

Assessment #2: Research Report

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BMOE5001: Discovering Outdoor Lifestyles

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Basic Acknowledgement format of AI tool use

I acknowledge the use of MyBib on May 4, 2026 to create my reference list.

I confirm that I have not presented any AI generated text as my own work. I confirm I have copies of my drafts, notes, and other resources I used before, and after the use of AI tools which I may be asked to provide in evidence.

I acknowledge the use of ChatGPT on March 29th for assistance in helping with my research paper.

I used the prompt(s):

1. "Can you explain how I can structure my report based on the four activities: swimming, biking, deep breathing, and forest bathing?"
2. "Can you help me with what to put in my findings what are the key things I should be mentioning about my results?"

I confirm that I have not presented any AI generated text as my own work. I confirm I have copies of my drafts, notes, and other resources I used before, and after the use of AI tools which I may be asked to provide in evidence.

I acknowledge the use of Grammarly on May 5, 2026, to check my work for punctuation, grammar, spelling mistakes, and some sentence structure changes

I confirm that I have not presented any AI generated text as my own work. I confirm I have copies of my drafts, notes, and other resources I used before, and after the use of AI tools which I may be asked to provide in evidence.

Introduction

Recently, there has been an increase with using nature exposure as it brings many positive benefits for both physical and psychological health (Cleary et al, 2016). Research from Vseteckova, Jones, and Methyl (2020) suggests that both green and blue spaces are useful for those experiencing stress or a negative mood, as these spaces are said to improve well-being and mood, and reduce levels of stress. For this research report, the following four activities, swimming, biking, deep breath work, and forest bathing, will be examined and critically evaluated on the impact they have on health and well-being. In particular, the focus is on decreasing stress, negative mood, and increasing positive mood using primary data, scholarly articles, and the three theories: Stress Reduction Theory (SRT), Self-Determination Theory (SDT), and Attention Restoration Theory (ART).

Literature Review

Nature is a broad topic as it can be defined and experienced in many ways. Nature refers to physical landscapes, green and blue spaces, urban environments, such as parks and gardens, wild nature, and farmland (Vseteckova, Jones, and Methyl 2020). Vseteckova, Jones, and Methyl (2020) suggest there are three ways in which we can engage with nature: viewing nature, being in the presence of nature, and actively being involved in nature. As humans, we have the innate response to be with nature, known as Biophilia. The biophilia hypothesis says that since we evolved in natural environments, we have an innate need to be with other forms of life, including nature (Zelenski and Nisbet 2014). Continuing, Zelenski and Nisbet (2014) state that spending time in nature fulfills this innate response and need to connect with others, which promotes well-being, whereas a life without nature may contribute to “maladaptive functioning”. For example, research suggests green exercise brings more psychological benefits when compared to

physical activity in synthetic environments like an indoor gym (Wicks et al, 2022). This shows that, of course, indoor exercise is beneficial for your health, but the environment plays a larger role than people expect.

It has been noted that more than half of our world population lives in urban areas, and this is not necessarily a bad thing, but it has an impact on our cognitive resources, which is linked to attention fatigue (Ohly et al, 2016). According to Attention Restoration Theory, developed in 1995 by Kaplan, nature and outdoor environments are ideal places for restoring reduced attentional capacity, as nature is essential for “mental housekeeping” (Basu, Duvall, and Kaplan, 2019). The theory suggests that the less time we spend doing attention-demanding tasks and the more time spent in natural environments, allows us to regain and recover our attention capability. (Ohly et al, 2016). Furthermore, ART says that being outside in the natural world allows you to “be away” from daily stressors, to be and experience different spaces that are “softly fascinating”, and participate in activities that are “compatible” with our intrinsic motivations (Ohly et al, 2016). ART divides fascination into two types: soft and hard fascination. Soft fascination refers to the attention that requires little cognitive effort, which allows for reflection and restoration, in comparison to hard fascination, which leaves minimal space for contemplation and requires our full attention (Basu, Duvall, and Kaplan, 2019).

Deci and Ryan (2000) suggested that humans are naturally curious, active, and ambitious or can be passive and alienated, which is dependent on the social conditions in which they develop and function. The Self-Determination Theory looks at the effect different environments have on an individual's motivation and psychological development (Deci and Ryan 2000). There are two types of motivation. Intrinsic motivation involves doing an activity because you feel it is enjoyable or meaningful, as opposed to extrinsic motivation that comes from rewards or

recognition. The theory suggests that there are three psychological needs: autonomy, relatedness, and competence. Autonomy refers to the feeling of control over your own actions with your own willingness to do so (Center of Self-Determination Theory, n.d). Relatedness is the feeling of connection to and bonding with others, which brings warmth and satisfaction (Center of Self-Determination Theory, n.d). Competence refers to the effectiveness and mastery in activities when using your own skills and expertise (Center of Self-Determination Theory, n.d). Cherry (2025) stated that people are more likely to feel motivated and continue to strive for their goals when they have control over their choices. Meaning, when these three psychological needs are met, people are more likely to have more self-motivation.

The outdoor environment is often associated with both feelings of calmness and relaxation, as this idea is explained through the Stress Reduction Theory. In the early 1980s, Roger Ulrich developed this theory as he wanted to address both the psychological and physiological impacts urban environments had on human health. As humans, we evolved in natural environments, though the majority of us live in urban environments, Ulrich states that there is still a significant positive relationship between natural environments and humans (Dose of Nature, 2026). The Stress Reduction Theory suggests that exposure to or viewing natural setting elements like greenery or water generates a greater calming response, which reduces feelings of stress through their restorative qualities (Shaffee and Abd Shukor, 2018). Though the rise of concern about people spending less time outdoors is becoming more of a problem that is affecting individuals health and wellbeing. Dose of Nature (2026) mentioned that elements within urban environments can be harmful to humans' psychological and physiological health due to the intensity, noise, and other hectic things that cities or other urban environments have. Furthermore, they mentioned that nature tends to be more stress-reducing and less intense when

compared to urban environments (Dose of Nature, 2026). To further support this, there have been many studies that have shown a greater positive mood and less negative mood in participants exposed to natural environments, when compared to participants who are exposed to built urban environments (Shaffee and Abd Shukor, 2018).

Methodology

This report uses data from the following two measures: PANAS and the Perceived Stress Scale to investigate the impact of the four activities, forest bathing, swimming, breath work, and biking, on the participants health and wellbeing. PANAS is a questionnaire that is designed to measure both positive and negative changes in mood. The Perceived Stress Scale is a tool used to measure the perceived stress an individual is experiencing. When filling out both the questionnaire and scale, it was done before and immediately after each activity. The study involved using 8 sport science students who took part in each activity, which occurred over 8 weeks, though for this report, only 4 student data will be analyzed. Each activity was done outdoors and lasted approximately 1-2 hours each.

Findings

The results shown from the four activities below all show a decrease in stress and an increase in positive mood. There is a common trend between the first three activities, forest bathing, swimming, and deep breathing, as they all have minimal impact in reducing negative mood (see Figure 3). Due to the limited sample size and data, results may be skewed by participant #4's data, as their results were more extreme compared to the rest of the participants. Some activities are based on the average scores of 3 participants' results rather than 4.

From the following four activities, deep breathing had the greatest impact on reducing the participants' stress levels (see Figure 1), cold water swimming had the greatest impact on

improving positive mood (see Figure 2), and lastly, there was minimal or no change in the reduction of negative mood (see Figure 3), in particular with biking, as there was no change. Though the participants started with low negative mood scores, meaning that the minimal change does not necessarily mean it is a bad thing.

Forest bathing was the first activity, and results from the perceived stress scale show the total average score decreasing from 10.5 to 7.5 (see Figure 1). In addition, results from PANAS positive mood increased from 2.2 to 3.3 (see Figure 2). Cold water swimming had the same change in perceived stress as before the activity started, the average score was a 6, and after was a 3 (see Figure 1). Swimming had the biggest impact on increasing positive mood, as it increased from 2.5 to 3.8 (see Figure 2). The Celtic deep breath work had the greatest impact on the participants in terms of their stress levels, as the average score was a 9, and after 5 (see Figure 1). The last activity, biking, showed minimal results of perceived stress, which only reduced from a 4 to a 3.6 (see Figure 1), though the positive mood increased from a 2.4 to a 3.6 (see Figure 2). Lastly, there was no decrease in negative mood (see Figure 3).

Figure 1:

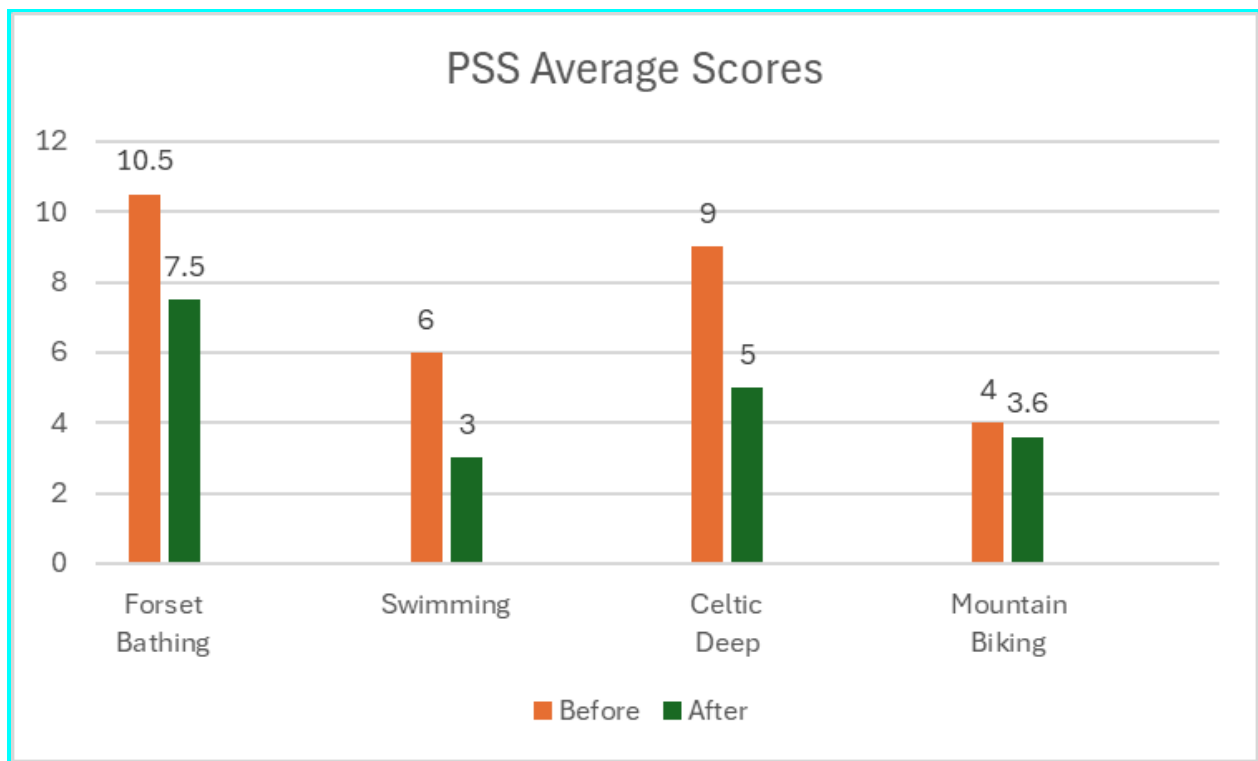


Figure 2:

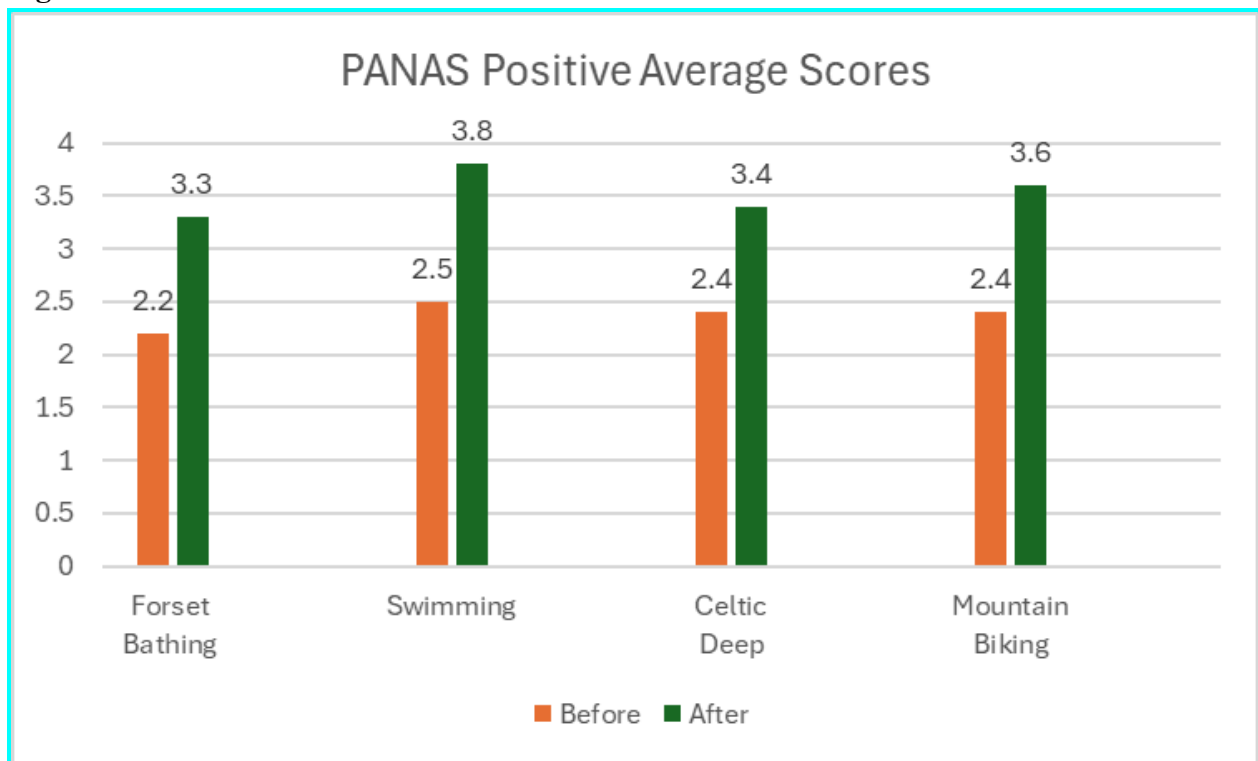
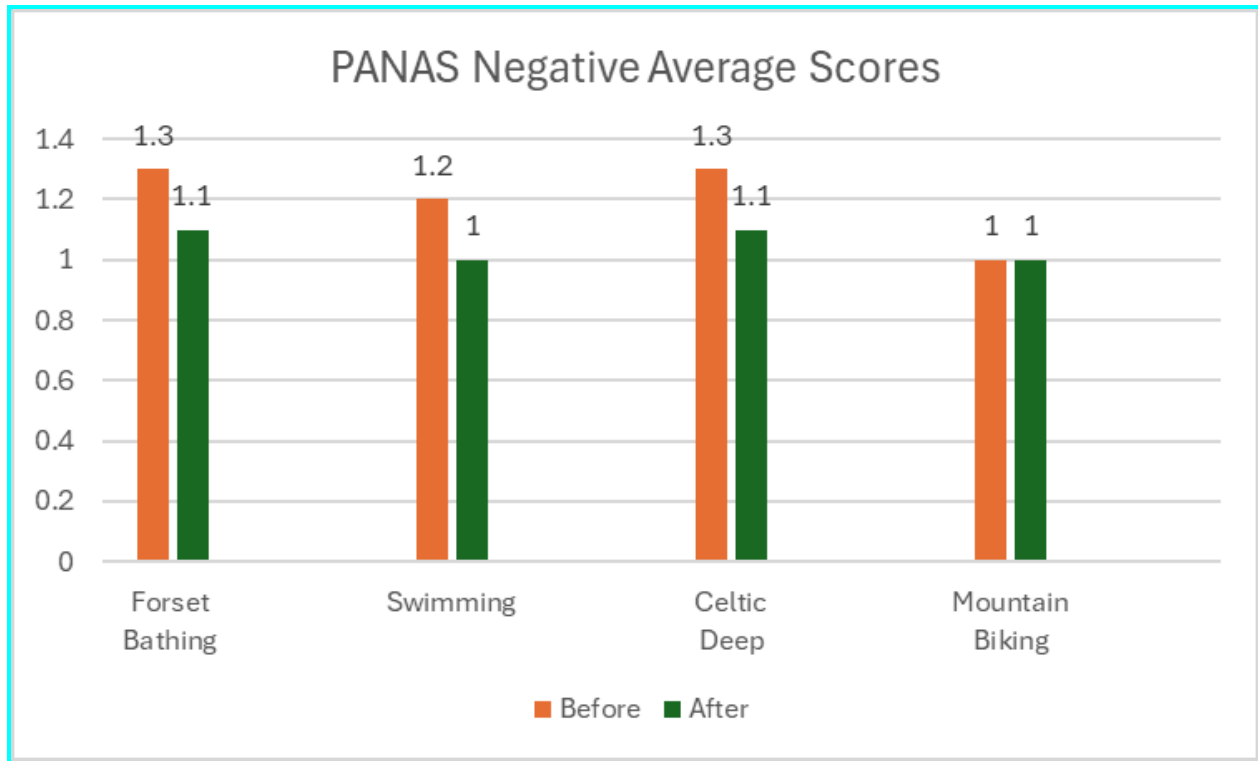


Figure 3:



Discussion

The WHO Organization (2024) recognizes that nature plays a crucial role in the promotion of health and well-being. They mentioned that forests, green spaces, and bodies of water can give opportunities for physical activity, social interactions, and relationships, all of which contribute to individuals' overall health (World Health Organization, 2024). From the four outdoor activities, forest bathing, swimming, deep breath work, and biking, this section will critically analyze and discuss the results these activities have on the participants' health and well-being.

Forest Bathing

The increase in positive mood, as well as the decrease in stress after forest bathing, connects back to both ART and SRT. In particular, to ART, soft fascination as mentioned above refers to the attention that requires little cognitive effort, which allows for reflection and

restoration (Basu, Duvall, and Kaplan, 2019). Forest bathing is quite easy to participate in and allows participants to effortlessly engage with nature, which allows for restoration and relaxation. Recent research from Rodríguez and González-Prieto, (2026) mentioned how students are more vulnerable to stress, anxiety, and reduced well-being, as this may play a role in studying, writing papers, and doing assignments, which are examples of hard fascination. As every participant was a sports science student, this activity was helpful as it reduced stress levels. An additional element that potentially contributed to the results was fractal patterns, as nature's fractals allow us to reach a state of relaxation, reducing our stress and can even help with cognitive function (Natural Health Move, n.d). Lastly, the sounds within the forest, including bird chirping, wind, or even the silence, are said to be peaceful, restorative, and stress-reducing (Dose of Nature, 2026), which can be a factor contributing to the overall results.

Swimming

Cold water swimming is an intense activity that takes courage and confidence to participate in. Overall, stress levels decreased after going swimming and had the biggest increase in positive mood. This connects back to SDT, in particular, it aligns with the 3 main psychological needs. Firstly, with autonomy, we had control in the situation, as when we entered the water, how long we stayed, and when we decided to get out. Competence was managing the cold water and temperature, and staying in and pushing ourselves to our limits. Lastly, relatedness was the social aspect of the activity, swimming with the other participants and feeling a sense of connection with nature in the quarry. Connecting back to recent research, Teleglow, Wrzesniewski, and Blecharz (2025) suggested that single cold water swimming can increase feelings of vigour as well as have a positive effect on mood. This directly connects back to our

results, as it had the biggest increase in mood and supports the idea that cold water swimming may decrease stress.

Deep Breath Work

The deep breathing at Celtic Deep had the biggest impact on decreasing stress levels and resulted in a notable increase in positive mood. Research from Roe et al (2013) suggests that being in green spaces has been linked to better mental health, improved mood, and reduced feelings of stress through several mechanisms, including physical activity, social interaction, and psychological restoration. In particular, this activity was done socially as a group, in a calm environment, and did include some physical activity, which directly connects back to the mechanisms that Roe et al (2013) were suggesting because of the overall results. The results also suggest that the theory of ART and SRT play a role, as the effortless engagement in breathing, viewing, and hearing natural elements like the sand and water, brought a calming response, which could be a contributing factor in the reduction of stress and increase of positive mood.

Biking

Stress levels decreased slightly after going biking, with the average score of 4 before and 3.6 after. The decrease is relatively small compared to other activities, suggesting that biking may have been less effective in reducing stress and changing mood. This can be due to the weather conditions of the day of the activity, as it was hailing and pouring rain, which had an impact on one of the participants during the activity. This caused them to stop participating, which can lead to the results being the way they are. Cleary et al (2016), highlighting that the positive relation between nature and wellbeing is likely determined by factors including the type of nature, where it occurs, and who is receiving the exposure. This connects to the results of positive mood changes of both participants 1 and 3 (see figure 5), as participant 1 seems to enjoy

the activity as their mood increased, but participant 3's positive mood decreased after the activity, showing the impact that the environment has on different individuals, supporting this idea.

Appendices

Activity	Forest Bathing		Swimming		Celtic Deep		Mountain Biking	
	Before	After	Before	After	Before	After	Before	After
P1	9	4	11	4	11	2	4	2
P2	6	5	5	4	5	3	4	3
P3	5	3	2	1	4	2	4	6
P4	22	18	X	X	16	13	X	X
Average	10.5	7.5	6	3	9	5	4	3.6
Change	3		3		4		0.6	

Figure 4: Perceived Stress Scale Results

Activity	Forest Bathing		Swimming		Celtic Deep		Mountain Biking	
	Before	After	Before	After	Before	After	Before	After
P1	2.7	4.7	2.7	4.9	2.3	4.9	2.3	4.7
P2	2.2	2.8	2.1	3.1	2.2	3	2.2	3.3
P3	2.3	2.8	2.8	3.5	3	3.1	2.8	2.7
P4	1.6	3	X	X	1.9	2.7	X	X

Average	2.2	3.3	2.5	3.8	2.4	3.4	2.4	3.6
Change	1.0		1.3		1.0		1.2	

Figure 5: PANAS Positive Results

Activity	Forest Bathing		Swimming		Celtic Deep		Mountain Biking	
	Before	After	Before	After	Before	After	Before	After
P1	1.3	1	1.2	1.1	1.3	1	1	1
P2	1.1	1	1.3	1	1	1	1	1
P3	1	1	1	1	1.1	1	1.1	1
P4	1.8	1.5	X	X	1.6	1.4	X	X
Average	1.3	1.1	1.2	1	1.3	1.1	1	1
Change	0.2		0.2		0.2		0	

Figure 6: PANAS Negative Results

Positive and Negative Affect Scale (PANAS) Watson, Clark & Tellegen (1988)

Below are a number of words that describe different feelings and emotions.

Read each word and then in the box next to the word, insert a number from 1 to 5 to indicate to what extent you feel this way right now, i.e. at the present moment.

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

Interested

Irritable

Distressed

Alert

Excited

Ashamed

Upset

Inspired

Strong

Nervous

Guilty

Determined

Scared

Attentive

Hostile

Jittery

Enthusiastic

Active

Proud

Afraid

About the Questionnaire

The questionnaire you have just completed assesses whether your mood is positive or negative. Physical activity, exercise and sport are often associated with positive emotional states. Is this the case for you?

How to Score the Questionnaire

The following items on the questionnaire relate to either positive or negative mood

Positive

Interested
Excited
Strong
Enthusiastic
Proud
Alert
Inspired
Determined
Attentive
Active

Negative

Distressed
Upset
Guilty
Scared
Hostile
Irritable
Ashamed
Nervous
Jittery
Afraid

1. Add your scores together for each of the items in the positive mood and negative mood list to produce a total score for positive and negative mood

Total positive
mood score

Total negative
mood score

2. Divide your total positive mood score by 10 to give an average score
3. Divide your total negative mood score by 10 to give an average score

Average positive
mood score

Average negative
mood score

4. If your negative mood score is below 3 your negative mood is low.
If your negative mood score is above 3 your negative mood is high.
5. If your positive mood score is below 3 your positive mood is low.
If your positive mood score is above 3 your positive mood is high.

Figure 7: Positive and Negative Affect Scale (PANAS)

PERCEIVED STRESS SCALE (Modified – State Measure)

The following questions ask about your feelings right now. Although some of the questions are similar, there are small differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly.

For each statement, please tell me if you agree with the statements: Strongly disagree, disagree, neither agree nor disagree, agree, strongly agree.

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
B.1. I am upset because of something that happened unexpectedly	0	1	2	3	4
B.2. I am unable to control the important things in your life	0	1	2	3	4

B.3. I feel nervous and stressed	0	1	2	3	4
B.4. I feel confident about my ability to handle my personal problems	4	3	2	1	0
B.5. I feel that things are going my way.	4	3	2	1	0
B.6. I feel that I cannot cope with all of the things that I have to do	0	1	2	3	4
B.7. I am able to control the irritations in my life	4	3	2	1	0
B.8. I feel that I am on top of things	4	3	2	1	0
B.9. I am angry because of things that are outside my control	0	1	2	3	4
B.10. My difficulties are piling up so high that I cannot overcome them	0	1	2	3	4

Perceived Stress Scale Scoring

Each item is rated on a 5-point scale ranging from strongly disagree (0) to strongly agree (4). Positively worded items are reverse scored, and the ratings are summed, with higher scores indicating more perceived stress.

Figure 8: Perceived Stress Scale

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