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The Effects of Moderate-Intensity Acute Aerobic Exercise on Self-Disclosure

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Abstract

This study sought to determine whether a relationship exists between acute aerobic exercise, at moderate intensity, and self-disclosure due to a positive change in affect. Participants took a pre-test measure of mood, and the Exercise Group exercised for 25 minutes afterwards. The remaining participants, the Non-exercise Group, sat in the same room while the others exercised. The Non-exercise Group was told that they would exercise next, when really they would not. After the Experimental Group finished exercising, all participants took a post-test measure of mood as well as a measure of self-disclosure. Results showed that overall mood improved for those who exercised with a significant increase in positive mood from pre-test to post-test, but a nonsignificant decrease in negative mood. Self-disclosure was measured by intimacy, abstractness, and valance. Because there was no pre-test measure of self-disclosure, the Non-exercise and Exercise Groups were compared on only a post-test measure of self-disclosure. In comparison to the Non-exercise Group, average self-disclosure scores were significantly higher for the Exercise Group. However, the only component of self-disclosure that was significantly different between groups was intimacy. The Exercise Group showed significantly higher levels of intimacy than the Non-exercise Group. Furthermore, increase in positive mood and levels of intimacy were positively correlated, revealing that exercise increased self-disclosure as a function of an increase in positive affect.

The Effects of Moderate-Intensity Acute Aerobic Exercise on Self-Disclosure

Self-disclosure, the process of revealing information about oneself to others, is considered an essential requirement for mental health, as it creates and maintains close personal relationships and increases enjoyment of greater overall well-being (Forgas, 2010; Kahn & Garrison, 2009). In therapeutic settings it is sometimes challenging for a client to self-disclose when the topic is too emotional or difficult to discuss. Among the various ways to jump this hurdle, physical exercise has yet to be considered as a method. Physical exercise has been shown to improve mood and affect (Hansen, Stevens, & Coast, 2001; Raedeke, 2007; Roth, 1989; Rudolph & Butki, 2008) in individuals. Furthermore, mood and affect are predictive of self-disclosure (Forgas, 2010; Kahn & Garrison, 2009). Although exercise is often used as an effective adjunct to psychotherapy because of its known psychological benefits to mood and affect, its subsequent benefits to self-disclosure have not been considered. The purpose of the current study is to assess whether acute physical exercise facilitates self-disclosure via a positive increase in mood and affect.

Physical Exercise Benefits

Physical exercise has often been prescribed as a supplemental therapy to psychotherapy, and literature that supports exercise as a treatment for mood and emotional problems is plentiful (Barnes, Coombs, Armstrong, Higgins, & Janelle, 2010, p. 1065). Long-term exercise programs are usually prescribed to coincide with the length of therapy as opposed to an acute bout of exercise. Acute physical exercise differs from long-term in that acute exercise is a single, quick bout of physical activity. There is emerging interest in the psychological effects of acute exercise to see how quickly

psychological benefits can be obtained. Research has shown that in as little as 10 minutes of moderate-intensity exercise, there are significant improvements in positive affect (Hansen et. al., 2001; Rudolph & Butki, 2008). The current study will examine acute physical exercise as a variable to ensure that possible self-esteem and self-efficacy improvements, due to increased physical fitness of a long-term program (Reynolds, 1996), do not influence the measure of self-disclosure.

There has been emerging research on affective and mood responses to acute exercise. Acute aerobic exercise is defined as exercising for a duration of 30 minutes or less. Rudolph and Butki (2008) studied the minimum amount of time required to see the psychological effects of exercise, and they found that in as little as 10 minutes, there was an increase in positive affect and a decrease in psychological distress. Also, there was not a significant difference in the magnitude of change in affect from the 10-minute condition to the 15-minute and 20-minute conditions. In addition, Hansen et al. (2001) found that 10 minutes of moderate-intensity aerobic exercise is sufficient for increasing vigor, decreasing fatigue, and decreasing total negative mood state. They also found little improvement from longer workouts, with the exception of diminished confusion. The research reveals that it does not take long to feel improvements in affect, but there is also the question of how long the effects last. In regards to acute aerobic exercise, mood states appear to be most positive 10-15 minutes after an exercise is completed (Hansen et al., 2001).

In addition to duration, exercise intensity and mode also seems to have an effect on mood outcomes of acute bouts of aerobic exercise. Generally, positive results come from an acute bout of exercise despite intensity (Bixby & Lochbaum, 2008), but it tends

to be high-intensity workouts that induce a greater amount of stress that can lessen the magnitude of positive affect or increase negative affect (Bixby & Lochbaum, 2006). Furthermore, preferred mode of exercise may have an effect on resulting positive affect. Bixby and Lochbaum (2008) found that participants experienced a more “pleasant state” after taking part in their preferred workout than executing an exercise modality they did not choose. Interestingly, not working out at all resulted in more pleasant feelings than exercising in an individual’s least-preferred modality.

Duration, intensity, and mode may affect net affect, but how they do so is another question. Among the various hypotheses that have been proposed is Solomon’s opponent-process model of acquired motivation (Bixby & Lochbaum, 2006). This theory states that the brain aims to maintain homeostasis and oppose extreme emotional processes. Naturally, stressors upset a state of homeostasis, and the brain reacts to return to its homeostatic state. This is accomplished through opponent processes that relax when the stressor is removed. In the context of exercise, this theory would predict that individuals feel worse during and better after a workout. The support for this theory is mixed (Bixby & Lochbaum, 2006). Although the current study seeks to find a relationship between acute physical exercise and self-disclosure via an increase in mood, these hypotheses and theories may help explain self-disclosure in the face of an emotional stressor. The implications for the importance of improved affect and mood in relation to psychological well-being is that mood and affect are variables in the degree of self-disclosure (Forgas, 2010).

Self-Disclosure

Self-disclosure is an essential component of mental health. Talking to others

about one's emotions helps build and maintain personal relationships (Forgas, 2010). Those who discuss their unpleasant emotions with others enjoy greater well-being (Kahn & Garrison, 2009) as well as decreased symptomology, a decrease in concern about one's social role, and overall greater improvement in therapy (Sloan & Kahn, 2005).

Self-disclosure is communicating information about oneself to another, and the more intimate the content, the more one is disclosing to another. There are two theories to explain why and how much individuals self-disclose. First, the theory of social sharing states that on a daily basis, people seek out others with whom they can share their emotions after experiencing a distressing event (Rimé, 1995). The second theory is the fever model of disclosure. It is similar to the social sharing theory in that it indicates that people are likely to disclose distress to others, but it also addresses how much. "Just as a fever is both a sign of disease and a curative factor in recovering from disease, self-disclosure is a sign of distress and a curative factor in recovering from distress" (Stiles, 1987, 1995). The level of distress is proportional to how much treatment is needed to cure it. In other words, the more distressed a person is, the more he or she will disclose to another about that distress.

Although it is beneficial and healthy to express emotions to others, some find it difficult because talking about distress may be distressing in itself. The emotion dysregulation theory of emotional disorders indicates that people with depression or anxiety tend to avoid their emotions, limiting self-disclosure (Campbell-Sills & Barlow, 2007). This theory was strongly supported by Kahn and Garrison (2009). Even if people do not have a diagnosed mood disorder like depression or anxiety, depressed and anxious feelings are negative moods that can be felt to some degree in the general population. It is

overall negative and positive affect that have an effect on self-disclosure.

It is known that an increase in positive affect and a decrease in negative affect facilitates self-disclosure, but there are several aspects of the content disclosed that adds to the level of self-disclosure. In several studies conducted by Forgas (2010), mood and affect were thoroughly examined to see their impact on levels of self-disclosure. In the first study, participants either viewed a sad film or a happy film that induced negative or positive moods respectively. Then, participants were asked to write five self-disclosing statements to describe themselves to another person. Results showed that positive mood increased both intimacy of disclosure and the abstractness of content. People who are in a good mood are able to disclose information that is more personal and less concrete (behavior-specific) in nature.

Because positive mood leads to the assimilation of information and negative mood leads to the accommodation of information, Forgas' second study investigated these processing effects in self-disclosure (Forgas, 2010). Assimilation means that individuals give priority to internal drives as opposed to external drives when processing information. With accommodation, individuals are more concerned with pleasing another party or conforming with the external environment. Participants in the study were placed in a condition to induce either a positive, negative, or neutral mood and were told to type into a computer eight things they would say about themselves to another person. Typing responses into the computer allowed observers to measure latency between responses as well as the amount of self-editing of responses. Positive affect was associated with assimilation, as determined from the faster response time and abstract content of responses. On the other hand, those with negative affect were more reciprocal and

cautious in disclosure, taking longer to respond and disclosing more concrete information. As it applies to self-disclosure, those with positive affect feel freer to reveal intimate information.

This study was taken to the next level to simulate a more “real” scenario of communicating with another person, and not just writing down information about oneself. Participants were tested by revealing information about himself or herself to “another person,” which was actually a computer programmed to respond with high-intimacy statements, low-intimacy statements, or progressively intimate statements. The purpose of receiving responses back was to simulate a real-life situation of disclosure with another person. In line with the accommodation style of those with negative affect, participants placed in the negative mood group were more reciprocal in their responses to all three of the controls of computer responses. Although those with negative affect were less likely to reveal abstract information about themselves, they accommodated and reciprocated the level of intimacy of the computer program when it disclosed abstract information.

Mood-congruency was also evaluated across the studies by Forgas (2010). Mood-congruency is when a person’s mood coincides with the content of disclosure revealed. In the second study previously described, results supported the theory of mood-congruency. Those in the positive mood condition produced more positive details than those of people in a negative mood.

Summary and Hypotheses

There has been research on the relationship between physical exercise and positive mood/affect and research on the relationship between positive mood/affect and

self-disclosure, but the two have not been linked. If acute physical exercise improves mood/affect, and positive mood and affect increase self-disclosure, then acute physical exercise may facilitate self-disclosure via an increase in positive mood and a decrease in negative mood.

Method

Participants

Forty-nine participants were recruited from the undergraduate population of Georgia Southern University (22 male, 28 females). Participants varied in ethnicity with 62% European American (White), 26% African American (Black), 4% Latino(a), 2% Asian American, and 6% mixed or “other.” Participants had to be at least 18 years of age to participate and the average age of participants was 19.54 years old ($SD = 1.27$).

Students signed up for the study online through the psychology department online SONA system for participant recruitment. Students could either receive extra credit or course credit for a psychology course by participating. An important requirement for participants to participate was that they were physically healthy (free of health conditions aggravated by exercise), and they had been involved in moderate physical activity (at least thirty minutes of aerobic exercise at least three times a week). It was important for participants to be relatively active individuals so that there was not discomfort to the participant that would harm him or her or influence measures of mood. Also, because mood was being measured, it was important to have participants who were not on any medication for mood disorders. Potential participants were told these requirements under the study information section on the SONA system.

Design

The experiment was a mixed between-subjects design with two levels of the Exercise Condition (exercise and no exercise) to which subjects were randomly assigned.

Apparatus

For the Experimental Group, stationary bikes (Schwinn AC performance with the AC Power computer Console) were used. To use a stationary bike at the Recreation Activity Center, it is required that each participant has his or her own towel and water bottle. A stopwatch was required to time increments of the exercise portion of the study. At the front of the room, a large poster displayed the RPEs and their descriptions for participants to refer to while exercising. Also, a sound system installed in the spin room was used along with instrumental music at a constant rate of 130 beats per minute (bpm). The music did not resemble any popular songs and was unrecognizable to participants.

Measures

Pre- and post-test measures of mood were measured using *Positive Affect Negative Affect Schedule (PANAS)* (Watson, Clark, & Tellegen, 1988). Using the state version of *PANAS*, how participants feel at the moment was assessed with ten items rating positive affect (PA), and 10 items rating negative affect (NA). The scale ranges from 1 to 5 (very slightly or not at all to extremely) when rating the words related to PA (interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, active) and the words related to NA (distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, afraid). The *PANAS* is both reliable and internally and externally valid. Internal consistency is acceptably high for PA (alpha range from .86 to .90) and NA (alpha range from .84 to .87) (Watson et al., 1988). Also, the correlation between positive affect and negative affect are low (-.12 to -.23) (Watson et al., 1988).

Self-disclosure was measured using a scale that was constructed based on the *Distress Disclosure Index* (DDI; Kahn & Hessling, 2001). The title of the new scale is *Distress Disclosure with Strangers Index* (DDSI). The original *DDI* is a 12-item 1-5 Likert scale, measuring the degree to which one discloses to others. This scale was modified to be in the present tense, specified to disclose to a stranger, and made to measure three components of self-disclosure. The 12 modified items were divided into four items for each of the three aspects of self-disclosure; intimacy (amount of personal details), concreteness versus abstractness (concrete being more specific characteristics and abstract being more general), and valence (positive or negative content) (Forgas, 2010). The instructions for the scale ask participants to answer as if they were to disclose to someone they just met, and to answer according to how they feel in the present moment. The following are examples of items measuring intimacy, abstractness, and valence, respectively: I am willing to share what is most important to me; I am willing to talk about things I am good at; I would like to talk about the worst things that happened to me this week. The *DDSI* is acceptably reliable. Internal consistency is acceptable (alpha range from 0.64 to 0.69).

Procedure

All participants were told to come to the study prepared in proper attire for physical activity. Upon arrival, participants were randomly assigned to either an Exercise group or a Non-Exercise Group, but they were unaware of the group to which they were assigned. Both groups participated at the same time and in the same space. Due to space and equipment restrictions, no more than eight participants were scheduled per time slot (four control and four experimental). Whether or not a participant was chosen to be in the

Experimental or Control Group was determined on where they sat in the room, with every other participant being in the same group. All participants in each time slot, regardless of assignment, sat down in the spin room, fairly spaced for privacy, and began the pre-test.

Participants in both groups began by taking the pre-test *PANAS* (Watson et al., 1988) to measure mood. Each participant was told that he or she can take as much time needed to respond and that every response is anonymous.

After the pre-test, participants in the Non-Exercise Group were told to sit on their mat and relax while waiting for their turn to exercise next.

After completion of the pre-test *PANAS*, each participant in the Exercise Group proceeded to a stationary spin bike, each seated every other bike. The researcher adjusted the spin bikes to fit each participant. They were told that they could use the controls on the bike to maintain a rate of perceived exertion (RPE) of 5 based on Borg's (1985) revised 1-10 scale. This level of exertion is described as moderate intensity and participants should feel the workout is hard but it feels like they "can exercise for hours, are breathing heavily, and can hold a short conversation." Participants were also told that they had 5 minutes to warm-up to this level of intensity and will be alerted each minute so they know when to reach an RPE of 5. Lastly, participants were told that they would have 5 minutes to cool down on the bike after being alerted that the 15-minute period of moderate-high intensity was over. Once all of this information was delivered, music was turned on and the participants began exercising at the same time for the 25-minute period as instructed. During the 15 minutes of moderate-high intensity exercise, the researcher reminded participants to stay at an RPE of 5 every five minutes. Participants were alerted

when the 15 minutes of moderate-intensity exercise was complete to begin the cool-down to return to a level of about 1 (very light). This cool down is necessary so that fatigue does not influence reports of mood, but not so relaxed that physical and mental conditions have returned to baseline. After the 5-minute cool down, the *PANAS* was retaken, and then the measure of self-disclosure was taken.

After the exercise portion of the study was over, participants in the experimental groups returned to their mats. All, both Experimental and Control Group, participants were given the post-test *PANAS* and the measure of self-disclosure, the *DDSI*, to be completed immediately after the completion of the *PANAS*. Once the self-disclosure survey was complete, participants were debriefed. Control participants were told that they would not be participating in the exercise portion of the study. The deception was explained in the debriefing, after which the participants were free to leave.

Results

Preliminary Analyses

When gender and the number of days exercised per week were covaried out, it was revealed that these factors had no effect on the dependent variables. Gender and number of days exercised were not included in further analyses.

Hypothesis Testing

It was hypothesized that when participants exercised, positive mood would increase and negative mood would decrease. Then, due to an overall improvement in mood, it was expected that participants who exercised would have greater levels of self-disclosure.

The effects of exercise on mood were analyzed using one-tailed independent-samples t-tests. Participants who exercised experienced a greater increase in overall mood ($M = 0.54$, $SEM = 0.07$) than participants who did not exercise ($M = 0.32$, $SEM = 0.07$), $t(47) = 2.34$, $p < 0.05$. Upon further evaluation, it was revealed that positive mood significantly increased, $t(48) = 3.85$, $p < 0.05$, while negative mood decreased, but not significantly $t(47) = 1.28$, $p > 0.05$. Participants who exercised experienced a greater increase in positive mood ($M = 0.37$, $SEM = 0.02$) than participants who did not exercise ($M = 0.27$, $SEM = 0.02$). However, participants who exercised ($M = 0.16$, $SEM = 0.07$) did not differ from participants who did not exercise ($M = 0.05$, $SEM = 0.06$) in the magnitude that negative mood decreased.

To examine if there were differences between the Exercise and the Non-Exercise Groups within pre-test and post-test, a mixed ANOVA was used. Results revealed a significant interaction between Group and Test (*Figure 1*), $F(47) = 11.11$, $p < 0.05$. One-tailed independent t-tests showed that Exercise and Non-Exercise Groups significantly differed in post-test measures of mood $t(48) = 3.51$, $p < 0.05$, with participants who were assigned to the Exercise Group starting the study with more positive overall mood scores ($M = 8.10$, $SEM = 0.21$) than the group that would not exercise ($M = 7.14$, $SEM = 0.16$). An independent samples t-test also confirmed that groups significantly differed in the post-test measure of mood, $t(48) = 4.27$, $p < 0.05$, with the Exercise Group reporting more positive overall mood scores ($M = 8.63$, $SEM = 1.04$) than the Non-Exercise Group ($M = 7.44$, $SEM = 0.91$). The initial differences in positive mood between groups cannot be significantly explained, but this difference was greater in the post-test, indicating that

the Exercise Group and Non-Exercise Group significantly differed in the post-test measure of mood.

A one-tailed independent-samples t-test was used to analyze the effect of exercise on general self-disclosure. Whether or not participants exercised did not have a significant effect on their level of general self-disclosure $t(48) = 1.52, p > 0.05$. Participants who exercised ($M = 3.44, SEM = 0.06$) did not differ from participants who did not exercise ($M = 3.28, SEM = 0.09$) in their levels of general self-disclosure. However, it was possible that some components of self-disclosure were affected by exercise. The three components of self-disclosure, abstractness, intimacy, and valence, were individually analyzed using independent-sample t-tests. Whether or not participants exercised had a significant effect on participants' levels of intimacy $t(48) = 2.47, p < 0.05$. Participants who exercised expressed greater levels of intimacy ($M = 3.57, SEM = 0.12$), than participants who did not exercise ($M = 3.08, SEM = 0.17$). Although the level of intimacy was significantly affected by exercise, abstractness $t(48) = 0.01, p > 0.05$ and valence $t(48) = -0.12, p > 0.05$ were not. Levels of abstractness did not differ from the exercise group ($M = 3.12, SEM = 0.04$) to the non-exercise group ($M = 3.12, SEM = 0.06$). Levels of valence did not differ from the exercise group ($M = 3.61, SEM = 0.11$) to the non-exercise group ($M = 3.63, SEM = 0.13$).

To make sure that the increase in intimacy was due to exercise as a function of mood, Pearson's correlation coefficient was used. Increase in positive mood and level of intimacy were positively related $r(48) = 0.39, p < 0.05$. As the magnitude of increase in positive mood increased, level of intimacy also increased.

Discussion

It was hypothesized that acute physical exercise would increase self-disclosure via an increase in positive mood and a decrease in negative mood. The hypothesis was partially supported.

Overall difference in mood increased significantly for those who exercised, but this increase in overall mood was only due to an increase in positive mood. This may have been due to a basement effect for negative mood. Although overall mood and positive mood increased, as hypothesized, negative mood did not decrease significantly as expected. Because the participants were in a generally good mood on arrival, their ratings of negative mood were too low for a significant decrease to exist on a 1-5 scale, on which they cannot rate lower than 1. Meanwhile, there was more room on the scale for positive mood ratings to increase than for negative mood ratings to decrease. Most people did not come to the study in an extraordinarily positive mood and usually rated mood mid-scale or lower. This allowed participants to increase 1-3 points at least on the scale from pre-test to post-test measures of mood.

What may have also caused such a significant increase in positive mood was that in the pre-test *PANAS*, the Exercise Group had significantly higher measures of mood than the Non-Exercise Group before anyone exercised or knew his or her group assignment. Analyses do not provide any explanation for this, but one possible cause for this was the potential difference in mood between participants who were run by themselves or in a larger group. When only one person showed up for the assigned timeslot, he or she was automatically assigned to the Exercise Group. Being alone, without feeling the need to perform in front of a group, may have increased initial ratings of positive mood. Also, if the participants arrived early, they may have developed a level

of comfort with the researcher, and for some, a potential attraction. Unfortunately, because of anonymity, it is not possible to identify these participants to run analyses on these data.

The hypothesis was not supported in that the measure of general self-disclosure did not significantly increase. However, this may have been due to how self-disclosure was measured. General self-disclosure was measured as an average of participants' scores on three components: intimacy, abstractness, and valance. Although intimacy significantly increased, abstractness and valance did not, bringing down the average score of self-disclosure. Intimacy is a strong indicator of self-disclosure, suggesting that a different measure of self-disclosure that focuses more on intimacy would have yielded results to support the hypothesis. The measure of self-disclosure used was created for this study based on the research of Forgas (2010) and the *DDI* (DDI; Kahn & Hessling, 2001). The reliability of this scale was acceptable, but it could have been stronger. Furthermore, other components could have been examined that are better indicators of self-disclosure.

The results of this study suggested partial support of research done by Rudolph and Butki (2008), which concluded that acute aerobic exercise increases positive affect and decreases psychological distress. In this study, only positive mood increased as shown by the increase in positive affect from participants who exercised compared to participants who did not exercise. Because an increase in positive affect and a decrease in negative affect is a predictor of increased self-disclosure, levels of self-disclosure did not significantly change between groups. Still, Forgas (2010) is partially supported because one of the components of self-disclosure, intimacy, significantly increased for

participants who exercised. One of his studies showed that those with positive affect feel freer to reveal intimate information (Forgas, 2010). Although abstractness and valence were components of self-disclosure not supported by this study, at least intimacy, perhaps the strongest indicator of self-disclosure, was supported. Furthermore, correlations showed an increase in intimacy was related to an increase in positive affect among all participants.

Limitations

It is possible that the hypothesis was only partially supported because of the measures used. An appropriate measure of self-disclosure did not exist for this study and one had to be made. As previously mentioned, average self-disclosure may have been significant if the reliability of the scale created (*Distress Disclosure with Strangers Index*) had greater reliability. Furthermore, the *PANAS* did not leave any room for negative mood to decrease due to a basement effect. It is possible that negative mood would have decreased if there was a scale designed to prevent this effect.

This study was also limited by the amount of equipment, time, and available researchers. The spin studio was the best place to conduct the study because it is an isolated exercise environment that the researcher had some control over. However, spin is not everybody's preferred modality. In fact, many of the participants had never been on a spin bike before. Exercise is more pleasurable when an individual performs his or her preferred mode of exercise (Bixby & Lochbaum, 2008). The environment would have been more realistic and the results more accurate if it was possible to examine one individual performing his or her preferred modality, but this was not possible with the resources available.

Lastly, if there was a way to prevent some timeslots from only having one participant, some of the variables that caused the pre-test difference in positive mood between groups may have been eliminated. Unfortunately, the researcher cannot control if participants show up or not.

Future Directions

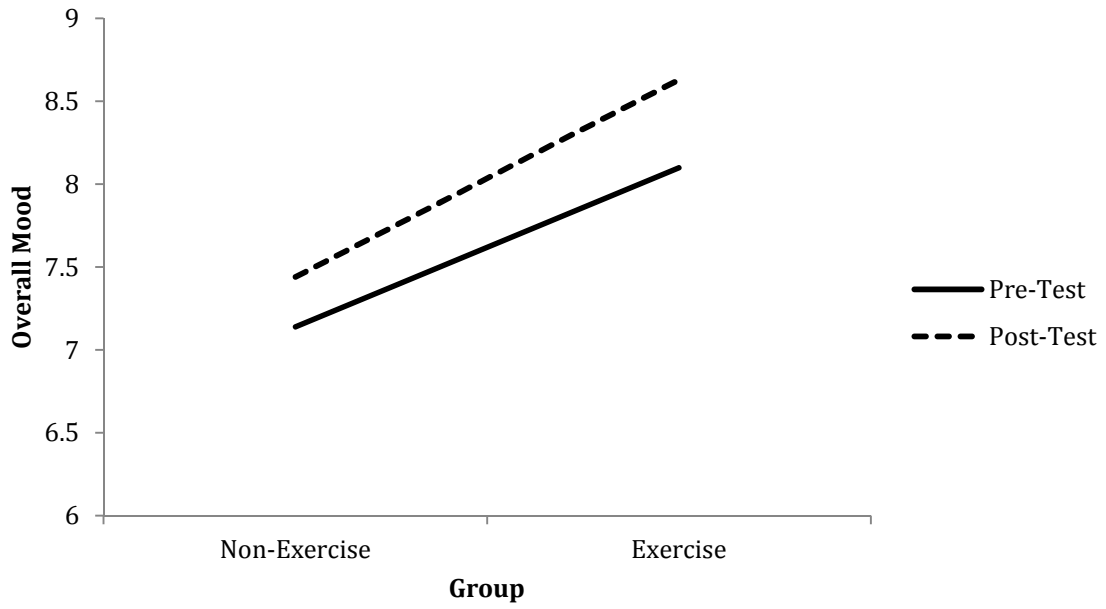
This study was conducted in hopes that the information gained could be applied to the therapeutic setting. By seeking to establish a relationship between acute moderate aerobic exercise and self-disclosure, the intention of the study was to discover that working out before a therapy session may be beneficial. Therapy may progress more if clients were more open with the therapist and with themselves. Before there has not been research on this exact relationship between exercise and self-disclosure, this study is important. However, more research needs to be done. To see if it is advantageous to exercise before a therapy session, the duration of the increase in positive mood and self-disclosure should be examined. It has been found that the most positive effects of exercise last 10-15 minutes post-exercise (Hansen, et al., 2001), but this time may be extended as disclosure continues or may be affected by different modes and durations of exercise. Also, possible research in the future would look more into how exercise facilitates self-disclosure. If this increase is due to mood, research can examine how exercise increase mood. Research can look further into current hypotheses such as Solomon's opponent-process model of acquired motivation (Solomon, 1980). Even further into the future, research can be conducted involving therapy sessions, such as conducting therapy while the client is exercising.

This study is the first to combine research of exercise on mood and mood on self-

disclosure. Further research on the subject could make great strides to the field of psychology. Although negative mood did not significantly decrease and average self-disclosure did not significantly increase, there was partial support for the hypothesis with positive affect and intimacy increasing for participants who exercised. These preliminary results are worth following up on, so advancements can be made in the therapeutic setting.

Figure 1

Overall Mood Measures Between-Groups Between-Tests



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