

EXAMINATION OF SELF-TALK AND EXERCISE ADHERENCE

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ABSTRACT

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The current study identified the factors related to exercisers' self-talk and exercise adherence. Hardy (2006) defined self-talk as "(a) verbalizations or statements addressed to the self; (b) multidimensional in nature; (c) having interpretive elements associate[d] with the content of statements employed; (d) is somewhat dynamic; and (e) serving at least two functions; instructional and motivational, for the athlete," or in this case, the exerciser (p. 84). The purpose was to discover an individual's exercise self-talk and what thoughts may be preventing, or encouraging, him or her to regularly exercise. Specifically, the participants were asked questions about their exercise participation, their use of and frequency of self-talk during exercise, their beliefs about the perceived benefits and barriers to exercise, and their confidence levels related to exercising.

Participants from three fitness locations volunteered to complete an online survey. There were 146 participants who completed the questionnaires. There were 91 defined adherers and 55 non-adherers.

The results indicated that the adherers perceived more benefits to exercise, as well as had higher exercise self-efficacy. The results of the open-ended responses indicated that the most important factors appeared to be the type of self-talk that was used during the exercise (positive/motivational was the most common response across both adherers

and non-adherers), and at what point during the exercise session the self-talk was used (20% of adherers reported using during difficult points in the session). The conclusions from the study can also be used to provide an indication of how self-talk could be used to encourage initiation and maintenance of exercise.

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TABLE OF CONTENTS

	Page
ABSTRACT.....	iii
ACKNOWLEDGEMENTS.....	v
LIST OF TABLES.....	viii
CHAPTER	
1. INTRODUCTION	
Introduction.....	1
Statement of the Problem.....	7
Research Questions.....	8
Delimitations.....	8
Limitations.....	9
Definition of Terms.....	9
2. LITERATURE REVIEW	
Self-talk and athletics.....	12
Self-talk and exercise.....	19
3. METHOD	
Research Design.....	24
Participants.....	24
Procedures.....	25
Measures.....	26
Data Analysis.....	29

4. RESULTS AND DISCUSSION	
Results.....	31
Additional Analysis	43
Discussion	43
General Discussion	50
Recommendations for Research	52
Recommendations for Practitioners.....	53
5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH	
Summary	55
Conclusions.....	56
Recommendations for Future Research.....	57
REFERENCES CITED.....	60
APPENDICES	66
APPENDIX A: Consent Form.....	67
APPENDIX B: Demographic Information	69
APPENDIX C: Exercise Participation.....	71
APPENDIX D: Self-Talk Questionnaire	74
APPENDIX E: Exercise Benefits/Barriers Scale	76
APPENDIX F: Exercise Self-Efficacy Questions	79
APPENDIX G: S-TQ Copyright Permission.....	81
APPENDIX H: EBBS Copyright Permission.....	83

LIST OF TABLES

Table	Page
1. Demographic information by fitness location.....	33
2. Percentages of reasons for exercising	33
3. Percentages of participation in exercise activities	34
4. Total responses of types of self-talk	36
5. Distribution of types and frequencies of self-talk (adherers and non-adherers).....	38
6. Descriptive statistics on the questionnaires for adherers and non-adherers	39
7. Descriptive statistics on the questionnaires by location	41
8. Total responses of types and frequencies of self-talk by location	42

CHAPTER ONE

INTRODUCTION

A key component of managing the barriers to exercise participation can be an exerciser's self-talk. Self-talk can be defined as "dialogue [through which] the individual interprets feelings and perceptions, regulates and changes evaluations and convictions, and gives him/herself instructions and reinforcement" (Hackfort & Schwenkmezger, 1993, p. 355). These words phrases, and statements can be positive or negative, and they usually influence people's actions and decisions. These thoughts can also greatly influence exercise performance and adherence. Self-talk can motivate a person to begin, maintain, or terminate an exercise program. Because self-talk can change over time, it is important to gain information about how exercisers use it and how it may influence their adherence to exercise.

Previous research on cognitive strategies in athletes has indicated that the more successful athletes use cognitive strategies (i.e., arousal control, concentration techniques, imagery, self-talk, etc.) more often than less-successful athletes (Baghurst, Thierry, & Holder, 2004; Gould, Eklund, & Jackson, 1992; Mahoney & Avener, 1977; Theodorakis, Hatzigeorgiadis, & Chroni, 2008). These strategies have been shown to improve an athlete's performance (Jones, Hanton, & Connaughton, 2002). Self-talk is one of the most common cognitive strategies used by athletes and coaches because it may have the power to enhance athletic performance (Thelwell & Greenlees, 2003; Van Raalte et al., 1995). Furthermore, self-talk is widely used because "it occurs unconsciously and consciously, and it can be used with or without prior training" (Chroni, Perkos, & Theodorakis, 2007, p. 20). The use of self-talk is evident, but more concrete conclusions

about its ability to improve or diminish an individual's performance, in athletic and exercise settings, is needed.

Hardy (2006) defined self-talk as “(a) verbalizations or statements addressed to the self; (b) multidimensional in nature; (c) having interpretive elements associate[d] with the content of statements employed; (d) is somewhat dynamic; and (e) serving at least two functions; instructional and motivational, for the athlete,” or in this case, the exerciser (p. 84). It was also determined that self-talk is positive and negative. Positive self-talk can be constructive and without focus on errors or mistakes by the athlete or exerciser. Negative self-talk can be criticism toward the athlete or exerciser and may be debilitating to performance outcomes. Most of the previous research in self-talk has focused on positive and negative self-talk and how they affect performance (Hardy, 2006). Results from previous research have found that positive self-talk may aid in increased desired performance outcomes (Dagrou et al., 1992; Van Raalte et al., 1995).

The application of Bandura's (1997) self-efficacy theory, which is when a person has “beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments,” was recommended for application in research on self-talk (p. 3). Hardy suggested that self-talk can influence the improvement of a person's confidence and encourage beliefs in his or her ability to accomplish a task (Hardy, 2006). This could lead to positive goal achievement outcomes. Overall, the main purpose of Hardy's literature review of self-talk was to create more interest in the application of this effective psychological skill and to inspire future research in both sport and exercise areas.

Exercisers can use their internal dialogue as a way to stay motivated to exercise. Self-talk can be a form of external or internal motivation, depending on the individual's desired outcome. An exerciser will ask him or herself "questions about a future behavior [to] inspire thoughts about autonomous or intrinsically motivated reasons to pursue a goal," (Senay, Albarracin, & Noguchi, 2010, p. 500). Their thoughts may also be used as a way to provide instruction for their physical movements during exercise, which is an instructional form of self-talk. The exerciser may tell him or herself to pay attention to physiological cues, such as stride or posture, in order to maintain focus on the exercise activity. Results of a study by Theodorakis et al. (2008), which focused on the development and validation of the Functions of Self-talk Questionnaire (FSTQ), concluded that "self-talk can serve to focus attention, regulate effort, enhance confidence, control cognitive and emotional reactions, or trigger automatic execution" (p. 27). The implications of the use of self-talk in athletic populations suggest that there can be carryover in other settings, because of the dynamic nature of self-talk and its many functions (Hardy, 2006). This suggests that self-talk can potentially be as effective for use during physical activity.

Self-talk has been a widely used cognitive strategy in athletic populations for years (Gould et al., 1993; Hardy et al., 2005; Hatzigeorgiadis et al., 2008; Thelwell et al., 2003; Van Raalte et al., 1994). The purpose of a study by Hamilton, Scott, and MacDougall (2007) was to research positive and negative self-talk, and how each can affect cycling performance. Three groups (self-regulated positive self-talk group, assisted positive self-talk group, and assisted negative self-talk group) were created from nine participants. The self-regulated positive self-talk group was given information about

positive self-talk, including how they could use positive self-talk to “increase confidence, prolong persistence, and increase effort” (p. 230). The participants were also given examples of positive self-statements they could use before each intervention session. Some examples included were, “My legs are strong and powerful,” and “I can maintain this pace” (p. 230). The assisted positive self-talk group was given the same information as the self-regulated positive self-talk group. Following the introduction, this group was given an audiotape they were advised to listen to, which included positive statements. The statements were the same as the statements given to the self-regulated positive self-talk group. The participants in the assisted negative self-talk group were given the same introduction to self-talk as the other two groups. They were also given an audiotape to listen to while they cycled. However, the tape had a variety of negative statements which included, “My legs are weak and lethargic,” and “I can’t maintain this pace” (p. 231).

The results indicated that all three conditions had a “positive impact on performance for the cycling task” (p. 232). The researchers concluded that it is necessary to match the type of self-talk with the sport. It is also important to match the type and content of the self-talk with a specific individual in order to deem the strategy useful, and applicable to the individual.

The conclusions drawn by previous research further demonstrate that self-talk needs to be specific to the individual (Hardy, 2006; Hardy et al. 2005; Rogerson & Hrycaiko, 2002; Senay et al., 2010). In order to create more awareness about using self-talk as a performance enhancement strategy, the results of previous research need to be shared and studied in more detail with more populations. Practical use of cognitive strategies, specifically self-talk, should also be employed. Once there is a firm belief in

the use of self-talk, then an individual will be able to use it to his or her advantage and increase performance outcomes. Because it appears athletes can benefit from the proper use of self-talk, exercisers may potentially benefit from self-talk use as well.

However, it is apparent that in today's American society that a majority of the population is having difficulties adhering to an exercise program, despite the credible health professionals and organizations who have indicated the physical and psychological benefits of regular physical activity (McAuley, 1992; Pate et al., 1995). According a recent study about the prevalence of physical activity in the United States, 55% of adults in the U.S. fail to adhere to the recommended weekly physical activity for health (minimum of 5 times a week of 30 minutes of moderate intensity exercise) (Macera et al., 2005). This trend has also been confirmed by the results from previous research in exercise adherence (Biddle & Fox, 1989; Dishman, 1982). In order to be determined an exercise "adherer" according to the Transtheoretical Model of behavior change (TTM), individuals are in the maintenance phase and "have made a behavior change for more than 6 months" (Sarkin et al., 2001, p. 463). There are clear reasons why people have perceived barriers not to adhere to an exercise program, but there is little evidence explaining the reasons why the other remaining percentage of U.S. adults chose to engage in physical activity. There should be a focus shifted on why people adhere to exercise and how their thoughts keep them motivated to continue. More specifically, it should be determined exactly what exercise adherers are thinking, how often they use self-talk, their perceived benefits of exercise, and their confidence in their abilities to engage in exercise despite perceived barriers.

Psychological skills have been attributed to exercise behavior; however, “the belief that one is capable of successfully adopting and maintaining a regular exercise regimen may be particularly important” (McAuley, 1992, p. 66). It is likely that the beliefs that individuals have towards participation in physical activity may influence their actual health-related behaviors, and their adherence to those behaviors. Previous research has confirmed that self-efficacy is a major factor influencing an individual’s intention to exercise, and maintain this behavior over time (McAuley, 1992; Weinberg, Grove, & Jackson, 1992; Weiss, Wiese, & Klint, 1989). According to a study on the role of efficacy cognitions in the prediction of exercise behavior by McAuley (1992), the participants’ perceptions of their abilities to “overcome barriers to exercise” were predictors of frequency and intensity levels of their physical activity (p. 82). Determining an exerciser’s self-efficacy may provide more insight to how confident s/he is in his or her abilities to overcome perceived barriers to exercising. Furthermore, exercise self-efficacy may be connected to an exerciser’s use of self-talk, as well as maintenance of physical activity behaviors.

There is a lack of research conducted on self-talk and exercise. To date, most of the research related to self-talk has focused on athletes (e.g., Edwards, Tod, & McGuigan, 2008; Hardy, Hall, & Hardy, 2005; Harvey et al., 2002; Thelwell, Greenlees, & Weston, 2009; Van Raalte, Cornelius, Brewer, & Hatten, 2000), which demonstrates the need for more research on self-talk and exercise.

In Gammage, Hardy, and Hall’s (2001) qualitative results related to self-talk and exercise, they found that exercisers reported using self-talk prior to exercising for the specific reason of encouraging themselves to complete their physical activity. “It appears

that self-talk is one way [that] individuals ensure they continue to [exercise]” (Gammage et al., 2001, p. 242). Exercise self-talk may also act as an evaluation of a past experience with physical activity, as demonstrated through previous research on automatic thought processes. “The evaluations [an exerciser] made in the past are now made for us to behave in consistent ways; the goals [an exerciser] pursued in the past now become active and guide our behavior in pursuit of the goal in relevant situations” (Bargh, & Chartrand, 1999, p. 463). An exerciser’s self-talk can become automatic thoughts, which can influence or guide his or her behaviors in the future to become more consistent.

Previous studies have noted this shortage of research on self-talk and exercise, and the need for assessments on the benefits of using self-talk during exercise (Gammage et al., 2001; Gibson, & Foster, 2007; Hamilton et al., 2007; Hardy, 2006; O’ Brien Cousins, & Gillis, 2005). If the use of self-talk is encouraged for the purpose of adhering to an exercise program, then it is possible that an exerciser could use self-talk to maintain a healthy lifestyle.

Statement of the Problem

The purpose of this study was to identify factors related to exercisers’ thoughts and behaviors associated with exercise adherence. The aim was to discover an individual’s exercise self-talk and what thoughts may be preventing, or encouraging, him or her to regularly exercise. Specifically, the participants were asked questions about their exercise participation, their use of and frequency of self-talk during exercise, their beliefs about the perceived benefits and barriers to exercise, and their confidence levels related to exercising despite perceived barriers.

Research Questions

The following research questions were explored in the current study:

1. What is the relationship of adherence to exercise and the use of self-talk?
2. Will the perceived benefits outweigh the barriers in the regular exercisers (adherers)? Furthermore, will the adherers demonstrate higher exercise self-efficacy than the non-adherers?
3. What are the similarities and differences in the use of self-talk between the three fitness locations?

The results of the responses to these questions will provide information about the use of self-talk in exercise, and potentially lead to comparisons of the use of self-talk between adherers and non-adherers. The results from the study can also be used to provide an indication of how we could use self-talk to encourage initiation and maintenance of exercise.

Delimitations

The following are delimitations that were present in the current study:

1. The participant population only included Temple University students, faculty, and staff who use the campus recreation facility, and other Philadelphia fitness center members (from a Philadelphia Sports Club location and Comcast Corporate Fitness Center).
2. The study only included participants who attend or have a membership to fitness center facilities. Given the time of year (winter) that the study was conducted, outdoor exercisers were not considered for participation. Furthermore, due to the limited

recruitment time that was allotted, exercisers from other locations such as in private studios or other gym locations were also not considered.

Limitations

The following are limitations that were present in the current study:

1. The participants' self-talk may change throughout the course of their lives, because self-talk can be a dynamic process, which can make it difficult to draw concrete conclusions from the responses.
2. There is no way to ensure that participants were completely honest with responses to the questionnaire.
3. The use of the online survey method to collect the participants' responses excluded people who may not regularly use the internet.
4. The participants may have completed the questionnaire before or after they exercised. Therefore, they completed the questionnaire while they were recalling thoughts that they had at a previous time.

Definition of Terms

The following terms are provided for further understanding and comprehension of the current study.

Adherence: related to exercise, is based on the individual's motivation to exercise and stay physically fit for its own sake (SportsMedicineDictionary.com, 2010). This is characterized by a continuation of exercise despite potential challenges or obstacles in an individual's life. Exercise adherence was defined based on the American College of Sports Medicine (ACSM) and the American Heart Association (AHA) guidelines for physical activity for adults under the age of 65.

Benefit (in exercise): a perceived reason to continue to exercise based on the Exercise Benefits Barriers Scale (Sechrist, Walker, & Pender, 1987), which was utilized in this study. The enjoyments of exercise or improved mental health are examples of benefits of exercising.

Barrier (in exercise): a perceived reason not to continue to exercise based on the Exercise Benefits Barriers Scale (Sechrist et al., 1987). Expensive gym costs or inconvenient schedules are examples of barriers to exercising.

Exercise: a type of physical activity exerted by an individual that is planned and structured (National Institute of Health [NIH], May 2009). The types of exercise included in the questionnaire are: running, brisk walking, weight lifting/strength training, group fitness (including kickboxing, aerobics, spinning), yoga and/or Pilates, swimming, cycling, and rowing. An “other” option is available and the participants are asked to indicate the activity.

Exercise adherence: defined in this study according to the American College of Sports Medicine and American Heart Association recommendations for physical activity. Regular exercisers (adherers) were defined based on the participation in moderate intensity exercise for at least 30 minutes, five times per week (or a total of 150 minutes or more per week).

Exercise self-efficacy: the extent to which an individual is confident that he or she could overcome the perceived barriers to exercising and adhere to exercise. It is expected that individuals who use self-talk strategies before, during, or after exercising will be more confident in their abilities to overcome the perceived barriers.

Instructional self-talk: the verbalizations or thoughts that are meant to help a person's desired behavior by maintaining focus on "technique and strategy execution" (Tod et al., 2009, p. 196).

Motivational self-talk: the verbalizations or thoughts that are meant to help a person's desired behavior by "increasing confidence, effort, and energy" in a positive direction (Tod et al., 2009, p. 196).

Negative self-talk: according to Hardy (2006) negative self-statements can be in the form of criticism or self-demeaning to the individual.

Perceived self-efficacy: the beliefs that people have about their abilities to produce effects (Bandura, 1994).

Positive self-talk: according to Hardy (2006) positive self-statements can be encouraging and praising to the individual.

Regular exerciser: The American College of Sports Medicine (ACSM) and the American Heart Association (AHA) recommend moderate intense cardio for 30 minutes a day and five days a week, or vigorous intense cardio for 20 minutes a day and three days a week. These recommendations are in addition to 8 to 10 strength training exercises with 8 to 12 repetitions of each exercise, twice a week (ACSM & AHA, 2007).

Self-talk: according to Hardy's (2006) working definition: a) verbalizations or statements addressed to the self; b) multidimensional in nature; c) having interpretive elements associated with the content of statements employed; d) is somewhat dynamic; and e) serving at least two functions; instructional and motivational.

Self-efficacy: "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3).

CHAPTER TWO

LITERATURE REVIEW

The purpose of this study was to identify factors related to exercisers' thoughts and behaviors associated with exercise adherence. The aim was to discover an individual's exercise self-talk and what thoughts may be preventing, or encouraging, him or her to regularly exercise. Specifically, the participants were asked questions about their exercise participation, their use of and frequency of self-talk during exercise, their beliefs about the perceived benefits and barriers to exercise, and their confidence levels related to exercising despite perceived barriers.

The following section is a review of the literature related to the use of self-talk in a variety of settings. First, studies which examined the use of self-talk in the athletic setting were reviewed. Next, studies which provided implications and direction for the current study were reviewed. A review of the studies related to the use of self-talk and exercise settings offered support and guidance for the present study.

Self-talk and athletics

The examination of self-talk in sports has been extensively studied (Edwards et al., 2008; Gould et al., 1993; Hardy et al., 2005; Hatzigeorgiadis et al., 2008; Rogerson & Hrycaiko, 2002; Thelwell et al., 2003; Theodorakis et al., 2008; Van Raalte et al., 1994; Zervas et al., 2007). There is a widely held belief that self-talk is related to overall sport performance, and can influence an athlete's success. Previous studies have indicated that positive self-talk can improve performance and negative self-talk can be detrimental to performance outcomes (Rogerson & Hrycaiko, 2002). Most of the previous research on

self-talk has focused on athletes, and how their self-talk correlates with their performance.

In a study conducted by Van Raalte, Cornelius, Brewer, and Hatten (2000) the antecedents and the consequences of self-talk during competition were examined. They stated that research on self-talk is limited, especially related to the antecedents of sport performance. It was reasoned that this may be because it is difficult to “[identify] events that precipitate self-talk and the challenges of measuring self-talk during sport performance” (p. 346). For the study, the researchers focused on determining competitive tennis players’ self-talk during various points throughout matches.

The researchers observed the audible self-talk, observable gestures, and recorded the tennis scores of the 18 players. The Self-Talk and Gestures Rating Scale was used (Van Raalte, Brewer, Rivera, & Petitpas, 1994), and showed that all of the participants used self-talk and gestures during matches. The data were collected during four match tournaments. The participants’ gestures were compiled into categories of positive, negative, and instructional self-talk. “All of the players exhibited at least some observable self-talk or gestures during the matches,” which demonstrates that almost all athletes use self-talk (p. 348). Also, the situation of the match, such as the outcome of a point, was associated with the type of self-talk that was used by the participants. Therefore, it was concluded that situational factors may determine the amount and type of self-talk that an athlete uses during competition.

In order to focus on self-talk related to a more specific setting, Thelwell, Greenlees, and Weston (2009) conducted a study on “soccer-specific psychological skills” to examine sport performance. The researchers were specifically interested in

determining an appropriate intervention that would be effective for different plays during various situations throughout a competition. Their claim was that there was a lack of research on “how psychological skills may influence performance during different stages of competition” (p. 111). The focus on determining specific psychological skills and strategies to use during the different parts of competition can be useful for helping athletes deal with anxiety about their performance.

The researchers designed an intervention; this included self-talk, relaxation and imagery, to determine if it would improve soccer performance. The self-talk portion of the intervention focused on using positive self-talk, based on the key words and phrases that each participant typically used during soccer games. Furthermore, lists of competition-specific affirmation statements were created by each participant. In the second part of the self-talk stage of the intervention, the participants gained insight as to how each of their negative self-talk affected their performances. Then they completed an exercise which helped them to restructure their negative thoughts into motivational thoughts. The last stage of the self-talk intervention focused on when to use the “new” self-talk during appropriate times in competitions (Thelwell et al., 2009).

The results demonstrated that the intervention enhanced the performance of the participants’ soccer games, specifically during the second half of the games. It was concluded that the implementation of psychological skills, including self-talk strategies, may have an impact on performance during soccer competitions. An important aspect of this study was the specificity of the self-talk intervention employed on each participant. Using psychological skills can be beneficial for performance enhancement if the content of the intervention is focused specifically on each individual (Thelwell et al., 2009).

In order to gain more information about the different types of self-talk and how it can affect the execution of a task, Edwards, Tod, and McGuigan (2008) examined the results the vertical jumps of male rugby players. The purpose was to determine how motivational self-talk and instructional self-talk affected performance on the players' jumps. The researchers stated that "previous research has not compared the influence of instructional or motivational self-talk on explosive movements in trained individuals;" therefore, the examination of these different types of self-talk was necessary (p. 1460). Instructional self-talk is characterized by trigger words or cues that focus on the technical movements of the task. On the other hand, motivational self-talk is characterized by cues that are associated with encouraging or inspiring individuals to perform a task better.

The 24 male rugby player participants were randomly assigned to either the motivational self-talk group, the instructional self-talk group, or the no-interventions control group. They were involved in their assigned group for 20 seconds before each of their three vertical jumps. There was a two minute rest period in between jumps. The motivational self-talk group was told to say "I can jump higher" out loud. The instructional self-talk group was told to say "bend and drive" out loud during the intervention period. The control group did not receive additional instructions with the standard procedures (Edwards et al., 2008).

Overall the results indicated that both motivational and instructional self-talk led to improved performance (greater hip displacement, greater center of mass displacement, greater hip rotation velocity) on the vertical jump task than the participants in the control group. It was concluded that motivational self-talk "led to greater centre of mass displacement," which requires an athlete to have strength and endurance (p. 1463).

Instructional self-talk appeared to be more effective for activities that required skill and coordination. More research is needed in order to understand how self-talk influences the execution of motor skills.

Motivational self-talk and instructional self-talk are not the only types of self-talk that can be utilized by athletes. Positive self-talk and negative self-talk are also cognitive strategies that can influence performance. Previous research has indicated that the use of positive self-talk has been encouraged by sport psychologists, coaches, and athletes more than negative self-talk (cited in Harvey, Van Raalte, & Brewer, 2002). However, positive thoughts may not always enhance every athlete's performance. The purpose of the study by Harvey et al. (2002) was to examine how self-selected self-talk statements affect sport performance.

Eighty male and female golfers were randomly assigned to the positive self-talk group, instructional self-talk group, negative self-talk group, or control group. All of the participants' golf accuracy and consistency were assessed before and after the trials. Each participant was also given the same number of shots to warm-up. The participants in each group were allowed two minutes to read the list of positive, negative, or instructional self-talk statements. Examples of the self-talk statements included "This is easy!" (positive), "I'm off!" (negative), and "Smooth" (instructional) (p. 85).

The results indicated that "the more negative and positive self-talk the participants reported using, the less accurate they were" (p. 87). The participants who used the instructional self-talk statements performed significantly on their golf accuracy. The researchers noted that the participants in each group were encouraged to use the positive, negative, or instructional statements (depending on which group they were randomly

assigned to) despite any discrepancies in their confidence levels or their actual internal perceptions of the task. It was possible that the positive self-talk participants may not have always used or “felt” positively about their performance on the golf putting task.

Overall, the results demonstrated that the use of instructional self-talk was associated with greater consistency of golf performance. Surprisingly, based on previous notions of positive self-talk and performance, “the greater use of positive and negative self-talk [was] correlated with decreased golf accuracy” (p. 87). The benefits of other types of self-talk on performance, not just positive, need to be explored. It is evident that instructional self-talk can improve some athletes’ performances. The focus on the technique and skill of the task may be useful for athletes, because there is no valence (positive/negative) attached to the thoughts about the task. A deeper understanding of how and why athletes use self-talk, as well as the type of self-talk, should be researched.

According to Hardy, Hall, and Hardy (2005), self-talk has been used in applied sport psychology settings for years, yet “relatively little is known about [its] nature” (p. 905). In order to quantify the content, use, and the differences among athletes who use self-talk, Hardy et al. conducted two studies. In the first study the researchers examined the content of athletes’ self-talk and the use of self-talk during practices and competitions. The main focus was to formulate quantitative data on the content of self-talk because previous research studies were primarily qualitative. The researchers designed a questionnaire that consisted of three sections about athletes’ self-talk. The questionnaire had three sections. Section one had questions related to the athletes’ general use of self-talk. The second section consisted of questions about the content of the athletes’ self-talk. The third section included questions about the reason why the

athletes use self-talk. After tests for reliability and validity, it was argued that the Self-Talk Use Questionnaire (STUQ) was an acceptable survey to measure self-talk.

After the researchers distributed the survey to 295 athletes, from a variety of skills and levels of competition, the results indicated that most of the athletes used positive self-talk. They also found that most of the self-talk used by athletes was internal and was characterized mostly by short words or phrases.

In the second study by Hardy et al. (2005), they focused on a specific population in order to examine gender differences based on the results of the first study. The participants were 164 recreational volleyball players. By focusing on a single sport and skill level, this allowed the researchers to draw clearer conclusions from the STUQ. The results in the second study were similar to the first study in that there were few gender differences. The researchers anticipated that gender differences would emerge if the sample was more homogeneous than Study one's sample. However, the researchers proposed that the recreational volleyball players, though they were not elite athletes in volleyball, could have been (or were also currently) competitive athletes in other sports. This would cause the second study's population to be similar to the first; therefore, indicating similar results.

Overall, "self-talk literature is still in its infancy," and more research is needed to draw conclusions about the content, frequency, and reasons why people use self-talk (p. 915). More research is also needed "focusing on the effectiveness of different types of self-talk" (Chroni, Perkios, & Theodorakis, 2007, p. 20). Expanding the self-talk research in more directions and with more populations, such as in exercise settings, can create a

deeper understanding of the use of psychological skills and how they impact a person's behavior.

Self-talk and exercise

There are few studies that have examined the role of self-talk in physical activity settings. Gibson and Foster (2007) highlighted two important purposes of self-talk during exercise. The researchers determined that self-talk creates a distance (or "time wedge") between the physical activity that the self-talk is describing and the self-talk itself, and self-talk allows the exerciser to view the activity from a different perspective. The researchers also stated that there is a lack of research on self-talk and exercise, even though everyone uses it. It is apparent that self-talk "may play a pivotal part in the success or failure of the exercise bout" (p. 1042). It is also important to distinguish the type of self-talk (instructional, motivational, positive, negative, or neutral) that is used by the exerciser in order to determine the relationship between self-talk and exercise adherence.

Similar to the Edwards, Tod, and McGuigan (2008) study which examined the vertical jumps of male rugby players, Tod et al. (2009) investigated the use of instructional and motivational self-talk on the task of vertical jumping in 24 non-Elite athletes. Previous research indicated that instructional self-talk may be more effective during skill and timed activities, and motivational self-talk may be best suited for endurance-type activities. The researchers hypothesized that the participants that were assigned to either self-talk condition would produce better results than the control conditions.

The 12 men and 12 women performed four vertical jumps. Each vertical jump was separated by a rest-time of three minutes. The center-of-mass displacement, impulse, the knee's angular displacement, and the speed of angular rotation were measured. Before each trial the participants were assigned to one of the four interventions: motivational self-talk, instructional self-talk, neutral self-talk, or no instruction. During the motivational condition the participants said aloud the phrase "I can jump high." During the instructional condition the participants said aloud the phrase "bend and drive." During the neutral condition the participants counted out loud down from 1000 in increments of 7. The control condition did not receive any additional instructions from the researchers (Tod et al., 2009).

The results revealed that both instructional and motivational self-talk were "associated with significantly higher center-of-mass displacement, greater impulse, and quicker angular rotation about the knee," which demonstrated that self-talk can improve the performance on a vertical jump task (p. 199). Furthermore, there were no significant differences between the instructional self-talk condition and the motivational condition. This outcome could be related to the fact that the self-talk was not individualized to each participant. One individual may need a certain type of instructional phrase to improve his or her performance. Similarly for motivational phrases, two individuals may not necessarily be motivated by the same phrase. It is not only necessary to identify the frequency of self-talk used by exercisers, but also to highlight the importance of specifying the self-talk to the exerciser, especially during individual activities.

In order to determine the preceding thoughts for health-promoting behavior, such as exercise, O' Brien Cousins and Gillis (2005) conducted a study to determine if active

people used self-talk to motivate themselves. The researchers also focused on identifying patterns and health issues of adults born before 1960, and to investigate how their self-talk influenced their lifestyles. The purpose was to determine if the participants' self-talk promoted or weakened their abilities to live a healthy lifestyle.

The researchers of this qualitative study interviewed 40 adults and asked them questions about their physical activity behavior, their self-referent thinking patterns, and personal beliefs about exercise. The results revealed that 88% of the participants used self-talk strategies. However, active adults indicated that they had many strategies to maintain their physical activity involvement. Some strategies that exercisers used included, “‘pep-talks’ and disciplined reminders of their goals and expected benefits – they focused on the fact that there were more pros than cons to being active” (p. 330). Other exercisers reported that they used the strategy of ignoring the “activity self-talk,” before they had the opportunity to convince themselves not to exercise. Instead they said that they simply told themselves to “just do it,” before they had a chance to change their minds about exercising.

It was concluded that the stage of change and willingness to exercise may be a key factor when determining which type of person to target with positive messages about physical activity. The population that has a desire to be more active, but has not established a regular routine yet, may need some assistance through reminders and trigger cues in order to reach exercise “adherence.” The use of self-talk as a strategy to continue exercising appears to be effective.

Another qualitative examination of self-talk in exercise, by Gammage, Hardy, and Hall (2001), examined where, when, what, and why self-talk was used in exercise. The

purpose of the study was to determine if the participants exhibited self-talk related to exercise. Participants were 164 exercisers, who had to participate in at least one “exercise activity.” The researchers developed an instrument to gather demographic information and exercise information from the participants. The next part of the questionnaire presented the participants with an explanation of self-talk, based on a definition developed by Hackfort and Schwenkmezger (1993). The following statement is what participants read before they were asked to share if they had ever used self-talk in relation to exercise:

Self-talk, as the name suggests, is best thought of as what you say to yourself. You may talk to yourself out loud or you may talk to yourself in your mind, so that only you can hear what you are saying. This study is concerned with your use of self-talk prior to, during, and after exercise. Self-talk may be associated with emotions (e.g., ‘psyching’ yourself up), staying focused (e.g., concentrating for the full duration of an exercise session), maintaining motivation (e.g., to keep pushing yourself to your max near the end of a tiring session), or for learning/improving exercise skills (e.g., correcting form) (p. 235).

The final section of the questionnaire had four open-ended questions related to where, when, what, and why they used exercise self-talk. The results demonstrated that “95% of the participants indicated that they had used exercise-related self-talk” (Gammage et al., 2001, p. 236). Many exercisers reported that they used self-talk before an exercise session, in order to talk themselves into going. During exercise, many participants said that they used self-talk when they felt tired, when they felt like quitting, or at the most difficult part of their workout. It was evident that “self-talk is one way

individuals ensure they continue to [exercise]” (p. 242). The use of self-talk before, during, and after exercise can help an exerciser to motivate him or herself to adhere to an exercise program.

The results of this study provide solid groundwork for the current study and highlight the necessity of future research in this domain. Furthermore, the proven benefits of physical activity (including decreased risk of cardiovascular disease, heart attack, diabetes, hypertension, cancer, and depression) demonstrate the need to determine an effective way to continue the promotion of physical activity in all adults (Warburton, Nicol, & Bredin, 2006). The use of psychological skills, like self-talk, should be a strategy to encourage and maintain physical activity. It is evident that further examinations of the functions of self-talk in exercise need to be explored, and how it could be used as a motivational tool to maintain exercise adherence.

CHAPTER THREE

METHOD

The purpose of this study was to identify factors related to exercisers' thoughts and behaviors associated with exercise adherence. The aim was to discover an individual's exercise self-talk and what thoughts may be preventing, or encouraging, him or her to regularly exercise. Specifically, the participants were asked questions about their exercise participation, their use of and frequency of self-talk during exercise, their beliefs about the perceived benefits and barriers to exercise, and their confidence levels related to exercising despite perceived barriers. The following section reviews the research design, participants, procedures, measures, and data analysis.

Research design

The current study used a quantitative and qualitative questionnaire designed by the researcher. The participants completed a questionnaire which had the following sections: a) demographic information, b) questions on exercise participation (including open-ended response questions about the specific phrases and words that the participants' use, and the frequency of each), c) the Self-talk Questionnaire (modified by the researcher for exercise), d) the Exercise Benefits/Barriers Scale, and e) exercise self-efficacy questions. The data were obtained through surveymonkey.com, a secure online website used for data collection.

Participants

Members of Comcast Corporate Fitness Center in Philadelphia, PA, members of the Philadelphia Sports Club at Rodin Place in Philadelphia, PA, and students, faculty, and staff from Temple University were recruited to complete the questionnaire. Comcast

Corporate Fitness Center had approximately 718 members (December 2010).

Philadelphia Sports Club at Rodin Place (abbreviated to PSC) had approximately 2,500 members (February 2011). Temple University had approximately 37,367 students (full-time, part-time, and graduate) enrolled, 2,936 faculty members, and 5,890 staff as either part time or full time workers, all of whom have access to all fitness facilities (January 2010). The participants who volunteered completed the online survey within the allotted time frame of two weeks. In order to be eligible to complete the survey, participants had to be enrolled or employed by Temple University, or a member of the fitness centers indicated in the survey. After the survey was completed by the participants, regular exercisers (“adherers”) were defined according to the ACSM and AHA guidelines for regular physical activity participation (150 minutes per week of moderate intensity exercise). Furthermore, the regular exercisers were defined as exercise adherers if they had been involved in their indicated exercise routine for more than six consecutive months based on maintenance phase of the Transtheoretical Model for behavior change (Sarkin et al., 2001). Any participants who did not meet these criteria were considered to be “non-adherers.”

Procedures

Participants were recruited by the use of flyers, handouts, and email blurbs. The participants were provided with a link to the on-line survey through SurveyMonkey (<http://www.surveymonkey.com>). The recruitment period was two weeks to gather volunteers to complete the online survey. After the first week, a reminder email was sent and flyers were re-posted and distributed as a reminder to complete the survey. Information concerning the security parameters of SurveyMonkey was available on the

SurveyMonkey website. The link for the survey was <http://www.surveymonkey.com/s/selftalkexercise>. The survey took approximately 15 minutes to complete (see Appendices).

Measures

Demographic Questions. The demographic information in the survey included questions asking each participant's age, gender, ethnicity, height, and weight in order to make comparisons among the groups. The survey directed participants who selected Temple University recreation as their primary exercise location to a question which asked them to indicate their affiliation with Temple. The survey directed participants who selected Philadelphia Sports Club or Comcast as their primary exercise location to a question which asked them to indicate their occupation. Both questions regarding Temple affiliation and occupation were not required answers by the participants, in order to respect the participants' potential privacy concerns.

Exercise Participation. In the next section, participants were asked questions concerning their exercise participation. They were asked to indicate the percentage of time spent on given physical activities (brisk walking, cycling, group fitness, rowing, running, swimming, weight lifting, yoga and/or Pilates, and other/please specify). They were also asked the number of days per week they exercise, the number of minutes they exercise per session, the number of years or months they have been participating in their exercise routine, and their level of agreement (Likert scale rating) on common reasons to exercise (i.e., have fun, increase positive mood, be healthy, prevent disease, socialize, train for a race/competition, be physically attractive, lose weight, maintain weight, gain weight, get stronger, and relieve stress). Following that question, the participants were

asked to indicate the percentages of intensity levels (vigorous, moderate, and light) of their exercise.

The questions about each participant's time (in minutes) spent exercising per week, the time period (in months and/or years) that the participant has engaged in this routine, and the participant's percentages of exercise intensity levels were asked for the purpose of distinguishing the exercise adherers and non-adherers. The exercise adherers were defined according to the American College of Sports Medicine and American Heart Association recommendations for physical activity (150 minutes or more of moderate intensity exercise per week). The adherers also had to be exercising for more than six continuous months.

In this section of the questionnaire the participants were also asked to comment on the exact words or phrases they use when they exercise. They were asked to specify the type of activity, the specific self-talk, and how often they use it for each activity. To formalize procedures and aid in the participants' recall of their exercise self-talk more accurately, the questionnaire presented this statement, "When I exercise I say to myself..." The participants completed the prompt with their thoughts related to their exercise participation. Their answers could include more than one response. The following open-ended question asked the participants to indicate how often they used the words/phrases while exercising, "How often do you use these words/phrases when exercising?"

Self-Talk Questionnaire. The Self-Talk Questionnaire (S-TQ; Zervas, Stavrou, & Psychountaki, 2007) is an 11-item measure of the motivational and cognitive functions of self-talk strategies used by athletes to enhance sport performance. The S-TQ was

modified for this study to apply to exercisers. To date, there are no validated measures to assess the use of self-talk during exercise. The statements on the questionnaire were modified to apply to exercise performance, as opposed to sport performance or competitions. For example, one of the statements was changed from “I talk to myself in order to be able to concentrate more fully on the competition” to “I talk to myself in order to be able to concentrate more fully on my exercise activity.” The participants were asked to indicate how often they used self-talk during an exercise activity. The responses ranged from “never” to “always.” Scores on the S-TQ can range from 11 to 55. The higher the total score, the higher the frequency of the reported use of instructional and motivational self-talk was used by the participant during exercise. Therefore, a high score of 55 indicated that the participant reported always using instructional and motivational self-talk during exercise. The S-TQ (modified for exercisers) was the third part of the questionnaire that was completed by the participants. Tests for reliability and validity indicate that the S-TQ is an internally consistent measure. There is strong convergent validity and discriminant validity of the S-TQ and similar constructs (Zervas et al., 2007).

Exercise Benefits/Barriers Scale. The next portion of the questionnaire was the Exercise Benefits/Barriers Scale (EBBS, 1987). The EBBS is a 43-item scale to measure the participants’ perceived benefits and barriers to exercise. Scores on the EBBS can range from 43 to 172. The higher the total score, the higher the individual has a positive perception of exercise. The responses of each question are Likert-type format, ranging from 4 (strongly agree) to 1 (strongly disagree). The scale can be split into just a Benefits scale or just a Barriers scale. The Barriers scale items are questions 2, 6, 9, 12, 14, 16,

19, 21, 24, 28, 33, 37, 40, and 42. The Barriers scale items are scored in reverse order from the Benefits scale scoring 1 (strongly agree) to 4 (strongly disagree). The entire scale was used for the current study. Evaluation of reliability and validity indicate that the use of the EBBS is acceptable with the assessment of participants' beliefs on barriers and benefits to exercise. Cronbach's alpha reliability coefficients were 0.952 for the entire scale. Test-retest reliability scores were 0.889 for the entire measure (Sechrist, Walker, & Pender, 1987).

Exercise Self-Efficacy Questions. The final portion of the questionnaire was the Exercise Self-Efficacy Questions. This is a 5-item measure used to assess each participant's confidence for exercising. The responses of each question are Likert-type format, ranging from 1 (not at all confident) to 5 (extremely confident). The highest possible score on the Exercise Self-Efficacy questions is 25. The establishment of a participant's exercise self-efficacy was determined to be an important factor for adherence to exercise. The higher the total score on exercise self-efficacy, the higher the individual's confidence has towards exercising. The alpha score is 0.76 and the test-retest reliability, over 2 weeks, is 0.90 (Marcus, Selby, Niaura, & Rossi, 1992).

All scales and measures were approved by the authors. The online survey consent form can be found in Appendix A. The scales can be found in Appendices B, C, D, E, and F. The approval letters can be found in Appendices G and H.

Data analysis

Descriptive statistics were used to analyze the data for the self-talk questionnaire. The frequencies, means, and standard deviations are provided. The quantitative statistical analyses were performed using the SPSS analytical computer software. Information on

the correlational analysis of the S-TQ scores, EBBS scores, and Exercise Self-Efficacy scores were provided. Comparisons of genders, ages, and ethnicities were determined. The differences between the three fitness facilities were examined. Exploratory analysis was used on the two qualitative self-talk questions from the Exercise Participation portion of the questionnaire. The first question asked the participants to identify words and/or phrases that they “said to themselves” during exercise. The questionnaire presented this statement, “When I exercise I say to myself...” The participants completed the prompt with their thoughts related to their exercise participation. The second question asked the participants how often they used these words and/or phrases when exercising.

These semi-structured questions were analyzed through interpretive methods by using an interpretivist qualitative research perspective. The goal of using the interpretivist qualitative research perspective is to gain more understanding of the context [of self-talk] by way of making meaning of the social context [of exercisers’ use of self-talk] (Willis, 2007). The preexisting theories on the types of self-talk (positive, negative, motivational, and instructional) will be used to make meaning of the participants’ responses on the open-ended questions. The answers given by the participants also provided further explanations to the quantitative questions in the questionnaire. This enhanced the understanding of the participants’ thought processes during exercise.

CHAPTER FOUR

RESULTS AND DISCUSSION

The purpose of this study was to identify factors related to exercisers' thoughts and behaviors associated with exercise adherence. The aim was to discover an individual's exercise self-talk and what thoughts may be preventing, or encouraging, him or her to regularly exercise. Specifically, the participants were asked questions about their exercise participation, their use of and frequency of self-talk during exercise, their beliefs about the perceived benefits and barriers to exercise, and their confidence levels related to exercising despite perceived barriers. The following section will review the results of the study.

Descriptive statistics were conducted for the demographic information. There were 146 (Male = 49, Female = 97) individuals who completed the questionnaires. The mean age of the participants was 24.61 years old ($SD = 6.89$). The descriptive statistics of age (range 18 to 55), gender, ethnicity, and BMI are shown in Table 1.

Chi-Square tests revealed that the participants were significantly different on gender among the three fitness locations, $X^2(2, N = 146) = 10.54, p < .01$. The crosstabulation demonstrated that the significant differences were between Comcast (Male = 15, Female = 10) and Temple participants (Male = 49, Female = 97).

A one-way analysis of variance test also showed significant differences with age among the three locations, $F(2, 143) = 87.05, p < .001$. Post hoc comparisons using the Tukey HSD test indicated that the significant age differences among the three groups was between Temple and Comcast participants ($M = -11.24, SD = 1.04, p < .001$), and between Temple and Philadelphia Sports Club participants ($M = -11.72, SD = 1.24, p < .001$).

There were no significant differences on ethnicity or BMI among the three locations. Descriptive statistics for the participants' percentages of the reasons for exercising are presented in Table 2. Descriptive statistics for the participants' percentages of participation in exercise activities are presented in Table 3.

The first research question examined the relationship of adherence to exercise and the use of self-talk. Results from the exercise participation questions were examined based on the definition of exercise adherence for this study (150+ minutes of moderate intensity exercise, for at least 6 months). There were 91 defined adherers and 55 non-adherers. Of the 55 non-adherers, 27 of them were determined to be non-adherers based on the exercise adherence criterion of continuing an exercise routine for at least six months. The remaining 28 non-adherers were classified based on their amount of time spent exercising per week (<150 minutes). None of the participants were determined to be non-adherers solely based on exercise intensity level. However, four participants who were non-adherers for meeting previous criteria (either exercising for less than six months or less than 150 minutes per week), were also non-adherers because of a high percentage of self-reported exercise intensity levels. Participants who indicated more than 30% of their exercise to be light intensity were determined to be non-adherers.

Therefore, the 91 defined adherers participated in 150 minutes or more of moderate intensity exercise every week for at least six continuous months. The average percentage of vigorous intensity exercise for the adherers was 49.2% (range 0 to 100%). The average percentage of moderate intensity exercise for the adherers was 41.3% (range 0 to 100%). The average percentage of light intensity exercise for the adherers was 9.5% (range 0 to 30%).

TABLE 1. Demographic information by fitness location

	Comcast	PSC	Temple	Total
Gender N(%)				
Male	15 (60)	6 (40)	28 (26.4)	49 (33.6)
Female	10 (40)	9 (60)	78 (73.6)	97 (66.4)
Age				
Mean	32.72	33.20	21.48	24.61
SD	8.23	9.17	1.72	6.89
Range	22-55	20-47	18-28	18-55
Ethnicity N(%)				
Caucasian	22 (88.0)	10 (66.7)	64 (60.4)	96 (65.8)
Asian American	1 (4.0)	1 (6.7)	18 (17.0)	20 (13.7)
African Amer.	2 (8.0)	2 (13.3)	14 (13.2)	18 (12.3)
Hispanic	0 (0.0)	1 (6.7)	6 (5.7)	7 (4.8)
Indian	0 (0.0)	0 (0.0)	1 (0.9)	1 (0.7)
Other	0 (0.0)	1 (6.7)	3 (2.8)	4 (2.7)
BMI				
Mean	25.69	24.26	23.77	24.29
SD	3.91	4.97	4.26	4.31
Range	20.2-35.5	19.7-39.6	18-43.9	18-43.9

N = 146

TABLE 2. Percentages of reasons for exercising

	Str. disagree	Disagree	Agree	Str. agree	N/A
Reason for exercise					
Have fun	3.4	14.2	55.4	27.0	0.0
Positive mood	2.7	5.4	39.2	52.7	0.0
Be healthy	2.0	0.7	18.9	78.4	0.0
Prevent disease	2.0	8.8	42.6	43.2	3.4
Socialize	16.4	42.5	30.8	10.3	0.0
Train for a race	21.4	35.2	20.7	13.8	9.0
Body image	1.4	2.7	39.5	55.8	0.7
Lose weight	6.8	20.5	27.4	39.0	6.2
Maintain weight	6.8	11.6	44.2	34.7	2.7
Gain weight	52.1	28.5	10.4	5.6	3.5
Get stronger	4.7	4.7	48.0	42.6	0.0
Relieve stress	3.4	4.1	38.1	54.4	0.0

N = 146

Str. = Strongly

Bolded % = highest %

TABLE 3. Percentages of participation in exercise activities

	M %	SD	Range %
Brisk Walking	19.19	41.14	0-100
Cycling	10.09	14.83	0-80
Group Fitness	21.92	23.01	0-100
Rowing	2.04	9.01	0-70
Running	33.47	26.49	0-100
Swimming	3.82	9.34	0-65
Weight Lifting	21.52	20.29	0-85
Yoga/Pilates	7.36	16.09	0-80
Other	19.82	24.94	0-100

N = 146

The S-TQ mean scores for the adherers and non-adherers were compared. The adherers' mean score was 34.6 ($SD = 8.72$), and the non-adherers' mean score was 36.1 ($SD = 9.46$). The independent samples t -test indicated that the adherers' and the non-adherers' scores on the S-TQ were not significantly different, $t(139) = -0.95$, $p = 0.34$. This result demonstrated that there were no significant differences between the adherers' and the non-adherers' use of self-talk during exercise. The results from the open-ended questions examined the comparison between the two groups more closely.

Ninety-one adherers and 55 non-adherers completed the open-ended self-talk questions. Collectively, 146 participants produced 257 responses of self-talk phrases, words, and statements. Five theme ranges emerged from the participants' responses (positive/motivational, negative/motivational, positive/instructional, negative/instructional, and combinations of the first four themes). The responses were divided among the five categories of the frequency of self-talk used during exercise (rarely/never, 50% or sometimes, when exercise was a "struggle," often/very often, and 75% to 100%).

Many participants indicated more than one type of self-talk that they used during exercise. Twelve participants used both positive and negative self-talk statements. For example, one participant said, “despite the discomfort, I will feel better after.” Of the 257 responses, 186 indicated themes of positive/motivational statements. Some examples included “Keep going,” “Finish strong,” “Challenge yourself in each workout,” “GO HARD WHILE U HAVE THE STRENGTH TO” and “You are going to feel so much better later!” The positive/instructional self-talk statements included 47 responses. Some examples included “Run tall,” “Breathe,” “Light, easy, smooth, fast,” and “5 more minutes.” The negative/motivational self-talk statements included 25 responses. One person even said “kill yourself.” Other negative/motivational statements included “Pain now,” “Remember that double cheeseburger you ate,” “keep pushing through the pain” and “pain does not exist unless you make it exist.” None of the participants used negative/instructional self-talk statements. Eight participants reported not using self-talk during exercise. The total number of responses from each of the types of self-talk is presented in Table 4.

Other interesting responses worth noting were from some of the female participants about exercising for potential body image reasons. Some of the responses that suggested this notion included comments such as “bikini, bikini, bikini,” “May is coming, Florida is coming, you’re going to look great,” and “summer is coming! Britney Spears for inspiration!” These responses to the open-ended question were striking and may lead to future research possibilities of self-talk and motivation to exercise.

TABLE 4. Total responses of types of self-talk

Type of Self-talk	N	%	Example
Positive/motivational	186	72.3	“Keep going!”
Negative/motivational	24	9.3	“Keep pushing through the pain”
Positive/instructional	47	18.3	“Just legs, just keep moving the legs”
Negative/instructional	0	0.0	N/A
N/A	8		“I don’t, I listen to music”
TOTAL	257	100.0	

The open-ended self-talk questions were reviewed again, focusing on the adherers’ and non-adherers’ responses. Each response was separated by type (positive/motivational, negative/motivational, positive/instructional, negative/instructional) and by frequency of use (rarely/never, 50% or sometimes, when exercise was a “struggle,” often/very often, and 75% to 100%).

Adherers

Of the 91 adherers who completed the open-ended self-talk questions, 52 demonstrated positive/motivational self-talk statements, 17 demonstrated a combination of positive/motivational and positive/instructional self-talk statements, seven demonstrated positive/instructional, six demonstrated negative/motivational, six indicated that they did not use self-talk, and one participant demonstrated a combination of positive and negative instructional statements.

The exercise adherers’ frequency of self-talk was determined. Of the 91 exercise adherers, 37 indicated that they used self-talk 75% to 100% of the time, 18 said that they used self-talk when they struggled or felt like quitting, 17 said that they used self-talk very often or often, seven said never or very rarely, six said that they used self-talk sometimes, and six of the participants’ responses were excluded due to ambiguity.

Non-adherers

Of the 55 non-adherers who completed the open-ended self-talk questions, 22 indicated that they used self-talk 75% to 100% of the time, 12 said that they used self-talk very often or often, seven said that they used self-talk sometimes, seven said never or very rarely, and six said they used self-talk when they struggled or felt like quitting.

The non-adherers type of self-talk was also determined. Of the 55 non-adherers, 42 demonstrated positive/motivational self-talk statements, six demonstrated a combination of positive/motivational and positive/instructional self-talk statements, three demonstrated positive/instructional, two demonstrated negative/motivational, and two participants indicated that they did not use self-talk. The frequencies and types of self-talk totals for the adherers and non-adherers, based on the open-ended questions, are presented in Table 5.

The second research question determined if the exercise adherers scored higher on the EBBS and the exercise self-efficacy questions, compared to the non-adherers. The adherers' mean score on the EBBS was 138.2 ($SD = 12.25$), and the non-adherers' mean score on the EBBS was 132.1 ($SD = 10.01$). The independent samples t -test indicated that the adherers significantly scored higher on the EBBS compared to the non-adherers, $t(85.73) = 2.82, p < .05$. Furthermore, the adherers significantly scored higher on the "Benefits" items of the EBBS than the non-adherers, $t(107.8) = 2.95, p < .05$. These results demonstrated that the exercise adherers perceived the benefits of exercise outweighed the barriers more than the non-adherers.

TABLE 5. Distribution of types and frequencies of self-talk (adherers and non-adherers)

Adherers	N	%	Non-adherers	N	%
Type of Self-talk			Type of Self-talk		
Positive/motivational	52	57.1	Positive/motivational	42	76.4
Negative/motivational	6	6.6	Negative/motivational	2	3.6
Positive/instructional	7	7.7	Positive/instructional	3	5.4
Negative/instructional	0	0.0	Negative/instructional	0	0.0
Combination	17	18.7	Combination	6	10.9
N/A	8	8.8	N/A	2	3.6
TOTAL	91	100.0	TOTAL	55	100.0
Freq. of Self-talk			Freq. of Self-talk		
75-100%	37	40.7	75-100%	22	40.0
Very often/often	17	18.7	Very often/often	12	21.8
50%/sometimes	6	6.6	50%/sometimes	7	12.7
Struggling/tired	18	19.8	Struggling/tired	6	10.9
Never	7	7.7	Never	7	12.7
Excluded	6	6.6	N/A	1	1.8
TOTAL	91	100.0	TOTAL	55	100.0

The adherers' mean score on the Exercise Self-Efficacy questions was 14.9 ($SD = 4.55$), and the non-adherers' mean score was 13.0 ($SD = 4.17$). The independent samples t -test indicated the adherers also scored higher on the Exercise Self-Efficacy questions compared to the non-adherers, $t(140) = 2.49, p < .05$. This result demonstrated that the exercise adherers were more confident in their abilities to overcome barriers to exercise than the non-adherers. The results of the scores on the three questionnaires for adherers and non-adherers are displayed in Table 6.

The scores on the EBBS and the Exercise Self-Efficacy questions were also compared among the three fitness locations. The EBBS mean score for Comcast was 141.38 ($SD = 11.07$), with a range of scores from 120 to 166. The PSC mean score was

132.6 ($SD = 16.2$), with a range of scores from 113 to 159. The Temple mean score was 135.3 ($SD = 11.15$), with a range of scores from 114 to 165.

TABLE 6. Descriptive statistics on the questionnaires for adherers and non-adherers

	Adherers		Non-adherers
S-TQ		S-TQ	
N (%)	88 (62.4)	N (%)	53 (37.6)
M	34.64	M	36.13
<i>SD</i>	8.72	<i>SD</i>	9.46
EBBS		EBBS	
N (%)	76 (67.3)	N (%)	37 (32.7)
M	138.18	M	132.08
<i>SD</i>	12.25	<i>SD</i>	10.01
Self-efficacy		Self-efficacy	
N (%)	89 (62.7)	N (%)	53 (37.3)
M	14.9	M	13.00
<i>SD</i>	4.55	<i>SD</i>	4.17
<hr/>			
N = 146			

The one-way analysis of variance test revealed that the difference in scores on the EBBS approached significance among the three groups, $F(2, 110) = 2.805$, $p = .065$. The one-way analysis of variance test further demonstrated that there was a significant difference among the three groups specifically on the “Barriers” items on the EBBS, $F(2, 123) = 6.444$, $p < .05$. Post hoc comparisons using the Tukey HSD test indicated that the mean difference for the Comcast participants’ scores on the “Barriers” items on the EBBS ($M = 3.89$, $SD = 1.09$, $p = .001$) was significantly different than the Temple participants. These results suggest that the Comcast participants had lower perceived barriers to exercise than Temple participants. Due to the reverse scoring method that was used on the “Barriers” items on the EBBS, a higher score on these items denotes a lower

indication of perceived barriers to exercise. There were no significant differences between PSC and the other two groups.

The exercise self-efficacy mean scores for each fitness location were also computed. The Comcast mean score was 17.4 ($SD = 4.12$), with a range of scores from 11 to 25. The PSC mean score was 15.69 ($SD = 6.10$), with a range of scores from 6 to 25. And the Temple mean score was 13.24 ($SD = 3.96$), with a range of scores from 5 to 25. The highest possible score on the exercise self-efficacy questions is 25. While Comcast demonstrated the highest exercise self-efficacy scores, Temple and PSC also reported moderate scores. The one-way analysis of variance test revealed that the difference in scores on the Self-Efficacy questions was significant among the three groups, $F(2, 139) = 10.71, p < .001$. Post hoc comparisons using the Tukey HSD test indicated that the mean difference for the Comcast participants' exercise self-efficacy scores ($M = 4.15, SD = 0.94, p < .001$) was significantly different than the Temple participants. There were no significant differences between PSC and the other two groups. These results demonstrated that Comcast participants had greater exercise self-efficacy than the Temple participants. These results were consistent with the comparisons between the groups on the EBBS. The results of the scores on the three questionnaires for each of the three fitness locations are displayed in Table 7.

The third research question determined the similarities and differences in the types/themes of self-talk and the frequencies of use of self-talk during exercise among the three fitness locations. There were 146 participants who completed the open-ended self-talk questions; 106 were Temple University participants (97 undergraduate, 9 graduate

students), 25 were Comcast participants, and 15 were PSC participants. The total amounts of each of the types and frequencies of self-talk are displayed in Table 8.

The S-TQ mean scores for each fitness location were also calculated. The Comcast mean score was 36.37 ($SD = 10.33$), the PSC mean score was 33.6 ($SD = 11.14$), and the Temple mean score was 35.16 ($SD = 8.37$). The highest possible score on the S-TQ is 55. While Comcast demonstrated the highest self-reported use of motivational and instructional self-talk during exercise, Temple and PSC also reported moderate scores on the S-TQ. Results of the analysis of variance test confirmed that there were no significant differences among the three fitness locations' use of self-talk, $F(2, 138) = 0.439, p > .05$, on the responses to the S-TQ. The results from the open-ended questions examined the comparison among the three groups more closely.

TABLE 7. Descriptive statistics on the questionnaires by location

	Comcast	PSC	Temple
S-TQ			
N (%)	24 (17)	15 (10.6)	102 (72.3)
M	36.38	33.6	35.16
SD	10.33	11.14	8.37
EBBS			
N (%)	21 (18.6)	11 (9.7)	81 (71.7)
M	141.4	132.6	135.3
SD	11.07	16.19	11.15
Self-efficacy			
N (%)	25 (17.6)	13 (9.1)	104 (73.2)
M	17.4	15.7	13.24
SD	4.12	6.10	3.96
N = 146			

TABLE 8. Total responses of types and frequencies of self-talk by location

	N (%)	Comcast	PSC	Temple
Type of Self-talk				
Positive/motivational		12 (48)	10 (66.7)	71 (67)
Negative/motivational		2 (8)	1 (6.67)	4 (3.8)
Positive/instructional		4 (16)	0 (0)	7 (6.6)
Negative/instructional		0 (0)	0 (0)	0 (0)
Combination		5 (20)	2 (13.3)	17 (16.04)
N/A		2 (8)	2 (13.3)	4 (3.8)
TOTAL (N = 146)		25 (17.1)	15 (10.3)	106 (72.6)
Freq. of Self-talk				
75-100%		10 (40)	9 (60)	39 (36.8)
Very often/often		3 (12)	3 (20)	23 (21.7)
50%/sometimes		3 (12)	0 (0)	10 (9.4)
Struggling/tired		6 (24)	1 (6.67)	17 (16.04)
Never		3 (12)	0 (0)	11 (10.4)
N/A		0 (0)	2 (13.3)	6 (5.7)
TOTAL (N = 146)		25 (17.1)	15 (10.3)	106 (72.6)

Comcast Fitness Center

Forty percent of the Comcast participants said they always used self-talk during exercise. Only three participants said that they never used self-talk. Most (48%) of the participants' self-talk statements were positive/motivational.

Philadelphia Sports Club

A majority (60%) of the PSC participants said that they always used self-talk during exercise. None of the participants indicated that they used self-talk 50% or less. Similar to Comcast participants, a majority (66.6%) used positive/motivational self-talk statements.

Temple University

Similar to Comcast's percentage, 36.8% of Temple participants said that they always used self-talk during exercise, while 22% said that they often used self-talk.

Similar to Comcast and PSC participants, a majority (67%) used positive/motivational self-talk statements.

Additional Analysis

In addition to the previous analyses, a correlation test between age and the scores on the three questionnaires was performed. This was used to further explore the potential relationship between age and the use of self-talk related to exercise adherence. The Pearson correlation test indicated that age was negatively correlated, $r(141) = -0.167$, $p < .05$, with the use of self-talk (from the scores on the S-TQ). This suggests that the younger population of participants may use self-talk slightly more during exercise.

Furthermore, age was also significantly positively correlated with exercise self-efficacy, $r(142) = .310$, $p < .01$. This suggests that the older participants have higher confidence in their abilities to overcome barriers to exercise. No other significant correlations were found in this analysis of age.

Discussion

The first research question examined the relationship of adherence to exercise and the use of self-talk. There were 91 defined exercise adherers and 55 defined exercise non-adherers who completed the S-TQ. The adherers' mean score was 34.63 ($SD = 8.72$) and the non-adherers mean score was 36.13 ($SD = 9.46$). Therefore, the most commonly selected response in both groups on the 11 items of the S-TQ was "sometimes," which suggests that both groups indicated that they used instructional and motivational self-talk sometimes while they exercise. The similarity between the adherers and the non-adherers suggests that they both moderately use self-talk during exercise. The S-TQ is a questionnaire that was originally developed for athletes, but it was modified for

exercisers for this study. The S-TQ is designed to evaluate the use of motivational and instructional self-talk during performance. However, the specificity of the questions (i.e., “I talk to myself about the technical elements of my exercise activity”) may not have translated over as well as expected from the athletic setting to the exercise setting.

However, participants from all three of the locations demonstrated at least moderate use of self-talk. The average selected value was 3.16. A value of 3 equals “sometimes” on the value scale of the S-TQ. This means that the participants indicated that they “sometimes” use self-talk during exercise, which may be an accurate reflection of their actual use of self-talk. The open-ended responses indicated different frequencies in the use of self-talk during exercise. Most (40.4%) of the participants indicated that they used self-talk 75% to 100% of time, which is different from “sometimes” as indicated on the S-TQ scores. It is possible that the participants were not familiar with the use of self-talk during exercise or that they were able to accurately recall the frequency of their self-talk (Chroni, Perkios, & Theodorakis, 2007), which is demonstrated in the discrepancy between the S-TQ scores and the open-ended responses.

Interestingly, the major difference between the adherers and non-adherers open-ended responses was the percentage of adherers (20.2%) who indicated that they used self-talk when they were struggling/felt like quitting during exercise, while only 11% of the non-adherers indicated that they used self-talk when they were struggling.

Knowing how and when to use self-talk appeared to be a contributing factor to the adherers’ maintenance of their exercise routines. However, the adherers and non-adherers also reported similar responses to the frequency of self-talk used during exercise. Regardless if their self-reported frequency levels were accurate, this result may

suggest that frequency is unrelated to the effectiveness of self-talk during exercise. The most important factors appeared to be the type of self-talk that was used during the exercise (positive/motivational was the most common response across both adherers and non-adherers), and at what point during the exercise session the self-talk was used (20% of adherers reported using self-talk during difficult points in the session). This result was consistent with the findings from Gammage et al. (2001), which determined from the qualitative responses from the participants that most of the exercisers said they used self-talk when they were tired or needed encouragement to finish their workout.

Overall, there were no significant differences between the adherers' and non-adherers' type of self-talk used during exercise. The differences between the S-TQ mean scores and the open-ended responses could be due to a possible misunderstanding or unawareness by the participants about how often they actually use self-talk. However, the participants indicated on almost all of the S-TQ items that they "sometimes" use self-talk. This suggests that they may be using self-talk, but possibly not to the extent that they indicated on the open-ended questions. On the other hand, it is possible that the participants used self-talk to the extent that they indicated in both the S-TQ and the open-ended questions. On the S-TQ, questions were very specific about the exercise activity and elements related to the activity. Participants may have only "sometimes" used self-talk for these specific items, but may have used other types of self-talk as well. Furthermore, the S-TQ was originally developed for athletes and the version used in this study was modified for exercisers. For example, in the original version of the S-TQ for athletes, the first item reads "I talk to myself in order to be able to concentrate more fully on my competition" (Zervas et al., 2007, p. 157). This item was modified for exercisers

in the current study to read “I talk to myself in order to be able to concentrate more fully on my exercise activity.” This demonstrated that the use of the S-TQ for exercisers may not be applicable. This warrants further research to determine an effective way of measuring an exerciser’s self-talk.

The second research question determined if the exercise adherers scored higher on the EBBS and the Exercise Self-efficacy questions, compared to the non-adherers. The results from the comparison of scores on the EBBS demonstrated that the exercise adherers perceived the benefits of exercise outweighed the barriers more than the non-adherers. The results from the comparison of scores on the Exercise Self-efficacy questions demonstrated that the exercise adherers were more confident in their abilities to overcome barriers to exercise than the non-adherers. This supported the previous research on exercise adherence which stated that non-adherers may have “levels of confidence that are more [unstable] in contemplation and preparation [stages of change], when individuals are experimenting with exercise...confidence may not stabilize until the majority of attempts are successful” (Sarkin et al., 2001, p. 467). The adherers will likely not experience this sense of confidence in their abilities until the maintenance stage (6 months or more) in the Transtheoretical Model of Stages of Change, which is what was demonstrated by the results from this study. It is possible that the adherers have learned the inherent benefits of regular exercise, which has potentially lead to their increased confidence in their abilities to overcome barriers to exercise. Further analysis of the factors of the EBBS and the Exercise Self-Efficacy questions is needed to determine the correlation between exercise self-efficacy and the perceived benefits/barriers to exercise.

The EBBS and the Exercise Self-Efficacy questions were also compared among the three fitness locations. Comcast participants had lower perceived barriers to exercise than Temple participants. There were no significant differences between PSC and the other two groups. In terms of the Exercise Self-efficacy score comparisons, Comcast participants had greater exercise self-efficacy than the Temple participants. This meant that the Comcast members were more confident in their abilities to overcome perceived barriers associated with exercising.

There are some factors that could be related to this finding. First, the uneven number of participants among the three groups made it difficult to make concrete conclusions about the comparisons among the three locations' scores. Second, a possible reason for the differences could be related to the environment and accessibility of each of the locations. Comcast Fitness Center's members all work in the same building as the fitness facility. This allowed participants easy access to the fitness center, even during busy work days and harsh weather conditions. Also, the cost to be a member of the fitness center as a Comcast employee was minimal. These factors could have related to their increased exercise self-efficacy scores and lower perceived barriers because "those who have a high sense of efficacy visualize success scenarios that provide positive guides and supports for performance...[and] they figure out ways of exercising some control" (Bandura, 1993, pp. 118, 125).

The Comcast members ($M = 32.72$, $SD = 8.23$) were also significantly older than the Temple participants ($M = 21.48$, $SD = 1.72$). Having experienced more instances of barriers against exercising, due to longer lives, may have contributed to the Comcast members developing strategies throughout the years to overcome the barriers. The

results also indicated that Comcast members not only had higher exercise self-efficacy, but they also had lower perceived barriers to exercise. This was supported by conclusions from previous research that the “exercisers were the actual experts about barriers” which possibly allowed them to develop the skills and strategies to overcome them (O’ Brien Cousins & Gillis, 2005, p. 315). The Comcast members could have remained adherent to their exercise routines because they were potentially able to counteract a negative thought associated with not exercising, with strong positive thoughts that provided solutions to overcoming the barriers (O’ Brien Cousins & Gillis, 2005).

However, the Philadelphia Sports Club members ($M = 33.20$, $SD = 9.17$) were also significantly older than the Temple participants, but did not display similar results on the questionnaire as the Comcast participants. Further research may be needed to explore the potential differences between commercial and corporate fitness members and group dynamics within the fitness center.

The accessibility of the fitness centers may have also been a contributing factor to the Temple participants and the Philadelphia Sports Club participants. This perceived barrier to exercise has also been demonstrated in previous research on inaccessibility of fitness facilities and involvement of physical activity (Sechrist, Walker, & Pender, 1987). Temple University recreational facilities are mainly situated on one location of the main campus. This may make it easy for students, staff, and faculty who work and live near this location, but it may not be ideal for all students, staff, or faculty. Similarly, Philadelphia Sports Club at Rodin Place is located near the Art Museum in Philadelphia, PA. While this is a lively and highly populated location, it was unknown how easily

accessible it was for the members. Also, time constraints because of work, school, or family may have been another barrier to exercise for Temple University students and Philadelphia Sports Club members (Dishman, 1982; Sechrist et al., 1987).

The third research question compared the similarities and differences in the types/themes of self-talk and frequencies of use of self-talk during exercise among the three fitness locations. The three locations (Comcast, PSC, and Temple) were similar in the use of self-talk because the large majority of participants from each location used positive/motivational self-talk statements. It was clear across all groups that positive/motivational self-talk was a commonly used type of self-talk during exercise. The use of positive statements to encourage exercise participation, whether it is before, during, or after, may contribute to continuous engagement in that exercise activity.

The three fitness locations were different because of the type of person who was a member at that location. Comcast Fitness center is a corporate location, which only allows members within the Comcast Corporation to exercise in its facility. It is also located in the same building where the Comcast employees work every day. The potential benefits of fitness facilities located directly in the office buildings can be improved work performance, better coping skills against tensions with work, and increased alertness and concentration (Pollack, 1979 as cited in Sechrist et al., 1987). Philadelphia Sports Club is a commercial fitness facility, which allows any person to join if s/he pays a monthly fee, and may not provide the same experience to the members as a corporate fitness center. Temple University facilities are available to all students, faculty, and staff who are a part of the Temple community. There is no additional cost to attend the recreation facilities, but the facilities are closed whenever the university closes for

holidays, academic breaks, etc. Obtaining samples from each of these locations was important to determine if self-talk differed across location. It was apparent that the frequency and type of self-talk that was used across different locations and different participants was very similar.

General Discussion

The majority of the participants, regardless if they were adherers or non-adherers, preferred or encouraged the continuation of exercise through the use of frequent, positive/motivational thoughts. Twenty-four of the non-adherent exercisers met the guidelines of 150 minutes or more of moderate physical activity per week, but had not achieved that for more than six months. After six months appears to be a critical point in exercise adherence because participation seems to either continue or drop off after this point of maintenance (Biddle & Fox, 1989; Dishman, 1982). It could be possible that the non-adherers who had not yet reached the “six month mark” (but had the appropriate time and intensity levels for physical activity) may have the intention of continuing their exercise routine, and could have been utilizing similar self-talk strategies as the adherers.

The literature on exercise adherence has adopted the six month maintenance mark as the standard (Biddle & Fox, 1989; Dishman, 1982; Sarkin et al., 2001). However, six months may not necessarily be the absolute time period in order to define adherence. Some participants in this study could have indicated that they had only been participating in their indicated exercise routine for a few months, but it is possible that they had engaged in an exercise routine prior to this study and did not indicate this. They may have developed the mental skills (such as self-talk) to adhere to an exercise program, but their bodies may not be physically able to perform the activities (potentially due to

injuries). Or there may have been some individuals who believed that they were adhering to an exercise program, even if it did not meet the criteria for the current study. Further research should examine exercisers' beliefs about their current exercise routines and if they believe they are adherent exercisers. The "six month" mark application to the exercise population may need to be revisited to fit a more flexible definition for exercise adherence.

It was clear that a large majority of the participants used self-talk during exercise. The next step would be to encourage effective thought processing, practice coping strategies to overcome barriers, and maintain a focus on the numerous benefits of exercise adherence (Pate et al., 1995; McAuley, 1992).

It could be possible that the use of specific, individualized, positive/motivational self-talk during points of physical activity when it starts to become a struggle or the exerciser feels like quitting can be a strategy to help exercise non-adherers to overcome the perceived barriers to exercising. This is similar to the application of self-talk in athletes and that "changes in the use of self-talk [occurs during] challenging pressure filled situations" (Hardy, 2006, p. 94). Previous research on self-talk and athletes has indicated that both instructional and motivational self-talk can increase performance outcomes (Hatzigeorgiadis et al., 2004). However, the use of instructional self-talk may be more applicable to athletes because the focus is on "proper attentional focus, technical information, and tactical choices," as opposed to motivational self-talk, which may be more appropriate for exercisers because it can build confidence, effort, and control arousal (Chroni, Perkos, & Theodorakis, 2007, p. 20; Hardy, Jones, & Gould, 1996).

The positive/motivational self-talk can also increase an exercisers' self-efficacy, which can lead to maintenance of exercise adherence behaviors (Hatzigeorgiadis et al., 2009). Furthermore, these results could provide implications of the practical use of self-talk for the overweight and obese populations who may be having difficulties adhering to an exercise routine.

Recommendations for research

The following are recommendations for those who are interested in conducting research in fitness settings. These suggestions are meant to provide instruction and direction to researchers.

During the recruitment phase of the research, it was helpful to advertise the survey through the use of a promotional table at Philadelphia Sports Club. This allowed participants to read the flyer, take a handout or card (business card size with survey link on it), or simply write down their email addresses on a sheet of paper. This was easy and convenient for the gym members because it was a short time commitment. The presentation of candy or a colorful sign, as well as a friendly face, appeared to attract the gym members and help with recruitment. The collection of email addresses worked well because then the link was forwarded directly to the participants. Comcast and Temple would not allow promotional tables to be set up. However, through effective and collaborative coordination with the Comcast Fitness Center manager, participants were recruited by word-of-mouth, flyers, and email lists. For future research, advertisements made on the internet through social networking sites or list-serves may assist in obtaining a larger population. Using the internet as a recruitment method may also allow for the

inclusion of a more diverse sample, which could include people who exercise at multiple places or outside of a fitness facility.

For researchers who plan to modify an established questionnaire for a different population (similar to the modifications that were made on the S-TQ for exercisers), it may be wise to collect data from a pilot population in order to determine if additional modifications need to be made or if another questionnaire needs to be utilized.

If a quantitative study is designed, the inclusion of an open-ended question can be beneficial. The open-ended question could allow participants to indicate their thoughts more clearly. The responses on the open-ended question can be used to understand the quantitative responses more clearly, or may facilitate the creation of ideas for the development of a future research study.

A potential limitation of the methodology of the current study was the use of the defining criterion of six months for exercise adherence. Given the borderline differences (even though statistically significant) between the adherers and non-adherers, it may be possible that six months is not the correct, or absolute, indication of exercise adherence. Furthermore, the population that volunteered to complete the survey was likely mostly active because the primary recruitment advertisements were located in the fitness facilities. These individuals were most likely more active than the general population. Further research examining the self-talk of a sedentary population versus an active population may produce more differences in the responses on the questionnaires.

Recommendations for Practitioners

Because of the nature of self-talk and how it is very individualized to each person, general recommendations for practitioners were applied. Most of the participants

indicated that they believed that exercise was beneficial and they were moderately confident in their abilities to overcome potential barriers to exercising. In order to further increase exercisers' confidence in overcoming barriers, fitness professionals should first understand what thoughts are motivating to the exercisers. Some exercisers may only need one phrase, or a "mantra," to help them during an exercise session. On the other hand, another exerciser may need to modify his or her thought process prior to an exercise session in order to remain adherent. Keeping the self-talk type and frequency unique to the individual is important. Increasing the exercisers' perceived benefits of exercise is also important for continued adherence to physical activity.

Exercise and sport psychologists or consultants should educate their clients about the effectiveness of self-talk in a variety of healthy lifestyle situations, not just exercise. They should properly demonstrate and suggest how their clients can use self-talk during exercise in order to increase or maintain their daily physical activity. Personal trainers or physical therapists could also benefit from encouraging the use of self-talk in their clients. The exerciser or patient is seeking support and services from these individuals, and may need psychological guidance related to exercise performance as well. Personal trainers should determine which type and amount of self-talk is effective for their exercise client to adhere to their exercise routine. Physical therapists should determine which type of self-talk their patients will benefit from in order to increase their confidence, abilities, and adherence to their rehabilitation programs.

CHAPTER FIVE
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FUTURE
RESEARCH

Summary

The current study identified the factors related to exercisers' thoughts and behaviors associated with exercise adherence. The purpose was to discover an individual's exercise self-talk and what thoughts may be preventing, or encouraging, him or her to regularly exercise. Specifically, the participants were asked questions about their exercise participation, their use of and frequency of self-talk during exercise, their beliefs about the perceived benefits and barriers to exercise, and their confidence levels related to exercising despite perceived barriers.

The research questions explored the relationship of adherence to exercise and the use of self-talk, the significance of perceived benefits, barriers and exercise self-efficacy on exercise adherence, and the similarities and differences in the use of self-talk between the three fitness locations were determined.

The questionnaire was distributed through an online survey link. Participants from three fitness locations (Comcast Fitness Center, Philadelphia Sports Club, and Temple University recreation facilities) were recruited through flyers, handouts, and email blurbs. There were 146 (Male = 49, Female = 97) participants who volunteered to complete the questionnaires. There were 91 defined adherers and 55 non-adherers.

The results indicated that the adherers perceived more benefits to exercise, as well as had higher exercise self-efficacy, compared to the non-adherers. The results of the open-ended responses indicated that the most important factors appeared to be the type of

self-talk that was used during the exercise (positive/motivational was the most common response across both adherers and non-adherers), and at what point during the exercise session the self-talk was used (20% of adherers reported using self-talk during difficult points in the session). The conclusions from the study can also be used to provide an indication of how self-talk could be used to encourage initiation and maintenance of exercise.

Conclusions

The following conclusions were drawn from the examined research questions and the statistical findings.

Research question 1.

The first research question was aimed to determine the relationship of adherence to exercise and the use of self-talk. After comparing the S-TQ mean scores among the three fitness locations, there were no significant differences among the three locations. The open-ended responses indicated different responses. Ninety-one adherers and 55 non-adherers completed the open-ended self-talk questions. The adherers and non-adherers reported similar responses to the frequency of self-talk used during exercise, with the majority of participants indicating that they used self-talk 75% to 100% of the time. However, adherers indicated that they used self-talk when they felt like quitting or when they were struggling more than the non-adherers, which could be a contributing factor to the adherers' maintenance of their exercise routines.

Research question 2.

The second research question was aimed to determine if the exercise adherers had higher scores on the EBBS and the Exercise Self-efficacy questions, compared to the

non-adherers. The results demonstrated that the adherers had higher scores on the EBBS, which meant that they had higher beliefs in the benefits of exercise, compared to the non-adherers. Furthermore, the adherers also scored higher on the Exercise Self-efficacy questions, which meant that they had higher confidence in the abilities to overcome potential barriers to exercising, such as bad weather, vacation, fatigue, perceived lack of time, or bad mood. Because the adherers were exercising for at least six months (the average time period of continued exercise adherence was 3.7 years), they had likely established strategies for overcoming potential barriers.

Research question 3.

The similarities and differences in the use of self-talk among the three fitness locations were examined. Forty percent of the Comcast participants said they always used self-talk during exercise. Only three participants said that they never used self-talk. Most of the participants' self-talk statements were positive/motivational. It was clear across all groups that positive/motivational self-talk was a commonly used type of self-talk during exercise. The use of positive statements to encourage exercise participation, whether it was before, during, or after exercise, may have contributed to continuous engagement in that exercise activity.

Recommendations for Future Research

The following recommendations should be considered for future research on self-talk and exercise.

1. Possible directions for future research on self-talk and exercise could include the comparison of former athletes' self-talk and how that may translate into the exercise setting after retirement from their sports.

2. Other populations to explore could be the older adult population or minority populations, who were not highly represented in this study's sample.

3. Also, other types of fitness locations, such as private or public community centers, may have different utilizations of self-talk. It would be interesting to compare the perceived benefits and barriers to exercising in facilities in different socioeconomic areas as well.

4. Another population to research would be the female population and their motivations for exercising. Some of the responses on the open-ended self-talk questions indicated that a number of women in this study were exercising for body image purposes. Some of the responses that suggest this included comments such as "bikini, bikini, bikini," "May is coming, Florida is coming, you're going to look great," and "summer is coming! Britney Spears for inspiration!" This topic may be interesting to research female body image issues, how that translates to her exercise self-talk, and the potential for this to lead to over-exercising.

5. Furthermore, the development of a quantitative measure to assess the use of self-talk during exercise is needed. The results from the current study indicated that the use of the S-TQ, which was previously designed for athletes, may not translate into the exercise population.

6. Another recommendation for future research is to develop an intervention to determine the different types of self-talk in different exercise activities. It was apparent from the results of this study that the participants were using, or attempting to use, self-talk during exercise. An intervention that focuses on the combination of different types of self-talk (positive, negative, motivational, and instructional) may be applicable for

different exercise activities. For example, activities that are primarily focused on form and posture (i.e., weight lifting, yoga, Pilates) may benefit more from the use of instructional self-talk to focus on technique. On the other hand, activities that are primarily high intensity (i.e., running, cycling, rowing) may benefit more from the use of motivational self-talk.

Overall, more research on self-talk and exercise is needed in order to educate people about the benefits of adhering to an exercise routine and how their thoughts can greatly influence the maintenance of healthy lifestyle behaviors.

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APPENDICES

APPENDIX A

Consent Form

Dear Fellow Exerciser,

This survey will ask you about your reasons for participating in exercise, perceived barriers to participating in exercise, and your self-talk during exercise.

Self-talk are thoughts that go through our mind throughout the day. These thoughts and phrases can be positive, negative, or neutral, and they may influence our actions and decisions.

During this survey, we ask you to consider your use of self-talk during exercise and how it affects your motivation to continue.

You must be 18 years of age or older to participate in this survey. This survey should take no longer than 10-15 minutes to complete, and should present no harm to you. If you wish to stop responding at any time, please feel free to do so. Please note that any information sent over the Internet is confidential only to the extent the Internet is secure. This is an anonymous survey. No personal identifiable data are requested or will be collected. Please do not provide any contact information.

If you have any questions about this research study, please contact Allison Ives at allison.ives@temple.edu or Michael Sachs at msachs@temple.edu. If I have any questions about my rights as a research subject, I may contact the Institutional Review Board Coordinator at (215) 707-3390. The IRB Coordinator may also be reached by email: IRB@temple.edu or regular mail:

Institutional Review Board Coordinator
Temple University Research Administration
Student Faculty Conference Center
3340 North Board Street – Suite 304
Philadelphia, PA 19140

I have decided to:

Please click here to indicate you have read the information and agree to participate in the study.

Please click here to indicate you have read the information and have decided not to participate in the study.

APPENDIX B

Demographic Information

1. What is your age?
2. Please select your primary exercise location.

- Temple University recreation
- Philadelphia Sports Club
- Comcast Fitness Center

3. If Temple University is your primary exercise location, what is your affiliation?

- undergraduate student
- graduate student
- faculty
- staff

4. If your primary exercise location is PSC or Comcast, what is your occupation?

5. Please select your gender:

- male
- female

6. Please indicate your ethnicity:

- African-American
- Asian-American
- Caucasian
- Hispanic/Latino
- Other (please specify):

7. What is your height? (example: 5'6")

8. What is your weight, in pounds? (example: 130)

APPENDIX C
Exercise Participation

1. What percentage of your exercise time do you spend in each of the following activities (total should be 100%)?

Brisk Walking	<input type="text"/>
Cycling	<input type="text"/>
Group Fitness	<input type="text"/>
Rowing	<input type="text"/>
Running	<input type="text"/>
Swimming	<input type="text"/>
Weight Lifting	<input type="text"/>
Yoga and/or Pilates	<input type="text"/>
Other (please indicate which activity/ies)	<input type="text"/>

2. How many days do you exercise per week?

- never
- 1
- 2
- 3
- 4
- 5
- 6
- 7

3. On average, how many minutes per session do you typically exercise?

4. How long have you been participating in the exercise routine you indicated above? (please specify months and/or years)

5. Please indicate your level of agreement with each of the following.

I exercise to...

strongly disagree

disagree

agree

strongly agree

N/A

Have fun

Increase positive mood

Be healthy

Prevent disease

Socialize

Train for a race/competition

Be physically attractive (body image)

Lose weight

Maintain weight

Gain weight

Get stronger

Relieve stress

6. What percentage of your exercise activities do you consider to be...

Vigorous intensity?

Moderate intensity?

Light intensity?

7. Please complete the following phrase: (If you participate in multiple activities, please indicate what words/phrases you use for each exercise or activity.) Please note- your answer could include more than one statement.

“When I exercise, I say to myself...”

8. How often do you use these words/phrases when exercising?

APPENDIX D

Self-Talk Questionnaire

Directions: Below are some statements that describe exercisers' self-talk during an activity. Please read each one carefully and indicate how often you have used self-talk. Your answers will be treated as anonymous responses.

1. I talk to myself in order to be able to concentrate more fully on my exercise activity.

never rarely sometimes often always

2. I talk to myself about the technical elements of my exercise activity.

never rarely sometimes often always

3. I talk to myself to give directions.

never rarely sometimes often always

4. I talk to myself to enhance my self-confidence.

never rarely sometimes often always

5. I talk to myself to motivate myself.

never rarely sometimes often always

6. I talk to myself to increase my effort.

never rarely sometimes often always

7. I talk to myself to encourage myself.

never rarely sometimes often always

8. I talk to myself to strengthen a positive thought.

never rarely sometimes often always

9. I talk to myself to stop negative thinking.

never rarely sometimes often always

10. I talk to myself in order to help myself to relax.

never rarely sometimes often always

11. I talk to myself to correct my mistakes.

never rarely sometimes often always

APPENDIX E

Exercise Benefits/Barriers Scale

Below are statements that relate to ideas about exercise. Please indicate the degree to which you agree or disagree with the statements.

strongly agree agree disagree strongly disagree

1. I enjoy exercise.
2. Exercise decreases feelings of stress and tension for me.
3. Exercise improves my mental health.
4. Exercising takes too much of my time.
5. I will prevent heart attacks by exercising.
6. Exercise tires me.
7. Exercise increases my muscle strength.
8. Exercise gives me a sense of personal accomplishment.
9. Places for me to exercise are too far away.
10. Exercising makes me feel relaxed.
11. Exercising lets me have contact with friends and people I enjoy.
12. I am too embarrassed to exercise.
13. Exercising will keep me from having high blood pressure.
14. It costs too much money to exercise.
15. Exercising increases my level of physical fitness.
16. Exercise facilities do not have convenient schedules for me.
17. My muscle tone is improved with exercise.
18. Exercising improves functioning of my cardiovascular system.
19. I am fatigued by exercise.
20. I have improved feelings of well being from exercise.
21. My spouse (or significant other) does not encourage exercising.
22. Exercise increases my stamina.
23. Exercise improves my flexibility.
24. Exercise takes too much time from family relationships.
25. My disposition is improved by exercise.
26. Exercising helps me sleep better at night.
27. I will live longer if I exercise.
28. I think people in exercise clothes look funny.
29. Exercise helps me decrease fatigue.
30. Exercising is a good way for me to meet new people.
31. My physical endurance is improved by exercising.
32. Exercising improves my self-concept.
33. My family members do not encourage me to exercise.
34. Exercising increases my mental alertness.
35. Exercise allows me to carry out normal activities without becoming tired.
36. Exercise improves the quality of my work.
37. Exercise takes too much time from my family responsibilities.
38. Exercise is good entertainment for me.
39. Exercising increases my acceptance by others.
40. Exercise is hard work for me.
41. Exercise improves overall body functioning for me.

- 42. There are too few places for me to exercise.**
- 43. Exercise improves the way my body looks.**

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APPENDIX F

Exercise Self-Efficacy Questions

Please rate the following items according to the scale provided below.

1= not at all confident 2= slightly confident 3= moderately confident
4= very confident 5= extremely confident

How confident are you that you could exercise in each of the following situations?

- 1. When I am tired.**
- 2. When I am in a bad mood.**
- 3. When I feel I don't have time.**
- 4. When I am on vacation.**
- 5. When it is raining or snowing.**

APPENDIX G

S-TQ Copyright Permission

Department of Kinesiology, 048-00
 114 Pearson Hall
 Temple University
 Philadelphia, Pa 19122

April 26, 2011

Yannis Zervas
 Bazarakí 73 str.
 Glyfada, 166 74
 Greece

Dear Professor Zervas,

I have completed my Master's thesis at Temple University entitled "Self-talk and Exercise Adherence." I would like your permission to reprint in my thesis the use of the S-TQ, which I modified slightly for the use with exercisers.

The requested permission extends to any future revisions and editions of my thesis, and to the prospective publication of my thesis by ProQuest Information and Learning (ProQuest) through its UMI® Dissertation and Thesis Publishing business. ProQuest may produce and sell copies of my thesis and may make my thesis available for free internet download at my request. These rights will in no way restrict republication of the material in any other form by you or by other authorized by you. Your signing of this letter will also confirm that you own the copyright to the scale material.

If these arrangements meet with your approval, please sign this letter where indicated below and return it to me by fax or scan. Thank you very much.

Sincerely,

Allison Ives

Allison Ives

PERMISSION GRANTED FOR THE

USE REQUESTED ABOVE:

[Signature]

Yannis Zervas

Professor Emeritus

Date: 4/27/2011

APPENDIX H

EBBS Copyright Permission

Department of Kinesiology, 048-00
114 Pearson Hall
Temple University
Philadelphia, Pa 19122

April 26, 2011

Karen R. Sechrist, PhD, RN
18 Morning Star
Irvine, CA 92603-3745
(949) 854-7167

Dear Dr. Sechrist,

I have completed my Master's thesis at Temple University entitled "Self-talk and Exercise Adherence." I would like your permission to reprint in my thesis the use of the entire Exercise Benefits Barriers Scale (1987).

The requested permission extends to any future revisions and editions of my thesis, and to the prospective publication of my thesis by ProQuest Information and Learning (ProQuest) through its UMI @ Dissertation and Thesis Publishing business. ProQuest may produce and sell copies of my thesis and may make my thesis available for free internet download at my request. These rights will in no way restrict republication of the material in any other form by you or by other authorized by you. Your signing of this letter will also confirm that you own the copyright to the scale material.

If these arrangements meet with your approval, please sign this letter where indicated below and return it to me by fax or scan. Thank you very much.

Sincerely,

Allison Ives

Allison Ives

PERMISSION GRANTED FOR THE
USE REQUESTED ABOVE:

Karen R. Sechrist

Karen R. Sechrist, PhD, RN
for Sechrist/Walker/Pender

Date: *April 27, 2011*