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Assessing Feeling States and Enjoyment of Various Exercise Activities

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University Honors Program Capstone

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Abstract

To maintain physical health, the American College of Sports Medicine (2022) recommends general exercise guidelines for healthy adults. A lack of adherence to these recommendations may be attributable in part to feeling states and enjoyment while exercising. The study utilized surveys to evaluate feeling states and enjoyment of various exercise activities to determine which type of group exercise most successfully induces changes in feeling states and if a positive correlation exists between feeling state changes and enjoyment. Students enrolled in the Fitness for Living course at the University of Nebraska at Omaha (UNO) were surveyed before and after eleven distinct 50-minute bouts of exercise using the Exercise-Induced Feeling Inventory and the Single-Item Measure of Enjoyment During Exercise scale. Through statistical analysis of the survey responses, it was determined that activities such as cardiorespiratory kickboxing and step aerobics are most successful in inducing feeling state changes. Following analysis of the collected data, it was determined that no correlation existed between feeling state changes and enjoyment following exercise. The lack of correlation between feeling state changes and enjoyment suggested that an individual does not have to experience both increased feeling states and enjoyment to adhere to an exercise program.

Keywords: exercise, exercise adherence, Exercise-Induced Feeling Inventory, feeling states, mood altercation, enjoyment

Contents

Introduction

Background

To maintain physical health, the American College of Sports Medicine (ACSM) recommends general exercise guidelines for the healthy adult. The recommendation for healthy adults is to perform 1) moderate-intensity aerobic activity for a minimum of 30 minutes on five days of the week or vigorous-intensity aerobic activity for a minimum of 20 minutes on three days of the week, 2) resistance exercises for the major muscle groups a minimum of 2 times per week, and 3) flexibility exercises for the major muscle groups a minimum of 2 times per week (ACSM, 2022). In 2020, only 24.2% of adults (i.e., 18 years or older) in the United States followed these guidelines (Elgaddal et al., 2022). This lack of exercise adherence holds serious implications concerning physical health and quality of life. Thus, it is important for exercise professionals to determine the best methods to circumvent barriers that cause low rates of exercise adherence.

Tuson and Sinyour (1993) conducted a review of twenty years of research and found that exercise can reduce anxiety and improve mood or feeling states. They found it was possible that increased feeling states may, in turn, cause a sense of enjoyment and lead to exercise adherence. Alternatively, enjoyment of a workout may have the effect of increasing feeling states, causing the person to want to continue participating in an exercise program. However, they concluded that it was unclear if all types of exercise could improve all feeling states and induce enjoyment for all people. As such, exercise professionals should understand which types of exercise to recommend to improve exercise adherence in a population.

As part of the Fitness for Living course curriculum at the University of Nebraska at Omaha (UNO), there are eleven activity-based lessons in which a designated practicum student

from the Kinesiology Practicum course must plan and lead a workout with the assistance of other practicum students. These lessons cover exercise activities ranging from yoga and mobility to cardiorespiratory interval and resistance training. The aim of the Fitness for Living course is to introduce various ways of working out in an enjoyable format. The capstone study utilized this course structure to determine which type of exercise activities were best at inducing positive feeling state changes. The study evaluated the relationship between the students' perceived enjoyment of the workouts and changes in their feeling states.

Aims and Hypothesis

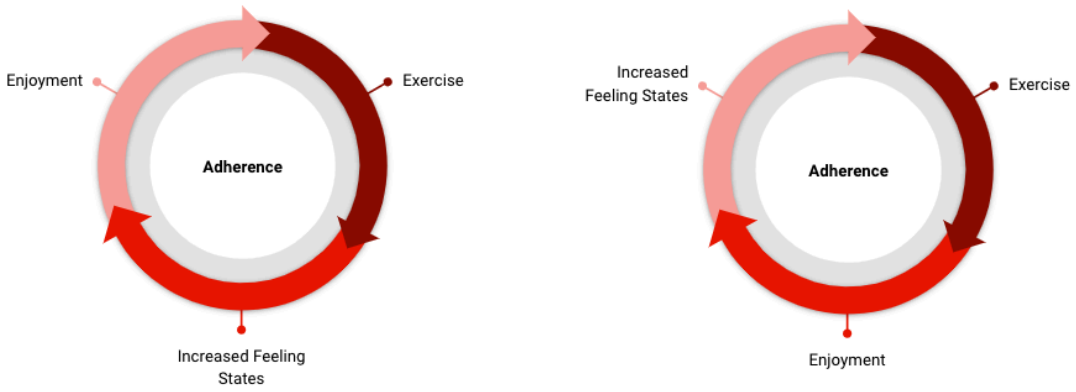
The aim of the study was twofold: 1) to determine which exercise activities were the best at inducing positive feeling state changes in the observed population and 2) to evaluate the relationship between the enjoyability of various workouts and the feeling states of those participating in the workouts. As both increased feeling states and enjoyability are assumed to cause adherence to exercise programs, determining the relationship between the two variables allowed for a model of exercise adherence to be constructed. The hypothesis of the study is that greater increases in positive feeling states from pre-exercise to post-exercise are associated with greater enjoyment of the workout. This suggests that both increased positive feeling states and enjoyment are necessary for adherence to an exercise program (as illustrated in Figure 1).

If the hypothesis is proven, it can be concluded that exercise programs must meet additional criteria–such as being enjoyable and capable of inducing positive feeling state changes–to effectively encourage participants to return for subsequent exercise sessions. Therefore, it is essential to determine which exercise activities are most effective at inducing positive feeling state changes in the observed population. Once exercise professionals understand

which types of exercise induce these changes, the primary remaining concern will be ensuring that the exercise bouts are enjoyable.

Figure 1

Hypothesized Exercise Adherence Models



Note. The figure represents the author's imagination of two possible models detailing the interaction between exercise, enjoyment, and increased feeling states in determining adherence to an exercise program.

Methodology

Participants

The participants of the study included thirteen students enrolled in the Fitness for Living course at UNO. The age demographic of the participants ranged from 18-38 years old. Of the thirteen students enrolled in the course, three students identified as female, nine identified as male, and one identified as other. Due to the nature of the class, attendance was required. However, due to various extenuating circumstances, not all the students were able to attend each activity-based lesson. Thus, the data of the study is reported as the means of the collected responses.

Procedure

To assess which exercise activities were best at inducing positive feeling state changes in the observed population, and to determine the relationship between the enjoyability of various workouts and the feeling states of those participating in the workouts, the thirteen participants were surveyed before and after eleven distinct 50-minute bouts of exercise.

The activity-based lessons took place on Mondays and Wednesdays over a 7-week time period. The eleven lessons were taught by students enrolled in the Kinesiology Practicum course. The course is offered to UNO undergraduate students who are in the last semester of their degree under the instruction of Dr. Jessica Baldwin. The Kinesiology Practicum students upheld exercise professional standards by leading the Fitness for Living students through the warm-up, training focus, and cool-down stages of each activity. The eleven lessons had various training focuses: weightroom resistance training, weightroom cardiorespiratory training, resistance training with dumbbells, step aerobics, cardiorespiratory/muscular endurance with medicine

balls, cardiorespiratory kickboxing, yoga, cardiorespiratory/muscular strength, aerobics, mobility, and resistance training with resistance bands.

The surveys were administered as hard copies in two parts. The pre-assessment was administered before the lesson began and included the Exercise-Induced Feeling Inventory (EFI). The post-assessment was administered following the completion of the lesson and included the EFI and Single-Item Measure of Enjoyment During Exercise scale (see Appendix A). The pre-assessment was administered to provide a baseline of feeling states. The pre-assessments and post-assessments were compared to determine any change (positive or negative).

The EFI measured four exercise-related feeling states–revitalization, tranquility, physical exhaustion, and positive engagement–on a 5-point Likert scale (Gauvin & Rejeski, 1993). The EFI's revitalization subcategory asked how refreshed, energetic, and revived participants felt before and after exercise. The tranquility section inquired about the calmness, relaxation, and peace they experienced. The physical exhaustion category noted their fatigue, tiredness, and feeling worn-out. Positive engagement measured their enthusiasm, happiness, and upbeat mood. Participants rated their feelings on a scale from 1-5, with 1 indicating they didn't feel the described state at all and 5 indicating they felt it very strongly.

The Single-Item Measure of Enjoyment During Exercise scale asked participants to use a 7-point Likert scale to answer the following statement: "Use the following scale to indicate how much you enjoyed this exercise session." Participants rated their feeling of enjoyment on a scale from 1-7, with 1 indicating they did not enjoy the exercise at all and 7 indicating they enjoyed the exercise extremely.

Data Analysis

To determine which exercise activities are the best at inducing positive feeling state changes in the observed population, the pre-assessment mean response for each subcategory of the EFI (i.e., revitalization, tranquility, physical exhaustion, and positive engagement) was compared to its paired post-assessment mean response via dependent sample t-test calculations. The t-value was evaluated under a significance level of 0.05 and a two-tailed hypothesis condition.

To evaluate the relationship between the enjoyability of various workouts and the feeling states of those participating in the workouts, each subcategory of the EFI was compared to the average enjoyment reported after completing the bout of exercise via Pearson correlation coefficient calculations.

Results

Figure 2 displays the results of the dependent sample t-test calculations for each type of exercise, representing the effect of that exercise on the four EFI subcategories. Significance is also denoted in this figure by the color red. Figure 3 represents the results of Figure 2 as absolute values and in graphical form. Figure 4 represents the average enjoyment of each type of exercise. Figures 5-8 represent the graphical results of the Pearson correlation calculations between the dependent sample t-test calculation values for the EFI subcategories and average enjoyment values for each type of exercise.

Figure 2

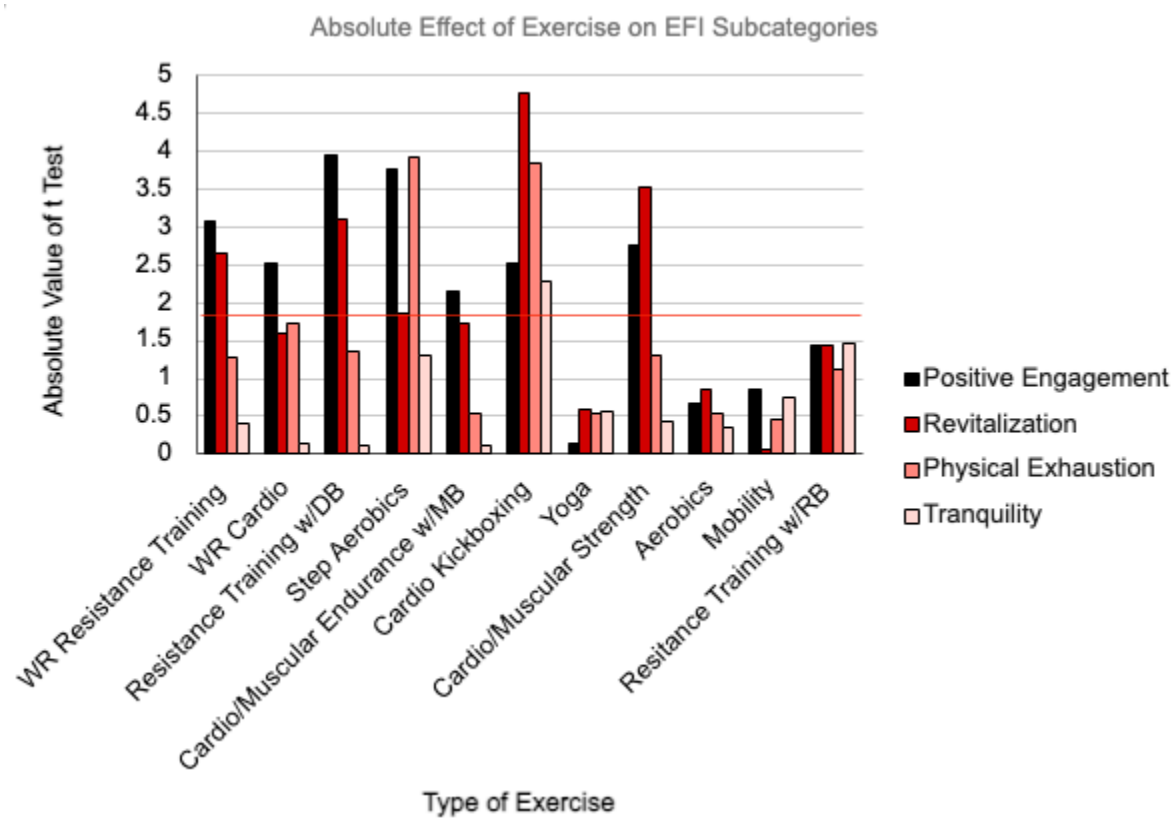
Effect of Exercise on EFI Subcategories

Effect of Exercise on EFI Subcategories				
Type of Exercise	Positive Engagement	Revitalization	Physical Exhaustion	Tranquility
WR Resistance Training	3.06	2.66	-1.27	-0.41
WR Cardio	2.53	1.6	-1.73	0.13
Resistance Training w/DB	3.95	3.09	-1.35	-0.12
Step Aerobics	3.77	1.85	-3.93	1.31
Cardio/Muscular Endurance w/MB	2.14	1.73	-0.55	0.12
Cardio Kickboxing	2.51	4.75	-3.85	2.29
Yoga	0.13	0.6	-0.53	0.56
Cardio/Muscular Strength	2.75	3.51	-1.3	0.44
Aerobics	0.66	0.86	-0.53	-0.36
Mobility	-0.85	0.07	-0.47	-0.75
Resitance Training w/RB	1.44	1.43	-1.12	1.45

Note. The figure represents the results of the dependent sample t-test calculations for each type of exercise. Positive values denote an increase in experiencing the given EFI subcategory after exercise (e.g., the student felt more revitalized after the workout); negative values denote a decrease in experiencing the given EFI subcategory after exercise (e.g., the student felt less physically exhausted after the workout). Values in red indicate significant results.

Figure 3

Absolute Effect of Exercise on EFI Subcategories



Note. The figure represents the absolute numerical results of the dependent sample t-test calculations for each type of exercise in graphical form. The horizontal red line denotes significance (i.e., bars at or above the line represent a significant EFI subcategory).

Figure 4

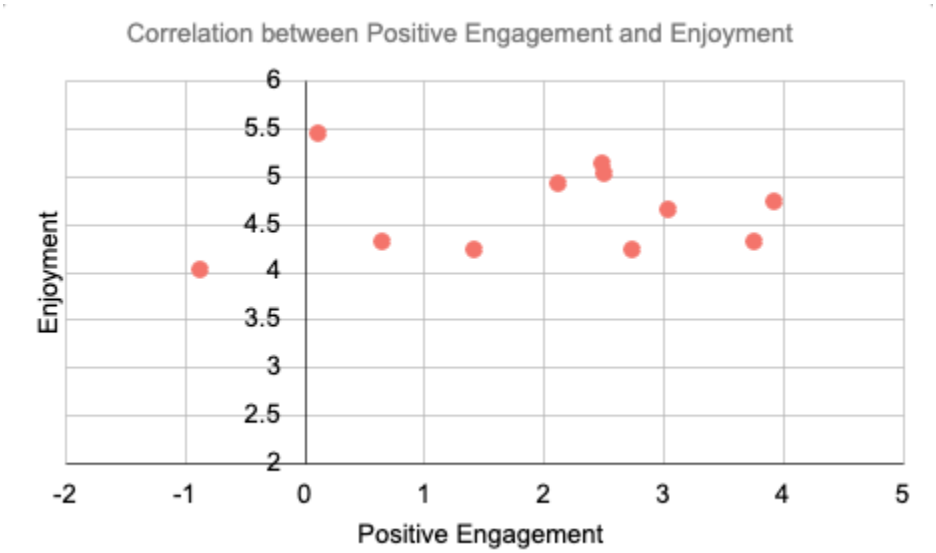
Average Enjoyment by Type of Exercise

Type of Exercise	Enjoyment
Yoga	5.43
Cardio Kickboxing	5.1
WR Cardio	5
Cardio/Muscular Endurance w/MB	4.91
Resistance Training w/DB	4.71
WR Resistance Training	4.64
Step Aerobics	4.3
Aerobics	4.3
Cardio/Muscular Strength	4.2
Resistance Training w/RB	4.2
Mobility	4

Note. The figure represents the average enjoyment reported immediately after completing a certain type of exercise. Values of 4 correspond to “moderately” experiencing enjoyment, values of 5 correspond to experiencing enjoyment “quite a bit,” and values of 6 correspond to experiencing enjoyment “very much.”

Figure 5

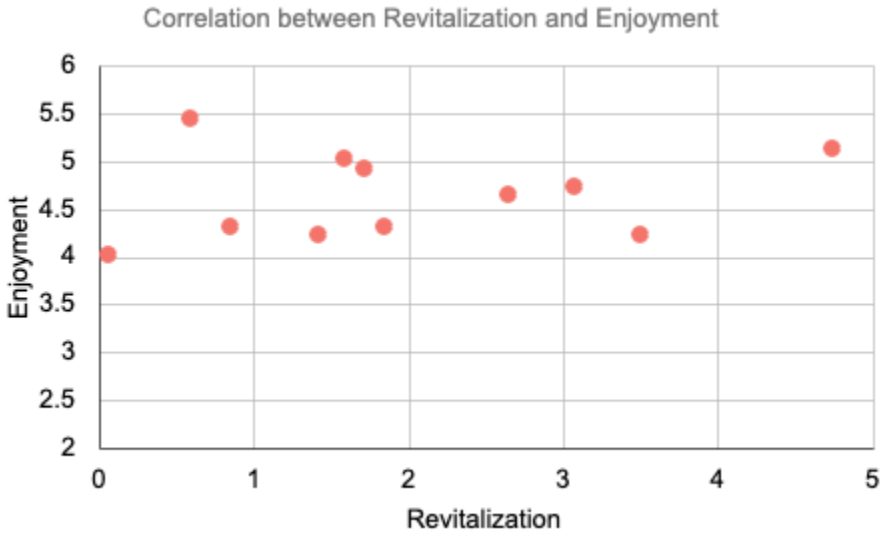
Correlation between Positive Engagement and Enjoyment



Note. The figure represents the graphical result of the Pearson correlation calculation between the dependent sample t-test calculation values for the positive engagement EFI subcategory and average enjoyment values for each type of exercise. Positive engagement and enjoyment were weakly correlated, $r(9) = 0.1056$, $p < .05$.

Figure 6

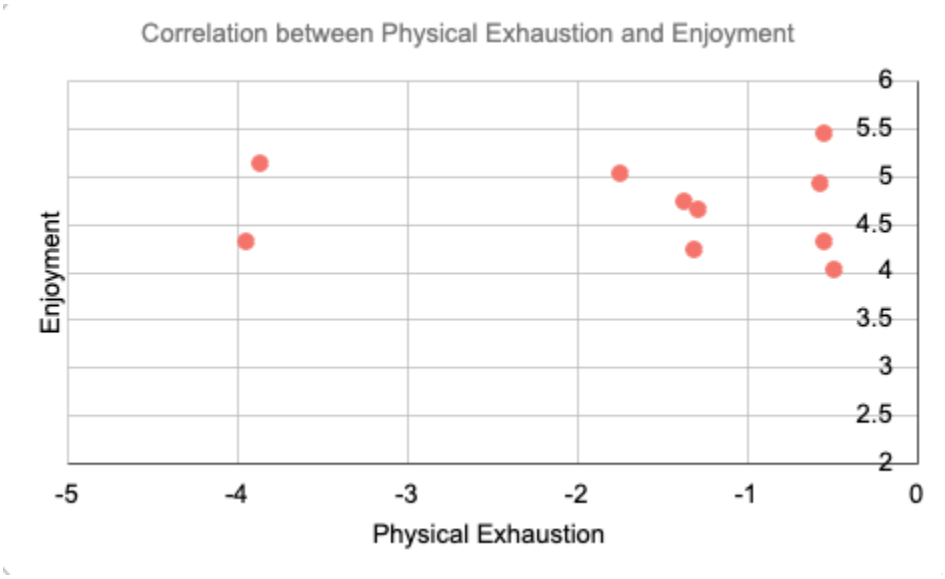
Correlation between Revitalization and Enjoyment



Note. The figure represents the graphical result of the Pearson correlation calculation between the dependent sample t-test calculation values for the revitalization EFI subcategory and average enjoyment values for each type of exercise. Revitalization and enjoyment were weakly correlated, $r(9) = 0.2053$, $p < .05$.

Figure 7

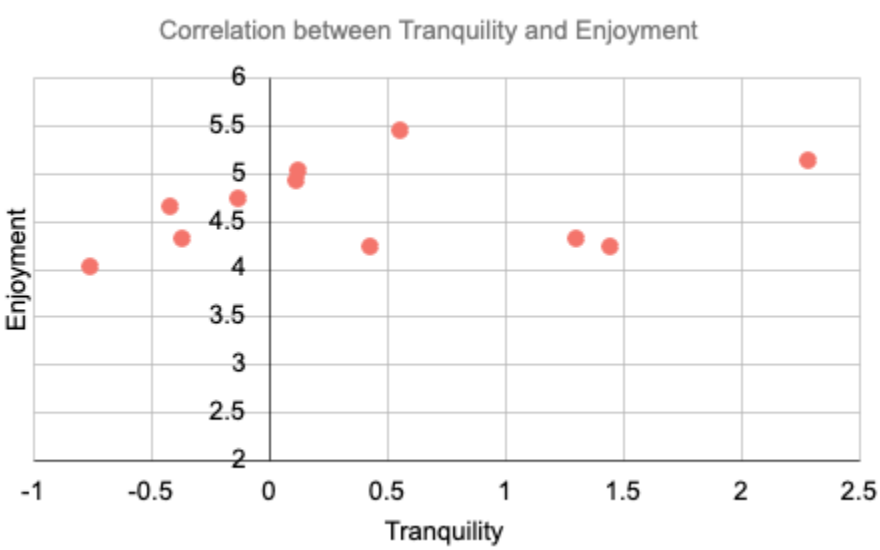
Correlation between Physical Exhaustion and Enjoyment



Note. The figure represents the graphical result of the Pearson correlation calculation between the dependent sample t-test calculation values for the physical exhaustion EFI subcategory and average enjoyment values for each type of exercise. Physical exhaustion and enjoyment were weakly correlated, $r(9) = -0.0977$, $p < .05$.

Figure 8

Correlation between Tranquility and Enjoyment



Note. The figure represents the graphical result of the Pearson correlation calculation between the dependent sample t-test calculation values for the tranquility EFI subcategory and average enjoyment values for each type of exercise. Tranquility and enjoyment were weakly correlated, $r(9) = 0.2385$, $p < .05$.

Conclusion

Discussion

The initial aim of this study was to identify which exercise activities most effectively induce positive changes in the emotional state of the observed population. Comparison of the mean pre-assessment and post-assessment responses suggested that only certain types of exercise were successful in inducing positive feeling state changes while participating in a group exercise setting.

Following analysis of the pre-assessment and post-assessment results, cardiorespiratory kickboxing and step aerobics were identified as the best at inducing significant increases in feeling states; cardiorespiratory kickboxing had a positive effect on all four feeling states while step aerobics increased positive engagement and revitalization while decreasing the feeling of physical exhaustion. It was also noted that the types of exercise that were able to significantly influence two feeling states (positive engagement and revitalization) included weightroom resistance training, resistance training with dumbbells, and cardiorespiratory/muscular strength. The types of exercise that were successful in only significantly increasing positive engagement included weightroom cardiorespiratory training and cardiorespiratory/muscular endurance with medicine balls. Yoga, aerobics, mobility, and resistance training with resistance bands were unable to significantly influence any of the feeling states.

Additionally, comparison of the mean pre-assessment and post-assessment responses indicated that certain feeling state categories (i.e., positive engagement, revitalization, physical exhaustion, and tranquility) were more likely to be influenced by exercise. Seven of the eleven activities caused a significant increase in participants' reported enthusiasm, happiness, and upbeat positive feelings. Revitalization experienced an increase after five of the eleven activities,

causing the student to feel more refreshed, energetic, and revived. The participants reported feeling significantly less physically exhausted (i.e., fatigued, tired, and worn-out) after two of the eleven activities. They also reported increased tranquility (i.e., calm, relaxed, and peaceful) after one of the eleven activities.

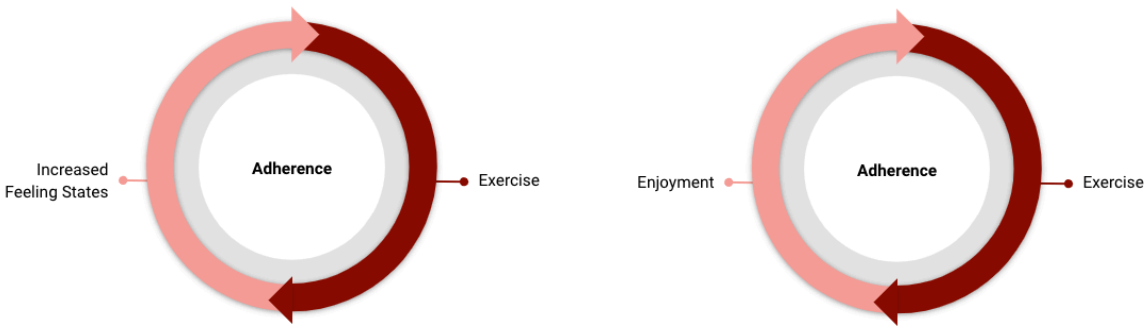
The second aim of the study was to evaluate the relationship between the enjoyability of various workouts and the feeling states of those participating in the workouts. Comparisons between reported changes in feeling states and enjoyment suggested that there was no significant correlation, disproving the hypothesis of this study. Greater differences in pre-exercise and post-exercise feeling states did not coincide with greater enjoyment of the workout (e.g., yoga was unable to significantly influence any of the feeling states and yet was the most enjoyable activity). This suggested that increased feeling states and enjoyment were not linked and only one (if either) must be experienced for adherence to occur in an exercise program (as imagined in Figure 9). Since the hypothesis was disproven, it suggests that exercise programs may not require criteria to be considered effective in encouraging participants to return for more exercise sessions. However, it is possible the study provided additional findings that support the idea that exercise professionals do not need to specialize in only a few types of activity to ensure adherence.

Research by Dimmock et al. (2013) highlighted the importance of cross training in an exercise program from both psychological and physiological aspects. Expecting variety in the tasks to be performed caused group exercise participants to enjoy the class more, find the class more interesting, and perceive greater internal causality or the autonomous drive to exercise. Sylvester et al. (2014) also found that a variety in exercise satisfied the psychological need for competence, relatedness, and autonomy that predicted motivation for physical activity behavior.

Therefore, incorporating variety into an exercise program allowed muscles to continually make advancements (as neuromuscular pathways are not able to fully mature, causing all muscles to be recruited in a contraction). Carter (2018) found that cross training also increased metabolism and decreased the risk of overuse injuries. Doing a wide variety of exercise activities may mean that not all exercise types will induce increased feeling states and enjoyment. However, if it is possible to induce exercise adherence via either positive feeling state changes or enjoyment (i.e., the activity must only satisfy one of the two), doing a wide variety of exercise activities will provide greater physiological results.

Figure 9

Amended Exercise Adherence Models



Note. The figure represents the author's imagination of two possible models detailing the interaction between exercise and enjoyment or exercise and increased feeling states in determining adherence to an exercise program.

Limitations and Suggestions

There are distinct limitations to the study. In particular, the sample size was small. There were thirteen participants for eleven bouts of exercise. Not all students were able to attend all activities and not all students were at the same level of fitness. Polling multiple Fitness for Living classes over multiple semesters would provide more data and stronger evidence that cardiorespiratory kickboxing is the best at inducing positive feeling state changes and there is no significant relationship between enjoyability and feeling state changes.

Another limitation of the present study's design concerns the lack of monitoring exercise intensity. Based on the exercise focus, intensity varied between activities. Exercise intensity has been previously identified as a crucial component of feeling state changes (Raglin, 1990). It is possible that the intensity of the provided exercises contributed to the specific result of all activities decreasing feelings of being fatigued, tired, and worn-out. Monitoring or standardizing exercise intensity may improve the current procedure or provide direction for further study.

Additionally, there were six Practicum students leading the Fitness for Living course. Not all exercise sessions were led by the same Practicum student. Each Practicum student varied in their preferred teaching style. This was not controlled for in the study and could have had the potential impact of introducing bias in the reported enjoyment and feeling state changes post-exercise.

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Appendix A

Pre-Assessment and Post-Assessment Survey Template

Figure 1A

Pre-Assessment Survey Template

ANSWER BEFORE LAB

Name: _____

Please use the following scale to indicate the extent to which each word below describes how you feel at ***this moment in time***. Fill in the circle that corresponds to each word:

	Do Not Feel	Feel Slightly	Feel Moderately	Feel Strongly	Feel Very Strongly
Refreshed	○	○	○	○	○
Calm	○	○	○	○	○
Fatigued	○	○	○	○	○
Enthusiastic	○	○	○	○	○
Relaxed	○	○	○	○	○
Energetic	○	○	○	○	○
Happy	○	○	○	○	○
Tired	○	○	○	○	○
Revived	○	○	○	○	○
Peaceful	○	○	○	○	○
Worn-Out	○	○	○	○	○
Upbeat	○	○	○	○	○

Figure A1. Represents the pre-assessment survey that was administered before the lesson.

Participants completed the EFI by reporting at which level they experienced the described state.

Figure A2

Post-Assessment Survey Template

ANSWER AFTER LAB

Please use the following scale to indicate the extent to which each word below describes how you feel at ***this moment in time***. Fill in the circle that corresponds to each word:

	Do Not Feel	Feel Slightly	Feel Moderately	Feel Strongly	Feel Very Strongly
Refreshed	○	○	○	○	○
Calm	○	○	○	○	○
Fatigued	○	○	○	○	○
Enthusiastic	○	○	○	○	○
Relaxed	○	○	○	○	○
Energetic	○	○	○	○	○
Happy	○	○	○	○	○
Tired	○	○	○	○	○
Revived	○	○	○	○	○
Peaceful	○	○	○	○	○
Worn-Out	○	○	○	○	○
Upbeat	○	○	○	○	○

Use the following scale to indicate how much you ***enjoyed this exercise session***. Fill in the circle that corresponds to your enjoyment:

Not at All	Very Little	Slightly	Moderately	Quite a Bit	Very Much	Extremely
○	○	○	○	○	○	○

Figure A2. Represents the post-assessment survey that was administered after the lesson. Participants completed the EFI and the Single-Item Measure of Enjoyment During Exercise scale.