

Alleviating Depressive Symptoms through Mindset

By

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## Abstract

**Background:** Depression is a devastating public health problem, and various treatments such as exercise have been shown to be effective in decreasing depression. However, depressed individuals often have difficulty initiating exercise due to low energy and motivation. Perhaps changing a person's mindset (i.e. beliefs and expectations) during exercise to decrease depressive symptoms could be a key to facilitating the antidepressant effects of exercise without changing the behavior itself.

**Methods:** 58 participants with a BDI score of 10-25 were recruited through the University of Kansas Psychology Department's SONA website. Participants completed surveys inquiring about depressive and anxiety symptoms and current level of exercise at three time points over the course of 7-10 days. The experimental group (N=27) was given a mindset manipulation informing the participant that their daily activities were considered exercise which would alleviate their depressive symptoms. The control group (N=31) was read a script that discussed various strategies to alleviate depressive symptoms with no mention of their daily activities.

**Results:** A linear mixed model analysis indicated a significant difference between the experimental and control groups' depression scores over time,  $F(1,113)=4.80$ ,  $p=.03$ , with the experimental group's depressive symptoms decreasing more rapidly than the control group's depressive symptoms.

**Conclusion:** In sum, the results show that altering mindset during exercise (current daily activities) is an effective method to decrease depressive symptoms in mild to moderately depressed individuals compared to the control group.

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## Alleviating Depressive Symptoms through Mindset

### **Background**

Major depressive disorder is a major public health problem. It is among the most prevalent psychiatric disorder, with some estimates suggesting as many as 15% of all individuals will develop a clinically significant episode of depression in their lifetime (Stewart, Ricci, Chee, Hahn, & Morganstein, 2003). In addition to the suffering and emotional misery that accompanies depression, the disorder disrupts not only interpersonal functioning but also occupational functioning. Americans miss approximately 200 million work days per year due to depression (Stewart et al., 2003), creating disruption not only for the economy but for individual financial functioning. Moreover, unipolar depressive disorders are the leading cause of disability in males, females, and low, middle, and high income countries around the world (World Health Organization, 2004). The disorder is so prevalent that about 1 in 10 Americans are currently taking an antidepressant in an attempt to treat the disorder, which represents a 400% increase since the late 1980s (Pratt, Brody & Gu, 2011). Depression is also highly recurrent; individuals with more than two depressive episodes have a greater than 80% chance of experiencing another depressive episode (Burcusa & Iacono, 2007). Clearly there is a substantial need for effective treatments for depression.

A number of treatments for depression have been developed, but none have been found to be fully effective. The most common treatments for depression are medication and psychotherapy. A wealth of studies have examined the efficacy of pharmacological interventions for depression. Data generally support the efficacy of medication for depression and show that psychotropic medications have comparable efficacy to placebo (Moncrieff & Kirsch, 2005). Nevertheless, research suggests that the efficacy of antidepressants increases

with the severity of depression, such that antidepressant medication tends to be less effective for mild to moderate levels of depression (Fournier et al., 2010). Additionally, pharmacological treatments are accompanied by side effects that may make them problematic for many individuals.

A number of psychotherapies have been developed for emotional disorders, including depression. Perhaps the most well-known psychotherapy is cognitive behavioral therapy (CBT). CBT is a “structured, short-term, present-oriented psychotherapy for depression, directed toward solving current problems and modifying dysfunctional (inaccurate and/or unhelpful) thinking and behavior” (Beck, 2011, p. 2). In essence, CBT is a treatment that relies on the connections between a person’s cognitions, emotions, and behaviors and their cyclical impacts on one another (Mujik, 2003). CBT teaches individuals to acknowledge and challenge dysfunctional thoughts and beliefs to decrease distress and enhance coping and adaptive functioning (Hollon & Dimidjan, 2014). The results of CBT have been generally positive with studies finding that cognitive therapy is as effective as medication (Hollon & Dimidjan 2014). A meta-analysis of 28 studies by Dobson (1989) found CBT to be more effective than various other psychotherapies in the treatment of depression. Despite CBT’s efficacy, it seems likely that that some individuals might receive greater benefits from alternative treatments.

Exercise has been suggested as an alternative treatment to psychotherapy and pharmacotherapy, and some data support its efficacy (North, McCullagh, & Tran, 1990; Lawlor, & Hopker, 2001; Mead et al., 2009; Cooney, Dwan, & Mead, 2014). For instance, a review of studies suggests that exercise decreases depressive symptoms by creating a stronger tolerance to stress-related causes of depression by regulating stress hormones (Ströhle, 2009). Specifically, aerobic exercise at a “public health dose” (180 to 210 minutes of activity per

week) decreases depressive symptoms comparable to medication or CBT without the potentially harmful side effects of medication (Dunn, Trivedi, Kampert, Clark, & Chambliss, 2005). A similar study found that performing aerobic exercise for 30 minutes three times per week is “sufficient” for reducing depressive symptoms comparable to CBT and an antidepressant, sertraline, when maintained for four months. However, the relapse rate for depression was significantly lower in the exercise group than the sertraline group when maintained for ten months (Babyak et al., 2000). Despite the relatively immediate effects of exercise and medication, it seems that exercise leads to a lower potential for relapse.

Despite the research evidence for exercise, depression can negatively impact motivation and energy levels required to exercise, and thus create a barrier for individuals to initiate this behavior. So how might depressed individuals reap the benefits of exercise when they have difficulty initiating and maintaining this activity? A number of possibilities exist but an intriguing perspective suggests that perhaps the physical act of exercise is not necessary; it may be that some of the positive effects of exercise are psychological. For example, a study by Blumenthal et al. (2007) found that, following four months of treatment in either (1) supervised group exercise, (2) exercise at home, (3) sertraline, or (4) placebo conditions, all groups reported lower Hamilton Depression Rating Scale scores, and that scores for the exercise groups were not significantly different than the placebo group. Although exercise was effective in decreasing depression, control groups were still receiving comparable benefits.

It is possible that these placebo these benefits are related to cognitive elements rather than the physical elements of the exercise. Cognition plays a substantial role in depression such that depressed individuals tend to focus, and later ruminate, on negative information more so than non-depressed individuals (Gotlib & Joormann, 2010). This tendency is a result of



schemas, which bias the type of information that is most salient to the individual (Gotlib & Joormann, 2010). For instance, depressed individuals have negative schemas and therefore are biased to focus on negative information available, or to interpret neutral information negatively. Given that cognition impacts the development of depression, it stands to reason that it might also impact treatment. However, cognition is a broad, over-arching concept that would be difficult to manipulate in its entirety to treat depression. It is possible that targeting certain cognitive elements might achieve the desired result. Specifically, manipulating cognitive elements such as mindset, beliefs, and expectations regarding exercise may play an important role in the reduction of depressive symptoms that exercise provides. This is not to suggest that engaging in regular physical exercise does not have a benefit on the vascular-system and overall health, as that has been widely studied (Bouchard, Blair, & Haskell, 2007; Laforge et al., 1999; Prior, Lloyd, Yang, & Terjung, 2003). Rather, at least some of the benefits of exercise on depressive symptoms might be mediated by cognitive elements.

One cognitive element that might influence the effects of exercise on depressive symptoms is the idea of “mindset.” This idea suggests that beliefs and expectations work together to create a mindset, which determines perceptions regarding experiences and resulting actions/behaviors. Changing a person’s mindset during exercise to decrease depressive symptoms could be a key to facilitating the antidepressant effects of exercise. In this regard, Crum and Langer (2007) conducted an experimental study investigating the effect of mindset during exercise on weight loss with hotel maids. The experimental group was told that their everyday work as maids was considered exercise that would help them lose weight. Findings showed that the experimental group’s body mass index and weight decreased significantly whereas the control group’s body mass index did not (Crum & Langer, 2007). Because they

went about their everyday activities with the beliefs and expectations to lose weight, they were successful in doing so.

A similar study by Crum, Corbin, Brownell, and Salovey (2011) assessed participants' levels of ghrelin, a peptide that signals hunger to the brain, before and after consuming a milkshake. However, each time the milkshake was presented differently to the participants. The first time the participants were informed that the milkshake had 140 calories, 0% fat, 0 grams added sugar, and it was marketed as "Guilt Free Satisfaction." The participants came back one week later and were then informed that the milkshake was 620 calories, 30 grams of fat, and 36 grams added sugar, and it was marketed as "Decadence you Deserve." The participants ghrelin rates dropped at both time points, but ghrelin rates dropped three times more at the second time point while nothing about the milkshake was changed. Because the participants consumed the milkshake with different beliefs and expectations regarding its properties, their bodies responded accordingly physiologically. Therefore, it appears that mindset can have a meaningful impact on physical outcomes.

Research has also supported a connection between mindset and depression. For example, data show that the ability to readily change mindset is linked to better sleep quality (Gieselmann, Opey, de Jong-Meyer, & Pietrowsky, 2012), and sleep quality plays a significant role in depression. There is also evidence that a more competitive mindset in a sporting event lowers depressive symptoms and facilitates anxiety management (Meyers, Bourgeois, LeUnes, & Murray, 1999). This research suggests that influencing mindset could add to the effectiveness of exercise in the treatment of depression because much of the benefits of exercise might be produced psychologically rather than physically.

The combination of beliefs and expectations that define mindset may thus have

powerful physiological and psychological effects. Ojanen (1994) goes so far as to say that the psychological effects of exercise cannot be explained without discussing the substantial role played by beliefs. The act of exercising elicits beliefs, expectations, and subjective efficacy which influences the psychological effects found. Another example of beliefs influencing exercise efficacy was seen in a study conducted by Desharnais, Jobin, Cote, Levesque, and Godin (1993). In this study, participants in the experimental condition were told that a 10-week exercise program would increase psychological well-being. The control condition was told the program was designed to improve the biological effects of exercise. There was a significant increase in self-esteem for the experimental condition despite the same levels of exercise because the participants believed that the program was increasing psychological well-being.

Indeed, some research has also suggested that nearly half of the psychological benefits of exercise may be produced by positive expectations (Lindheimer, O'Connor, & Dishman, 2015). A recent study by Mothes et al. (2016) created positive expectations regarding exercise prior to a single 30 minute session of cycling. They found that the participants who experienced the induced expectations showed more psychological benefits such as "higher exercise enjoyment, mood improvement, and anxiety reduction" (Mothes et al., 2016). This suggests that expectations play a large role in the psychological benefit of exercise. Although not all research has supported the impact of mindset on exercise (e.g., Stanforth, Steinhardt, Mackert, Stanforth, & Gloria, 2011), the results of this body of research suggest that at least some of the effects of exercise may be due to the experimental beliefs and expectations and are worthy of further exploration.

In sum, alternative treatments to depression such as exercise have been shown to be

effective in decreasing depression, but depressed individuals have difficulty initiating exercise. The research also suggests, however, the physical elements of exercise may not completely account for depressive symptom reduction. It might be that mindset regarding exercise plays a role in the benefits of exercise on depressive symptomatology. Although there are data on the effects of mindset on health outcomes, to date there is no research on whether mindset during exercise or typical daily activities decreases depressive symptoms. Thus the current study investigated whether altering the mindset of participants with mild to moderate depression scores during current daily activities might decrease depressive symptoms. To test this idea, the experimental participants were led to believe and expect that their current daily activities are considered exercise. The control participants were read a script with information about the benefits of Omega-3 fatty acids, anti-rumination strategies, light exposure, and sleep hygiene on depressive symptoms.

## **Method**

### **Participants**

Participants were recruited through the University of Kansas Psychology Department's SONA website. Undergraduate student volunteers took a survey on SONA to determine their eligibility to participate in the experiment. The eligibility criterion was a score of 10-25 on the Beck Depression Inventory, which indicates a mild to moderate level of depression (BDI; Beck, 1967). 59 participants were recruited that met criteria, although one outlier was eliminated as the BDI score in the third time point was 3.17 standard deviations from the mean.

Prior to the experiment, each participant was randomly assigned to either the experimental condition or the control condition. When the participant arrived to session, a second BDI was re-administered to ensure that the participant's scores still fell between a 10 and 25 indicating a

mild to slightly moderate level of depression (BDI; Beck, 1967). Participants were excluded if their BDI scores were below 10 or above 25. Participant demographics and baseline testing means and standard deviations from time 1 are summarized in [Table 1](#).

## Measures

**Daily activities and exercise.** The Incidental and Planned Exercise Questionnaire (Delbaere & Lord, 2009) was adapted for our purposes, and only the self-report format that measures physical activity during the past week was used (see [Appendix B](#) for the adapted Incidental and Planned Exercise Questionnaire). The questionnaire is a 10-item self-report measure inquiring about incidental (e.g., housework) and planned activity (e.g. exercise class). The Incidental and Planned Exercise Questionnaire has “excellent test–retest reliability, intraclass correlation coefficient .87” and construct validity as the items created a “unidimensional scale” (Delbaere, Hauer, & Lord 2010). The internal consistency was found to be low (Cronbach’s alpha=.60), and the measure was shown to discriminate activity levels based on “sex, age, and fall risk factors” (Delbaere et al., 2010).

**Depressive symptomatology.** The Beck Depression Inventory is a 21-item self-report measure used to examine the level of depression in adults and adolescents over the past two weeks (BDI; Beck, 1967). Each item asks about the severity of various depressive symptoms. The items are on a 4 point scale ranging from 0 (e.g., I do not feel sad) to 3 (e.g., I am so sad or unhappy that I can’t stand it) with a range of scores from 0 to 63. The BDI has been shown to consistently demonstrate strong reliability and validity (Beck, Steer, & Carbin, 1988) (see [Appendix C](#) for the BDI).

The lifetime version of the Inventory to Diagnose Depression (IDDL) is a 22-item self-report measure used to examine if an individual met criteria for a major depressive disorder

according to the DSM-III in their lifetime. Each item asks about the severity of various depressive symptoms as well as comorbid symptoms such as anxiety, irritability, and annoyance. The items are on a 5 point scale ranging from 0 (e.g., I did not feel sad or depressed) to 4 (e.g., I was so sad or unhappy that I couldn't stand it) with a range of scores from 0 to 88. Each item also asks if the symptom was present for more or less than two weeks. The IDDL has "good internal consistency (Cronbach's  $\alpha=.92$ )" (Zimmerman & Coryell, 1987) (see [Appendix D](#) for the IDDL). For our purposes, we added two extra questions. The first asked how many periods of depression they have experienced similar to their report, and the second asked the level of treatment they were provided for their depressive symptoms (see [Appendix D](#) for the IDDL and the two additional questions).

**Anxiety symptomatology.** The Beck Anxiety Inventory (BAI) is a 21-item self-report measure used to examine anxiety levels in adults and adolescents over the past two weeks (Beck, Epstein, Brown, & Steer, 1988). Each item asks how much the participant is bothered by a specific symptom of anxiety. The items are on a 4 point scale ranging from 0 (Not at all) to 3 (Severely- I could barely stand it). Scores of 0-7 are considered minimal, 8-15 is mild, 16-25 is moderate, and 26-63 is severe. The BAI has excellent internal consistency (Cronbach coefficient  $\alpha=.92$ ) and high "test-retest reliability over 1 week,  $r(81)=.75$ " (Beck et al., 1988) (see [Appendix E](#) for the BAI).

## **Procedure**

After consenting, the participants were randomly assigned to either the experimental or control group and filled out a demographics form (See [Appendix A](#) for demographic questionnaire) and the BDI again to ensure they met the eligibility criterion. If they met criteria, they took the BAI, IPEQ, and the IDDL. The research assistant then read the oral scripts to the

participants depending on their condition. The experimental script (manipulation) informed the participant that their daily activities were considered exercise which would alleviate their depressive symptoms. The same standardized script was administered to each participant, but each participant received feedback about the particular form of daily activities they indicated on the IPEQ (see [Appendix F](#) for the experimental script). The participants were asked to repeat this information back to the research assistant to ensure that they understood the information provided. The control group went through the exact same procedure, with the exception that their script discussed various strategies to alleviate depressive symptoms with no mention of their daily activities (see [Appendix G](#) for the control script). They were finally asked to schedule their second appointment to come back into the lab and fill out a second BDI, BAI, IPEQ, and IDDL after approximately 7-10 days.

Participants received emails reminding them of their appointment times and the information they learned during the manipulation was reiterated. This script reminded the participants in the experimental condition that their daily activities were considered exercise which would alleviate their depressive symptoms. When the students arrived for their second appointment, they completed the forms for a second time in order to obtain a post-test measure of depressive symptoms. Finally, they were read the debriefing form and given a copy for their records.

### **Data Analysis**

Statistical analyses were performed using the R Statistical Package (Version 3.4.3). Linear mixed modeling packages, lme4 and lmerTest, were used to conduct the statistical analyses as the data violated the assumption of homogeneity of variance required for an analysis of variance or analysis of covariance. Linear mixed models also allow for random effects (i.e.

participant variability) in addition to fixed effects (i.e. time and condition). A correlated random slope and random intercept were used to account for changes in depression, anxiety, and intentional and planned exercise scores over time. Satterthwaite's degree of freedom method was used to test significance of the fixed effects. For this study, we ran three linear mixed models to assess changes in BDI, BAI, and IPEQ scores over time (Time 1, 2, and 3), by condition, and by time\*condition using an alpha level of .05 to test significance.

## Results

### Power analysis

A post hoc repeated measures ANOVA power analysis was conducted using G\*Power in which  $\alpha = .05$ , effect size  $F = .240$ , and correlation between repeated measures (BDI time point 1 and 3) = .42. The effect size  $F$  was calculated using Hedge's  $G$  which is a measure of effect size similar to Cohen's  $d$ , although it includes an adjustment for sample size. Hedge's  $G = .48$ , and it was calculated using the means, standard deviations, and sample sizes for the control and experimental groups from the third time point. Hedge's  $G$  was then converted to an effect size  $F$  using an effect size converter in Excel. Given these inputs, this study's power = .63. This means that there is a 63% probability that the study accurately rejected the false null hypothesis; that is, there is a 63% probability that the study identified an existing effect.

### Independent samples t-test to determine pre-existing group differences

To rule out pre-existing differences, an independent samples t-test was used to examine possible group differences between the experimental and control groups' current and previous levels of depression, anxiety, and exercise at time 1. The results demonstrated that there were no significant differences between the experimental and control groups' current depression scores ( $p = .87$ ), history of depression ( $p = .36$ ), anxiety scores ( $p = .25$ ), or intentional and planned



exercise total scores ( $p=.73$ ) at time 1. This indicated that there was no significant difference between the groups' current and previous levels of depression, anxiety, or exercise at the start of the experiment.

### **Linear mixed model analysis for depressive and anxiety symptoms**

A linear mixed model analysis was used to examine if there was a significant difference between the experimental and control groups' depression scores over time. The results indicated that there was a significant difference between the experimental and control groups' depression scores over time,  $F(1,113)=4.80$ ,  $p=.03$ , with the experimental group's depressive symptoms decreasing more significantly than the control group's depressive symptoms (See [Figure 1](#)).

A linear mixed model analysis was also used to examine if there was a significant difference between the experimental and control groups' anxiety scores over time. Results indicated that there was also a significant difference between the experimental and control groups' anxiety scores over time,  $F(1,113)=4.6$ ,  $p=.03$ , with the experimental group's symptoms of anxiety decreasing more significantly than the control group's symptoms of anxiety (See [Figure 2](#)).

### **Linear mixed model analysis for intentional and planned exercise**

A linear mixed model analysis was used to examine if there was a significant difference between the experimental and control groups' intentional and planned exercise total scores. The results indicated that there was no significant difference between the experimental and control groups,  $p=.98$ . The results suggest that the manipulation was effective in solely targeting the mindset of the experimental group rather than influencing the level of intentional or planned exercise in which they engaged.

### **Relationship between history of depression and current depression**

Correlational analyses were used to examine the association between the IDDL and BDI scores for the control and experimental group to determine if some function of the results was related to history of depression. A bivariate Pearson two-tailed correlation was used, and the results indicated that the correlations between the BDI time 1 scores and the IDDL scores for the control group,  $r=.20$ ,  $p= .28$ , were similar to the experimental group,  $r=.26$ ,  $p=.19$ . Therefore, initial BDI and IDDL scores indicate that there is a low correlation, and that a history of depression likely does not play a role in the results.

### **Discussion**

The results of the current study indicated that both the control group and the experimental group showed decreases in BDI. However, the experimental group scores decreased at a faster rate, suggesting that mindset accelerated the return of BDI scores to more normative levels. Moreover, although they decreased, the control group BDI mean of 10.42 at time 3 suggests that this group was still mildly depressed. On the other hand, the experimental group, on average, evidenced BDI scores falling below the cut off for mild depression. Interestingly, the most dramatic difference between the groups' decrease in BDI occurred at time 2, with the experimental group reporting lower depression despite starting at the same level at time 1. Both groups continued to report reduced BDI at time 3, but the trends were nearly parallel. This might indicate that the mindset manipulation was initially very effective, but must be maintained in order to continue to experience the same level of symptom reduction over time.

Although not the main focus of the current study, results also indicated that BAI scores decreased at a faster rate for the experimental group than for the control group. Unlike for the BDI, however, initial BAI scores were lower for the control group than for the experimental group, and although the differences between the groups at time 3 were not as large as for BDI

differences, the experimental group showed a 13.67 point drop compared to an 8.68 drop for the control group. Additionally, these BDI and BAI accelerated decreases for the experimental group were seen despite no significant differences between groups in level of exercise. Altering mindset is thus a very plausible reason why the experimental group showed faster drops in negative affect.

These results reinforce the notion that changing a person's mindset (i.e., beliefs and expectations) improves the effectiveness of exercise and decreases depressive symptoms. It was expected that the participants previously lacked conscious beliefs and expectations regarding their current activities to a particular outcome. However, by influencing mindset, and therefore adding conscious beliefs and expectations regarding exercise and depression, they were successful in reducing their depressive symptoms. For example, an individual might view walking to be a means to get from point A to B. However, by influencing mindset through developing the conscious awareness of decreasing depressive symptoms through activity, the individual would then view walking as a means to decrease depression. Although nothing in the behavior has changed, the conscious shift in mindset would positively impact self-reported symptoms of depression. Along with this finding, these results were also consistent for symptoms of anxiety; as noted, mindset seemed to have an impact on decreasing symptoms of anxiety. Hence, future research should look more closely at the relationship between mindset and anxiety.

Additionally, given that exercise has been shown to be effective in decreasing depression, future research should consider adapting the methods of this study to be used with high intensity exercise (Dunn et al., 2005). For example, it would be interesting to compare an experimental group that has been administered the mindset manipulation to a control group that is exercising

at the same level without a shift in mindset. In particular, an exercise group could be compared to a daily activities group that does not change their current level of exercise, but are administered a mindset manipulation. If the depression of the daily activities group decreases at an accelerated rate compared to the exercise group, mindset might have an impact above and beyond physical exercise itself. If mindset does, in fact, potentiate the antidepressant effects of exercise, the addition of a mindset manipulation could be employed when encouraging exercise.

Similar results have been found in previous studies examining the relationship between mindset and physiological health. For instance, mindset has been found to have a physiological impact on variables such as Body Mass Index (Crum & Langer, 2007) and levels of ghrelin (Crum et al., 2011), but there is no research to date regarding the impact of mindset on mental health. The results of the current study suggest that influencing mindset during exercise (current daily activities) decreases depressive symptoms in mild to moderately depressed individuals. It is conceivable this was achieved through changing the experimental group's expectations and beliefs regarding their current daily activities, although future studies should add a measure of these cognitive elements to ensure they were changed. While holding constant participants' level of activity over time, the participants began to consider their current daily activities as exercise that would decrease their depressive symptoms. This impact on mindset during exercise was effective in reducing depressive symptoms in the experimental group.

These findings may hold clinical significance for individuals suffering from depression that are unable to initiate exercise due to low motivation and energy levels. Rather than requiring depressed individuals to increase their level of exercise, perhaps all that is required is impacting their mindset regarding their current daily activities' ability to decrease depressive symptoms. This simple mindset manipulation, if effective, could provide a degree of hope to individuals

suffering from depression. Instead of feeling shame or guilt associated low motivation and energy levels, this treatment strategy allows a solution that might provide the initial antidepressant effects needed to exercise or pursue other treatment modalities previously viewed as unobtainable.

There were several limitations that should be noted. First, the sample was taken from the University of Kansas Psychology Department's SONA website. Consistent with an undergraduate sample from a university, participants were highly educated with an average age of 18.90 years. Furthermore, participants were sent the time 2 survey via email 3-4 days after their initial session. However, there was variance in terms of when the participants completed the time 2 survey as there was no way of enforcing completion on days 3-4. There was also variance in terms of the time between the participants' initial and final sessions (time 1 vs. time 3) due to scheduling conflicts. Finally, the study relied on participant self-report regarding their activity level, depressive symptoms, and symptoms of anxiety. Given the data supporting the relationship between exercise and depression (North et al., 1990; Lawlor, & Hopker, 2001; Mead et al., 2009; Cooney et al., 2014), it is possible to infer that the results were mediated by a change in participant activity level. Although the self-reported data does not support this conclusion, it is possible that the participant self-report was not accurate. In the case that the mindset manipulation did in fact increase activity level, that would also make for an intriguing finding.

Limitations aside, there is much still unknown regarding the underlying mechanisms of change for successful treatments. The current study suggests that one such mechanism is the cognitive element, mindset. Shifting mindset for the treatment of depression appears promising and should continue to be thoroughly studied and understood in order to advance the treatment of depression. On the other hand, perhaps it is the case that influencing mindset is a method of

cognitively restructuring the perception of exercise, and this concept would fit seamlessly into the cognitive model of depression. Cognitive restructuring allows individuals to become consciously aware of their negative thoughts and then challenge or modify those thoughts to create more adaptive thinking patterns over time. Hence, perhaps altering mindset is a form of cognitive restructuring and is simply a novel way of describing an established concept. Re-conceptualizing the basic principles of cognitive restructuring to inform mindset manipulation is a valuable pursuit that researchers and practitioners could find useful. In that case, our study results support the idea that cognitive restructuring, specifically influencing mindset, is effective and may be used as a therapeutic technique to decrease depression. Perhaps the revolutionary idea of altering mindset is in fact old wine in a new bottle.

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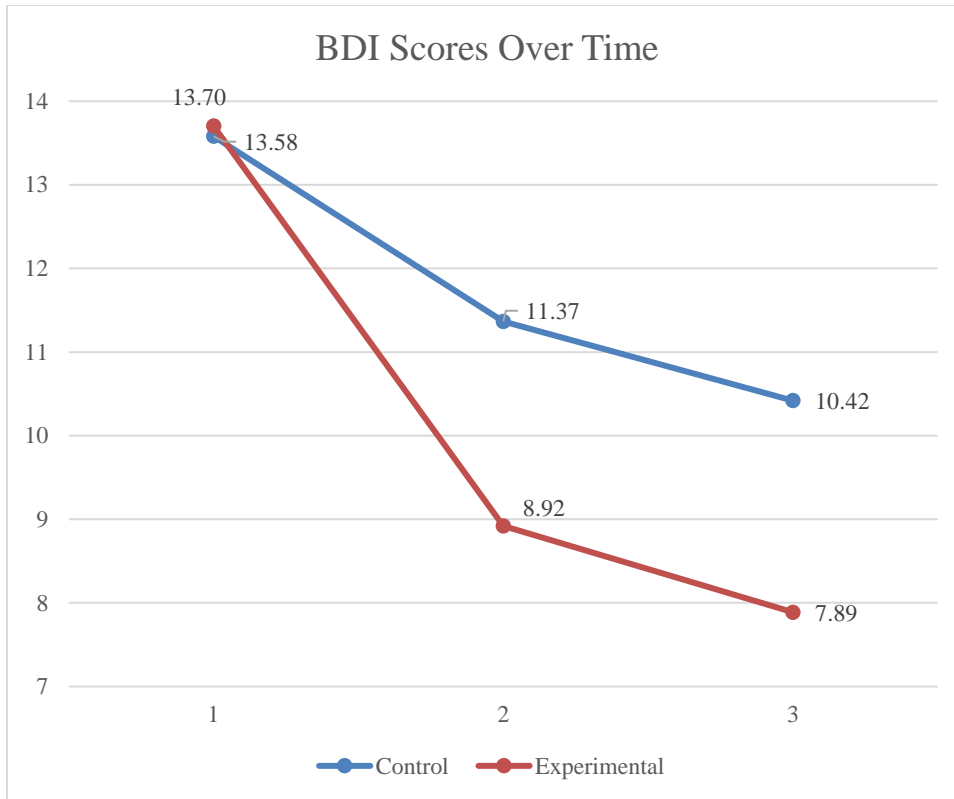


Figure 1: Beck Depression Inventory Means for Control and Experimental Groups at Times 1, 2, and 3.

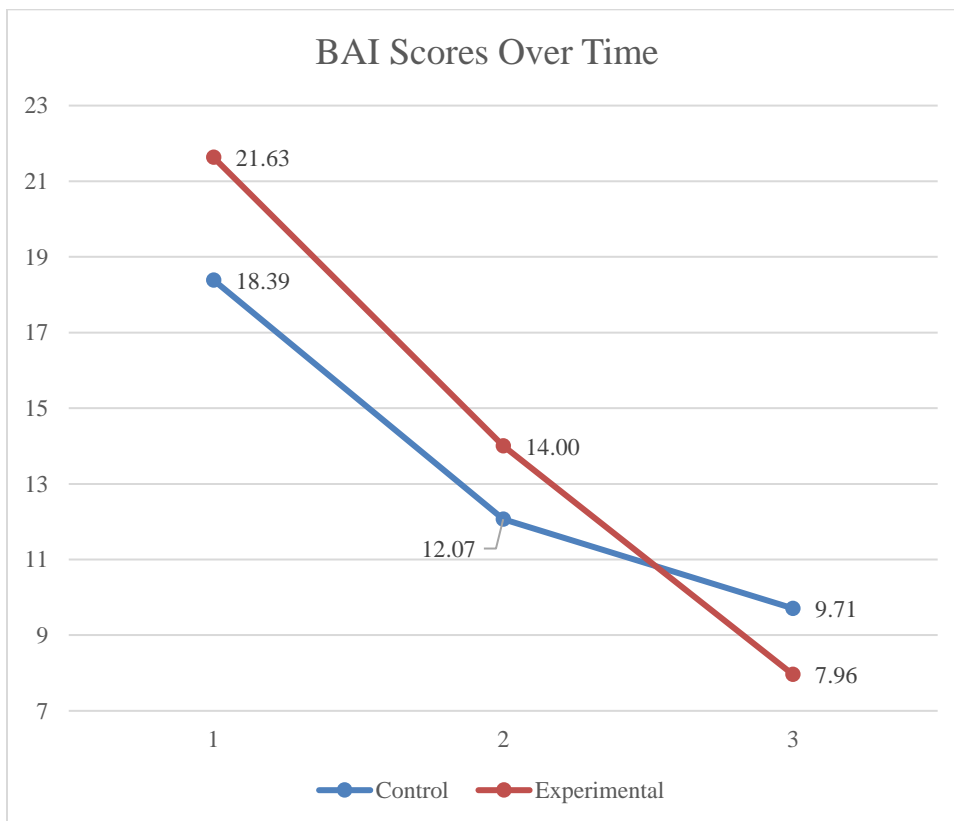


Figure 2: Beck Anxiety Inventory Means for Control and Experimental Groups at Times 1, 2, and 3.

Table 1

*Participant demographics and baseline testing means and standard deviations from time 1*

Variables	Control	Experimental
<i>N</i>	31	27
Mean BDI (SD)	13.58 (2.73)	13.70 (2.96)
Mean BAI (SD)	18.39 (9.73)	21.63 (11.12)
Mean IDDL (SD)	37.61 (12.13)	40.48 (11.30)
Mean IPEQ (SD)	17.53 (17.88)	19.07 (12.97)
Mean Age in years (SD)	18.90 (1.35)	19.30 (2.07)
Female	77.4%	74.1%
Male	22.6%	25.9%
African American/Black	9.7%	11.1%
Asian American/Pacific Islander	6.5%	18.5%
Hispanic	3.2%	0.0%
Caucasian/White	77.4%	66.7%
Other Race/Ethnicity	3.2%	3.7%

## Appendix A

### Demographic Questionnaire

Participant ID: \_\_\_\_\_

Date: \_\_\_\_\_

### Demographic Questionnaire

What is your age? \_\_\_\_\_

What is your gender?

Female

Male

Transgender

What is your current relationship status?

Single, never married

Married

Divorced

Separated

Widowed

Year in school?

Freshman

Sophomore

Junior

Senior

What is your race/ethnicity?

Caucasian/White

African American/Black

Asian American/Pacific Islander

Hispanic

American Indian

Other (please specify): \_\_\_\_\_

What is your current household income in US dollars?

Under \$10,000

\$10,000-25,000

\$25,000-\$50,000

\$50,000-\$100,000

Over \$100,000

## Appendix B

### Adapted Incidental and Planned Exercise Questionnaire

#### INCIDENTAL AND PLANNED EXERCISE QUESTIONNAIRE

Q1-Q4. During the last week, how much time did you spend in the following activities?

Never  Please go to question 5

Exercise Type	Number of times /week	Number of minutes per session				
		<30	30-45	45+	1-2hrs	2-4hrs
Exercise Class	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Home Exercise (e.g. stationary bicycle, stretching)	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other Exercise 1 (please specify)	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other Exercise 2 (please specify)	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other Exercise 3 (please specify)	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*Examples of other activities: bowls, golf, tennis, swimming, dancing, jogging, bicycling, etc.*

Q5. During the last week, how often have you been on walks specifically for exercise? (e.g. walking in the park, in the streets, cross-country walking, walking the dog, etc.).

Every day

3-6 times/week

Twice/week

Once/week

Less than once/week

Never  Please go to question 7

Q6. In these walks for Exercise, how long did you walk for?

Less than 15mins/day

15mins to less than 30mins/day

30mins to less than 1 hour/day

1 hour to less than 2 hours/day

2 hours to less than 4 hours/day

4 or more hours/day

Q7. During the last week, how often have you been on other walks (e.g. walk to class, general practitioner, pharmacy, or store)?

Every day

3-6 times/week

Twice/week

Once/week

Less than once/week

Never  Please go to question 9

Q8. In these other walks, how long did you walk for?

Less than 15mins/day

15mins to less than 30mins/day

30mins to less than 1 hour/day

1 hour to less than 2 hours/day

2 hours to less than 4 hours/day

4 or more hours/day

Q9. During the last week, in addition to the walking you mentioned above, how much time did you spend each day out of your house doing other physical activity such as house maintenance and gardening? (Excluding housework and activities inside the house).

Never

Less than 15mins/day

15mins to less than 30mins/day

30mins to less than 60mins/day

1 hour to less than 2 hours/day

2 hours to less than 4 hours/day

4 or more hours/ day

Q10. During the last week, how many hours did you spend on your feet each day indoors at home doing tasks like housework, self-care or care for another person?

Never (i.e. living in hostel, assisted living)

- Less than 15mins/day
- 15mins to less than 30mins/day
- 30mins to less than 60mins/day
- 1 hour to less than 2 hours/day
- 2 hours to less than 4 hours/day
- 4 or more hours/day



## Appendix C

### Beck's Depression Inventory

1.
  - 0 I do not feel sad.
  - 1 I feel sad.
  - 2 I am sad all the time and I can't snap out of it.
  - 3 I am so sad and unhappy that I can't stand it.
2.
  - 0 I am not particularly discouraged about the future.
  - 1 I feel discouraged about the future.
  - 2 I feel I have nothing to look forward to.
  - 3 I feel the future is hopeless and that things cannot improve.
3.
  - 0 I do not feel like a failure.
  - 1 I feel I have failed more than the average person.
  - 2 As I look back on my life, all I can see is a lot of failures.
  - 3 I feel I am a complete failure as a person.
4.
  - 0 I get as much satisfaction out of things as I used to.
  - 1 I don't enjoy things the way I used to.
  - 2 I don't get real satisfaction out of anything anymore.
  - 3 I am dissatisfied or bored with everything.
5.
  - 0 I don't feel particularly guilty.
  - 1 I feel guilty a good part of the time.
  - 2 I feel quite guilty most of the time.
  - 3 I feel guilty all of the time.
6.
  - 0 I don't feel I am being punished.
  - 1 I feel I may be punished.
  - 2 I expect to be punished.
  - 3 I feel I am being punished.
7.
  - 0 I don't feel disappointed in myself.
  - 1 I am disappointed in myself.
  - 2 I am disgusted with myself.
  - 3 I hate myself.
8.
  - 0 I don't feel I am any worse than anybody else.
  - 1 I am critical of myself for my weaknesses or mistakes.
  - 2 I blame myself all the time for my faults.
  - 3 I blame myself for everything bad that happens.
9.
  - 0 I don't have any thoughts of killing myself.

- 1 I have thoughts of killing myself, but I would not carry them out.  
2 I would like to kill myself.  
3 I would kill myself if I had the chance.
10. 0 I don't cry any more than usual.  
1 I cry more now than I used to.  
2 I cry all the time now.  
3 I used to be able to cry, but now I can't cry even though I want to.
11. 0 I am no more irritated by things than I ever was.  
1 I am slightly more irritated now than usual.  
2 I am quite annoyed or irritated a good deal of the time.  
3 I feel irritated all the time.
12. 0 I have not lost interest in other people.  
1 I am less interested in other people than I used to be.  
2 I have lost most of my interest in other people.  
3 I have lost all of my interest in other people.
13. 0 I make decisions about as well as I ever could.  
1 I put off making decisions more than I used to.  
2 I have greater difficulty in making decisions more than I used to.  
3 I can't make decisions at all anymore.
14. 0 I don't feel that I look any worse than I used to.  
1 I am worried that I am looking old or unattractive.  
2 I feel there are permanent changes in my appearance that make me look unattractive.  
3 I believe that I look ugly.
15. 0 I can work about as well as before.  
1 It takes an extra effort to get started at doing something.  
2 I have to push myself very hard to do anything.  
3 I can't do any work at all.
16. 0 I can sleep as well as usual.  
1 I don't sleep as well as I used to.  
2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.  
3 I wake up several hours earlier than I used to and cannot get back to sleep.
17. 0 I don't get more tired than usual.  
1 I get tired more easily than I used to.  
2 I get tired from doing almost anything.  
3 I am too tired to do anything.
18. 0 My appetite is no worse than usual.  
1 My appetite is not as good as it used to be.

- 2 My appetite is much worse now.  
3 I have no appetite at all anymore.
19. 0 I haven't lost much weight, if any, lately.  
1 I have lost more than five pounds.  
2 I have lost more than ten pounds.  
3 I have lost more than fifteen pounds.
20. 0 I am no more worried about my health than usual.  
1 I am worried about physical problems like aches, pains, upset stomach, or constipation.  
2 I am very worried about physical problems and it's hard to think of much else.  
3 I am so worried about my physical problems that I cannot think of anything else.
21. 0 I have not noticed any recent change in my interest in sex.  
1 I am less interested in sex than I used to be.  
2 I have almost no interest in sex.  
3 I have lost interest in sex completely.

## Appendix D

### Lifetime Version of the Inventory to Diagnose Depression

Try to remember THE WEEK IN YOUR LIFE YOU FELT THE MOST DEPRESSED.

What was the approximate starting and ending date of the episode you have in mind?

began: \_\_\_\_\_ ended: \_\_\_\_\_

Circle the number of the one statement that best describes how you felt. Remember to also circle whether you felt that way for MORE or LESS than two weeks.

- 1) 0 I did not feel sad or depressed.
- 1 I occasionally felt sad or down.
  - 2 I felt sad most of the time, but I was able to snap out of it.
  - 3 I felt sad all the time, and I couldn't snap out of it.
  - 4 I was so sad or unhappy that I couldn't stand it.

This lasted MORE/LESS than two weeks (circle one)

- 2) 0 My energy level was normal.
- 1 My energy level was a little lower than normal.
  - 2 I got tired more easily and had less energy than is usual.
  - 3 I got tired from doing almost anything.
  - 4 I felt tired or exhausted almost all the time.

This lasted MORE/LESS than two weeks (circle one)

- 3) 0 I was not feeling more restless and fidgety than usual.
- 1 I felt a little more restless or fidgety than usual.
  - 2 I was very fidgety, and I had some difficulty sitting still in a chair.
  - 3 I was extremely fidgety, and I paced a little bit almost everyday.
  - 4 I paced more than an hour per day, and I couldn't sit still.

This lasted MORE/LESS than two weeks (circle one)

- 4) 0 I did not talk or move more slowly than usual.
- 1 I talked a little slower than usual.
  - 2 I spoke slower than usual, and it took me longer to respond to questions, but I could still carry on a normal conversation.
  - 3 Normal conversations were difficult for me because it was hard to start talking.
  - 4 I felt extremely slowed down physically, like I was stuck in mud.

This lasted MORE/LESS than two weeks (circle one)

- 5) 0 I did not lose interest in my usual activities.

- 1 I was a little less interested in 1 or 2 of my usual activities.
- 2 I was less interested in several of my usual activities.
- 3 I lost most of my interest in almost all of my usual activities.
- 4 I lost interest in all of my usual activities.

This lasted MORE/LESS than two weeks (circle one)

- 6) 0 I got as much pleasure out of my usual activities as usual.
  - 1 I got a little less pleasure from 1 or 2 of my usual activities.
  - 2 I got less pleasure from several of my usual activities.
  - 3 I got almost no pleasure from several of my usual activities.
  - 4 I got no pleasure from any of the activities which I usually enjoy.

This lasted MORE/LESS than two weeks (circle one)

- 7) 0 My interest in sex was normal.
  - 1 I was only slightly less interested in sex than usual.
  - 2 There was a noticeable decrease in any interest in sex.
  - 3 I was much less interested in sex then.
  - 4 I lost all interest in sex.

This lasted MORE/LESS than two weeks (circle one)

- 8) 0 I did not feel guilty.
  - 1 I occasionally felt a little guilty.
  - 2 I often felt guilty.
  - 3 I felt quite guilty most of the time.
  - 4 I felt extremely guilty most of the time.

This lasted MORE/LESS than two weeks (circle one)

- 9) 0 I did not feel like a failure.
  - 1 My opinion of myself was occasionally a little low.
  - 2 I felt I was inferior to most people.
  - 3 I felt like a failure.
  - 4 I felt I was a totally worthless person.

This lasted MORE/LESS than two weeks (circle one)

- 10) 0 I didn't have any thoughts of death or suicide.
  - 1 I occasionally thought life was not worth living.
  - 2 I frequently thought of dying in passive ways (such as going to sleep and not waking up) or that I'd be better off dead.
  - 3 I had frequently thoughts of killing myself.
  - 4 I tried to kill myself.

This lasted MORE/LESS than two weeks (circle one)

11) 0 I could concentrate as well as usual.

- 1 My ability to concentrate was lightly worse than usual.
- 2 My attention span was not as good as usual and I had difficulty collecting my thoughts; but this didn't cause any problems.
- 3 My ability to read or hold a conversation was not as good as usual.
- 4 I could not read, watch TV, or have a conversation without great difficulty.

This lasted MORE/LESS than two weeks (circle one)

12) 0 I made decisions as well as usual.

- 1 Decision making was slightly more difficult than usual.
- 2 It was harder and took longer to make decisions, but I did make them.
- 3 I was unable to make some decisions.
- 4 I couldn't make any decisions at all.

This lasted MORE/LESS than two weeks (circle one)

13) 0 My appetite was not less than normal.

- 1 My appetite was slightly worse than usual.
- 2 My appetite was clearly not as good as usual, but I still ate.
- 3 My appetite was much worse.
- 4 I had no appetite at all, and I had to force myself to eat even a little.

This lasted MORE/LESS than two weeks (circle one)

14) 0 I didn't lose any weight.

- 1 I lost less than 5 pounds.
- 2 I lost between 5-10 pounds.
- 3 I lost between 11-25 pounds.
- 4 I lost more than 25 pounds.

This lasted MORE/LESS than two weeks (circle one)

15) 0 My appetite was not greater than normal.

- 1 My appetite was slightly greater than usual.
- 2 My appetite was clearly greater than usual.
- 3 My appetite was much greater than usual.
- 4 I felt hungry all the time.

This lasted MORE/LESS than two weeks (circle one)

16) 0 I didn't gain any weight.

- 1 I gained less than 5 pounds.
- 2 I gained between 5-10 pounds.

- 3 I gained between 11-25 pounds.
- 4 I gained more than 25 pounds.

This lasted MORE/LESS than two weeks (circle one)

- 17) 0 I was not sleeping less than usual.
- 1 I occasionally had light difficulty sleeping.
  - 2 I clearly didn't sleep as well as usual.
  - 3 I slept about half my normal amount of time.
  - 4 I slept less than 2 hours per night.

This lasted MORE/LESS than two weeks (circle one)

- 18) 0 I was not sleeping more than normal.
- 1 I occasionally slept more than usual.
  - 2 I frequently slept at least 1 hour more than usual.
  - 3 I frequently slept at least 2 hours more than usual.
  - 4 I frequently slept at least 3 hours more than usual.

This lasted MORE/LESS than two weeks (circle one)

- 19) 0 I did not feel anxious, nervous, or tense.
- 1 I occasionally felt a little anxious.
  - 2 I often felt anxious.
  - 3 I felt anxious most of the time.
  - 4 I felt terrified and near panic.

This lasted MORE/LESS than two weeks (circle one)

- 20) 0 I did not feel discouraged about the future.
- 1 I occasionally felt a little discouraged about the future.
  - 2 I often felt discouraged about the future.
  - 3 I felt very discouraged about the future most of the time.
  - 4 I felt that the future was hopeless and that things would never improve.

This lasted MORE/LESS than two weeks (circle one)

- 21) 0 I did not feel irritated or annoyed.
- 1 I occasionally got a little more irritated than usual.
  - 2 I got irritated or annoyed by things that usually didn't bother me.
  - 3 I felt irritated or annoyed almost all the time.
  - 4 I felt so depressed that I didn't get irritated at all by things that would normally bother me.

This lasted MORE/LESS than two weeks (circle one)

- 22) 0 I was not worried about my physical health.

- 1 I was occasionally concerned about bodily aches and pains.
- 2 I was worried about my physical health.
- 3 I was very worried about my physical health.
- 4 I was so worried about my physical health that I could not think about anything else.

This lasted MORE/LESS than two weeks (circle one)

- 23) 0 This bout of depression is the only one I have ever had.
- 1 I have had an additional period of depression similar to the one I already described.
  - 2 I have had two more periods of depression similar to the one I already described.
  - 3 I have had three more periods of depression similar to the one I already described.
  - 4 I have had four or more periods of depression similar to the one I already described.
- 24) 0 I did not get any treatment for how I felt.
- 1 I got psychotherapy, but did not take anti-depressant medication.
  - 2 I took anti-depressant medication, but did not get psychotherapy.
  - 3 I got psychotherapy and took anti-depressant medication(s).
  - 4 I was admitted to a psychiatric hospital for treatment.



## Appendix E

### Beck Anxiety Inventory

Participant ID: \_\_\_\_\_

Date: \_\_\_\_\_

A list of common symptoms of anxiety will be presented. Indicate how much you have been bothered by each symptom during the PAST MONTH, INCLUDING TODAY by choosing the number of the corresponding description beneath the symptom.

	0 Not at all	1 Mildly	2 Moderately: It did not bother me	3 Severely: It was very unpleasant, but I could stand it	4 I could barely stand it
1. Numbness or tingling	0	1	2	3	4
2. Feeling hot	0	1	2	3	4
3. Wobbliness in legs	0	1	2	3	4
4. Unable to relax	0	1	2	3	4
5. Fear of the worst happening	0	1	2	3	4
6. Dizzy or lightheaded	0	1	2	3	4
7. Heart pounding or racing	0	1	2	3	4
8. Unsteady	0	1	2	3	4
9. Terrified	0	1	2	3	4
10. Nervous	0	1	2	3	4
11. Feeling of choking	0	1	2	3	4
12. Hands trembling	0	1	2	3	4
13. Shaky	0	1	2	3	4
14. Fear of losing control	0	1	2	3	4
15. Difficulty breathing	0	1	2	3	4
16. Fear of dying	0	1	2	3	4
17. Scared	0	1	2	3	4
18. Indigestion or discomfort in abdomen	0	1	2	3	4
19. Faint	0	1	2	3	4
20. Face flushed	0	1	2	3	4
21. Sweating (not due to heat)	0	1	2	3	4

## Appendix F

### Experimental script

#### Verbal Script (Experimental):

Look at the Incidental and Planned Exercise Questionnaire for the following questions:

#### Q1-4

If “Exercise Class” is endorsed ask, “What exercise class do you take?”

---

If “Home Exercise” is endorsed ask, “What exercise do you do at home?”

---

If “Other Exercise 1, 2, or 3” are endorsed and not specified, ask the participant to specify the exercise. (If specified, copy this information below.)

---

#### Q5

If Q5 is endorsed ask, “Where do you go on walks specifically for exercise? For example, walking in the park, in the streets, cross-country walking, walking the dog, etc.”

---

#### Q7

If Q6 is endorsed ask, “Where do you go on other walks not specifically for exercise? For example, walking to class, general practitioner, pharmacy, or store.”

---

#### Q9

If Q9 is endorsed ask, “What other physical activities do you spend each day out of your house doing? For example, house maintenance and gardening”.

---

#### Q10

If Q10 is endorsed ask, “What physical activities do you spend each day indoors at home doing? For example, tasks like housework, self-care or care for another person?”

---

*Take the highest amount of exercise listed above (Q1-10 are in ascending order of exercise), and personalize the script below according to that specific exercise routine.*

Exercise has been shown to decrease depressive symptoms. For the purpose of this study, exercise is defined as moving one's muscles and burning calories. Therefore, everyone exercises in some ways. You had to exercise to make it on campus and come to this floor of the building for this study. This week, as you do any activity that moves your muscles or burns calories, I want you to focus on how that activity will decrease depressive symptoms and make you feel better overall.

You reported (insert exercise information gained from the Incidental and Planned Exercise Questionnaire here) in the past two weeks. (Insert exercise here) is in fact exercise that can help reduce depressive symptoms and make you feel better overall. Here is how (insert exercise) can make you feel better:

The following is information obtained from the Mayo Clinic Website:

“Regular exercise probably helps ease depression in a number of ways, which may include:

- **Releasing feel-good brain chemicals** that may ease depression
- **Reducing immune system chemicals** that can worsen depression

Regular exercise has many psychological and emotional benefits, too. It can help you:

- **Gain confidence.** Meeting exercise goals or challenges, even small ones, can boost your self-confidence.
- **Take your mind off worries.** Exercise is a distraction that can get you away from the cycle of negative thoughts that feed anxiety and depression.
- **Get more social interaction.** Exercise and physical activity may give you the chance to meet or socialize with others. Just exchanging a friendly smile or greeting as you walk around your neighborhood can help your mood.
- **Cope in a healthy way.** Doing something positive to manage anxiety or depression is a healthy coping strategy. Trying to feel better by drinking alcohol, dwelling on how badly you feel, or hoping anxiety or depression will go away on its own can lead to worsening symptoms.

- Certainly running, lifting weights, playing basketball and other fitness activities that get your heart pumping can help. But so can physical activity such as gardening, washing your car, walking around the block or engaging in other less intense activities. Any physical activity that gets you off the couch and moving can help improve your mood.”

This week as you are (insert exercise here), I want you to focus on how that activity will decrease depressive symptoms and make you feel better overall. Can you see yourself doing that? \_\_\_\_\_

To ensure understanding, can you tell me what you learned today?

#### Reference

Depression (major depressive disorder). (2014, October 10). Retrieved 2015, from <http://www.mayoclinic.org/diseases-conditions/depression/in-depth/depression-and-exercise/art-20046495>

## **Appendix G**

### **Control Script**

#### **Verbal Script Control:**

Depression is a growing epidemic of our society that causes suffering every day. There are various lifestyle changes that have been rigorously studied and proven to be effective in the treatment of depressive symptoms (Ilardi, 2009; Karwoski, 2008). Here I would like to explain some of these lifestyle changes and their impact on decreasing depression:

The following is information obtained by Dr. Ilardi's Therapeutic Lifestyle Change website:

#### **“Omega-3 Fatty Acid Supplements**

Omega-3 fatty acids come from naturally occurring plants and animals that eat them. These fatty acids have been shown to have antidepressant and anti-inflammatory properties, and studies indicate that they help serotonin and dopamine circuits in our brains function more efficiently. Our bodies cannot produce Omega-3 fatty acids, and our diets generally do not provide the optimal Omega-3 to Omega-6 ratio necessary for antidepressant effects. Thus, we recommend that you supplement your diet with omega-3 fatty acids.

#### **Anti-Rumination Strategies**

In the ancestral environment, people had less time to sit alone and think negative thoughts. There were often activities to do, or other people around to serve as distractions. This is no longer the case, and many people in the modern environment may find they have plenty of opportunity to ruminate...When you find yourself doing it, do one of these things: call a friend, exercise, write down the negative thoughts in a journal, or do some other pleasant activity (like knitting, reading, or another hobby).

#### **Light Exposure**

We recommend that people get at least 30 minutes of bright light exposure per day. You can actually go outside in the sun (take off the sunglasses, but leave on the sunscreen!) or get light exposure from a special light box that emits the same amount of light (10,000 lux). You should try to get light exposure at the same time every day. Experiment to see what works best for you.

#### **Sleep Hygiene**

While everyone varies in the amount of sleep they need, the average is approximately 8 hours of sleep per night. One of the biggest risk factors for depression is sleep deprivation. Thus, it is important to maintain a regular sleep schedule and protect that time for sleep that may be pushed aside when our lives become hectic.

To create a healthy sleep pattern, try to go to sleep and wake up at the same time each day. Prepare yourself for bed by having a “bedtime ritual”. Dim the lights, turn off the TV and computer, put on your PJs, and do a quiet activity, like reading.”

Ilardi, Stephen. "TLC Elements." TLC Elements. University of Kansas. Web. 2015.  
<<https://tlc.ku.edu/elements>>.