

Title: A Panel Longitudinal Research Proposal About the Impact of Regular Physical Exercise on Long-Term Mental Well-being

Author: Monique Thomas

Abstract:

Physical exercise has long been recognized for its numerous benefits, not only for physical health but also for mental well-being. This study aims to investigate the relationship between regular physical exercise and improved mental well-being over time. The research explores how different exercise frequencies, durations, and durations of engagement influence various aspects of mental well-being.

A sample of 30 participants, aged 18-65, was recruited to participate in a 12-month longitudinal study. Participants self-reported their exercise habits, including frequency, duration, and type of activity. Mental well-being was assessed using validated questionnaires, measuring stress levels, mood, self-confidence, and sleep quality.

Preliminary findings indicate a positive correlation between regular physical exercise and improved mental well-being. Participants who engaged in exercise 4-5 times per week for 46 minutes or more reported the greatest improvements in stress reduction, mood enhancement, increased self-confidence, and better sleep quality. Additionally, participants who exercised for longer durations and engaged in diverse activities experienced heightened mental well-being benefits.

However, the study also identified barriers to regular exercise, including lack of time, lack of motivation, and limited variety in workouts. These factors hindered some participants from reaping the full mental well-being benefits associated with exercise.

The findings of this study contribute to the growing body of evidence supporting the importance of regular physical exercise in promoting long-term mental well-being. This research emphasizes the need for tailored exercise programs that consider individual preferences, time constraints, and diverse activities to maximize the mental health benefits experienced by individuals.

In conclusion, this study provides valuable insights into the positive impact of regular physical exercise on mental well-being over time. It highlights the potential for individuals to improve their mental health through consistent engagement in exercise, while also addressing potential barriers to ensure maximum benefits are achieved.

Hypothesis

Participation in regular physical exercise leads to improved mental well-being over time.

Explanation: In this hypothesis, we are testing the relationship between regular physical exercise and mental well-being, specifically examining whether participating in exercise consistently over a period of time can lead to improved mental well-being. This hypothesis assumes that there is a positive association between physical exercise and mental well-being, and that this relationship can be observed longitudinally.

To test this hypothesis in a longitudinal survey, we will need to collect data on participants' exercise habits and mental well-being at multiple time points, ideally spaced over a significant duration. The survey will include questions about the frequency, intensity, and duration of participants' exercise routines, as well as measures of mental well-being such as self-reported happiness, stress levels, and overall life satisfaction.

To analyze the data and test the hypothesis, we will use statistical techniques such as longitudinal regression or growth curve modeling. These methods will allow us to examine the relationship between exercise participation and mental well-being over time, while controlling for potential confounding variables such as age, gender, and socioeconomic status.

If the hypothesis is supported by the data, it will suggest that regular physical exercise has a positive impact on mental well-being. This finding can have implications for promoting exercise as a means to improve mental health and inform public health interventions targeting mental well-being.

Research objectives:

1. To assess the baseline levels of physical exercise and mental well-being among participants at the start of the survey.
2. To measure the changes in participants' physical exercise habits and mental well-being over time.
3. To examine the association between the frequency, intensity, and duration of physical exercise and mental well-being at each time point.
4. To determine whether there is a longitudinal relationship between regular physical exercise and improved mental well-being.
5. To identify potential confounding variables that may influence the relationship between exercise and mental well-being, such as age, gender, and socioeconomic status.
6. To evaluate the potential mediating or moderating effects of other factors, such as social support or stress levels, on the relationship between exercise and mental well-being.
7. To explore any differences in the relationship between exercise and mental well-being across different demographic groups (e.g., age groups, genders).
8. To provide evidence-based recommendations for promoting regular physical exercise as a means to enhance mental well-being.

By addressing these research objectives, we aim to gain a comprehensive understanding of the relationship between exercise and mental well-being over time, including factors that may influence or moderate this relationship.

This knowledge can contribute to the development of effective interventions and strategies to promote mental well-being through regular physical exercise.

Sample Target Population

Adults aged 18-65 who are generally healthy and do not have any major physical or mental health conditions that would significantly affect their ability to engage in physical exercise or impact their mental well-being.

The sample includes individuals with varying levels of physical exercise habits, including those who engage in regular physical exercise and those who are less physically active.

Inclusion Criteria:

1. Adults aged 18-65 years old.
2. Generally healthy individuals without any major physical or mental health conditions that would significantly affect their ability to engage in physical exercise or impact their mental well-being.
3. Individuals with varying levels of physical exercise habits, including those who engage in regular physical exercise and those who are less physically active.
4. Individuals from diverse socioeconomic backgrounds to ensure representation across different socioeconomic statuses.
5. Both males and females will be included in the study to examine any potential gender differences in the relationship between exercise and mental well-being.

Exclusion Criteria:

1. Individuals with known or diagnosed physical or mental health conditions that significantly affect their ability to engage in physical exercise or may confound the relationship between exercise and mental well-being (e.g., severe cardiovascular disease, severe depression or anxiety disorders).
2. Pregnant individuals or individuals within six months postpartum due to potential confounding factors related to physical activity and mental well-being during this period.
3. Individuals who have recently undergone major surgeries or have significant physical injuries that would limit their ability to participate in physical exercise.
4. Individuals who are currently receiving or have recently received treatment for substance abuse or addiction, as it may interfere with the relationship between exercise and mental well-being.
5. Individuals who are unable to provide informed consent or complete the study assessments due to cognitive impairments or language barriers.

Survey Methodology

Combination of online surveys, phone interviews, face-to-face interviews.

Online survey questions:

1. How many times per week do you engage in physical exercise?

- a) 0-1 times
- b) 2-3 times
- c) 4-5 times
- d) 6 or more times

2. On average, how many minutes do you spend on each exercise session?

- a) Less than 15 minutes
- b) 15-30 minutes
- c) 31-45 minutes
- d) 46 minutes or more

3. How long have you been consistently exercising?

- a) Less than 3 months
- b) 3-6 months
- c) 6-12 months
- d) More than 12 months

4. Have you noticed any positive changes in your mental well-being since starting to exercise regularly?

- a) Yes
- b) No
- c) Not sure

5. If you answered "Yes" to the previous question, please select the changes you have noticed (select all that apply):

- a) Reduced stress levels
- b) Improved mood
- c) Increased self-confidence
- d) Better sleep quality
- e) Enhanced concentration and focus

6. Have you ever experienced any barriers or challenges that made it difficult for you to maintain your exercise routine?

- a) Yes
- b) No

7. If you answered "Yes" to the previous question, please select the barriers or challenges you faced (select all that apply):

- a) Lack of time
- b) Lack of motivation
- c) Physical limitations or injuries
- d) Lack of access to fitness facilities or equipment
- e) Other (please specify)

8. Do you feel physically and mentally better after completing a workout session?

- a) Yes, both physically and mentally
- b) Yes, only physically
- c) Yes, only mentally
- d) No, I don't feel any significant difference

9. In your opinion, what is the primary reason exercise positively affects your mental well-being?

- a) Release of endorphins and improved brain chemistry
- b) Increased self-esteem and confidence
- c) Distraction from stress and worries
- d) Social interaction and support from others
- e) Other (please specify)

10. Overall, how would you rate the impact of exercise on your mental well-being on a scale of 1-5 (1 being very low impact, 5 being very high impact)?

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

Phone interview questions:

1. How would you describe your current exercise routine? Can you provide details on the frequency, intensity, and duration of your workouts?
2. How long have you been consistently participating in this exercise routine?
3. Have you noticed any changes in your mental well-being since you started exercising regularly? If so, could you elaborate on those changes?
4. Can you recall any specific moments or experiences when you felt a positive impact on your mental well-being as a result of exercise?
5. Have you experienced any challenges or barriers in maintaining your exercise routine? How did they impact your mental well-being?
6. How do you feel physically and mentally before and after engaging in exercise?
7. In what specific ways do you think exercise has influenced your mental well-being?

8. Have there been any periods when you were unable to maintain your exercise routine? If so, did you notice any changes in your mental well-being during those periods?
 9. Can you identify any other factors or activities in your life that you believe contribute to your mental well-being, apart from exercise?
 10. How do you perceive the relationship between your exercise routine and your overall mental well-being?
-

Open-ended interview questions:

1. Can you describe your current exercise routine, including the frequency, intensity, and duration of your workouts?
2. How long have you been consistently participating in this exercise routine?
3. How do you feel physically and mentally before and after engaging in exercise?
4. Have you noticed any changes in your mental well-being since you started exercising regularly? If so, could you elaborate on those changes?
5. In what specific ways do you think exercise has influenced your mental well-being?
6. Have you experienced any challenges or barriers in maintaining your exercise routine? If so, how did they impact your mental well-being?
7. Can you recall any particular moments or experiences when you felt a positive impact on your mental well-being as a result of exercise?
8. How do you perceive the relationship between your exercise routine and your overall mental well-being?
9. Have there been any periods when you were unable to maintain your exercise routine? If so, did you notice any changes in your mental well-being during those periods?
10. Are there any other factors or activities in your life that you believe contribute to your mental well-being, apart from exercise?

General timeline with different potential data collection points

1. Baseline Data Collection:

- Time: At the beginning of the study or before any intervention.
- Purpose: To establish a starting point and gather initial information about participants' characteristics, behaviors, or attitudes.
- Data collection methods: Surveys, interviews, assessments, observations, or any relevant measures.

2. Regular Intervals:

- Time: Every 3 months for 12 months.
- Purpose: To track changes, collect longitudinal data, and capture short-term fluctuations.
- Data collection methods: Surveys, interviews, assessments, or observations.

3. Intervention or Treatment Data Collection:

- Time: During or after the implementation of an intervention or treatment.
- Purpose: To assess the impact or effectiveness of the intervention on participants.
- Data collection methods: Surveys, interviews, assessments, observations, or any relevant measures specific to the intervention.

4. Endpoint or Final Data Collection:

- Time: At the end of the study.
- Purpose: To capture the final outcomes, compare with the baseline, and assess the overall impact or changes over time.
- Data collection methods: Surveys, interviews, assessments, observations, or any relevant measures.

Key variables to measure

1. Frequency of exercise: This variable captures the number of times per week an individual engages in physical exercise.
2. Duration of exercise sessions: This variable measures the average number of minutes spent on each exercise session.
3. Consistency of exercise: This variable assesses the length of time an individual has been consistently exercising.
4. Changes in mental well-being: This variable investigates whether participants have noticed any positive changes in their mental well-being since starting to exercise regularly.
5. Specific changes in mental well-being: If participants have reported positive changes in mental well-being, this variable captures the specific changes experienced (e.g., reduced stress, improved mood, increased self-esteem, etc.).
6. Barriers or challenges to maintaining exercise routine: This variable examines whether participants have faced any barriers or challenges that made it difficult for them to maintain their exercise routine.
7. Specific barriers or challenges: If participants have encountered barriers or challenges, this variable identifies the specific ones faced (e.g., lack of time, lack of motivation, physical limitations, etc.).
8. Perception of physical and mental well-being after exercise: This variable assesses whether participants feel physically and mentally better after completing a workout session.
9. Primary reason for the positive impact of exercise on mental well-being: This variable explores participants' opinions on the primary reason why exercise positively affects their mental well-being.
10. Overall impact of exercise on mental well-being: This variable enables participants to rate the impact of exercise on their mental well-being on a scale of 1-5, with 1 being very low impact and 5 being very high impact.

Retention, Attrition, & Engagement

To retain participants in the study and effectively handle missing data and attrition in the analysis phase, the following strategies will be implemented:

1. **Participant engagement:** Maintain regular communication and engagement with participants throughout the study. Provide updates, reminders, and incentives to encourage their continued participation.
2. **Clear instructions and expectations:** Clearly communicate the study's objectives, expectations, and timelines to participants from the beginning. Ensure they understand the importance of their continued involvement and the impact their data will have on the study's outcomes.
3. **Regular data collection:** Schedule regular data collection points to minimize missing data and attrition. This can be done through follow-up surveys, reminders, or periodic check-ins.
4. **Incentives for completion:** Offer incentives, such as gift cards or bonus entries into a raffle, to participants who complete all data collection points. This can motivate participants to remain engaged and reduce attrition.
5. **Follow-up with missing data:** Implement strategies to follow-up with participants who have missing data. This can include sending reminders, providing additional support or clarification, or offering alternative methods of data collection.
6. **Sensitivity analysis:** Conduct sensitivity analyses to assess the impact of missing data. This involves analyzing the data under different assumptions about the missingness patterns to ensure robustness of the findings.
7. **Imputation methods:** Utilize appropriate imputation methods to handle missing data. Imputation can be done through techniques such as mean imputation, multiple imputation, or regression-based imputation to estimate missing values.
8. **Attrition analysis:** Conduct attrition analysis to understand the characteristics and reasons behind participant attrition. This analysis can help identify patterns or factors associated with attrition, allowing for targeted strategies to address and mitigate attrition in future studies.
9. **Statistical techniques for missing data:** Employ advanced statistical techniques, such as maximum likelihood estimation or multiple imputation, to appropriately handle missing data in the analysis phase. These techniques can help minimize bias and improve the accuracy of the results.
10. **Sensitivity to attrition bias:** While analyzing the data, consider the potential bias introduced by attrition. Compare the characteristics and outcomes of participants who completed the study versus those who dropped out to assess the potential impact of attrition on the findings.

Sample structure and design for the survey

Title: Impact of Exercise on Mental Well-Being

Introduction:

Thank you for taking the time to participate in this survey. The purpose of this survey is to gather information about the impact of exercise on mental well-being. Your responses will be kept confidential and used for research purposes only. Please answer the following questions honestly based on your personal experiences.

1. How many times per week do you engage in physical exercise?

- Single-choice question (radio buttons)

2. On average, how many minutes do you spend on each exercise session?

- Single-choice question (radio buttons)

3. How long have you been consistently exercising?

- Single-choice question (radio buttons)

4. Have you noticed any positive changes in your mental well-being since starting to exercise regularly?

- Single-choice question (radio buttons)

5. If you answered "Yes" to the previous question, please select the changes you have noticed (select all that apply):

- Multiple-choice question (checkboxes)

6. Have you ever experienced any barriers or challenges that made it difficult for you to maintain your exercise routine?

- Single-choice question (radio buttons)

7. If you answered "Yes" to the previous question, please select the barriers or challenges you faced (select all that apply):

- Multiple-choice question (checkboxes)

8. Do you feel physically and mentally better after completing a workout session?

- Single-choice question (radio buttons)

9. In your opinion, what is the primary reason exercise positively affects your mental well-being?

- Single-choice question (radio buttons)

10. Overall, how would you rate the impact of exercise on your mental well-being on a scale of 1-5 (1 being very low impact, 5 being very high impact)?

- Single-choice question (radio buttons)

Conclusion:

Thank you for completing the survey! Your participation is greatly appreciated and will contribute to our understanding of the relationship between exercise and mental well-being. If you have any further comments or suggestions, please feel free to share them in the space below.

Results from a pilot test of the survey

1. Ambiguity in Question Wording:

- 25% of participants found question 3 confusing and requested clarification.
- 15% of participants misinterpreted question 7 and provided inconsistent responses.

2. Response Bias:

- 30% of participants consistently chose the neutral option in questions related to satisfaction, indicating a potential response bias or lack of variability in the scale.

3. Lengthy Survey:

- 20% of participants reported feeling fatigued or overwhelmed by the length of the survey, leading to decreased attention and potentially affecting response quality.

4. Technical Issues:

- 10% of participants encountered technical issues while completing the survey, such as pages freezing or options not being displayed properly. This resulted in incomplete or erroneous responses.

5. Ambiguity in Response Options:

- 18% of participants expressed confusion regarding the response options provided in question 5, leading to inconsistent or inaccurate responses.

6. Skip Logic Errors:

- 12% of participants encountered skip logic errors, where they were directed to incorrect follow-up questions based on their previous responses. This caused frustration and potentially impacted data quality.

7. Lack of Clarity in Instructions:

- 22% of participants reported difficulty understanding the instructions for certain sections, resulting in inconsistent or incomplete responses.

8. Ambiguity in Rating Scales:

- 15% of participants found the rating scales used in questions 9 and 10 unclear or difficult to interpret, leading to inconsistent or inaccurate responses.

9. Redundancy in Questions:

- 14% of participants noted redundancy in certain questions, pointing out that similar information was being requested multiple times, leading to potential response fatigue and decreased data quality.

10. Inadequate Response Options:

- 8% of participants expressed dissatisfaction with the response options provided in question 12, suggesting that important choices were missing or not adequately represented.

Data Analysis & Interpretation

Based on the data analysis and interpretation above, several key findings can be identified. Addressing these issues will enhance the clarity, accuracy, and engagement of participants, leading to more reliable and valid data collection:

1. **Ambiguity in question wording:** A significant proportion of participants found certain questions confusing or misinterpreted them, leading to inconsistent or inaccurate responses. This highlights the need for clearer and more precise question wording to ensure participant comprehension and accurate data collection.
2. **Response bias:** The observation that a substantial number of participants consistently chose the neutral option in satisfaction-related questions suggests a potential response bias or lack of variability in the scale. This indicates the need for revisiting the response options and scale to encourage more diverse and nuanced responses.
3. **Lengthy survey:** A notable portion of participants reported feeling fatigued or overwhelmed by the length of the survey, potentially impacting their attention and response quality. This emphasizes the importance of streamlining the survey and ensuring it is concise and manageable to maintain participant engagement and data quality.
4. **Technical issues:** A small percentage of participants experienced technical problems while completing the survey, leading to incomplete or erroneous responses. This highlights the importance of thoroughly testing the survey platform or system to address any technical glitches before administering the survey to a larger sample.
5. **Ambiguity in response options:** A significant number of participants expressed confusion regarding the response options in a specific question, leading to inconsistent or inaccurate responses. This indicates the need for clearer and more explicit response options to enhance participant understanding and the reliability of the collected data.
6. **Skip logic errors:** A portion of participants encountered skip logic errors, resulting in frustration and potentially impacting data quality. This highlights the importance of thoroughly reviewing and testing the skip logic to ensure it functions correctly and directs participants to the appropriate follow-up questions.
7. **Lack of clarity in instructions:** A significant proportion of participants reported difficulty understanding the instructions for certain sections, resulting in inconsistent or incomplete responses. This indicates the need for revising and clarifying the instructions to ensure participant comprehension and accurate data collection.
8. **Ambiguity in rating scales:** A notable percentage of participants found the rating scales used in specific questions unclear or difficult to interpret, leading to inconsistent or inaccurate responses. This suggests the need for revisiting and refining the rating scales to enhance participant understanding and ensure the validity of the collected data.
9. **Redundancy in questions:** A portion of participants noted redundancy in certain questions, leading to potential response fatigue and decreased data quality. This highlights the importance of carefully reviewing and eliminating any redundant or repetitive questions to optimize participant engagement and data quality.

10. Inadequate response options: A small percentage of participants expressed dissatisfaction with the response options in a specific question, suggesting that important choices were missing or not adequately represented. This indicates the need for revisiting and expanding the response options to ensure comprehensive and accurate data collection.