Framing Effects on Exercise Behavior

Aubrie Potteiger

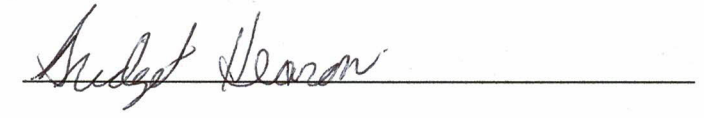
Candidate for the degree

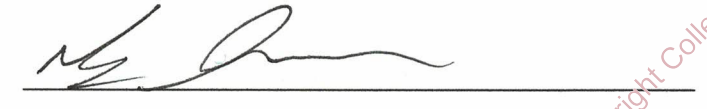
Bachelor of Sciences

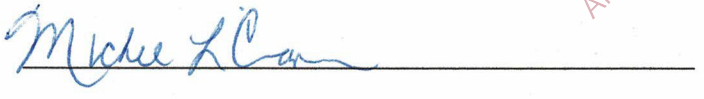
Submitted in partial fulfilment of the requirements for

College Honors

Departmental Distinction in Psychology







F. Wilbur Gingrich Library
Special Collections Department
Albright College

Release of Senior Thesis

I hereby grant to the Special Collections Department of the F. Wilbur Gingrich Library at Albright College the nonexclusive right and privilege to reproduce, disseminate, or otherwise preserve the Senior Honors Thesis described below in any noncommercial manner that furthers the educational, research or public service purposes of Albright College. Copyright privileges remain with me, the author.

Title: Framing Effects on Exercise Behavior

Signature of Author: Aubrie R. Potteiger Date: 4-18-18

Printed Name of Author: Aubrie Potteiger

Street Address: 4411 5th Avenue

City, State, Zip Code: Temple, PA, 19560

Framing Effects on Exercise Behavior

Aubrie Potteiger

Albright College

Abstract

Framing is a cognitive tool that has been used in decision-making. It also has been used as a tool in fitness intervention for individuals (Hearon, et al. 2016), with results indicating that promoting the mood benefits of exercise to those with severe mental illnesses (SMI) led to greater increases in physical activity than promotion of the physical health benefits. 98 participants viewed one of four types of information on exercise benefits: mental benefits, physical benefits, emotional then physical benefits, or physical then emotional benefits. Then, participants completed questionnaires to measure exercise behavior and emotional states, with a follow-up survey conducted one week later. There was no significant effect of framing on motivation to exercise, exercise goals, increased exercise at timepoint two, or knowledge retained at timepoint two. However, there was a significant effect of condition on knowledge of information at time one. Specifically, those in the physical benefits condition remembered less than those in the mental benefits and physical then mental benefits conditions. This suggests that emotional benefits may be more memorable to participants than the physical benefits of exercise.

Keywords: framing, exercise behavior, motivation

Framing Effects on Exercise Behavior

Currently, the CDC recommends engaging in moderate physical activity for 150 minutes or 75 minutes of vigorous activity to attain health benefits. However, despite the numerous mental and physical health benefits of regular physical activity, approximately half of American adults fall short of minimum weekly recommendations (CDC, 2014). Therefore, identification of effective ways to promote exercise is essential for healthcare providers.

Exercise often gets acknowledged for its association with physical benefits. Some of the physical benefits associated with regular physical activity include: weight loss, weight control, increased daily energy, and better sleep. In addition to these features, medical conditions such as some cancers, cardiovascular diseases, and Type II diabetes may be reduced with regular exercise adherence (Mayo Clinic; WHO). In addition to these benefits, exercise has been shown to improve sexual health, increase chances of living longer, reduce risks of falls, and help individuals quit smoking (MedlinePlus). Aside from these physical benefits, research suggests regular physical activity leads to mood benefits as well.

Exercise has emerged as a recognized treatment for those with psychological disorders. Research suggests that regular physical activity can reduce anxiety sensitivity while increasing both resilience to stressful situations and self-efficacy for the general population (Asmundson et al., 2013). Similarly, regular exercise has been shown to reduce the onset of mental disorders and help those recover from existing psychological disorders like depression (Bartholomew, Morrison, & Ciccolo, 2005). While the latter require regular adherence to physical activity, other research suggests that immediate results occur after participating in moderate intensity exercise (Ekkekakis, Lind, Vazou, 2009). To specify, 30 consecutive minutes of moderate intensity

exercise has been shown to increase positive affect and reduce negative affect in individuals. Also, exercise can reduce tiredness, increase energy and stamina (Sharma et al., 2006). If numerous benefits, both physical and mood, exist with regular physical activity adherence, why is exercise not accepted by more people? Studies suggest that the way in which exercise gets framed can influence physical activity adherence.

Framing is a cognitive tool that was first identified by Tversky and Kahneman (1981), as a mode of examining decision-making. When given options and background information for those options, people can weigh the risks differently depending on how the information is presented as either a loss or a gain (Kühberger, 1998). For example, a negative outcome can be perceived as either a cost or an uncompensated loss. This indicates that negative outcomes can be processed cognitively as a "bet" that did not result in a gain or simply as a loss with the former seeming to have more as a cognitive discomfort (Kahneman & Tversky, 1984). By finding that messages can influence perception of a situation, research looked at the way it could influence behaviors. Initially, it was hypothesized that positively framed messages, ones that showed what the individual would gain, would induce more behavioral compliance than negatively framed messages, what the individual would lose. Studies found that positively framed messages were more likely to engage a behavior when the message was vague whereas negatively framed messages were more likely to induce change when they were detailed (Maheswaran & Meyers-Levy, 1990). In addition, negative information usually receives more cognitive weight than positive information. For example, when women were given the negative symptoms of birth control, they were less likely to use the product as opposed to when the positive effects were given (Kanouse, 1984; Wright & Weitz, 1977). Thus, it has been suggested that when individuals are given a negatively framed message, the information in the message must be more persuasive

and detailed to encourage behavioral adherence than when it is positively framed (Meyerowitz & Chaiken, 1987).

In addition, the order in which information is presented (e.g. gain first then loss information or vice versa), has also been shown to influence decisions. In the study, Bigman and colleagues (2010) participants were given information about the effectiveness or ineffectiveness of a vaccine to determine which framing would lead to acceptance of the vaccine. To do this, participants saw either the effectiveness framing first and the ineffectiveness framing second, or vice versa. Those who were given the successful statistics of the vaccine (effectiveness) were more likely to rate the vaccine as more effective than those who were given the unsuccessful statistics (ineffectiveness), suggesting that ordering of information may also be important. The results suggest that those who read the effectiveness first were less likely to favor the vaccine as opposed to those who heard the ineffectiveness first. However, research is still needed to better understand the impact of framing on medical and health-related decision-making, particularly regarding exercise. (McNeil, Pauker, Sox & Tversky, 1982; Rothman et al., 1999; Armstrong et al., 2002).

To determine how to increase exercise adherence, research into framing of exercise information has been examined. For individuals recovering from cardiac surgery, framing exercise benefits as a gain, such as positive health and mental outcomes of exercise ("Being sufficiently physically active increases your chance of a healthy and strong heart.") increased participants' desire to engage in future physical activity more than the negative, physical and mental disadvantages that a lack of exercise gives ("Being insufficiently physically active increases your risk of cardiovascular diseases."; McCall & Martin Ginis, 2004). Likewise, other studies suggest similar findings that participants exposed to gain framing of exercise had a higher

intention of participation for individuals than the loss framing (Arora, et al., 2006; de Bruijin et al., 2014; Gray & Harrington, 2010). In addition to increasing exercise intentions, positive framing was also successful at increasing actual exercise behavior in a 9-week longitudinal study. This study found that when exercise was framed as a gain (i.e. benefits of regular physical exercise as per the CDC), the participants had higher physical activity participation at the week two and week nine check-in (Latimer, et al., 2008).

Instead of framing exercise in terms of losses vs, gains, Hearon and colleagues (2016) examined an exercise-for-mood vs. an exercise-for-fitness intervention on individuals with severe mental illness (SMI), with results indicating that promoting the mood benefits of exercise to this population led to greater increases in physical activity than promotion of the physical health benefits. This research, however, focused only on individuals with SMI as opposed to the general population. While those with SMI have been shown to benefit from daily exercise, those without SMI also can benefit from regular exercise. However, other studies found that framing exercise benefits as physical or mental has similar results to Hearon and colleagues (2016).

Exercise has been shown to have immediate effects on mental abilities while physical effects are more distant; thus, framing for improved mental functions has been examined in terms of the construal theory. The construal theory suggests that long-term concepts (e.g. weight loss from exercise) are viewed more abstractly than the short-term ones (e.g. finding time to exercise).Thus, it is easy to perform a behavior that has immediate results (e.g. eating a cookie, smoking); however, we often neglect to consider the long-term harm that can be done (Fong & Hall, 2003). This maladaptive behavior has plenty of short-term benefits but few, if any, long-term ones. On the contrary, adaptive behavior (e.g. eating healthy, exercise) is perceived as having many long-term benefits (e.g. weight loss, decreased rate of diseases), but few immediate

results (Hall & Fong, 2007). However, exercise does have immediate mental benefits. Thus, for individuals with maladaptive behavior tendencies, framing exercise for the immediate mental benefits garners more adherence than the long-term physical benefits (Gellert, et al., 2011). Likewise, those experiencing psychological disorders, or having a "bad day" would reap the most immediate benefits, better mental abilities, from exercising. This immediate reward would allow for an increased adherence to an exercise regimen that can have long-lasting benefits (e.g. weight loss). Therefore, research suggests that framing exercise for mental benefits may increase adherence as opposed to framing exercise for physical benefits (Segar et al., 2014).

Further research has examined the best framing for successful health behavior outcomes. In these studies, those who saw the positive information had higher positive perspectives and were more likely to commit to the healthy behavior than those who saw the negative perspectives (i.e. a vaccine is 70% versus a vaccine is 30% ineffective) (Levin, Schneider, & Gaeth, 1998; Linville, Fischer, & Fischhoff, 1993; O'Connor, Pennie, & Dales, 1996). This suggests that positive framing may be beneficial to encourage physical activity adherence. However, little research has been done to see if framing the positive physical benefits, positive mental benefits, or both help with adherence to physical activity in a non-clinical sample. While this study aims to use the positive framing of exercise, it focused on two different positive effects, mental and physical benefits. This study will also use similar ordering effects to another study, which framed medical statistics positively, negatively, positively then negatively, and negatively then positively (Bigman, Cappella, & Hornik, 2010).

Therefore, based on past research on individuals with serious mental illness (SMI; Hearon, et al., 2016), the aim of this study is to examine the impact of framing exercise in terms of mental and physical benefits for the general population. It is hypothesized that individuals in

the framing of exercise for mood benefit will endorse greater motivation and intention to exercise as well as report more exercise during the week following the experimental appointment than those in the framing for fitness condition (*Hypothesis 1*). About combined conditions, I hypothesize that effects will be like the mood benefit alone condition when the order of presentation is physical then mental health benefit, consistent with the ordering effects noted by Bigman and colleagues (2010; *Hypothesis 2*). With regards to motivation to exceed CDC requirements at the time of the first survey, I believe those in the exercise for mood condition will have an increased desire exercise (*Hypothesis 3*). When it comes to actual moderate and vigorous exercise the week after the first survey, I believe those in the exercise for mental benefits condition will have exercised more than those in the exercise for physical condition (*Hypothesis 4* and *Hypothesis 5*, respectively). Information retained from each condition one-week post intervention will also be evaluated as a secondary outcome measure. I predict the following hypotheses framing of emotional benefits for exercise will be more salient, and thus, more likely to be recalled at timepoints one and two (*Hypothesis 6* and *Hypothesis 7*, respectively).

Methods

Participants

A total of 98 individuals (88 females,10 males, M_{age}=32.01, SD_{age}= 16.33, *Range*= 17-70) from Albright College and the Reading, PA community were recruited for this IRB approved study. Participants described their ethnicity (6.58% Hispanic, 93.42% not Hispanic) and their race (14.29% African American, 5.19% Asian, 76.62% White, and 3.90% other). Psychology students at Albright College were sent an email with a general description of the study and were

given a link to the study on an experiment sign-up website, Albright Sona Systems Psychology Department Experiment Sign-Up. Non-psychology students and individuals from the Reading community were recruited by word of mouth from the researchers. Students in a psychology course earned either course credit or extra credit towards a participating psychology course for completion of the study. Other students and members of the community did not receive compensation for their participation.

There was a notable difference in the number of participants between timepoints 1 and 2. At timepoint one, there were 98 participants total; however, 31 individuals failed quality control questions or did not complete the survey leaving a true sample size of 67. At timepoint two, there were a total of 49 participants who completed the survey, but only 29 who entered ID numbers consistent with time 1 entries. Those without an identifiable match to time 1 data were excluded from analyses. A frequency analysis also showed that 63 of the 67 participants at timepoint 1 were already exceeding the minimum recommendations for physical activity ($M_{MET\ total}$ = 7241.20, $SD_{MET\ total}$ = 11258.86).

Materials

Stimuli. Participants received a link to SurveyMonkey to complete this study. On this survey, participants were randomly assigned to one of four reading conditions 1) information about mood benefits from exercise, 2) information about health benefits from exercise, 3) information about mood benefits first then health benefits, and 4) health benefits first then mood benefits (See Appendix 1). Participants were asked to complete comprehension questions based on the reading (See Appendix 2).

International physical activity questionnaire (IPAQ). The IPAQ is a 7-item self-report questionnaire, which measures a person's exercise activities, including vigorous, moderate, walking, and sitting for the past week. Participants rate their exercise abilities by indicating the number of days each week, hours and minutes they participated in said physical activity (Craig et al., 2003). Scores on the IPAQ at time one were used as a covariate in all analyses to control for baseline exercise levels. Scores at time two were used as a primary outcome measure.

Demographics questionnaire. For a basic informational background on the participant, a demographics questionnaire was given that was prepared by the researchers.

Exercise Motivation. To assess each participant's motivation to engage in exercise, a 2-item self-report questionnaire was given that was prepared by the researchers. These questions asked how likely the participant wanted to "meet" or "exceed" recommended weekly exercise with a 7-point Likert scale 1 (strongly disagree) and 7 (strongly agree). Each participant was also asked to list how many minutes of vigorous and moderate exercise he aims to complete the following week (see Appendix 3).

Procedure

After completing informed consent, participants were asked to indicate the last two digits of their social security number which randomized them to one of the four framing conditions. Participants were also asked to create a code, with a prompted form, which would help link their data between the surveys at both time points while maintaining confidentiality. Individuals then read the exercise information stimuli relevant to their randomized condition as described above and answered the comprehension and motivation questions. Finally, individuals were asked to complete the IPAQ and demographics questionnaires. At the end of survey one, individuals were

linked to another survey where they were asked to provide a valid email for survey two. Exactly, one week after completion of survey one, individuals were sent the follow-up survey, and were given 48 hours to complete this follow-up. This survey asked for the last two digits of their social security number and they were prompted to enter their code from the first survey for random assignment in the study. Participants then were asked the same comprehension questions from the readings of survey one without access to the informational paragraph. Then, participants completed the IPAQ and were given a debriefing form. Finally, individuals were linked to another survey where they could insert their information to receive extra/course credit compensation.

Results

Exercise at Time One

To test my *Hypothesis 1* that condition would predict exercise at timepoint two, a one-way independent ANOVA was conducted with condition as the independent variable and exercise at timepoint one (IPAQ score), entered as a covariate. However, results revealed no significant effect of condition on exercise at timepoint two, F (3,24) = 0.90, p =.46, partial η^2 = .12.

Exercise Motivation

Hypothesis 2 was that condition would predict motivation to meet CDC physical activity requirements. To test this, a one-way independent ANOVA with condition as the independent variable and desire to meet exercise requirements as the dependent variable was run. Once more, baseline levels of physical activity for participants was controlled for by using the IPAQ score at

time 1. Again, there was no significant effect of condition on motivation to meet CDC physical activity requirements, $F(3, 68) = 1.07$, $p = .37$, partial $\eta^2 = .05$.

To test *Hypothesis 3* that condition would predict motivation to exceed CDC physical activity requirements, a one-way independent ANOVA with condition as the independent variable and desire to exceed exercise requirements as the dependent variable was run. Again, the baseline levels of physical activity for participants was controlled for by using the IPAQ at time one. Once more there was no significant effect of condition on desire to exceed exercise requirements, $F(3,68) = 0.48$, $p = .70$, partial $\eta^2 = .02$.

Exercise Goal Setting

Hypothesis 4 that condition would predict moderate exercise during the course of the next week, was analyzed using a one-way independent ANOVA with condition as the independent variable and participant's plan to complete "x" minutes of moderate exercise as the dependent variable was run. Yet again, baseline levels of physical activity for participants was controlled for by using the IPAQ. However, there was no significant effect of condition on planned moderate exercise during the next week, $F(3,68) = 0.07$, $p = .98$, partial $\eta^2 = .003$.

Hypothesis 5 that condition would predict vigorous exercise during the next week, a one-way independent ANOVA with condition as the independent variable and participant's plan to complete "x" minutes of vigorous exercise as the dependent variable was run. Similarly, baseline levels of physical activity for participants was controlled for by using the IPAQ. There was no significant effect of condition on planned vigorous exercise during the next week, $F(3,68) = 0.55$, $p = .65$, partial $\eta^2 = .03$.

Exercise Knowledge

Hypothesis 6 that condition would predict knowledge of exercise benefits at timepoint two, was analyzed using a one-way independent ANOVA with condition as the independent variable and knowledge of exercise at timepoint two as the dependent variable. There was no significant effect of condition on knowledge of exercise benefits at timepoint two, $F(3,26) = 0.01$, $p = .99$, partial $\eta^2 = .001$.

Hypothesis 7 that condition would predict knowledge of exercise benefits at timepoint one, a one-way independent ANOVA with condition as the independent variable and knowledge of exercise at timepoint one as the dependent variable. There was a significant main effect of condition $F(3,67) = 9.55$, $p < .001$, partial $\eta^2 = .309$. Specifically, pairwise comparisons using a Bonferroni correction revealed the condition that saw the physical benefits of exercise alone ($M = 0.73$, $SD = 0.12$) had a lower knowledge than emotional benefits of exercise alone ($M = 0.95$, $SD = 0.14$) and physical benefits then emotional benefits ($M = 0.90$, $SD = 0.09$). This suggests that emotional benefits may be more immediately salient to participants than the physical benefits of exercise (see Figure 1).

Discussion

This study was designed to extend research on framing of exercise benefits, physical and/or mental, on exercise adherence. My findings suggest that the conditions did not have a significant effect on motivation to exercise (both to exceed and meet CDC recommendations), goal setting (both for moderate and vigorous physical activity), self-reported exercise at timepoint two, or knowledge at timepoint two. While most of my hypotheses were not supported, I did find a significant effect of condition on knowledge of comprehension questions at timepoint one.

This finding suggests that, when given initial information about exercise benefits, emotional benefits were more salient. Thus, this could result from one of two reasons: learning new material, emotional benefits of exercise, remains more salient, or the participants referred to the reading for the answers to the comprehension questions. While the latter may appear more plausible, participants in the physical benefit alone condition had equal opportunity to refer to the readings to answer questions as those in the groups scoring higher, which still suggests greater interest and engagement with the mood-related content. This coincides with similar findings of past research (McCall & Martin Ginis, 2004). Another explanation for the increased salience of the mental related exercise benefits could result from my sample, which was largely comprised of psychology students.

The significant finding of framing condition on knowledge at timepoint one is consistent with previous research noting that exercise for mental benefits can be more salient, especially for those with mental disorders (Penedo & Dahn, 2005). For example, Hearon and colleagues (2016) found that participants in the exercise for mood benefits condition who also had increased exercise behavior, experienced mood benefits. My findings also suggest that individuals paid more attention to the knowledge at timepoint two, especially for the exercise for mood framing conditions. Thus, my findings are consistent with past literature (Hearon et al., 2016), yet it also adds to the literature for a healthy sample rather than a clinical sample.

Hypotheses that examined framing condition on motivation to exercise could result from the construal theory, which suggests that long-term concepts are perceived as being more abstract than the short-term ones. Thus, it may have been more difficult to plan to exercise than to exercise in the present, especially without seeing any results when planning the behavior. Another explanation for the nonsignificant results of framing condition on exercise goal setting,

could be a similar finding that occurs when making other commitments. For example, it is easy to make a decision to exercise (e.g. New Year's resolution); however, when there are other challenges that occur during the day (e.g. work, homework, sleep) it can become difficult to adhere to exercise (Hall & Fong, 2007). It is also important to note that my framing conditions referred to the minimum exercise requirements of CDC. However, most of my sample was already meeting the minimum requirements. Thus, a reason I may not have significant findings could be that my participants did not have much room for the framing conditions to encourage them to exercise more.

In addition, my methods differed from Hearon and colleagues (2016). Rather than have the participants have a group therapy session and reflect on either the mental or physical benefits, depending on the condition, I had individuals read about the mental and/or physical benefits. Thus, having participants reading a paragraph about the benefits of exercise likely is not as salient as individuals sitting in a group session for a period of 50 minutes. Therefore, my methods did not generate as much salience with the benefits, whereas those in Hearon and colleagues' (2016) study did.

The present study has several limitations. There were four conditions and I only had a total of 98 participants at timepoint one; however, the correct total was 67 individuals amongst four conditions, with only 29 participants submitting data that could be used for time two analyses. Therefore, this suggests that the study was underpowered and would benefit from additional participants. In addition to this small sample size, the lack of participants completing timepoint two is a limitation. The study was designed to monitor the changes in exercise behavior from timepoints one and two. Having data from only 29 at time two limited the ability

to see this possible change. Another limitation is the limited diversity among my sample. For example, I had a small fraction of male participants within this study compared to females.

Future studies could stem from this project. For one, this study could use additional participants in each condition and, thus, overall in the study. Another option, includes a different intervention or numerous ones such as readings as used in this procedure or in person discussions. Past research suggests that a longer framing option would likely result in a more salient behavioral change than a short reading (Gross & D'Ambrosio, 2004; Hearon et al., 2016). In a similar matter, I could have multiple methods of intervention delivery instead of one reading as suggested by past research (Schuch & Koch, 2015). For example, we could have participants learn about the benefits derived from exercise over the course of a week or even a few days. All things considered, this research helps to expand on the clinical and medical interventions of exercise behavior by suggesting that individuals tend to remember the mental benefits of exercise more so than the physical benefits.

References

Armstrong, K., Schwartz, J.S., Fitzgerald, G., Putt, M., & Ubel, P.A. (2002). Effect of framing as gain versus loss on understanding and hypothetical treatment choices: Survival and mortality curves. *Medical Decision Making, 22,* 76–83.

Asmundson, G. J., Fetzner, M. G., Deboer, L. B., Powers, M. B., Otto, M. W., & Smits, J. A. (2013). Let's get physical: A contemporary review of the anxiolytic effects of exercise for anxiety and its disorders. *Depress Anxiety, 30,* 362-373.

Arora, R., Stoner, C., & Arora, A. (2006). Using framing and credibility to incorporate exercise fitness in individuals' lifestyle. *Journal of Consumer Marketing, 23*, 199-207.

Bigman, C. A., Cappella, J. N., & Hornik, R. C. (2010). Effective or ineffective: Attribute framing and the human papillomavirus (HPV) vaccine. *National Institute of Health, 81,* 70-76.

de Bruijin, G., Out, K., & Rhodes, R. E. (2014). Testing the effects of message framing, kernel state, and exercise guideline adherence on exercise intentions and resolve. *British Journal of Health Psychology, 19,* 871-885.

Centers for Disease Control and Prevention. (2008) Physical activity guidelines for Americans. 2008. http://www. health.gov/PAGuidelines.

Craig, C. L., Marshall, A. L., Sjostrom, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E.… Oja, P. (2003). International physical activity questionnaire: 12- country reliability and validity. *Journal of the American College of Sports Medicine, 9,* 1381-1395.

Maheswaran, D., & Meyers-Levy, J. (1990). The influence of message framing and issue involvement. *Journal of Marketing Research, 27,* 361-367.

Ekkekakis, P., Hall, E. E., & Petruzzello, S. J. (2008). The relationship between exercise intensity and affective responses demystified: To crack the 40-year-old nut, replace the 40-year-old nutcracker! *Annals of Behavioral Medicine, 35,* 136-149.

Fong, G. T., & Hall, P. A., (2003). Time perspective: A potentially important construct for understanding adolescent risk behavior. In D. Romer (Ed.), *Reducing adolescent risk: Toward an integrated approach* (106-112), Newberry Park, CA: Sage publications.

Gellert, P., Ziegelmann, J. P., Lippke, P., & Schwarzer, R. (2011). Future time perspective and health behaviors: Temporal framing of self-regulatory processes in physical exercise and dietary behaviors. *Annals of Behavioral Medicine, 43*, 208-218,

Gray, J. B., & Harrington, N. G. (2010). Narrative and framing: A test of an integrated message strategy in the exercise context. *Journal of Health Communication, 16,* 264-281.

Gross, J.J., & John, O.P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85,* 348-362.

Hall, P. A., & Fong, G. T. (2007). Temporal self-regulation theory: A model for individual health behavior. *Health Psychology Review, 1,* 6-52.

Hearon, B., Beard, C., Kopeski, L., Smits, J., Otto, M., & Bjorgvinsson, T. (2016). Attending to timely contingencies: Promoting physical activity uptake among adults with serious mental illness with an exercise-for- mood versus an exercise-for-fitness prescription. *Behavioral Medicine, 1,* 1-9.

Kahneman, D., & Tversky, A. (1984). Choices, values, and frames. *American Psychologist, 39*(4), 341-350.

Kanouse, D. E. (1984). Explaining negativity biases in evaluation and choice behavior: Theory and research. *Consumer Research, 11*, 703-708.

Kühberger A. (1998). The influence of framing on risky decisions: a meta-analysis. *Organizational behavior and human decision processes, 75*, 23–55.

Latimer, A. E., Rench, T. A., Rivers, S. E., Katulak, N. A., Materese, S. A., Cadmus, L.,… Salovey, P. (2008). Promoting participation in physical activity using framed messages: An application of prospect theory. *British Journal of Health Psychology, 13*, 659-681.

Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998). All frames are not created equal: A typology and critical analysis of framing effects. *Organism Behavior Human Decision Process, 76,* 149–188.

Linville, P. W., Fischer, G. W., & Fischhoff, B. (1993). AIDS risk perceptions and decision biases. In B. Editor & G.D. Editor. *The social psychology of HIV infection*. (5-38). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Lovibond, S. H. & Lovibond, P. F. (1993). Manual for the depression anxiety stress scales (DASS). Psychology Foundation Monograph. (Available from The Psychology Foundation, Room 1005 Mathews Building, University of New South Wales, NSW 2052, Australia).

MedlinePlus. (2018) Benefits of exercise. https://medlineplus.gov/benefitsofexercise.html

Meyerowitz, B. E., & Chaiken, S. (1987). The effect of message framing on breast self-examination attitudes, intentions and behavior. *Journal of Personality and Social Psychology, 52*, 500-510.

McCall, L. A., & Martin Ginis, K. A. (2004). The effects of message framing on exercise adherence and health beliefs among patients in a cardiac rehabilitation program. *Journal of Applied Biobehavioral Research, 9,* 122-135.

McNeil, B. J., Pauker, S. G., Sox, H. C., & Tversky, A. (1982). On the elicitation of preferences for alternative therapies. *The New England Journal of Medicine, 306,* 1259–1262.

O'Connor, A. M., Pennie, R. A., & Dales, R. E. (1996). Framing effects on expectations, decisions, and side effects experience: The case of influenza immunization. *Journal Clinical Epidemiology, 49,* 1271–1276.

Penedo, F. J., & Dahn, J. R. (2005). Exercise and well-being: A review of mental and physical health benefits associated with physical activity. *Current Opinion in Psychiatry, 18,* 189-193.

Rothman, A. J., Martino, S. C., Bedell, B. T., De tweiler, J. B., & Salovey, P. (1999). The systematic influence of gain- and loss-framed messages on interest in and use of different types of health behavior. *Personality and Social Psychology Bulletin, 25,* 1355–1369.

Rothman, A., & Salovey, P. (1997). Shaping perceptions to motivate healthy behavior: The role of message framing. *Psychological Bulletin, 121,* 3–19.

Segar, M. L., Richardson, C. R. (2014). Prescribing pleasure and meaning: Cultivating walking motivation and maintenance. *American Journal of Preventative Medicine, 47,* 838-841.

Schuch, S., & Koch, I. (2015). Mood states influence cognitive control: The case of conflict adaptation. *Psychology Research, 79,* 759-72.

Sharma, A., Madaan, V., & Petty, F. D. (2006). Exercise for mental health. *Primary Care Companion to The Journal of Clinical Psychiatry, 8*(2), 106.

Taylor, S., Zvolensky, M. J., Cox, B. J., Deacon, B., Heimberg, R. G., Ledley, D. R., . . . Cardenas, S. J. (2007). Robust dimensions of anxiety sensitivity: Development and initial validation of the Anxiety Sensitivity Index-3. *Psychological Assessment, 19*(2), 176-188.

Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science, 211*, 453–458.

Wójcicki, T. R., White, S. M., & McAuley, E. (2009). Assessing outcome expectations in older adults: The multidimensional outcome expectations for exercise scale. *The Journals of Gerontology: Series B, 64*, 33–40.

Wright P., & Weitz, B. (1977). Time horizon effects on product evaluation strategies. *Journal of Marketing Research, 14*, 429-44

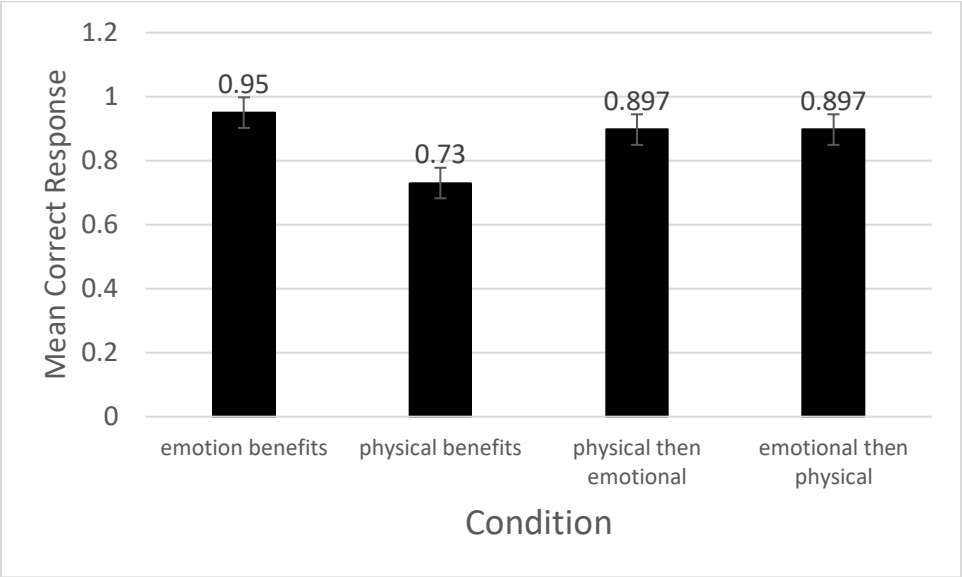


Figure 1. Mean correct response of comprehension questions at timepoint one for each framing condition.

Appendix 1

Exercise for mood benefits:

The Centers for Disease Control (CDC) recommends 150 minutes of moderate or 75 minutes of vigorous physical activity each week. By engaging in the recommended amount of physical activity, several studies have found that mental benefits exist. These studies have found that regular physical activity can reduce anxiety sensitivity while increasing resilience to stressful mood states and self-efficacy (Asmundson et al., 2013). Other studies have also found that individuals who participate in 30 consecutive minutes of moderate-intensity physical activity will have an immediate increase in positive mood and a decrease in negative mood (Ekkekakis, Lind, & Vazou, 2009). Likewise, regular exercise can reduce anger, distress, and confusion. It has also been suggested that implementing an exercise regimen can reduce the onset of a mental disorders and even help those recovering from disorders such as depression (Bartholomew, Morrison, & Ciccolo, 2005).

Exercise for physical benefits

The Centers for Disease Control (CDC) recommends 150 minutes of moderate or 75 minutes of vigorous physical activity each week. Engaging in regular physical activity can be beneficial to the overall physical health. In fact, several studies have examined the impact of regular aerobic exercise on physical fitness and found that it can boost energy during the day while allowing for better sleep at night. In addition, regular exercise can help with weight control and weight loss (Mayo clinic). By having better weight control and weight loss, the probability of developing certain diseases decreases. For example, regular exercise has been linked to a reduction in the risk of Type II diabetes, some cancers, and cardiovascular diseases. A decrease in osteoporosis risks also occurs from the increase bone density that results from regular exercise (CDC & WHO).

Appendix 2

Comprehension Questions mood benefits:

1. How much physical activity have studies found will have an immediate increase in positive mood? A. 10 minutes B. 30 minutes C. 2 minutes D. 60 minutes (Answer= "B")
2. Asmundson et al., 2013 found that regular physical activity can reduce anxiety sensitivity, increase resilience to stressful mood states, and increase what else? A. alertness B. metabolism C. Self-efficacy D. cognitive ability (Answer= "C")
3. How much vigorous physical activity each week does the CDC recommend? A. 25 minutes B. 150 minutes C. 50 minutes D. 75 minutes (Answer="D")
4. How much moderate physical activity does the CDC recommend each week? A. 150 minutes B. 75 minutes C. 15 minutes D. 100 minutes (Answer= "A")
5. Which is NOT a mental benefit listed in the above paragraph? A. reduce anger B. reduce anxiety sensitivity C. reduce onset of mental disorders D. increase memory (Answer= "D")

Comprehension Questions physical benefits:

1. How much vigorous physical activity each week does the CDC recommend? A. 25 minutes B. 150 minutes C. 50 minutes D. 75 minutes (Answer="D")
2. How much moderate physical activity does the CDC recommend each week? A. 150 minutes B. 75 minutes C. 15 minutes D. 100 minutes (Answer= "A")
3. The Mayo Clinic found that regular physical activity can help with weight loss and what else? A. Sleep B. control of diabetes C. eye sight D. weight control (Answer= "D")
4. Which of the following has been reduced by regular exercise according to the paragraph above? A. Type II diabetes B. Cataracts C. Huntington's Disease D. Autism (A= letter "A")
5. Engaging in regular physical activity has benefits such as A. weight loss B. decrease osteoporosis C. boost in energy D. all of the above (A= letter "D")

Appendix 3

Using the following scale, please indicate how likely you are to agree or disagree with the following statements.

1----------2----------3----------4----------5----------6----------7

Strongly neutral Strongly

disagree agree

I feel motivated to meet the minimum physical activity requirements as recommended by the CDC over the next week.

I feel motivated to exceed the physical activity requirements as recommended by the CDC over the next week.

Please indicate how many minutes you plan to engage in each of the following statements.

Thinking about moderate physical activity, I will aim to complete _____ minutes of moderate intensity activity over the next week.

Thinking about vigorous physical activity, I will aim to complete _____ minutes of vigorous intensity activity over the next week.