

The Relationship Between Self-talk and Flow Experiences in Endurance Athletes

by

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## **Abstract**

Sport and exercise researchers have examined numerous factors that influence athletic performance. Amongst those factors are self-talk and flow, which are typically studied independently of each other. The current study examined and compared different types of self-talk as predictors of experiencing flow in endurance athletes. Based on prior research in both self-talk (e.g., Tod, Hardy, & Oliver, 2011) and flow (e.g., Weinberg, Miller, & Horn, 2012), it was hypothesized that motivational self-talk would be a better predictor for experiencing flow compared to instructional self-talk. Additionally, a negative correlation between negative self-talk and flow experiences was expected compared to positive self-talk. Forty-five NCAA runners from two Pennsylvania university teams served as participants, each competing in mid- to long-distance races. At the end of each race, self-talk and flow measures were completed. Results yielded strong support for both hypotheses: a significant, positive relationship between motivational self-talk and flow experiences and a significant, negative relationship between negative self-talk and flow experiences. These findings add to current literature in the realm of sport and exercise psychology. Flow is a positive experience and influential to athletic performance; thus, it is important to understand the type of self-talk that might inhibit or facilitate flow experiences.

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## **CHAPTER I**

### **Introduction**

Athletes are continuously searching for ways to improve performance and productivity in their sport. Beyond the physical preparation, there are a number of mental factors that are necessary for consideration in order to enhance optimal performances. According to some of the most recent research conducted by sport psychologists, there are several factors that help athletes improve their mental capacities in both training and competition. Some of these include increased confidence levels (Maynard, Smith, & Warwick, 1995), lowered anxiety levels (Hatzigeorgiadis, Zourbanos, Mpoumpaki, Theodorakis, 2009), and the proper use of self-talk (Hatzigeorgiadis, Zourbanos, Galanis, & Theodorakis, 2011). Additionally, researchers have found that athletes who experience flow perform better than those who do not (Csíkszentmihályi, 1975; Kawataba & Mallett, 2011). Consequently, these topics have generated much interest from researchers, coaches, and athletes.

Although researchers have studied the relationships of self-talk and flow independently, there has been no systematic analysis of the two together. Both self-talk and flow have been found to be crucial components of athletic performance, making an examination of their possible relationship a worthwhile project. Drawing on previous literature addressing each concept independently, the present study will attempt to understand various self-talk types in regards to the likelihood of athletes experiencing a state of flow. First, an explanation of previous literature conducted on the concept of self-talk will be provided. In continuation to the general overview of the self-talk literature, a more narrow description of self-talk will be reviewed in regards to athletes. Following the

self-talk discussion, the concept of flow and flow in regards to sport and exercise will be described. Finally, a layout of the possible relationship between both self-talk and flow in athletics will be presented.

### **Defining Self-talk**

The concept of self-talk has been persistently researched through recent decades in an attempt to understand its broad importance, frequency, and content. Bunker, Williams, and Zinsser (1993) offered a general description of self-talk as any type of individual thought. Due to the vagueness of their view, other researchers have considered more precise definitions of self-talk (Hackfort & Schwenkmezger, 1993; Hardy, 2006; Theodorakis, Weinberg, Natsis, Douma, & Kazakas, 2000). For example, Theodorakis et al. allocated self-talk into two different behaviors: covert or overt. According to this definition, overt self-talk is a verbalization made aloud to one's self while covert is considered inner speech. Furthermore, Hackfort and Schwenkmezger (1993) argued that self-talk involves multiple purposes such as the process and interpretation of feelings and perceptions.

Self-talk may serve as a self-regulatory system, a means to changing evaluations and convictions, and can be both instructional and reinforcing. The result of using self-talk for these different functions is then indicative of later behavior (Bandura, 1977, 1991; Ellis, 1962). Specifically, Bandura (1977) explained the use of self-statements as a means of cognitive insight. That is, through the cognitive processes of self-reflection and self-regulation, people develop a sense of agency and motivation to think and behave in specific ways. Ellis (1962) postulated that self-directed statements determine the way in which an individual responds emotionally which in turn influences behaviors in various

situations. More recent researchers have attempted to understand the different types of self-talk in this manner. For example, Brinthaupt, Hein, and Kramer (2009) developed the Self-Talk Scale. This scale measures the functions of self-talk in four categories: self-criticism, self-management, self-reinforcement, and social assessment.

The above definitions of self-talk help piece together what self-talk is and its likely purposes. Hardy's (2006) review of self-talk research and literature in sport and exercise psychology highlighted the most prominent and scientifically supported definition of self-talk. Hardy offered the following guidelines, which define self-talk from a collection of previous work: Self-talk involves verbalization or self-statements that have interpretive elements. It is both multidimensional and dynamic in nature. Finally, self-talk in the sport and exercise domains serves two major functions, instructional and motivational.

In summary, self-talk has been found to be influential in a variety of ways. Having both positive and negative applications, its self-regulatory and self-reflective demeanor has been viewed as crucial for future thoughts and behavior. Thus, psychologists in a variety of domains have attempted to better understand the importance and application of self-talk.

### **Types and Functions of Self-talk In Athletes**

Sport and exercise psychologists have conducted a large amount of research on self-talk in elite and non-elite athletes (Hardy, Gammage, & Hall, 2001; Highlen & Bennett, 1983; Moran, 1996). Hatzigeorgiadis et al. (2011) conducted a meta-analysis of studies of self-talk in the sport domain. Their results exemplified the importance of understanding the effects of self-talk and self-talk interventions on task performances in

different sports. More specifically, it was confirmed that self-talk is an effective strategy for enhancing task performances. For example, Hatzigeorgiadis, Theodorakis, and Zourbanos (2004) concluded that self-talk may have the ability to help lower levels of cognitive distractions and help athletes focus on the task at hand. Hamilton, Scott, and MacDougall's (2007) research on the use of self-talk is just one example of how certain types of self-talk serve a positive function in performance. This particular research found that positive and negative types of self-talk interventions helped improve performance amongst cyclists. Research similar to Hamilton et al.'s (Moran, 1996) suggests that self-talk is often a form of praise to athletes, helping individuals to stay focused on the present, rather than on the future or past.

Two kinds of self-talk frequently examined in athlete use are positive and negative self-statements. However, there have been contradicting results with respect to the benefits of each type of self-talk. Whereas positive self-talk has been noted as an enhancement for performance, negative self-talk has also been found to result in the same effects for athletes. Specifically, researchers such as Dargou, Gauvin, and Halliwell (1992) found support that positive self-talk improves performance. In addition, Van Raalte, Brewer, Riveria, and Petitpas (1994) measured self-talk in youth tennis players using the Self-talk and Gestures Rating Scale and determined that match winners used less negative self-talk. Nonetheless, there was no difference on the use of positive self-talk between winners and losers in their study. Prior to this particular study, Highlen and Bennett (1983) found that negative self-talk could improve performance. Overall, it appears that the effects of positive and negative self-talk may vary in terms of personality and sport. Tod, Hardy, and Oliver (2011) reviewed a number of studies that illustrated

this variation. First, negative self-talk may not have a detrimental effect on motor skill performance because some negative self-talk may be perceived as positive. Additionally, these researchers indicated that positive self-talk does not necessarily make for a better performance. Tod and colleagues concluded that more research needs to be conducted in the specific realm of the effects of negative self-talk.

Due to the unclear conclusion of research on the effects of positive and negative self-talk, researchers have looked beyond these types to better understand the relationship between athletic performance and self-talk. For example, Hardy et al. (2001) conducted a qualitative study on the what, why, where, and when of self-talk. The findings of this study helped answer these questions and determined that self-talk was used for both instructional and motivational purposes. Other researchers have verified this idea (Theodorakis et al., 2000; Hatzigeorgiadis et al., 2004) and expanded the research in other domains such as Brinthaupt et al.'s (2009) work on the Self-Talk Scale.

Some research addresses how and when different types of self-talk might have more of a positive or negative affect on athletic performance. For example, Fitts and Potsner (1967) suggested that the early stages of learning a skill or sport promote more frequent use of instructional talk. Later, once the skill and practice have accumulated enough for the athlete, less cognitive activity is needed and performance becomes more automated. Thus, self-talk, at least in its instructional form, is less commonly used. It is possible that motivational self-talk might become more frequent and useful than instructional self-talk for more automated skills. However, to my knowledge, no research has addressed this possibility.

Instructional self-talk typically involves skill- and strategy-related self-directed statements (Weinberg, Miller, & Horn, 2012). Motivational self-talk is more multi-faceted, however. This type of self-talk refers to experiences such as arousal, mastery, and drive. Arousal self-talk refers to relaxation, psyching oneself up, and controlling arousal levels. Mastery self-talk refers to maintaining focus, mental toughness, confidence, and mental preparation. Finally, self-statements referred to as drive help assist athletes in keeping on track to achieve goals.

Other researchers have suggested that the effects of self-talk on performance might vary as a function of the task being performed (Theodorakis et al., 2000). In precision-based tasks, a person focuses on technical, tactical and kinesthetic aspects of the performance or movement and may benefit from instructional self-talk. Examples of precision-based sports may include sports such as basketball or baseball. This instructional self-talk is useful in directing one action to another. This may be in response to a preceding action or planning for future plays. The importance of instructional self-talk is to help guide athletes' sequence of actions when those actions may be unpredictable and random. On the other hand, motivational self-talk may be more useful in endurance- or condition-related tasks. These types of tasks may include performing tasks via strength and endurance, like water polo (Hatzigeorgiadis et al., 2004) or running (Weinberg, Miller, & Horn, 2011). In such activities, motivational self-talk would be used to increase effort, enhance self-confidence, and create and further positivity.

Another important way in which instructional and motivational self-talk enhances the performance of an athlete is by reducing anxiety and improving self-confidence (Maynard, Hemmings, Greenless, Warwick-Evans, & Stanton, 1998; Maynard, Smith,

Warwick-Evans, 1995). Further, Hatzigeorgiadis et al. (2004) found that self-talk could be attributed to reducing the amount of extra distracting cognitive activity. In a study using tennis players, Hatzigeorgiadis et al. (2009) hypothesized that using self-talk would create higher levels of confidence and reduce cognitive anxiety. The results yielded positive improvement from both motivational and instructional self-talk types. However, motivational self-talk proved to be the more advantageous of the two, coinciding with previous research (Hatzigeorgiadis, 2006).

Research shows that self-talk can be a key mental component to athletic performance. Collectively, research has indicated that athletes who use self-talk in the manner more appropriate for the type of activity they are exerting may perform more efficiently than their physically equal opponents. That is, using different types of self-talk is more beneficial and more detrimental depending on the nature of the sport. For instance, a basketball player may focus more on step-by-step movements, such as remembering how to make his/her next move in the game. This instructional self-talk may be beneficial for successful performance; however, the endurance-type athlete may benefit more from motivational self-talk. Non-instructional self-statements such as “Keep fighting” (Donohue, Barnhart, Covassin, Carpin, & Korb, 2000; Miller & Donohue, 2003) would benefit the runner who is attempting to push through any physical or mental strain in a race.

In summary, research shows that self-talk is beneficial for athletic performance (Hatzigeorgiadis et al., 2011). The processes of self-talk have been favorable to a variety of types of athletes (Thelwell & Greenless, 2003) such as volleyball players (Van Raalte et al., 1994), basketball players (Perkos, Theodorakis, & Chroni, 2002), and runners

(Weinberg et al., 2012). Positive and negative self-talk types have been found as beneficial and detrimental, determined by the type of sport and the athlete. Further, motivational and instructional self-talk have been noted as important in both learning a sport and competing in one. Instructional self-talk is more beneficial in the process of learning a sport and for precision-based sports. On the other hand, motivational self-talk is more beneficial for endurance-based sports. These findings are important for researchers, coaches, and athletes to understand better the mental state of athletes in their sport.

### **The Concept of Flow Experiences**

Another aspect of an athlete's mental state has provoked interest among researchers. The concept of flow has been a topic of interest to psychological researchers in the past few decades (St. Clair Gibson & Foster, 2007; Morin, 2011; Stavrou, Jackson, Zervas, & Karteroliotis, 2007). This concept is used to describe an individual's experience of subjective feelings of optimal state of mind (Csíkszentmihályi, 1975). By identifying the key components to flow, researchers (Csíkszentmihályi, 1990; Kawabata & Mallet, 2011) have been able to better understand this phenomenon in different activities including work (Bryce & Haworth, 2002; Nielson & Cleal, 2010) and physical activity (Jackson & Marsh, 1996; Jackson, Thomas, Marsh, & Smethurst, 2001; Nakamura & Csíkszentmihályi, 2002). There are several key flow components. First, *challenge-skill balance* refers to the belief that one's perceived skill meets the perceived challenge of the activity. Second, *action-awareness merging* refers to the deep involvement the individual feels; the action begins to feel spontaneous and automatic. The individual has *clear goals* in which he/she knows what is going to occur followed by

unambiguous feedback. There must be *concentration on the task at hand*, including an intense feeling of focus on the present moment. An individual must feel a *sense of control* in the situation but also shows a *lack of self-consciousness* that blocks out any worry. Finally, one's perception of time will become distorted.

Researchers have also reviewed the experience of flow in terms of intensity and frequency, individual and situational factors, and flow proneness (Csíkszentmihályi, 1975; Csíkszentmihályi & Csíkszentmihályi, 1988; Privette & Bunrick, 1991; Ullén, Manzano, Almedia, Magnusson, Pedersen, Nakamura, Csikszentmihalyi, & Madison, 2012). Specifically, researchers have explained that the likelihood of experiencing flow is associated with major personality dimensions. For example, Ullén et al. (2012) found a negative association between flow and neuroticism (or negative emotional reactivity). Similarly, sports psychologists have found a negative association between flow and anxiety or stress (Stavrou, Jackson, Zervas, & Karteroliotis, 2007). Other individual personality factors such as conscientiousness, active problem coping (D'Zurilla, Maydeu-Olivares, & Gallardo-Pujol, 2011), life satisfaction, subjective happiness, and positive affect (Quevedo & Abella, 2011) have been positively associated with flow proneness.

In summary, it makes sense that research has found flow to be subjective based on a person's perceptions of the activity. For example, Csíkszentmihályi (1975, 1982) explained that flow is based on an individual's perceptions of existing challenges and the nature of the challenges and skills themselves. Reflecting on one of the most important components of flow, skills and challenge balance, researchers claim that one's perception of skill and the future challenge must be in balance in order to experience flow (Moneta & Csíkszentmihályi, 1996). Additionally, one's ability to experience flow is related to the

extent to which the activity results in pleasure, happiness, and satisfaction (Csíkszentmihályi & Csíkszentmihályi, 1988). Flow is also more likely to occur if an individual is not bored, anxious, or worrisome (Nakamura & Csíkszentmihályi, 2002).

### **The Effects of Flow on Athletic Performance**

Much like self-talk, sports psychologists have become particularly interested in the experience of flow in recent decades (Csíkszentmihályi, 1975; Jackson et al., 2001; Jackson & Marsh, 1996; Jackson and Roberts, 1992; Kawataba & Mallett, 2011; Privette & Bundrick, 1991; Stavrou et al., 2007). Researchers have found that when athletes experience flow, they are able to perform at an optimal level (Jackson & Roberts, 1992). It is obvious, then, why researchers have attempted to more deeply understand the factors that prompt this experience for athletes. Recent correlational research has indicated that there are four strong dimensions in flow and athletes (Koehn, Morris, & Watt, 2013). In particular, as challenge to skill balance, clear goals, sense of control, and concentration on the task increase, the likelihood of experiencing flow also increases.

As previously noted, one of the identified components of the flow experience is challenge to skill balance. Csíkszentmihályi (1975, 1982) explains that when the perceived skills and challenge are in balance, the individual is able to fully immerse oneself in the activity. That is, once the skill is practiced and self-efficacy of the individual is built up, he/she will have the ability to exert actions in an automated manner. On the other hand, when feelings of inferiority or doubt consume the individual, he or she is unable to project the whole self into the activity. In this case, flow is difficult or impossible to attain. Other researchers have elaborated on this point by explaining that in sports, the challenge of the competition and the skill of the athlete are two subjective

experiential variables (Moneta & Csíkszentmihályi, 1996). That is, these variables exert a dependent effect on each other and also have an independent effect on the quality of experience.

Researchers have found that individual qualities and situational characteristics relate to the challenge to skill ratio. Moneta and Csíkszentmihályi (1996) noted that level of experience and mental and physical preparation of the athlete are important in relation to situational characteristics. These characteristics may include the importance of the competition and perceived difficulty of the opponent. In terms of more specific situational factors, Stein, Kimiecik, Daniels, and Jackson (1995) explained that in a competitive atmosphere, the perceived level of skills is positively related to the quality of the experience. In a practice or training environment, both the individual's perceived skills and challenges are related to the quality of the experience. In sum, depending on the context or setting of an athletic activity, be it competition or practice, the quality of experience is defined by the challenge and skill balance.

Stavrou et al. (2007) found support for the importance of relaxation in regards to entering a state of flow. Specifically, they compared athletes using the Flow State Scale (FSS). Those athletes who reported significantly higher flow characteristics reported experiencing a state of flow more often than those who did not report high flow characteristics. In fact, athletes who reported lower ratings also experienced more anxiety and less relaxation. Thus, as mentioned previously, athletes' perception of their skills must be high enough for flow to occur. Stavrou and colleagues concluded that this perception is most important, while the challenge may play a secondary role to performance.

Researchers have also examined which type of athlete is most likely to experience flow. Koehn et al. (2013) conducted a study in which self-paced athletes and externally paced athletes were compared. Externally-paced sports are defined as activities in which the athlete must respond to the preceding action, similar to precision based tasks (e.g., basketball, baseball). On the other hand, self-paced athletes (such as endurance athletes) differed from externally-paced in the type of continuity of actions they exerted. Based on previous research (Kimiecik & Stein, 1992), Koehn et al. suggested that self-paced tasks would facilitate flow because athletes can determine the onset of performance themselves. There is no process of reaction to opponents, which can interrupt or inhibit flow. In addition to the predictability of self-paced sports, the aspect of team and independent sports may also need consideration. Specifically, in team sports, athletes are dependent on the actions and reactions of others. The sequence of events is often less controlled and predictable and thus, flow may be less attainable. Because an athlete's focus may be altered and potentially experience distraction, movements may be less automatic. Although the hypotheses of Koehn et al. (2013) were not supported, they recommended that future research further examine specific types of sports, such as those whose performance movement is continuous and not broken up by step-by-step actions.

Researchers have also emphasized the importance of fun and enjoyment in athlete flow (Jackson & Roberts, 1992; Jackson, 1996; Privette & Bundrick, 1997; Stavrou et al., 2007). Flow is a positive experience for the individual and without feelings of joy and happiness, flow may not exist (Csíkszentmihályi, 1975). Because flow is an intrinsically rewarding experience (Privette & Bundrick, 1991), people must truly enjoy the activity or sport they are participating in. Athletes who do not like their sport may not experience the

combination of exertion of automatic movements and enjoyment. That is, although athletes may be able to move freely and without lack of cognitive awareness to each action, they may not do so due to pure enjoyment. Stavrou et al. (2007) and Jackson (1996) suggest that without enjoyment, the experience becomes boring or perhaps provokes anxiety, two elements negatively associated with the likelihood of experiencing flow.

In summary, there are a number of factors that can affect an athlete's likelihood of experiencing a state of flow. These factors include an athlete's perception of personal skills and challenges, anxiety and relaxation levels, and the pleasure one gains from participating in the activity. Without the right degree of these factors, entering a state of flow is less likely to occur. Clearly, because of this influence on performance, researchers, coaches, and athletes are very interested in how to integrate the research on flow into training and competition.

### **Statement of the Problem and Hypotheses**

Researchers have studied both flow and self-talk as independent factors in athletics. However, there has been very little discussion of a possible relationship between these two factors. Given that both are important to athletic performance, it is necessary to understand their connection in order to develop mental strategies for successful sport and exercise performance.

Researchers have determined the variations in frequency and types of self-talk athletes used in practice and competition (Hatzigeorgiadis et al., 2004; Maynard et al., 1995; Theodorakis et al., 2000; Tod et al., 2011; Weinberg et al., 2012). With this accumulated knowledge, sports psychologists have been able to move forward in

developing adequate mental strategies for athletes. Researchers indicate a number of significant factors that increase optimal performances such as type of sport, skill level, time of measurement, anxiety, and confidence levels. In previous self-talk research, two major types have been identified and compared, motivational and instructional (Hatzigeorgiadis et al., 2004; Hatzigeorgiadis, 2006; Hatzigeorgiadis et al., 2009). While instructional self-talk has been noted as being used most in precision-type tasks and at the learning level, motivational self-talk is seen more commonly in endurance-type sports and at more competitive levels. Endurance activities, such as running, may require more motivational than instructional self-talk to maintain performance. That is, the clear goal is to finish the race in the fastest time possible. Instructional self-talk is unlikely to be used, for it could potentially block the runner from focusing on keeping the end goal in mind, which is finishing the race in the quickest and most efficient way.

Flow researchers have indicated that a specific type of athlete is more likely to enter a state of flow. Self-paced athletes, analogous to endurance athletes studied in self-talk research, are those who exert continuous and physically steady movements (Koehn et al., 2013). These self-paced athletes (e.g., runners) have been suggested to experience a state of flow more often compared to the externally-paced athletes (those most similar to the precision-type athletes). Further, Koehn et al. (2013) speculate that a predictable order or sequence of movements may be associated with a greatly likelihood of experiencing flow. That is, when an athlete does not have to react to preceding actions, the movements should be predictable (e.g., each stroke a swimmer makes with his/her arms). Koehn et al. suggested that further research should be conducted to determine if

specific sports with these types of movements are positively related to entering a state of flow.

Researchers have also found confidence and anxiety levels to be significant variables of both self-talk and flow experiences. Self-talk can be beneficial in reducing athlete anxiety, specifically when using motivational self-talk (Hatzigeorgiadis et al., 2009). As instructional self-talk has been found to be most useful in the training and practice phase of sport, the athlete benefits more from motivational self-talk in competition. However, when considering the athlete in the training or practice phase, it is logical to believe that confidence may be at a lower level because the specific task is still new or being practiced. Thus, instructional self-talk is being used as a means of navigation and in building confidence levels. Once the skill is learned, an emergence of confidence and reduction of anxiety occur. It is then that motivational self-talk begins to dominate; namely, the athlete most likely feels strong enough in the particular learned skill and now must keep him/herself motivated to apply this learned skill to the challenge of competition.

Coinciding with the importance of skill building and confidence levels, flow has been found to occur in athletes who report that perceived skill level meets the demands of the challenge. In order for this to occur, one must have higher confidence levels and reduced anxiety. Reflective of this component of flow and self-talk together, one could speculate a potentially valuable connection between the two. For example, a swimmer may learn a new way to breathe between strokes at practice. While learning to change his/her breathing pattern, instructional self-talk is used. After much practice, the athlete may find that his/her skill set is now adequately matched for future competition. If

confidence is at an appropriate level, and anxiety is at a minimum, the swimmer may not have use for instructional self-talk. In fact, now the use self-talk, if any, may be more directed for motivation. Because the movements are continuous and steady, breathing becomes synchronized automatically. Now, the athlete focuses on the race itself, using self-talk as a means of motivation. The combination of practice and confidence leads to the higher likelihood of performing in an optimal state or having a flow-like experience.

It is clear that examining the possible connection between self-talk and flow experience in athletes is intriguing and useful. The purpose of the current study is to determine if a relationship between self-talk and flow exists. Considering the previously reviewed information, two hypotheses have been developed. First, motivational self-talk would show a larger, more positive correlation with experiences of flow in comparison to instructional self-talk. Additionally, positive self-talk would have a positive correlation with the experience flow while negative self-talk would show a negative correlation. There will also be no significant relationship between irrelevant self-talk and flow. That is, self-talk that is unrelated to what the athlete is doing will be negatively correlated with flow.

## CHAPTER II

### Method

#### Participants

Forty-five runners (64% men, 36% women) were recruited from two universities located in Pennsylvania. All runners were part of the National Collegiate Athletic Association. The number of years participants had been running ranged from 3 to 13, with an average of 7.84 years ( $SD = 1.89$ ). Participants had been competing in collegiate running from 1 to 5, years with an average of 2.78 years ( $SD = 1.24$ ). The age of participants ranged from 18 to 23, with an average age of 20.33 years ( $SD = 1.38$ ).

Participants who were competing in race distances of 400 meters or more were able to take part in this study. The majority of participants raced the 800-meter distance either as an open race or in a relay event (31.8%). Other events included 400-meter events (22.7%), 500-meters (4.5%), 1,000-meters (2.3%), 1,200-meters (2.3%), 1,600-meters (15.9%), 3,000-meters (15.9%), and 5,000-meters (4.5%) events. In exchange for participation, runners were offered individual feedback on their results. Approval to conduct this study was provided by the Institutional Review Board at each participating university, as well as from Middle Tennessee State University (see Appendix A).

#### Measures

*Demographic information.* Participants completed a form to indicate their gender, age, years running, years competing in collegiate running, and the race they were participating in (see Appendix B).

*Objective measure.* Participants provided information about their current personal records in race distances of 400-meters to 5,000 meters. Additionally, they reported their

goal times for the upcoming race. After they competed in their race, participants gave their official race times (see Appendix C).

*Motivational and instructional self-talk.* Self-talk was measured according to motivational and instructional types. There were 40 motivational self-statements and 26 instructional self-statements administered after competition. These statements were developed specifically for cross-country athletes (Donohue et al., 2000). Originally, a Division 1 collegiate cross-country coach identified the set of instructional self-statements as a way to improve performance. The motivational self-statements were derived from four athletes, all of which were determined to be the most influential in enhancing motivation. Four runners created the list of motivational self-statements based off of their personal use of the statements during competition. Miller and Donohue (2003) used these statements as an intervention, instructing different groups to use different types of self-statements. The purpose of the intervention was to determine which type of self-talk would improve performance. The results of their study confirmed that motivational self-statements were most beneficial in promoting optimal performance. Other studies have used these lists of motivational and instructional self-talk, but there has been no analysis of the measure's psychometric properties to date (see Appendix D).

In this study, the motivational and instructional self-statements were presented to participants at the end of his/her race. Motivational and instructional statements were rated on how often each statement was used during the race, using a 5-point scale (1= *never*, 5 = *very frequently*). Motivational statements include statements such as, "You're strong and explosive," or "Nobody can keep up with you today." Examples of instructional self-statements include, "Focus on your running technique," and "Stick with

your plan.” The mean frequency of the instructional and motivational items were compared to determine which type of self-talk was used more during the race.

*Positive, negative, and irrelevant self-talk.* The Automatic Self-Talk Questionnaire for Sports (ASTQS) was developed to measure specific types of self-talk used by athletes (Zourbanos et al., 2009). This scale is used to measure the specific content of self-talk rather than the effects that the content has on the athlete. The ASTQS measures self-talk according to positive, negative, and neutral types. Positive self-talk was classified into the following four categories, psyching up (e.g., “Give 100%”), confidence (e.g., “I feel strong”), instruction (e.g., “Concentrate on your goal”), and anxiety control (e.g., “Calm down”). Negative self-talk categories included worry (e.g., “I am not going to make it”), disengagement (e.g., “I am fed up”), and somatic fatigue (e.g., “I am tired”). Finally, the neutral category included irrelevant thoughts (e.g., “I am hungry”). Statements are rated using a 5-point scale (1 = *poor match*, 5 = *excellent match*) (see Appendix E). The items for each category of self-talk were averaged, with the highest score representing which type of self-talk was most prevalent during competition.

Zourbanos, Hatzigeorgiadis, Chroni, Theodorakis, and Papaioannou (2009) conducted a confirmatory analysis on the ASTQS in addition to assessing concurrent validity. Confirmatory factor analysis results revealed that the scale showed the ASTQS to have high loadings and low error, coinciding with the hypothesized factor structure of positive, negative and neutral self-talk statements. Concurrent validity was found to be significant in relation to other measures of self-talk. Researchers explained that this scale

was a psychometrically sound instrument for developing cognitive-behavioral theories in athletes.

*Flow experiences for the athlete.* The Dispositional Flow Scale (DFS; Jackson et al., 1998) was used to measure flow characteristics after the completion of the race. The DFS is a dispositional version of the Flow State Scale (Jackson & Eklund, 2002) used to assess likelihood of experiencing flow in physical activity. There are 36 items divided into nine subscales, four items in each (see Appendix F). Each response indicates the frequency of flow characteristics experienced during the race. Using a 5-point Likert scale, participants rated the extent to which they agreed with each statement describing flow characteristics (1 = *Strongly disagree*, 5 = *Agree*). The subscales include challenge-skill balance, action-awareness merging, clear goals, unambiguous feedback, concentration on the task at hand, sense of control, loss of self-consciousness, transformation of time, and autotelic experience. A moderate score (3) indicates some degree of experiencing flow. Participants whose average item scores are above “3” on the dimensions of Clear Goals, Unambiguous Feedback, and Challenge-Skill Balance are considered to be in a flow state at some point during the activity. Jackson and Eklund (2002) found the subscales to show acceptable internal consistency values, ranging between .80 and .90.

*Flow experience manipulation check.* Participants read a quote by Ayrton Senna, a 1988 Monaco Grand Prix qualifier. The quote was a description of the experience of flow (see Appendix G). After reading the quote, participants rated if they felt similar to the description during their race. If their answer was “yes,” they were asked to explain at which point in the race they felt most similar to the description. Participants also chose at

which point they felt most similar to the quote by circling “Beginning,” “Middle,” or “End.” Finally, participant rated the intensity of their race experience on a 5-point Likert-scale (1 = *low*, 5 = *high*).

### **Procedure**

Research was conducted at two collegiate indoor track meets. At the first meet event, 20 participants were administered testing packets between 1 hour and 6 hours before their race. For the second meet event, 7 of the participants completed the first part of the packets 1 week prior to the race while the remaining 18 completed the packets the day before their race. The discrepancy between pre-race participation was due to either time constraints of the researcher or location of the participants. Runners provided informed consent before the beginning of the study. They were informed that the purpose of the study was to understand the effects of speaking to oneself in different manners during competition. Next, they were asked to complete the first 4 pages of the packet, which included the demographic form, objective measure, and the Self-Talk Scale (Brinthaupt et al., 2009). After completing the first section of the packets, participants returned their packet to the researcher and were asked to return within 30 minutes after their race to complete the remainder of the packet.

Participants returned to their packets within an hour of the completion of their race. They completed the packet that included the motivational and instructional self-talk measure (Donohue et al., 2000), the ASTQS (Zourbanos et al., 2009), the DFS-2 (Jackson et al., 1998), and the flow manipulation check. Upon completion of the study, participants received information about the purpose of the study as well as about current research in self-talk use and flow experiences in endurance athletes. Participants were

given the opportunity to receive feedback on their individual test scores as compensation.

If they chose this option, they recorded their e-mail addresses on their packets.

Participants were informed they would receive feedback within 3 months of the test.

## CHAPTER III

### Results

#### Descriptive Statistics

Descriptive statistics including means, standard deviations, and internal reliability coefficients of each of the measures can be found in Table 1. As the table shows, all of the alpha coefficients were in the acceptable range. There was a tendency for the participants to report more instructional than motivational self-talk as well as more positive than negative self-talk. A paired-samples *t*-test was conducted to determine significant trends amongst the self-talk measures. There was a significant difference in the scores for motivational self-talk and instructional self-talk;  $t(44) = -3.92, p < .001$ . Additionally, there was a significant difference between positive self-talk and negative self-talk;  $t(44) = 6.82, p < .001$ . Using an alpha of .05, independent samples *t*-tests were conducted to determine if male and female participants differed significantly on the major measures. There were no significant gender differences.

Table 1

#### *Descriptive Statistics*

	Mean	Standard Deviation	$\alpha$
MST	2.45	.93	.98
IST	2.85	.81	.94
PosST	3.11	1.09	.97
NegST	1.65	.66	.94
IrrST	1.61	.76	.84

DFS Avg	3.48	.91	.98
DFS Challenge	3.34	1.07	.93
DFS Action	3.31	1.16	.93
DFS Goals	3.85	.973	.91
DFS Feedback	3.51	1.06	.92
DFS Concentration	3.62	1.07	.92
DFS Control	3.38	1.23	.93
DFS Loss	3.51	1.00	.87
DFS Time	3.51	.92	.82
DFS Autotelic	3.33	1.17	.91

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*Note.* MST = Motivational self-talk; IST = Instructional self-talk; PosST = Positive self-talk; NegST = Negative self-talk; IrrST = Irrelevant self-talk; DFS Avg = Dispositional Flow Scale – 2 average; DFS Challenge = Challenge –skill balance; DFS Action = Action awareness-merging; DFS Goals = Clear goals; DFS Feedback = Unambiguous feedback; DFS Concentration = Concentration on the task at hand; DFS = Control = Sense of control; DFS Loss = Loss of self-consciousness; DFS Time = Transformation of time; DFS Autotelic = Autotelic experience.

Zero-order correlations for all critical variables can be found in Table 2. The analyses revealed significant relationships between motivational self-talk, instructional self-talk, positive self-talk, negative self-talk, and flow. While negative self-talk was negatively correlated with DFS-2 scores, other self-talk variables were positively correlated with the flow measure. Motivational self-talk also showed a significant positive correlation with instructional self-talk and positive self-talk. Instructional self-talk was also positively correlated with positive self-talk. There was a negative

correlation between negative and positive self-talk. Finally, negative self-talk and irrelevant self-talk showed a significant positive correlation.

Table 2

*Summary of Intercorrelations among Study Variables in Total Sample*

Variable	MST	IST	PosST	NegST	IrrST	DFSAvg
MST	---					
IST	.710**	---				
PosST	.794**	.659**	---			
NegST	-.216	.140	-.300*	---		
IrrST	.063	.277	.007	.430**	---	
DFSAvg	.643**	.380*	.539**	-.533**	-.150	---

*Note.*  $N = 45$ ; \* $p < .05$ ; \*\* $p < .01$ .

Correlational analyses were also conducted for the nine DFS-2 subscales and the self-talk measures (see Table 3). The analysis revealed significant relationships, especially motivational self-talk and positive self-talk with each of the DFS-2 subscales. Instructional self-talk showed some significant positive correlations with the subscales. Additionally, negative self-talk showed several significantly negative correlations with the DFS-2 subscales. There was one significant correlation between the irrelevant self-talk measure and the DFS-2 *Loss* subscale.

Table 3

*Summary of Correlations Between Self-talk Measures and DFS-2 Subscales*

DFS Variable	MST	IST	PosST	NegST	IrrST
Challenge	.662**	.405**	.619**	-.556**	-.062
Action	.607**	.393**	.524**	-.490**	-.108
Goals	.600**	.459**	.573**	-.419**	-.212
Feedback	.490**	.361*	.363*	-.286	.129
Concentration	.506**	.229	.390**	-.572**	-.184
Control	.573**	.282	.413**	-.534**	-.135
Loss	.418**	.086	.310*	-.547**	-.372*
Time	.533**	.331*	.495**	-.162	-.128
Autotelic	.581**	.384**	.492**	-.516**	-.116

*Note.*  $N = 45$ ; \*  $p < .05$ ; \*\*  $p < .01$ .

**Tests of the Hypotheses**

1. *The first hypothesis predicted that flow experiences would be more strongly related to motivational than instructional self-talk scores.* Using motivational and instructional self-talk measures as predictors, a multiple linear regression analysis was conducted to understand the relationship to flow experiences. The results provided strong support for this hypothesis,  $F(2, 42) = 15.55$ ,  $p < .001$ ,  $R^2 = .425$  (see Table 4). As expected, motivational self-talk was found to be a significant predictor of flow ( $p < .001$ ), whereas instructional self-talk did not significantly predict flow scores.

2. *Positive self-talk was predicted to have a positive correlation with the flow experience while negative self-talk was expected to show a negative correlation.* A multiple regression analysis was conducted to assess the relationship of positive, negative, and irrelevant self-talk to flow. The overall model was significant,  $F(3, 41) = 10.87, p < .05, R^2 = .443$  (see Table 5). As predicted, positive self-talk showed a significant, positive relationship with the likelihood of experiencing flow ( $p = .002$ ), whereas negative self-talk showed a significant, negative relationship with the likelihood of experiencing flow ( $p = .004$ ). Irrelevant self-talk was unrelated to flow experiences. Thus, Hypothesis 2 was also supported.

Table 4

*Summary of Multiple Regression Analysis for Motivational Self-talk and Instructional Self-talk Measures Predicting Flow*

DFS-2	B	SE B	$\beta$
MST	.738	.188	.753*
IST	-.176	.163	-.156

*Note.* \*  $p < .001$ .

Table 5

*Summary of Multiple Regression Analysis for Positive, Negative, and Irrelevant Self-talk Measures Predicting Flow*

DFS-2	B	SE B	$\beta$
PosST	.466	.109	.476*
NegST	-.769	.200	-.473*

IrrST	.196	.167	.138
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*Note.* \*  $p < .004$ .

As a final analysis, a multiple regression analysis was conducted using all of the self-talk measures as predictors of flow (see Table 6). Although this was not a specified hypothesis, running the analysis provided more information of the separate roles of self-talk functions and affect in relation to flow experiences. Results yielded a positive, significant relationship between motivational self-talk and flow. There was also a significant negative relationship between negative self-talk and flow. This finding suggests the relationship of positive self-talk to flow was primarily driven by its relationship with motivational self-talk.

Table 6

*Summary of Multiple Regression Analysis for All Self-talk Measures Predicting Flow*

DFS-2	B	SE B	$\beta$
MST	.523	.185	.534*
IST	.179	.198	.158
PosST	-.108	.155	-.129
NegST	-.650	.183	-.468**
IrrST	-.030	.142	-.025

*Note.* \*  $p < .05$ , \*\*  $p < .001$ .

## CHAPTER IV

### Discussion

Self-talk in sport and exercise has captured the attention of researchers and athletes throughout the past few decades (Hardy et al., 2001; Highlen & Bennett, 1983; Moran, 1996). For example, Tod et al. (2011) explained that athletes differ in the way they react to using positive or negative self-talk. Variation is dependent on the type of sport and the personality of the athlete. Further, researchers have narrowed down the effects of using motivational and instructional self-talk. Hatzigeorgiadis et al. (2009) suggested that using both motivational and instructional types of self-talk are beneficial, but that motivational is more advantageous. Specifically, in endurance sports, motivational self-talk enhances self-confidence and creates positive affect (Weinberg et al., 2012). Interestingly, those who are more likely to experience flow in sport and exercise are also endurance athletes (Koehn et al., 2013). The current study employed both of these ideas to determine if a relationship existed between specific types of self-talk and experiencing flow. That is, because motivational self-talk is associated with positive affect, it would be more likely to predict the likelihood of an athlete experiencing flow. Additionally, using negative self-talk should yield a negative relationship to the experience of flow. The zero-order correlations indicated that motivational self-talk showed a significant, positive relationship with the experience of flow. A significant, negative relationship was seen between negative self-talk and the experience of flow. Of all 5 types of self-talk tested in the measure, motivational self-talk yielded the strongest relationship to flow.

The findings of the present study not only add to current literature in the self-talk and flow domains, but they also address a relationship previously unspecified. Flow is a positive experience and has been associated with optimal athletic experiences (Jackson & Robert, 1992). Similarly, when athletes use motivational self-talk, they are more likely to report a positive experience (Hatzigeorgiadis et al., 2009). The results of this study showed that using more motivational self-talk yielded a higher likelihood to experience flow, a positive experience. This was evident using a multiple regression analysis of instructional and motivational self-talk types together. Additionally, the multiple regression analysis of all types of measured self-talk showed that motivational self-talk remained the biggest predictor of flow. It is evident then that motivational self-talk cueing is most strongly related to flow. Furthermore, negative self-talk is independent of positive and instructional self-talk affect. Thus, regardless of positive self-talk and instructional self-talk, using negative self-talk showed a negative association to flow.

Understanding the underlying psychological mechanisms that explain the self-talk to flow relationships are crucial. Researchers have explained flow as a positive experience, one that is produced by a person gaining a sense of enjoyment and happiness from the activity they are participating in (Csikszentmihalyi, 1975). For athletes, it can be assumed that most engage in their chosen sport for a sense of happiness and well-being. That is, participating should enhance positive affect. Conversely, there are a number of factors that can deter the athlete's positive affiliation for participating or performance. Some of these may include lack of self-confidence and anxiety. The experience of flow, however, occurs when these two factors exist very little or not at all (Csikszentmihalyi, 1982). Components such as challenge to skill balance and lack of self-consciousness are

significant in athlete flow likelihood (Stavrou et al., 2007). When these components are fulfilled, flow experiences are more likely to emerge. On a similar token, research on self-talk in athletes has found that the type of self-talk used in performance has a relationship to self-confidence and anxiety. Researchers explained that self-talk could attribute to reducing distracting cognitive activity and creating higher levels of confidence (Hatzigeorgiadis, 2006; Hatzigeorgiadis et al., 2009). Specifically, motivational self-talk is more highly associated with diminishing anxiety and increasing self-confidence levels.

Merging the previously stated research, a common theme can be perceived in regards to self-talk and flow experiences in athletic performance. That is, both flow and self-talk are related to positivity of the individual participating in his or her sport. When motivational self-talk is used, the individual is most likely having a more positive experience by reducing anxieties or self-doubt. Further, they are more likely promoting their self-efficacy and thus feeling more self-confident. Because lack of anxiety and more confidence is associated with happiness and joyful experiences, it becomes more likely that individuals will experience lack of self-consciousness and high beliefs in their challenge to skill balance. Along with these components, other components of flow may arise such as sense of control, concentration on the task at hand, and clear goals. Overall, there is a rich connection between flow experiences and self-talk which can be supported by the results of the current study. Athletes who focus on motivating themselves in their sport by using statements of reinforcement and encouragement are more than likely to have a positive experience. Practicing self-talk that is negative in orientation does not coincide with motivational self-talk or the essence of experiencing flow. Therefore, it is

obvious that using negative self-talk would be a detriment to experiencing flow compared to using motivational self-talk. Although the current research is correlational, the strong, positive relationship between motivational self-talk to flow and strong, negative relationship between negative self-talk and flow does coincide with the underlying ideas of flow experiences. That is, when motivational self-talk in athletic competition occurs, a more positive perception of the self may emerge. If this occurs, the likelihood of experiencing flow components may be engaged, and consequently, the athlete may experience true flow.

### **Limitations and Future Research**

Although this study provides important information relevant to sport and exercise research by offering a state of mind associated with positive experiences, there are some limitations. First, the sample was limited to undergraduate, collegiate runners. It is important to determine if these results would be applicable to elite athletes as well as to non-competitive athletes. Because motivational self-talk is associated with more experience, it is important to examine if non-competitive, recreational athletes would use more instructional self-talk while still experiencing flow-like experiences. It would also be interesting to determine if the results would remain for more experienced, elite athletes. A second limitation is that only runners were used to represent endurance athletes. It would be important in the future to use other endurance athletes such as swimmers or dancers.

Another limitation was the procedure of the actual study. Participants were asked to return to the researcher within 30 minutes of the end of their races. Although the majority of runners did follow this instruction, there were some participants who did not

follow through. Thus, a number of runners did not complete the survey until an hour after the completion of their race. This potentially takes away from the immediate memory of the race. The measures asked questions that directly related to the race they had just competed in. It is possible that the participants' self-reports were not fully accurate due to a time lapse. Future research should consider this and perhaps test these measures in a more controlled setting. For example, researchers could ask athletes to report feedback of their experience immediately after their activity. Additionally, it would be interesting to compare an objective measure, such as goal time and race time, to DFS-2 scores. Although it was not a hypothesis of this study, objective data was collected for future research. It would be important to understand if a relationship exists between meeting one's goal time in the race to experiencing flow. Analyzing this relationship would help to understand if race performance, in regards to time, is associated with experiencing flow.

Additionally, the current study was a correlational study and hence, cannot explain if self-talk and flow experiences have a causal relationship. With this limitation in mind, future researchers should consider using an experimental design to further test the self-talk to flow relationship. For example, it would be beneficial to test athletes in a more controlled setting where self-talk can be monitored more efficiently. One way of doing this could be to have participants report each time they use one type of self-talk or another. However, this could potentially change the way in which they are participating. By making it known they are self-talking, they become more aware of themselves and thus, eliminate the ability to be less self-conscious, a crucial component of flow. Another way of testing the self-talk and flow relationship could be by creating a manipulation.

Researchers could assign participants to one type of self-talk, either motivational or instructional. Athletes could participate in their event and either be shown a sign that has a motivational statement (e.g., “You can do this”) or an instructional statement (e.g., “Lift your knees”) throughout different points. Participants, in this case runners, could report how they felt it influenced their race with consideration to experiencing flow components. There are a number of variables to consider when studying self-talk and flow in athletes. Future researchers should consider using a more experimental approach but understand the importance of keeping participants in a natural setting where they have the opportunity to experience flow.

### **Summary**

The present findings do demonstrate important ideas for researchers, coaches, and endurance athletes. The evidence suggests that practicing more motivational self-talk leads to the higher likelihood of experiencing flow. If an athlete enters a state of flow, he or she may be more likely to have a positive experience in the activity. On the other hand, using more instructional self-talk may be detrimental to flow experience, since it is not associated with positive affect. Additionally, the use of negative self-talk is associated with a smaller possibility of experiencing flow. Researchers have debated if using negative self-talk could be perceived as positive depending on the athlete or sport. In this case, using negative self-talk might be more of a detriment for an athlete in regards to having a fulfilling and positive experience. It is important that coaches, athletes, and other researchers continue to understand the relationship between self-talk and flow. Further research may be able to conclude if there is a causal link; that is, does self-talk cause flow to occur or is another variable involved? Regardless, the results of this study

give insight to flow and self-talk types. There is an association between experiencing flow components and using positive self-statement. Researchers, coaches and athletes should consider these results and be prompted to learn more by further research.

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## Appendices

## Appendix A

Principal Investigator:

Study Title:

Institution:

Name of participant:

Age: \_\_\_\_\_

The following information is provided to inform you about the research project and your participation in it. Please read this form carefully and feel free to ask any questions you may have about this study and the information given below. You will be given an opportunity to ask questions, and your questions will be answered. Also, you will be given a copy of this consent form.

Your participation in this research study is voluntary. You are also free to withdraw from this study at any time. In the event new information becomes available that may affect the risks or benefits associated with this research study or your willingness to participate in it, you will be notified so that you can make an informed decision whether or not to continue your participation in this study.

For additional information about giving consent or your rights as a participant in this study, please feel free to contact the MTSU Office of Compliance at (615) 494-8918.

## 1. Purpose of the study:

You are being asked to participate in a research study because you have met the requirements for the population of interest. You are an endurance athlete participating in a track event that is at least 400 meters or more in length.

2. Description of procedures to be followed and approximate duration of the study: If you choose to participate in this study, you will complete 2 sets of questionnaires. The first set will be one week prior to your scheduled race, administered by your coach or the primary investigator of the study. The duration of this section of the study should be 15-20 minutes long. These questionnaires will ask you to note previous race experiences in addition to daily thoughts you may experience. Thirty minutes after the completion of your race, you will report back to the primary investigator to complete the second set of questionnaires. This will be administered by the primary investigator and will take between 20 and 30 minutes. These questionnaires will ask you to report on thoughts and experiences of the race you just competed in. After all questionnaires are completed, you will be thanked and asked to report your name and e-mail address if you wish to gain feedback from your answers.

3. Expected costs: There are no expected costs of participating in this study.

4. Description of the discomforts, inconveniences, and/or risks that can be reasonably expected as a result of participation in this study:

There will be no discomforts, inconveniences, and/or risks that will be expected as a result of participation in this study.

5. Compensation in case of study-related injury: N/A

6. Anticipated benefits from this study:

a) The potential benefits to science and humankind that may result from this study include a better understanding of particular self-statements used in athlete performance. Specifically, results may indicate different types of self-statements effect experiences in exercise and athletic performance in endurance athletes.

b) There will be no direct, personal benefits from participating in this study.

7. Alternative treatments available: N/A

8. Compensation for participation:

You will be presented with the option to learn your results from the study. If you choose this option, the primary investigator will send your individual results with a thorough explanation via e-mail within a timely manner. By choosing this option, you will have the ability to better understand your mental practice during athletic performance.

9. Circumstances under which the Principal Investigator may withdraw you from study participation:

If you do not complete participate in your assigned race, the primary investigator will withdraw you from participating in the remainder of the study.

10. What happens if you choose to withdraw from study participation:

If at any point you choose to withdraw from participating in the study, your surveys will be discarded properly. You will be debriefed and thanked for your participation. There will be no punishment from withdrawing.

11. Contact Information. If you should have any questions about this research study or possible injury, please feel free to contact Rachel E. Taylor at 302-312-3439 or my Faculty Advisor, Dr. Tom Brinthaup at 615-898-2317.

12. Confidentiality You will be given the option to learn your results of the study and have them sent to you via e-mail by the primary investigator. If you choose this option, the primary investigator will keep the information private but privacy cannot be promised. If you do not wish to learn your results, all efforts, within reason, will be made to keep the personal information in your research record private but total privacy cannot be promised. Your information may be shared with MTSU or the government, such as the Middle Tennessee State University Institutional Review Board, Federal Government Office for Human Research Protections. If you or someone else is in danger or if we are required to do so by law.

13. STATEMENT BY PERSON AGREEING TO PARTICIPATE IN THIS STUDY

I have read this informed consent document and the material contained in it has been explained to me verbally. I understand each part of the document, all my questions have been answered, and I freely and voluntarily choose to participate in this study.

---

Date

---

Signature of patient/volunteer

Consent obtained by:

---

Date

---

Signature

---

Printed Name and Title

## Appendix A (cont.)

## IRB Approval Letter from Middle Tennessee State University

1/17/2014

Dear Investigator(s),

The MTSU Institutional Review Board, or a representative of the IRB, has reviewed the research proposal identified above. The MTSU IRB or its representative has determined that the study poses minimal risk to participants and qualifies for an expedited review under 45 CFR 46.110 and 21 CFR 56.110, and you have satisfactorily addressed all of the points brought up during the review.

Approval is granted for one (1) year from the date of this letter for 75 participants.

Please note that any unanticipated harms to participants or adverse events must be reported to the Office of Compliance at (615) 494-8918. Any change to the protocol must be submitted to the IRB before implementing this change.

You will need to submit an end-of-project form to the Office of Compliance upon completion of your research located on the IRB website. Complete research means that you have finished collecting and analyzing data. **Should you not finish your research within the one (1) year period, you must submit a Progress Report and request a continuation prior to the expiration date.** Please allow time for review and requested revisions. Failure to submit a Progress Report and request for continuation will automatically result in cancellation of your research study. Therefore, you will not be able to use any data and/or collect any data. Your study expires **1/17/2015**.

According to MTSU Policy, a researcher is defined as anyone who works with data or has contact with participants. Anyone meeting this definition needs to be listed on the protocol and needs to complete the required training. **If you add researchers to an approved project, please forward an updated list of researchers to the Office of Compliance before they begin to work on the project.**

All research materials must be retained by the PI or faculty advisor (if the PI is a student) for at least three (3) years after study completion and then destroyed in a manner that maintains confidentiality and anonymity.

Sincerely,

Kellie Hilker □ Compliance Officer/ MTSU Institutional Review Board Member

## Appendix A (cont.)

## IRB Approval Letter from Lock Haven University of Pennsylvania

January 23, 2014

Dear Ms. Taylor, Dr. Brinthaup and Dr. Russell,

Your request to conduct your research project entitled “The Relationship Between Self-Talk and Flow in Endurance Athletes” (SP14-01) has been reviewed by the IRB and is approved as an expedited review for the period of one year from January 23, 2014 to January 23, 2015.

Please note that Lock Haven University strictly adheres to Federal Policy that requires you to notify the IRB promptly for any of the following reasons pertaining to this study.

1. If you wish to make any additions or changes to your human participant procedures, these changes must be approved by the IRB before they are implemented.
2. If any events occur that affect the safety or well-being of subjects, you must notify the IRB.
3. If any modifications to your study or other responses not included in your methodology are necessitated by events that occur during your research (e.g., medical intervention due to an unanticipated injury, or consultation with a mental health professional due to an unanticipated negative emotional reaction), you must notify the IRB.

Should you need to continue your data collection beyond the approval period stated above, you must submit a written request for continuing review. If you have any questions or concerns concerning the treatment of human participants in this approved study, please contact me, via email ([bmcMahon@lhup.edu](mailto:bmcMahon@lhup.edu)) or call (570) 484-2214. I wish you success as you pursue this important research endeavor.

Sincerely,

*Beth McMahon*

Dr. Beth McMahon, IRB Chairperson

## Appendix A (cont.)



Mansfield, PA 16933

Rachel Taylor  
285 North Rutherford Blvd #F201A  
Murfreesboro, TN 37130

DATE: February 24, 2014

ATTN: Rachel Taylor

RE: IRB14-01 (Taylor-self talk and flow in endurance athletes)

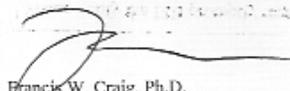
Dear Ms. Taylor

Your application has been reviewed and approved by the Mansfield University Institutional Review Board.

Should any other changes in the content, delivery, project focus/management, or intended use of project data, please update the MU-IRB as these changes would necessitate additional review<sup>1</sup>. Correction of minor phrasing or typographical errors does not require re-review. This approval is current through January 22, 2015.

Should your project extend beyond that date, please notify the MU-IRB of its ongoing status.

If you have any further questions or concerns, I am glad to discuss these with you:



Francis W. Craig, Ph.D.  
Chair- Mansfield University IRB  
Mansfield University  
South Hall #235  
Mansfield, PA. 16933

570-662-4774 (office)  
570-662-4112 (office fax)  
fcraig@mansfield.edu

<sup>1</sup> Please notify the IRB promptly regarding: (1) Any changes or additions in procedures you might wish for your study (additions or changes must be approved by the IRB before they are implemented), (2) any events that affect the safety or well-being of participants, and (3) any modifications to your study or other responses that are necessitated by any events reported in #2

## Appendix B

## Objective Measure

Please record your personal record for the following events:

400 m: \_\_\_\_\_

800 m: \_\_\_\_\_

1,000 m: \_\_\_\_\_

1 Mile: \_\_\_\_\_

3,000 m: \_\_\_\_\_

5,000 m: \_\_\_\_\_

Please record your goal time for the upcoming race/races you will be participating in:

400 m: \_\_\_\_\_

800 m: \_\_\_\_\_

1,000 m: \_\_\_\_\_

1 Mile: \_\_\_\_\_

3,000 m: \_\_\_\_\_

5,000 m: \_\_\_\_\_

## Appendix B (cont.)

## Objective Measure, Part 2

What race did you compete in? \_\_\_\_\_

What was your official race time? \_\_\_\_\_

## Appendix C

## Motivational Self-talk

The following is a list of statements identified by other athletes and coach as motivating them to do their best. Rate how often each of the following phrases you used to motivate yourself during the race on the following scale: 1 = never, 2 = frequently, 3 = occasionally, 4 = frequently, 5 = very frequently. After you have completed rating each statement, please circle your top 12 ones.

1. It's time to kick butt. \_\_\_\_\_
2. It's time to go to work. \_\_\_\_\_
3. You're in control. \_\_\_\_\_
4. You're going to dominate today. \_\_\_\_\_
5. This is what you've been training for. \_\_\_\_\_
6. This is the best day of your life. \_\_\_\_\_
7. You've worked hard for this. \_\_\_\_\_
8. You're ready and totally prepared. \_\_\_\_\_
9. You're strong and explosive. \_\_\_\_\_
10. You're the definition of speed. \_\_\_\_\_
11. You're in an elite class, 2<sup>nd</sup> to none. \_\_\_\_\_
12. You respect all, but fear none. \_\_\_\_\_
13. It's your destiny to win today. \_\_\_\_\_
14. You feel the need for speed. \_\_\_\_\_
15. Today is your day. \_\_\_\_\_
16. Nobody can keep up with you today. \_\_\_\_\_
17. You're going to shatter the records today. \_\_\_\_\_
18. You're a force today. \_\_\_\_\_

19. You can do it. \_\_\_\_\_
20. You're going to destroy the competition. \_\_\_\_\_
21. You're a champion and a winner. \_\_\_\_\_
22. This will be your best performance ever. \_\_\_\_\_
23. Nobody's going to take away your glory today. \_\_\_\_\_
24. Let's go, let's do it. \_\_\_\_\_
25. You've got the power today. \_\_\_\_\_
26. No one's in your class today. \_\_\_\_\_
27. You own the competition. \_\_\_\_\_
28. You can go all the way. \_\_\_\_\_
29. No one's going to deny you today. \_\_\_\_\_
30. This is your moment. \_\_\_\_\_
31. This is your playground. \_\_\_\_\_
32. I believe in you. \_\_\_\_\_
33. The competition wishes they were you. \_\_\_\_\_
34. You run the show. \_\_\_\_\_
35. This is your time to shine. \_\_\_\_\_
36. This is the day of your dreams. \_\_\_\_\_
37. You're in the best shape of your life. \_\_\_\_\_
38. You've earned the right to win. \_\_\_\_\_
39. Let them feel your power and strength. \_\_\_\_\_
40. Let them feel what it is to be dominated. \_\_\_\_\_

## Appendix D

## Instructional Self-talk

The following is a list of instructional/running technique factors identified by other athletes and coach as helping them to accomplish their “perfect run”. Rate how often each of the following phrases you used to motivate yourself during the race on the following scale: 1 = never, 2 = frequently, 3 = occasionally, 4 = frequently, 5 = very frequently. After you have completed rating each statement, please circle your top 12 ones.

1. Stretch your muscles well. \_\_\_\_\_
2. Get your body warmed up. \_\_\_\_\_
3. I have a good strategy for this run. \_\_\_\_\_
4. Stick with your plan. \_\_\_\_\_
5. Get an explosive start. \_\_\_\_\_
6. Get a good position at the start. \_\_\_\_\_
7. Keep mouth opened and relaxed. \_\_\_\_\_
8. Keep hands open and relaxed. \_\_\_\_\_
9. Drop your shoulders while you run. \_\_\_\_\_
10. High knee lift. \_\_\_\_\_
11. Run on toes. \_\_\_\_\_
12. Pump your arms. \_\_\_\_\_
13. Take deep breaths before making any major moves. \_\_\_\_\_
14. Relax each muscle in your body. \_\_\_\_\_
15. Focus on your running technique. \_\_\_\_\_
16. Strike your heels against ground softly. \_\_\_\_\_
17. Point your toes straight ahead. \_\_\_\_\_
18. Breath nice and relaxed. \_\_\_\_\_
19. Take perfect strides. \_\_\_\_\_
20. Maintain a perfect pace. \_\_\_\_\_
21. Start your kick at the right time. \_\_\_\_\_
22. Get your body in perfect rhythm. \_\_\_\_\_
23. Keep your head still. \_\_\_\_\_
24. Swing your arms effortlessly. \_\_\_\_\_
25. Keep your eyes focused straight ahead. \_\_\_\_\_
26. Run through the finish line. \_\_\_\_\_

## Appendix E

## Positive, Negative, Irrelevant Self-talk

Please indicate, based on your race, thoughts you usually experienced or intentionally used while performing. Please rate your responses on a 5-point scale (0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*, 4 = *very often*)

Let's go.	1	2	3	4	5
Power.	1	2	3	4	5
Give 100%	1	2	3	4	5
Do your best.	1	2	3	4	5
Strong.	1	2	3	4	5
Relax.	1	2	3	4	5
Don't get upset.	1	2	3	4	5
Calm down.	1	2	3	4	5
No stress.	1	2	3	4	5
I believe in me.	1	2	3	4	5
I am very well prepared.	1	2	3	4	5
I feel strong.	1	2	3	4	5
I can make it.	1	2	3	4	5
I believe in my abilities.	1	2	3	4	5
Concentrate on your goal.	1	2	3	4	5
Focus on what you need to do now.	1	2	3	4	5
Concentrate on what you need to do.	1	2	3	4	5
Concentrate on your game.	1	2	3	4	5
Focus on your technique.	1	2	3	4	5

Concentrate.	1	2	3	4	5
I am going to lose.	1	2	3	4	5
I'm wrong again.	1	2	3	4	5
I am not as good as the others.	1	2	3	4	5
I am not going to reach my goal.	1	2	3	4	5
I cannot concentrate.	1	2	3	4	5
I am not going to make it.	1	2	3	4	5
Others think of my poor performance.	1	2	3	4	5
I want to stop.	1	2	3	4	5
I want to get out of here.	1	2	3	4	5
I think I'll stop trying.	1	2	3	4	5
I can't keep going.	1	2	3	4	5
I am fed-up.	1	2	3	4	5
My body is not in good condition.	1	2	3	4	5
I am tired.	1	2	3	4	5
Today I 'suck'.	1	2	3	4	5
My legs/arms are shaking from tiredness.	1	2	3	4	5
My body doesn't help me today.	1	2	3	4	5
I am thirsty.	1	2	3	4	5
What will I do later tonight?	1	2	3	4	5
I am hungry.	1	2	3	4	5
I want to take a shower.	1	2	3	4	5

## Appendix F

## DISPOSITIONAL FLOW SCALE-2

Please answer the following questions in relation to your experience in racing. These questions relate to the thoughts and feelings you may have experienced during participation in your race. You may experience these characteristics some of the time, all of the time, or none of the time. There are no right or wrong answers. Think about how often you experienced each characteristic during your race and circle the number that best matches your experience.

1	2	3	4	5
Never	Rarely	Sometimes	Frequently	Always

When participating in my race:

1. I was challenged, but I believed my skills would allow me to meet the challenge.

1	2	3	4	5
---	---	---	---	---

2. I made the correct moves without thinking about trying to do so.

1	2	3	4	5
---	---	---	---	---

3. I knew clearly what I wanted to do.

1	2	3	4	5
---	---	---	---	---

4. It was really clear to me how my performance was going.

1	2	3	4	5
---	---	---	---	---

5. My attention was focused entirely on what I was doing.

1	2	3	4	5
---	---	---	---	---

6. I had a sense of control over what I was doing.

1	2	3	4	5
---	---	---	---	---

7. I was not concerned with what others may have been thinking of me.

- |  |   |   |   |   |
|--|---|---|---|---|
| 1  | 2 | 3 | 4 | 5 |
| 8. Time seemed to be altered (either slows down or speeds up).           |   |   |   |   |
| 1  | 2 | 3 | 4 | 5 |
| 9. I really enjoyed the experience.                                      |   |   |   |   |
| 1  | 2 | 3 | 4 | 5 |
| 10. My abilities matched the high challenge of the race.                 |   |   |   |   |
| 1  | 2 | 3 | 4 | 5 |
| 11. Things just seemed to happen automatically.                          |   |   |   |   |
| 1  | 2 | 3 | 4 | 5 |
| 12. I had a strong sense of what I wanted to do.                         |   |   |   |   |
| 1  | 2 | 3 | 4 | 5 |
| 13. I was aware of how well I was performing.                            |   |   |   |   |
| 1  | 2 | 3 | 4 | 5 |
| 14. It was no effort to keep my mind on what was happening.              |   |   |   |   |
| 1  | 2 | 3 | 4 | 5 |
| 15. I felt like I could control what I was doing.                        |   |   |   |   |
| 1  | 2 | 3 | 4 | 5 |
| 16. I was not concerned with how others may have been evaluating me.     |   |   |   |   |
| 1  | 2 | 3 | 4 | 5 |
| 17. The way time passed seems to be different from normal.               |   |   |   |   |
| 1  | 2 | 3 | 4 | 5 |
| 18. I loved the feeling of the performance and want to capture it again. |   |   |   |   |
| 1  | 2 | 3 | 4 | 5 |

19. I felt I was competent enough to meet the high demands of the race.

1                      2                      3                      4                      5

20. I performed automatically, without thinking too much.

1                      2                      3                      4                      5

21. I knew what I wanted to achieve.

1                      2                      3                      4                      5

22. I had a good idea while I was racing about how well I was doing.

1                      2                      3                      4                      5

23. I had total concentration.

1                      2                      3                      4                      5

24. I had a feeling of total control.

1                      2                      3                      4                      5

25. I was not concerned with how I was presenting myself.

1                      2                      3                      4                      5

26. It felt like time went by quickly.

1                      2                      3                      4                      5

27. The experience left me feeling great.

1                      2                      3                      4                      5

28. The challenge and my skills were at an equally high level.

1                      2                      3                      4                      5

29. I did things spontaneously and automatically without having to think.

1                      2                      3                      4                      5

30. My goals were clearly defined.

1                      2                      3                      4                      5

31. I could tell by the way I was performing how well I was doing.

1                      2                      3                      4                      5

32. I was completely focused on the task at hand.

1                      2                      3                      4                      5

33. I felt in total control of my body.

1                      2                      3                      4                      5

34. I was not worried about what others may have been thinking of me.

1                      2                      3                      4                      5

35. I lost my normal awareness of time.

1                      2                      3                      4                      5

36. The race was extremely rewarding.

1                      2                      3                      4                      5

## Appendix G

## Flow Questions

The following quote was made by Ayrton Senna, a 1988 Monaco Grand Prix qualifier:

"I was already on pole, I just kept going. Suddenly I was nearly two seconds faster than anybody else, including my team mate with the same car. And suddenly I realized that I was no longer driving the car consciously. I was driving it by a kind of instinct, only I was in a different dimension. It was like I was in a tunnel. Not only the tunnel under the hotel but the whole circuit was a tunnel. I was just going and going, more and more and more and more. I was way over the limit but still able to find even more."

Was there any point during your race you felt similar to Senna's quote? YES NO

If so, at what point in the race did you feel most like this?

---

At what point in the race did you feel that you were in a similar state of mind:

BEGINNING

MIDDLE

END

Rate on the following scale the intensity of your individual race:

(1 = low, 3 = neutral, 5 = high)

1

2

3

4

5