose was to determine if watching water videos paired with music or natural water sounds improves well-being. In the first study (N = 39), experimental participants viewed short videos of moving water (crashing beach waves, babbling brook, and a waterfall) for two weeks. Videos were paired with either water inspired classical music or natural water sounds. Unlike controls who did not watch the videos, both treatment groups experienced significant increases in grit and happiness, and the natural sounds condition also experienced increases in life satisfaction. In the second study (N = 71), a one-session intervention and a live water treatment condition (sitting next to a fountain) were introduced. Participants in all treatment conditions experienced significant increases in happiness and decreases in revenge and avoidance transgressions. Thus, both experiments reveal that “Blue Mind” interventions that include water scenes paired with either music or natural sounds can improve the well-being of college students.*

*Key words: positive psychology, well-being, undergraduate, Blue Mind, well-being intervention*

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## The Effect of a Blue Mind Intervention on College Student Well-Being

College students are at a heightened risk for developing mental health problems (Xiao et al., 2017). In a 2021 survey of undergraduate students, 51% of college students reported having moderate psychological distress (ACHA, 2021). Similarly, during the 2020-2021 school year, more than 60% of students met the criteria for at least one mental health problem as demonstrated through a survey completed by more than 350,000 students (Lipson et al., 2022). Anxiety, depression, and stress are reported as the top presenting concerns of college students according to a survey of college counseling center directors (AUCCCD, 2021). Despite this growing population continuing to report mental health issues and psychological distress, college counseling center staff are unable to keep up with the demand. Rates of participation in counseling center services increased 81% from 2007 to 2017, causing counseling center staff to increase their caseload but diminish their treatment efficacy (Bailey et al., 2021). In addressing this problem, it is important to research alternative treatment techniques that could be easily implemented in the daily lives of college students. However, it is important to note that while these other techniques may be helpful in the management of psychological distress, they are not a replacement for counseling or therapy.

Prior research shows that being in and around water can improve well-being (Nichols, 2014). Central to this study is the Blue Mind theory, which explains the human-water connection as fostering a semi-meditative state of happiness and satisfaction inspired by water, its elements, and even the color blue (Nichols, 2014). The Blue Mind theory has been studied through the effects of water-based activities (Britton et al., 2018; Nichols, 2014; Wheaton et al., 2018), visual and auditory stimuli of water (Depledge et al., 2011; Nichols, 2014; Thake et al., 2020, Passmore & Holder, 2017) and even living near the water (MacKerron & Mourato, 2013; Nichols, 2014; Wheaton et al., 2018). The framework for Blue Mind lends support to eco-existential psychology, the concept that nature can help address anxieties (Passmore & Howell, 2014). While not a replacement for therapy, there is evidence that Blue Mind interventions can help mediate stress and mental health needs in single sessions and across multiple sessions (Schleider & Weisz, 2017; van der Klink et al., 2001; Britton et al., 2018). However, no study to date has compared the effects of single-session versus multiple-session applications of the Blue Mind theory.

Exposure to natural scenes (e.g., forests, coastlines) can promote stress reduction (Depledge et al., 2011; Wheaton et al., 2018). In initial interpretations of nature photos, participants frequently mention words with heavy

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emotional connection, such as rejuvenation and peace. Meanwhile, initial interpretations of photos of buildings caused emotional words like stress and annoyance to be frequently mentioned (Passmore & Holder, 2017). Through multiple studies, participants gave higher positive mood ratings when looking at any photo containing water (Nichols, 2014; Passmore & Holder, 2017). In a survey about the thoughts and feelings around photographs of nature scenes, scenes with the presence of water were most liked, as they reminded participants of pleasant memories (Thake et al., 2020). In addition to the positive impact of looking at natural scenes with water on emotional well-being, additional research supports a positive relationship between exposure to the natural environment or elements of the natural environment and behaviors intended to help others (Weinstein et al., 2009; Guéguen et al., 2015), even if nature is viewed only through a brief video (Weinstein et al., 2009; Zelenski et al., 2015; Zu et al., 2021).

Consistent with the research on the positive impact of viewing nature scenes, natural sounds are associated with low levels of auditory stress (Heo et al., 2017) and improvement of mood (Febriandirza et al., 2017). For example, non-biotic sounds, like the splashing of waves or trees rustling in the forest, help enhance relaxation and improve mood states (Turner & Freedman, 2004; Jo et al., 2019). In a study with a two-week nature intervention, well-being, including the net-positive affect, was higher for those in the nature condition (Passmore & Howell, 2014). Music may have the same well-being benefit, because music connects humanity with the natural world (Turner & Freedman, 2004). In a study focusing on classical, awe-inspiring music, participants experienced a positive effect when listening to awe-inspiring music and were motivated to do moral acts (Ji et al., 2021). Although music exposure does produce benefits of well-being, additional researchers found that when natural sounds and classical music are directly compared, natural sounds allowed for greater concentration and enjoyment and lesser distraction than classical music when completing a designated task (Febriandirza et al., 2017).

The research reviewed thus far suggests that people might experience a well-being enhancement from watching videos that contain water scenes (Zelenski et al., 2015; Xu et al., 2021), especially when those water scenes are accompanied by natural sounds as opposed to classical, instrumental music (Febriandirza et al., 2017). Based on research showing that watching natural water scenes through videos has a positive impact on well-being (Zelenski et al., 2015), it was hypothesized that the treatment groups (students who watch audiovisuals using a Blue Mind intervention) would exhibit significant increases in well-being from baseline to post-treatment compared to those in the control group (students who do not watch the audiovisuals with the Blue Mind intervention).

Additionally, based on research showing that listening to nature sounds more positively impacts psychological measures compared to music (Febriandirza et al., 2017), it was hypothesized that the participants in the treatment condition with audiovisuals and natural water sounds would exhibit a significantly greater increase in well-being from baseline to post-treatment compared to participants in the treatment condition with audiovisuals and “water inspired” instrumental music.

## Study One

### Method

#### Design

The study formed a 3 x 2 mixed-subjects factorial with treatment condition (water videos with natural sounds, water videos with instrumental music, no treatment control) as the between-subjects factor, and changes in well-being measures from baseline to post-treatment as the repeated, dependent measures.

#### Participants

Participants included 39 undergraduate students enrolled in one of two fall semester courses (a positive psychology course,  $n = 21$  or a psychology and the social world course,  $n = 18$ ) at a small liberal arts college located in the subtropic region of the Southeastern United States. Participation took approximately six hours over the course of eight sessions. Prior to the first treatment session, participants were randomly assigned to be in one of three treatment conditions (water videos with natural sounds, water videos with instrumental music, no treatment control).

The majority of the sample indicated psychology as their major (47.2%). Approximately 19% indicated one of the natural sciences as their major, and approximately 17% indicated business or communication as their major. The sample was majority cis-female (77.1%), followed by 20% cis-male, and 2.9% gender non-binary. The majority of the sample was white (71.4%). Approximately 11% identified as Black or African American, and approximately

9% indicate that they were Latino. The majority of the sample consisted of seniors (42.9%). Approximately 26% percent of the sample was composed of juniors, approximately 23% was composed of freshmen, and approximately 9% was composed of sophomores.

## **Materials**

Seventeen baseline assessments were used that covered topics of subjective happiness, depressive symptoms, emotions, life satisfaction, stress coping, college maladjustment, self-esteem, and self-worth. All questionnaires that were used have been found to be reliable and valid.

### ***Authentic Happiness Inventory (Seligman et al., 2005)***

The AHI scale was designed to evaluate an individual's level of happiness through three components: pleasure, engagement, and meaning. Participants were asked to choose one of five statements that best described how they had been feeling for the past week (e.g., "I am usually in a bad mood"). The 24-item questionnaire uses a 5-point scale: 1 (*negative*) to 5 (*extremely positive*). This measure has demonstrated reliability;  $\alpha = .92$  (Schiffrin & Nelson, 2010).

### ***General Happiness Scale (Lyubomirsky & Lepper, 1999)***

This well-being measure was designed to measure subjective happiness by rating their own happiness and comparing it to the happiness of their peers. The scale uses a 7-point response range and asked participants questions about the extent they agree with a statement (e.g., "Compared to most of my peers, I consider myself: 1 (*less happy*) to 7 (*more happy*)"). This measure has demonstrated reliability;  $\alpha = .86$ .

### ***PANAS Questionnaire (Watson et al., 1988)***

The Positive and Negative Affect Scale is a questionnaire designed to measure one's emotional state. The questionnaire is divided into two parts: positive affect and negative affect. The positive affect section assesses one's tendency to experience positive emotions (e.g., "Interested") while the negative affect section assesses one's tendency to experience negative emotions (e.g., "Upset"). The questionnaire measures 20 items on a 5-point scale: 1 (*very slightly or not at all*) to 5 (*extremely*). Lower scores represent lower levels of positive and negative affect, while higher scores represent higher levels of positive affect. This measure has demonstrated reliability;  $\alpha = .86$  for positive affect and  $\alpha = .84$  for negative affect.

### ***CES-D Questionnaire (Radloff, 1977)***

The Center for Epidemiologic Studies Depression questionnaire measures depression symptoms in a general population by asking participants to indicate how often they experience each symptom within the span of a week (e.g., "I felt hopeful about the future"). Participants were asked to rank 20 sentences using a 4-point range: 0 (*rarely or none of the time*) to 3 (*most of the time*). This measure was reported to be reliable;  $\alpha = .90$ .

### ***Fordyce Happiness Questionnaire (Fordyce, 1977)***

The Fordyce Happiness Scale, alternatively known as the Fordyce Emotions Questionnaire, provides insight into one's emotional well-being by focusing on the different components of subjective well-being. The questionnaire asked participants to indicate the percentage of time generally spent in happy, unhappy, and neutral moods, ensuring that the overall percentage was equal to 100%. There was also an additional question that asked participants to rate their perceived quality of general happiness on a 9-point scale: 1 (*extremely unhappy*) to 9 (*extremely happy*). Using test-retest methods, this measure was found to be reliable ( $\alpha = .86$  over two weeks,  $\alpha = .67$  over four months) (Fordyce, 1977).

### ***Optimism Test (Scheier & Carver, 1985)***

This scale measured whether one has an optimistic or pessimistic outlook of their future by having participants choose the cause that was most likely to be applicable to them (e.g., “You host a successful dinner: *I was particularly charming that night, I am a good host*”). This measure was reported to be reliable;  $\alpha = .70$

### ***Transgression Motivations Questionnaire (McCullough et al., 2010)***

The Transgression-Related Interpersonal Motivations revised questionnaire assesses the motivation for forgiveness through avoidance and revenge (e.g. “I’ll make him/her pay”). Participants were asked to think of a specific person who had seriously hurt them recently and indicate current thoughts and feelings about the person through rating statements on a 5-point scale: 0 (*slightly disagree*) to 4 (*strongly agree*). This measure was reported to be reliable;  $\alpha = .85$ .

### ***Gratitude Survey (McCullough et al., 2002)***

The gratitude survey helps one assess one’s current level of gratitude by considering concrete gratitude, specific instances of thankfulness, and connective gratitude, which is how gratitude influences one’s perspective (e.g., “I have so much to be thankful for”). Participants were asked to answer six items on a 7-point scale: 1 (*strongly disagree*) to 7 (*strongly agree*). This measure is reported to be reliable;  $\alpha = .82-.87$ .

### ***GRIT Survey (Duckworth et al., 2007)***

This survey measures one’s self-perception of their passion and perseverance in pursuing and completing long-term goals (e.g., “I am a hard worker”). Participants were asked to rate 12 statements on a 5-point scale: 0 (*not like me at all*) to 4 (*very much like me*). This measure has demonstrated reliability;  $\alpha = .85$ .

### ***PERMA (Butler & Kern, 2016)***

The PERMA-Profiler is a questionnaire that measures five pillars of well-being: positive emotion, engagement, relationships, meaning, and accomplishment. It provides insight into one’s overall life satisfaction. Participants were asked to rate on a 10-point scale – 0 (*not at all*) to 10 (*completely*) – how they feel each sentence best describes themselves (e.g., “In general, how often do you feel anxious?”). This measure was reported to be reliable;  $\alpha = .85$ .

### ***Satisfaction with Life Scale (Diener et al., 1985)***

The Satisfaction with Life Scale is a cognitive evaluation that measures an individual’s satisfaction with their life. Participants were asked to rate 5 statements using a 7-point scale (e.g., “The conditions of my life are excellent: 1 (*strongly disagree*) to 7 (*strongly agree*)”). This measure was reported to be reliable;  $\alpha = .86$ .

### ***Approaches to Happiness (Peterson et al., 2005)***

The Approaches to Happiness Questionnaire measures overall happiness and the different ways they approach happiness (e.g., “My life serves a higher purpose”). The questionnaire had participants rate 18 sentences on a 5-point scale: 1 (*not like me at all*) to 5 (*very much like me*). This measure was reported to be reliable;  $\alpha = .72-.82$ .

### ***Stress & Empathy Questionnaire (Peterson et al., 2005)***

The Stress and Empathy Questionnaire measures one’s stress levels and their tendency to support, help, and understand others. Participants were asked to what degree they agree or disagree with a statement using an 11-point scale (e.g., “If I see someone fidgeting, I’ll start feeling anxious too: 1 (*strongly disagree*) to 11 (*strongly agree*)”). This measure was reported to be reliable;  $\alpha = .72-.82$ .

### ***Meaning In Life Questionnaire (Steger et al., 2006)***

The Meaning in Life Questionnaire assesses two dimensions in the meaning of life: presence of meaning and search for meaning. The presence of meaning measures how much one feels their life is full of meaning, while the search for meaning measures the extent to which individuals seek and explore meaning in their lives (e.g., “I understand my life’s meaning”). The questionnaire makes use of a 7-point scale: 1 (*absolutely untrue*) to 7 (*absolutely true*). This measure was reported to be reliable;  $\alpha = .86-.87$ .

### ***Well-Being Survey (Ryff, 1989)***

The Well-Being Survey is a questionnaire that assesses one’s quality of life. Participants were asked to rate several statements (e.g., “In most ways my life is close to ideal”) using either a 10-point scale: 1 (*not satisfied at all*) to 10 (*completely satisfied*), or a 7-point scale: 1 (*strongly disagree*) to 7 (*strongly agree*). This measure has demonstrated reliability;  $\alpha = .83$ .

### ***Mindfulness Scale (Brown et al., 2011)***

The Mindfulness Scale measures one’s use of mindfulness in their daily lives. The questionnaire has participants rate 15 statements on a 6-point scale (e.g., “I find myself preoccupied with the future or the past: 1 (*almost always*) to 6 (*never*)”). This measure is reported to be reliable;  $\alpha = .82$ .

### ***Perceived Stress Scale (Wang et al., 2011)***

The Perceived Stress Scale measures how one’s life can be perceived as stressful by investigating how unpredictable, uncontrollable, and overloaded one finds their life over the course of 10 items using a 5-point range (e.g., “In the last month, how often have you been upset because of something that happened unexpectedly?: 0 (*never*) to 4 (*very often*)”). This measure was reported to be reliable;  $\alpha = .86$ .

### ***Audiovisuals***

Participants in the treatment conditions were randomly assigned to one of the two auditory content conditions (natural sounds vs instrumental music). All participants in the treatment condition watched all three video content types which are approximately three minutes long. Video one for both groups showed running streams and brooks. Video two for both groups showed waves crashing against the shore. Video three for both groups showed a running waterfall. The only difference in the audiovisual content of each group was the corresponding audios. Those in the natural sound treatment condition listened to natural water sounds, like ones of waves crashing on the seashore and babbling brooks, in the background of each video. The audio of natural water sounds was the same in each video and therefore were not congruent to the scene being shown. Those in the “water inspired” instrumental music group listened to one of three pieces of music in the background of the video. In “Music Video 1,” participants listened to an excerpt of the eighth movement (Bourrée) of Handel’s *Water Music Suite I in F*. In “Music Video 2,” participants listened to an excerpt of Debussy’s “La cathédrale engloutie” (The Sunken Cathedral). In “Music Video 3,” participants listened to Du and Wu’s “Dance of the Seaweed.”

## **Procedure**

Following the obtainment of informed consent, participants were randomly assigned into one of three groups: control, water inspired instrumental music, and natural water sounds. All groups completed 17 baseline questionnaires designed to assess mental well-being prior to the treatment phase of the experiment. During the treatment phase, both treatment groups viewed one of three videos at the beginning of class for two consecutive weeks with water inspired music or natural water sounds in the background. They saw each video a maximum of two times and never saw the same video two sessions in a row. The control group was not exposed to any of the videos. Upon completion of the two-week treatment, all groups completed the same 17 post-treatment measures of well-being.

## **Results**

The comparison of pre- and post-treatment measures of the Fordyce Happiness Questionnaire, GRIT survey, and Satisfaction of Life Scale for all conditions, including descriptive and inferential statistics, are shown in Table 1. All analysis of the data was done using IBM SPSS version 29. A series of paired samples t-tests were conducted to determine if there was a significant change in well-being measures from baseline to post-treatment exposure as a function of the type of treatment exposure (videos with natural sounds, videos with music sounds, control - no video and sound). Of the seventeen measures of well-being utilized during this study, only the Fordyce Happiness Questionnaire, GRIT Survey, and Satisfaction of Life Scale had statistically significant differences from pre-treatment to post-treatment in at least one condition. Participants in the music treatment condition experienced statistically significant increases in two of the seventeen measures: happiness (*FHQ*),  $t(13) = -1.88, p = .04, \text{Cohen's } d = -.25$ , and grit (*GRIT*)  $t(13) = -2.72, p = .009, \text{Cohen's } d = -.36$ . Meanwhile, those in the natural water sounds treatment condition experienced statistically significant increases in three of the seventeen measures: happiness (*FHQ*),  $t(17) = -2.19, p = .02, \text{Cohen's } d = -.24$ ; grit (*GRIT*),  $t(17) = -1.81, p = .04, \text{Cohen's } d = -.27$ , and satisfaction with life (*SLS*),  $t(17) = -2.19, p = .02, \text{Cohen's } d = -.52$ . There were no differences in scores between pre- and post-treatment in the control condition among all seventeen measures.

**Table 1**

*Pre- and Post-treatment Assessments of Well-Being Among Students Using a Blue Mind Intervention*

Natural Water Sounds Video				
Assessment	Pre-Treatment, <i>M (SD)</i>	Post-Treatment, <i>M (SD)</i>	<i>t</i> (17)	<i>p</i>
FHQ	6.95 (1.72)	7.37 (1.71)	-2.19*	0.02
GRIT	3.51 (0.56)	3.68 (0.68)	-1.81*	0.04
SLS	21.51 (8.01)	25.22 (6.21)	-2.19*	0.02
Instrumental "Water Inspired" Music Video				
Assessment	Pre-Treatment, <i>M (SD)</i>	Post-Treatment, <i>M (SD)</i>	<i>t</i> (13)	<i>p</i>
FHQ	6.86 (1.70)	7.29 (1.68)	-1.88*	0.04
GRIT	3.61 (0.74)	3.85 (0.57)	-2.72**	0.009
SLS	25.64 (4.52)	26.86 (4.20)	-1.23	0.12
No Treatment (Control)				
Assessment	Pre-Treatment, <i>M (SD)</i>	Post-Treatment, <i>M (SD)</i>	<i>t</i> (5)	<i>p</i>
FHQ	7.50 (1.38)	7.83 (1.75)	-1.00	0.18
GRIT	3.35 (0.68)	3.43 (0.54)	-0.67	0.27
SLS	27.83 (1.72)	27.67 (1.97)	0.20	0.43

*Note.* FHQ = Fordyce Happiness Questionnaire; SLS = Satisfaction with Life Scale

\* $p < .05$ . \*\* $p < .001$

## Discussion

Consistent with the hypotheses, participants in both treatment conditions experienced significant increases in grit, happiness, and satisfaction with life. Thus, the results reveal that Blue Mind interventions that include watching videos of water scenes with either water inspired music or water-based natural sounds can improve the well-being of college students. In addition to and consistent with the hypothesis, those in the natural sounds treatment condition reported increases in more of the well-being measures than those in the instrumental “water inspired” music condition. Specifically, those in the treatment condition who listened to water-based natural sounds experienced significant and greater improvements in happiness, grit, and life satisfaction. Meanwhile those treatment conditions that listened to classical “water inspired” music only experienced statistically significant increases in happiness and grit. However, those in the control condition did not experience any significant differences in any of the measures from baseline to post-treatment on any of the well-being measures.

The findings provide insight into the effectiveness of Blue Mind interventions for college students, suggesting that exposure to water-related stimuli can promote well-being and emotional balance. Prior research has

shown that water can induce relaxation and reduce stress levels (Depledge et al., 2011; Nichols, 2014) and the present results are consistent with findings in previous literature. Therefore, the positive outcomes of this study emphasize the importance of incorporating water and nature-based interventions into mental health initiatives directed at college students.

## **Future Directions**

Study one served as a pilot study for study two. One limitation of the pilot study was that there was a small sample size (39 participants). Study two increased the sample size (72 participants) to support the law of large numbers. In increasing the participant pool, the number of well-being questionnaires will decrease to five: three questionnaires that found statistically significant differences in the first study (Fordyce Happiness Scale, Grit Survey, and Satisfaction with Life Scale) and two questionnaires that are supported by the literature to have significant differences (Gratitude Survey and Transgression Motivations Questionnaire) (Depledge et al., 2011; Guéguen et al., 2015; Nichols et al., 2014; Passmore & Holder, 2017; Weinstein et al., 2009). The initial study experienced high amounts of attrition, so in addition to the number of well-being questionnaires being decreased, the number of Blue Mind treatment sessions decreased to one.

Since the second study was reduced to one single session where participants watched the audiovisuals on one occasion, significant changes were to the audiovisuals of the second study. Instead of having three separate audiovisuals each with different water scenes, there was only one video with the Blue Mind content for each audiovisual treatment condition that was three minutes in length. During the audiovisual, three different water scenes were displayed with each scene lasting one minute in length. For the natural sound group, the water sounds aligned with the water scenes displayed, allowing for the audiovisuals to be more congruent. For the water inspired instrumental group, the same three pieces of music from the first study were used with one piece of music being associated with each scene.

Several studies show that spending two hours in nature each week, whether it be through exercise or relaxing, improves physical health and overall well-being (AHA, 2024; Nichols, 2014; Passmore & Howell, 2014; Turner & Freedman, 2004). Across multiple studies, people were happier in outdoor environments than in any kind of urban environment (MacKerron & Mourato, 2013; Seresinhe et al., 2019). The same study found that happiness levels increased by an additional 5% when water was a part of the environment (MacKerron & Mourato, 2013; Nichols, 2014). Furthermore, live sounds and recorded sounds have different impacts on listeners. Recorded sounds are more rousing, while live sounds are more immersive (Cooper, n.d.). A study comparing recorded sounds of a natural environment and live sounds of a natural environment revealed that immersive technologies do not simulate nature better (Bates et al., 2020). While soundscapes should be considered on separate terms from live sounds, an “immersive experience” through sound is richest when individuals experience nuanced responses to live, natural environment sounds (Bates et al., 2020). As a result of this research, the second study also utilized a live treatment condition where participants were exposed to a live fountain of water.

The second study lacks a true control condition, so the hypotheses from the first study were adjusted to the conditions of the second study. Based on research showing that watching natural water scenes through videos has a positive impact on well-being (Zelenski et al., 2015), it was hypothesized that the treatment groups (students who watch audiovisuals using a Blue Mind intervention or students who were exposed to the live fountain of water) will exhibit significant increases in well-being from baseline to post-treatment.

Based on research showing that that listening to nature sounds more positively impacts psychological measures compared to music (Febriandirza et al., 2017), it was hypothesized that the participants in the natural water sounds audiovisual treatment condition and the live treatment condition will exhibit a significantly greater increase in well-being from baseline to post-treatment compared to participants in the “water inspired” music audiovisual treatment condition.

Additionally, based upon research that natural sounds positively impact psychological records (Febriandirza et al., 2017) and that live sounds and recorded sounds have different effects on listeners (Cooper, n.d.; Bates et al., 2020), it was hypothesized that participants in the treatment condition who watch natural water scene videos with natural water sounds playing in the background, and participants exposed to the life fountain of water will experience a difference in well-being from baseline to post-treatment when directly compared to each other.

## **Study Two**

### **Method**

## Design

The study formed a 3 x 2 mixed-subjects factorial with treatment condition (water videos with natural sounds, water videos with instrumental music, blank video with live treatment) as the between-subjects factor and changes in well-being measures from baseline to post-treatment as the repeated, dependent measures.

## Participants

Participants included 71 undergraduate students ( $M = 19.3$ ,  $SD = 1.68$ ) enrolled in one of two fall semester courses (a positive psychology,  $n = 30$  or psychology of well-being course,  $n = 41$ ) at a small liberal arts college located in the subtropic region of the Southeastern United States. Participation took approximately one hour over the course of one session. Prior to the first treatment session, participants were randomly assigned to be in one of three treatment conditions (water videos with natural sounds, water videos with instrumental music, no treatment control).

The majority of the sample indicated psychology as their major (49.3%). Approximately 19.7% indicated one of the natural sciences as their major, and approximately 5.6% indicated business or communication as their major. The sample was majority cis-female (65.6%), followed by 25.4% cis-male, and 4.2% gender non-binary. The majority of the sample was white (73.2%). Approximately 8.5% identified as Black or African American, and approximately 14.1% indicate that they were Latino. The majority of the sample consisted of freshmen (38.0%). Approximately 26.8% of the sample was composed of seniors, approximately 21.1% was composed of juniors, and approximately 14.1% was composed of sophomores.

## Materials

### *Well-Being Surveys*

Five well-being assessments – the Fordyce Happiness Questionnaire (Fordyce, 1977), Transgression Motivations Questionnaire (McCullough et al., 2010), Gratitude Survey (McCullough et al., 2002), GRIT Survey (Duckworth et al., 2007), and Satisfaction with Life Scale (Diener et al., 1985) – were used that covered topics of subjective happiness, depressive symptoms, emotions, life satisfaction, stress coping, college maladjustment, self-esteem, and self-worth. These five assessments were chosen because they had statistically significant differences in the first study (Fordyce Happiness Scale, GRIT Survey, and Satisfaction with Life Scale) or because they are supported by the literature to have significant differences (Gratitude Survey and Transgression Motivations Questionnaire) (Depledge et al., 2011; Guéguen et al., 2015; Nichols et al., 2014; Passmore & Holder, 2017; Weinstein et al., 2009). For descriptions of the five measures being used, please refer to the Materials section of Study 1.

All questionnaires that were used have been found to be reliable and valid. For the current study, reliability coefficients (Cronbach's Alphas) were computed for the well-being surveys at the baseline phase of measurement. Results revealed that the surveys used in the current study exhibited high internal consistency: Transgression Motivations Questionnaire – Revenge,  $\alpha = .83$  ( $n = 69$ ); Transgression Motivations Questionnaire – Avoidance,  $\alpha = .91$  ( $n = 69$ ); Gratitude Survey,  $\alpha = .79$  ( $n = 68$ ); GRIT Survey,  $\alpha = .79$  ( $n = 68$ ); and Satisfaction with Life Survey,  $\alpha = .65$  ( $n = 68$ ).

### *Audiovisuals*

Participants in the video treatment conditions were randomly assigned to one of the two auditory content conditions (natural sounds vs instrumental music). All participants in the video treatment conditions watched one video approximately three minutes in length. Each video showed three water scenes approximately one minute in length each. The first scene for both groups showed running streams and brooks. The second scene for both groups showed waves crashing against the shore. The third scene for both groups showed a running waterfall. Those in the natural sound treatment condition listened to natural water sounds, like ones of waves crashing on the seashore and babbling brooks in the background. The audio of the natural water sounds matched the type of scene being shown but was not congruent to the scene being shown. Those in the “water inspired” instrumental music group listened to one of three pieces of music in the background of the video. While watching the first scene, participants listened to an excerpt of the eighth movement (Bourrée) of Handel's *Water Music Suite I in F*. While watching the second

scene, participants listened to an excerpt of Debussy's "La cathédrale engloutie" (The Sunken Cathedral). While watching the third scene, participants listened to Du and Wu's "Dance of the Seaweed." The live treatment condition did not watch a video with water scenes. They instead watched a black screen with the text "Please sit in silence for the duration of this video. Instructions will resume at the end," written in white in a legible font.

## ***Fountain of Water***

Participants who were not in a video treatment condition were assigned to the live treatment condition. An outdoor water fountain located in the center of the Ordway building on the Florida Southern College campus was used for the live treatment condition. Participants experienced the live fountain for less than 10 minutes before watching the blank video.

## **Procedure**

Participants were asked to complete baseline measures by completing the Survey Monkey, which contains the five well-being measures that were considered (Fordyce Emotions Questionnaire, Transgression Motivations Questionnaire, Gratitude Survey, Grit Survey, Satisfaction with Life Scale). After completing the Survey Monkey, participants were randomly assigned to one of three treatment conditions (video with natural sounds, video with music sounds, and blank video with live treatment). During the treatment phase, both video treatment groups (natural water sounds, water inspired instrumental music) viewed one video three minutes in length with water inspired music or natural water sounds in the background. The visual content of the videos was the same, and the only difference was the audio. Participants in the same group watched the videos together in a supervised classroom. Those in the live treatment condition waited outside by the fountain of water for less than 10 minutes while the video treatment groups watched their respective videos. When participants completed their post-treatment measures, they then watched a blank video three minutes in length. Following the treatment phase of the experiment, all participants completed the same well-being measures again through the Survey Monkey.

## **Results**

In the initial analyses, we included course (positive, resilience) as an independent variable, and found no interaction between course and any of the dependent variables, indicating that any benefits found across any of the three treatment conditions occurred regardless of whether they were in the positive psychology course or the resiliency course. Both classes received the same effect. All  $p$  values were greater than 0.10. Therefore, we did not include the course as an independent variable when reporting the remaining results.

The comparison of pre- and post-treatment measures of all well-being measures for all conditions, including descriptive and inferential statistics, is shown in Table 2. All analysis of the data was done using IBM SPSS version 29. A series of 3 x 2 mixed subjects factorial ANOVAs were conducted with treatment condition (video with natural sounds, video with music sounds, blank video with live treatment) as the between subjects factor and changes in well-being measures from baseline to post-test as the repeated dependent measure. A series of pairwise comparisons (LSDs) were conducted to determine if there was a significant change in well-being measures from baseline to post-treatment as a function of the type of treatment exposure (audiovisuals with natural sounds, audiovisuals with water inspired music, blank video with live treatment) for students in both the positive psychology course and the resiliency course. Of the five well-being measures, only the Fordyce Happiness Questionnaire, Transgression Motivations Questionnaire, Gratitude Survey, and GRIT Survey had statistically significant differences from pre-treatment to post-treatment. Participants in the natural water sounds treatment condition experienced a statistically significant increase in happiness ( $FHQ$ ),  $p < .001$ ,  $Cohen's d = -2.20$ , and statistically significant decreases in four other measures of well-being: avoidance tendencies ( $TMQ-AS$ ),  $p < .001$ ,  $Cohen's d = 1.37$ ; revenge tendencies ( $TMQ-RS$ ),  $p < .001$ ,  $Cohen's d = 1.48$ ; gratitude ( $GS$ ),  $p < .001$ ,  $Cohen's d = 1.63$ ; and grit ( $GRIT$ ),  $p < .001$ ,  $Cohen's d = .67$ . Participants in the water inspired music treatment condition experienced statistically significant increases in happiness ( $FHQ$ ),  $p < .001$ ,  $Cohen's d = -1.61$ , and statistically significant decreases in four other measures of well-being: avoidance tendencies ( $TMQ-AS$ ),  $p < .001$ ,  $Cohen's d = 1.31$ ; revenge tendencies ( $TMQ-RS$ ),  $p < .001$ ,  $Cohen's d = 1.59$ ; gratitude ( $GS$ ),  $p < .001$ ,  $Cohen's d = 1.39$ ; and grit ( $GRIT$ ),  $p > 0.53$ ,  $Cohen's d = .74$ . Participants in the live treatment condition experienced statistically significant increases in happiness ( $FHQ$ ),  $p < .001$ ,  $Cohen's d = -2.27$ , and statistically significant decreases in four other measures of well-being: avoidance tendencies ( $TMQ-AS$ ),  $p < .001$ ,  $Cohen's d = 1.50$ ; revenge tendencies ( $TMQ-RS$ ),  $p < .001$ ,

Cohen's  $d = 1.07$ ; gratitude (GS),  $p < .001$ , Cohen's  $d = 1.76$ ; and grit (GRIT),  $p < .001$ , Cohen's  $d = 1.08$ . There were no significant changes in Satisfaction with Life between baseline and post-treatment in any condition.

**Table 2**

*Pre- and Post-treatment Assessments of Well-Being Among Students Using a Blue Mind Intervention.*

Natural Water Sounds Video ( $N = 27$ )				
Assessment	Pre-Treatment, $M$ ( $SD$ )	Post-Treatment, $M$ ( $SD$ )	$F$	$p$
FHQ	3.78 (1.12)	6.41 (1.19)	74.06	<.001
TMQ-AS	26.19 (7.24)	16.81 (6.40)	734.98	<.001
TMQ-RS	9.89 (4.24)	3.52 (4.34)	776.31	<.001
GS	5.84 (0.84)	4.75 (0.43)	114.41	<.001
GRIT	3.01 (0.61)	2.59 (0.64)	317	<.001
SLS	4.84 (1.18)	4.89 (1.10)	<1	>.53
Instrumental "Water Inspired" Music Video ( $N = 27$ )				
Assessment	Pre-Treatment, $M$ ( $SD$ )	Post-Treatment, $M$ ( $SD$ )	$F$	$p$
FHQ	3.85 (1.64)	6.44 (1.58)	74.06	<.001
TMQ-AS	24.63 (7.61)	14.96 (7.20)	734.98	<.001
TMQ-RS	10.48 (3.80)	4.48 (3.75)	776.31	<.001
GS	6.06 (0.77)	5.11 (0.58)	114.41	<.001
GRIT	2.93 (0.58)	2.50 (0.58)	317	<.001
SLS	5.20 (1.21)	5.23 (1.38)	<1	>0.53
Live Treatment ( $N = 17$ )				
Assessment	Pre-Treatment, $M$ ( $SD$ )	Post-Treatment, $M$ ( $SD$ )	$F$	$p$
FHQ	3.41 (1.23)	6.47 (1.46)	74.06	<.001
TMQ-AS	25.12 (6.13)	16.41 (5.49)	734.98	<.001
TMQ-RS	9.88 (4.76)	4.47 (5.33)	776.31	<.001
GS	6.14 (0.91)	4.80 (0.58)	114.41	<.001
GRIT	3.00 (0.50)	2.46 (0.50)	317	<.001
SLS	5.21 (0.96)	5.20 (1.05)	<1	>0.53

*Note.* FHQ = Fordyce Happiness Questionnaire; TMQ-AS = Transgressions Motivations Questionnaire – Avoidance Score; TMQ-RS = Transgressions Motivations Questionnaire – Revenge Score; GS = Gratitude Survey; SLS = Satisfaction with Life Scale

## Discussion

Consistent with the hypotheses, participants in all conditions experienced significant increases in happiness and decreases in revenge and avoidance tendencies. Thus, the results reveal that Blue Mind interventions that include watching videos of water scenes with either water inspired music or water-based natural sounds and interventions that include being near fountains of water can improve the well-being of college students.

Consistent with the first hypothesis, all three treatment groups experienced significant increases in happiness and decreases in revenge and avoidance tendencies against transgressors, all of which are consistent with the prior literature (Nichols, 2014). However, the literature also supported an increase in satisfaction with life (MacKerron & Mourato, 2013; Nichols, 2014), grit (Nichols, 2014), and gratitude (Nichols, 2014; Passmore & Holder, 2017). This study found no difference in satisfaction with life and a decrease in grit and gratitude after experiencing a single, three-minute session of a Blue Mind intervention. Although prior literature shows that seeing photos of urban environments with water-elements does have positive effects on well-being (MacKerron & Mourato, 2013; Nichols, 2014; Passmore & Holder, 2017), the effects of the three-minute intervention could have worn off by the time they completed the three questionnaires, since they were the last three questionnaires in the set. Additionally, it could demonstrate that a single, three-minute intervention is not enough time to have a lasting effect.

The Blue Mind state is characterized by being present in the moment (Nichols, 2014), so taking the time to complete the first two questionnaires post-treatment could have put participants in a state outside of the Blue Mind.

Inconsistent with the second hypothesis, the natural sounds treatment condition and the live treatment condition did not experience significantly greater increases in well-being from baseline to post-intervention compared to the instrumental water inspired music condition. Since prior research did support the idea that the natural sounds condition and the live treatment condition would have greater well-being benefits than the instrumental “water inspired” music (Febriandirza et al., 2017), the lack of differences could be due to the Blue Mind intervention being done in one, three-minute session in this study as opposed to the six, five-minute sessions in the pilot study.

Additionally and inconsistent with the third hypothesis, there was no significant difference between the natural water sounds condition and the live treatment condition. While it is understood that there could be a difference in the processing of live audio and pre-recorded audio (Cooper, n.d.; Bates et al., 2020), it was unknown if there would even be a difference in well-being measures since the use of live audio and pre-recorded audio had not been studied in terms of the effect on well-being prior to this study.

This study’s findings provide insight into the effectiveness of Blue Mind interventions for college students, suggesting that exposure to water-related stimuli can promote well-being. The overall positive outcomes of this study – the increase in happiness and decreases in revenge and avoidance tendencies – emphasizes the importance of incorporating water and nature-based interventions into mental health initiatives directed at college students.

Although these two studies utilized different audiovisuals to determine the effect of a Blue Mind intervention on college student well-being, they provide some initial insight as to how Blue Mind interventions could impact the well-being of college students in short-term and longer-term use. Overall, we saw that the immediate effects of a Blue Mind intervention contribute to an increase in happiness and a decrease in avoidance and transgression tendencies, while long term effects of a Blue Mind intervention could also lead to an increase in happiness, grit, and satisfaction with life.

Both studies showed significant increases in happiness after one three-minute session and six five-minute sessions of a Blue Mind intervention. The increase in happiness as demonstrated across experiments and treatment-types (audiovisuals or live treatment) continue to provide support for the Blue Mind state, as it is characterized with a general state of happiness (Depledge et al., 2011; Nichols, 2014; Passmore & Howell, 2014; Wheaton et al., 2018). Interestingly, this was the only dimension of well-being that increased in both studies despite literature showing support for increases in satisfaction with life (Nichols, 2014; Wheaton et al., 2018), gratitude (Weinstein et al., 2009; Guéguen et al., 2015), and grit (Nichols, 2014). The experiments conducted in this paper demonstrate that happiness will increase after experiencing at least three minutes of a Blue Mind intervention, but happiness could increase further after experiencing a repeated Blue Mind intervention over a longer period.

The pilot study demonstrated a significant increase in grit over multiple sessions while the second study demonstrated a decrease in grit over one session. According to the literature, it would be expected for grit to increase across both studies due to the conscious or subconscious thoughts about the resiliency of nature (Nichols, 2014; Passmore & Howell, 2014; Wheaton et al., 2018). One reason that grit may have decreased in one session is due to the semi-meditative quality of the Blue Mind state (Nichols, 2014). After one session, the meditative aspect of the state could lead to a temporary decrease in motivation, which would cause grit scores to also decrease. However, repeated exposure to a Blue Mind intervention can build mental resilience, supporting an increase in grit (Duckworth et al., 2007). Another reasoning for the differences in grit between one session and multiple sessions is due to the contrast effect. The contrast effect is a cognitive bias that distorts one’s perception when directly comparing it to something else (Ozimek et al., 2023). Due to being in a semi-meditative state that makes one more present in the moment (Nichols, 2014), the calming experience (Depledge et al., 2011; Passmore & Howell, 2014) could expose how stressed the participants truly were. Both studies began shortly after the midterms period in the academic year. Since the participants were college students, the stress of having experienced midterms and beginning to prepare for finals would have impacted how they perceived the calming videos. In future replications of the study, it is recommended to conduct the experiment earlier in the semester to mitigate the risks of increased stress factors.

Although the first study demonstrated a significant increase in satisfaction with life after several sessions, the second study experienced no significant change after a single session. The literature suggested that satisfaction with life would have increased after being exposed to a Blue Mind treatment due to the combination of the induced semi-meditative state and the increased happiness (Nichols, 2014; MacKerron & Mourato, 2013). Additionally, the literature suggests that prolonged exposure to the water, such as living near the water, can increase satisfaction with life (MacKerron & Mourato, 2013; Nichols, 2014; Wheaton et al., 2018) and can help reduce auditory stress (Bates, 2020; Heo et al., 2017). One reason that satisfaction of life may not have increased is because of a difference in

reflection times between and among sessions. In a single session, participants may not have connected the calming effects of a nature scene (Depledge et al., 2011; Passmore & Holder, 2017) to a larger perspective. However, since the first study utilized the Blue Mind intervention over multiple sessions, the participants had more time to reflect and connect the experience into their broader life perspective. Additionally, the Satisfaction with Life Scale looks at satisfaction with one's whole life, not just satisfaction with life in the moment (Diener et al., 1985). Satisfaction with life is relatively stable as a trait (Diener et al., 1985), so the shift in satisfaction with life is more likely to happen with the use of a repeated Blue Mind intervention or with cognitive framing instructions.

The second study found decreases in the tendency to avoid and seek revenge on transgressors after a single Blue Mind intervention session, which supports prior literature (Nichols, 2014; Passmore & Holder, 2017). However, it is inconsistent with the results of the pilot study which experienced no significant changes in the tendencies after multiple Blue Mind intervention sessions. With avoidance and revenge tendencies decreasing after a single session, the Blue Mind state can be achieved after a single session as demonstrated through a mindfulness boost in the overall results (Nichols, 2014; Weinstein et al., 2009; Zelensky et al., 2015). The Blue Mind state is primarily sensory, which can reduce negative feelings in the moment (Nichols, 2014; Passmore & Holder, 2017; Thake et al., 2020), but will not change the beliefs and long-standing interpersonal patterns of a participant over multiple sessions. Over time, the emotional intensity of the intervention may wear off because of habituation, the reduced response to a stimulus after repeated exposure to the stimulus (Yazdani et al., 2008). The familiarity of watching water scenes, despite different scenes and audios being used, likely became a familiar process to the participants, leading to habituation. According to other literature on repeated uses of well-being interventions, interventions led by a therapist, as opposed to a laboratory-controlled intervention session, would be less likely to result in habituation (Schleider & Weisz, 2017) as they could adjust the intervention and add additional interventions to ensure maximum patient effectiveness.

The first study demonstrated no significant differences in gratitude, while the second study demonstrated a significant decrease in gratitude across all treatment conditions. Meanwhile, the literature suggests that gratitude should have increased after the exposure to a Blue Mind treatment (Nichols, 2014; Passmore & Holder, 2017; Weinstein et al., 2009; Zelensky et al., 2015). The semi-meditative state that the Blue Mind state induces may bring clarity to the participants of what is lacking in their life. Although the literature suggests that exposure to photos and videos should have increased well-being measures like gratitude (Depledge et al., 2014; Passmore & Holder, 2017; Weinstein et al., 2009; Zelensky et al., 2015), participants may have experienced a wanting to be present in nature and be in the scene. The live treatment group, despite being more physically present with the water element, also experienced a decrease in gratitude after one session. This could be due to the setting of the fountain, as there is evidence suggesting that being in a manufactured setting could have negative effects on one's well-being (MacKerron & Mourato, 2013; Passmore & Holder, 2009). The present study demonstrated that gratitude did not experience any significant change over multiple Blue Mind intervention sessions. While this too could be due to the effects of habituation (Yazdani et al., 2008), there was a lack of cognitive framing in the instructions before watching the video. While Blue Mind interventions do show positive benefits to well-being, gratitude specifically needs intentional framing (McCullough et al., 2002). Without the intentional instruction on reframing, the intervention fell short of enhancing gratitude.

## **Limitations**

These two studies, while being extremely beneficial for understanding the effects of Blue Mind interventions on college students, could be improved in the future. While the second study nearly doubled the number of participants of the pilot study, there was still too low of a number of participants to make the results generalizable to all college students. To continue to explore the effects of Blue Mind interventions, future studies should increase the number of participants in order to fulfill the law of large numbers. Both studies also experienced attrition. The first study experienced high amounts of attrition due to issues of attendance over six sessions, and the high quantity of questionnaires that participants were requested to complete. The second study was originally designed to have a one-week follow-up after participants were exposed to the treatment. However, over half of the participants did not return to complete the questionnaires at the one-week point. The data was not analyzed because the treatment conditions were left disproportionate, and in the case of one treatment group, less than five data points were left to analyze. Increasing the number of participants earlier in the process would not only help support the law of large numbers, but also combat any attrition that could occur. Additionally, colleges and universities of different sizes and backgrounds should explore the use of Blue Mind interventions on their student populations in order to determine the generalizability for college students as an overall population.

The study being conducted in a classroom setting did lack some ecological validity. Although both studies began at the same point in the semester, the students did not actively seek out participation in the Blue Mind intervention, as they participated in it for class credit. There was limited contextual diversity, since participants were in a familiar academic setting, which could have impacted how the participants self-reported in the questionnaires. Additionally, the Blue Mind relies on immersion in water elements (Nichols, 2014) which is limited in a classroom setting due to the use of pre-recorded audiovisuals. Future studies should not only explore the use of Blue Mind interventions in classroom settings, but also the immersion of Blue Mind interventions through exposure to water through lakes, water fountains, and pools.

Both studies used five or more well-being measures that participants were required to complete pre-treatment and post-treatment across all conditions. While this provided researchers with a broad and multidimensional assessment of well-being, the extensive number of measures, especially in the first study, may have inadvertently placed a heavy burden on participants. Completing lengthy surveys before and after treatment can lead to fatigue, reduced attention, and potentially lower-quality responses. Participant fatigue not only threatens the accuracy of self-reported data but can also increase the risk of attrition. Furthermore, if participants become disengaged, their responses may reflect hurried or less thoughtful answers, compromising the validity of the findings. In future research, carefully selecting and limiting the total number of well-being dimensions measured could reduce the participant burden and improve response quality, enhancing both the validity of the study and the overall participation experience.

The second study lacked a true control group. As a result, there was no way to directly compare the results of the three treatment groups to a group that did not experience the same conditions. While there was a true control group in the pilot study that the data could be compared to, the two studies were different in several ways, including the number of Blue Mind intervention sessions, audiovisual length, and audiovisual content. Utilizing a true control condition in this study would allow for further comparison of how effective the Blue Mind intervention was on college student well-being.

When directly comparing the two studies, one also needs to consider the fact that the first study used three, three-minute intervention audiovisuals that were utilized on a rotation, while the second study used a single, three-minute audiovisual. During the first study, the audiovisuals showed only a single scene for the three-minute period. The three audiovisuals of the initial study were put on a rotation so that no participants saw the same video back-to-back. Meanwhile, the second study utilized audiovisuals that showed three different scenes for one minute each. Because the visual content of the videos was different and the number of videos viewed were different (both in terms of intervention repetition and number of videos exposed to), the well-being effects experienced could be due to the audiovisuals themselves as opposed to the number of exposures. If doing a study comparing long-term and short-term effects of Blue Mind interventions, the audiovisual content should remain the same for the most accurate results.

Another aspect of the audiovisuals that could have served as a limitation was the instrumentation of the pieces utilized. Handel's *Water Music Suite I in F* is an orchestral piece featuring two natural horns, two oboes, bassoon, strings, and basso continuo (Handel, 1717). Debussy's "La cathédrale engloutie" (The Sunken Cathedral) and Du and Wu's "Dance of the Seaweed" are piano solos. Since both orchestral and piano pieces were used, there could have been a difference in audio processing of the instruments by the participants that could have affected their well-being. In future studies, the water inspired instrumental music should try to keep the type of music – orchestral, piano, vocal, choral, band – consistent to avoid the potential confound.

## Future Directions

There are many more ways in which the research in the Blue Mind could continue to be expanded, especially when exploring it as a form of well-being intervention. There is limited research about how live audio and pre-recorded audio effect well-being. While research is growing in sound therapy, the use of pre-recorded audio and live audio have different effects on how it is understood and processed by individuals (Cooper, n.d.; Bates et al., 2020). With this being the first study to compare live audio to pre-recorded audio in the use of audiovisuals to look at the effect on well-being, this study helps fill the gap in literature that continues to exist. Understanding the differences between pre-recorded audio and live audio is understood by people will help lay the framework to understand how the audio type could affect well-being. In time, the Blue Mind intervention could be explored through the exposure of live sounds and pre-recorded of natural water scenes without visual content.

Additionally, there is a lack of literature in comparing the use of a live Blue Mind intervention to the use of a pre-recorded audiovisual of a Blue Mind intervention. Similarly to the comparison of live audio to pre-recorded audio, this study was also the first of its kind to compare the use of a live Blue Mind intervention to a pre-recorded

Blue Mind audiovisual to determine the effects on well-being. Continuing to study the differences of a live Blue Mind intervention, pre-recorded audiovisual Blue Mind intervention, and a control will continue to determine the difference in well-being effects in watching audiovisuals of natural water scenes to watching natural water scenes in person. Additional explorations within this could include adding a treatment condition that looks at elements of water in urban settings or manufactured structures.

To track the potential changes in habituation in a long-term, repeated measures Blue Mind intervention study, having participants complete the well-being questionnaires or an abbreviated version of the well-being questionnaires could help track the changes in habituation after initial exposure to a Blue Mind intervention. Similarly, it would allow researchers to determine if the changes in well-being occur linearly or exponentially, which could provide insight into the use of Blue Mind and eco-existential psychology interventions for well-being. In multiple sessions of blue mind, tracking the changes in well-being after each session.

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