

RELATIONSHIP BETWEEN SELF-TALK AND FLOW
IN ATHLETIC TRAINING AND COMPETITION SETTINGS

by

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ABSTRACT

Of interest for sport and exercise researchers is how to facilitate performance through mental skills. Self-talk and flow have a number of overlapping principles that makes studying them intriguing for sport psychology research. This study examined the relationship of these two factors in both practice and competition settings for endurance athletes. In an attempt to advance previous research (Taylor, 2014), it was predicted flow would be correlated to a greater degree with motivational self-talk than instructional self-talk. Additional predictions were made that motivational self-talk would be more prevalent in competition and instructional self-talk would be more prevalent in training (Theodorakis et al., 2000). Thirty-two runners from three NCAA teams in Tennessee participated by answering self-talk and flow questionnaires after a hard training session and after a race. Results did not support the hypothesis of motivational self-talk being more facilitative of flow than instructional self-talk. Type of self-talk also did not show to be significantly different based on training or competition settings. This suggests the type of self-talk has less to do with flow than self-talk in general.

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CHAPTER I

Introduction

Self-talk occurs throughout the day to day activities of people's lives. What people say to themselves has a bearing on how they react to their environment and stressful situations. One situation where this comes to life in an observable way is through athletic performance and competition. Using self-talk to enhance performance has been demonstrated through lowering anxiety (Hatzigeorgiadis, Zourbanos, Mpoupaki, & Theodorakis, 2009), skill development (Landin & Hebert, 1999), and increasing confidence (Theodorakis, Weinberg, Natsis, Douma, & Kazakas, 2000). Self-talk is frequently used by competitive athletes during training and competition (Gammage, Hardy, & Hall, 2001). Achieving a flow state during an athletic performance has been associated with better performance than activities without a flow experience (Jackson, 1992).

Self-talk and flow have both been researched a great deal, but very little has been done researching the relationship between these two constructs. In a recent study, the use of certain types of self-talk, such as positive and motivational, has been associated with the achievement of flow in competition (Taylor, 2014). This study will attempt to further link self-talk and flow in competition and examine the relationship between self-talk and flow in a practice setting. It will also examine how flow and self-talk in practice may contribute to flow and self-talk in competition. The following review of literature will explore the definitions, types, and functionality of self-talk, particularly in relation to exercise and sport. Then a review of the literature with regards to the definition of flow is and how it relates to sport and exercise will be presented. The relationship between self-

talk and flow will then be examined and the value that their combination adds to sport and exercise will be explored.

Defining Self-talk

Self-talk has been researched extensively in both sport psychology and other areas of psychology over the years. As a result, numerous definitions have been proposed. It has been defined as broadly as being any thought that someone has (Bunker, Williams, & Zinsser, 1993). A more thorough definition of self-talk provided by Hackfort and Schwenkmezger (1993) defines self-talk as a conversation kept with oneself that includes feelings and thoughts and can provide instruction and reinforcement. A differing definition by Theodorakis et al. (2000) includes external self-talk. They defined self-talk as taking either a covert or overt presence. Covert self-talk is statements made only internally to oneself. Overt self-talk consist of aloud verbalizations. Developmentally, self-talk begins as an overt occurrence but as children age self-talk transitions into being covert due to social awareness (St. Clair Gibson & Foster, 2007).

Theories on self-talk span beyond sport psychology and are rooted in cognitive and behavioral theories (Bandura, 1997; Vygotsky, 1986). For example, Bandura (1997) included verbal persuasion in his self-efficacy theory, a portion of which would be self-talk. Self-talk also is theorized to play a role in self-regulation. Vygotsky (1986) postulates that humans employ language as a cognitive tool that serves a role in private thoughts used as a self-regulatory process.

In a qualitative review, Hardy (2006) proposed a multifaceted definition of self-talk. He defined self-talk in five parts: “(a) Verbalizations or statements addressed to the self; (b) multidimensional in nature; (c) having interpretive elements in association with

the content of statements employed; (d) is somewhat dynamic; and (e) serving at least two functions; instructional and motivational for the athlete” (p. 84). This definition of self-talk has been the most comprehensive one in the sport and exercise literature.

Functions of Self-talk

A number of studies focus on positive, negative or neutral self-talk. Mixed results have been found as to whether positive or negative self-talk has greater benefits. For example, a study divided dart throwing participants into one of three groups: a control group with no instructions about self-talk, a group told to say “I can do it” (positive) and a group told to say “I cannot do it” (negative). The results of the study showed that those in the positive self-talk condition performed significantly better than the control or negative self-talk conditions. The negative self-talk and control groups did not significantly differ (Van Raalte et al., 1995). This finding replicated the results of a similar study by Dargou, Gauvin, and Halliwell (1992).

Another study on positive and negative self-talk observed that tennis players’ positive self-talk did not result in better performance; however negative self-talk was observed in great quantity with losing performances (Van Raalte, Brewer, Rivera, & Petitpas, 1994). This corresponds to findings by Hatzigeorgiadis and Biddle (2008) that greater differential between goal performance and actual performance generates more negative self-talk.

Highlen and Bennett’s (1983) results showed better performing divers used significantly more positive self-talk and negative self-talk than poorer performing divers. This suggests that both kinds of self-talk can have positive effects on performance when used properly. More importantly, how the athlete responds to the self-talk may determine

whether it positively or negatively affects performance. Some findings have even suggested that neutral self-talk may be the most prevalent of all three types (Gammage et al., 2001).

Positive, negative and neutral aspects of self-talk remain as valuable constructs, but due to unclear conclusions over which provides the most benefit, studies have looked at other ways self-talk is used. In a qualitative analysis, Gammage et al. (2001) found that exercisers use self-talk to serve motivational and cognitive functions, adding another perspective from which to investigate self-talk. Much of what was previously studied as positive or negative self-talk falls under the motivational self-talk function, while neutral self-talk usually performs as a cognitive function.

Cognitive self-talk, which is also referred to as instructional self-talk, is the practice of making self-statements that involve instructing the individual in the process of the task at hand. Instructional self-talk can aid in learning skills and focusing on skills to achieve better performances. For example, an intervention study using instructional self-talk for sprinters used phrases such as push, heel, and claw in relation to racing strategies (Mallet & Hanrahan, 1997). In addition to sprinting, instructional self-talk has shown performance benefits in other athletic disciplines including golf (Malouff & Murphy, 2004), tennis (Landin & Hebert, 1999), basketball (Perkos, Theodorakis, & Chroni, 2002), and water polo (Hatzigeorgiadis, Theodorakis, & Zourbanos, 2004).

Motivational self-talk is used to provide self-efficacy, focus, and arousal control, both in relaxation and amping up, for the athletic performer. For exercisers, motivational self-talk is used as a way to get out and start exercising, while competitive athletes use it as part of training, pre-competition, and in competition (Gammage et al., 2001).

Motivational self-talk might be statements such as “you can do it” or “strong and explosive” (Donohue, Barnhart, Covassin, Carpin, & Korb, 2000). It has been used effectively in a variety of sports including distance running (Weinberg, Miller, & Horn, 2012), water polo (Hatzigeorgiadis et al., 2004), and basketball (Chroni, Perkos, & Theodorakis, 2007).

Self-talk has also been shown to provide assistance in lowering competition anxiety, which is an underlying factor in cognitive aspects of athletic performances. Findings by Hatzigeorgiadis et al. (2009) showed motivational self-talk was useful in not only task performance, but also improving self-confidence and lowering cognitive anxiety in a self-talk training intervention with competitive tennis players.

Studies focusing on when motivational and instructional self-talk are used have been helpful in examining how these benefits can be maximized. A study by Theodorakis et al. (2000) comparing several tasks indicated instructional self-talk was more beneficial to performances requiring accuracy and precision (i.e., soccer passing, badminton serving). Alternatively, events requiring more strength and endurance, such as sit-ups and knee extensions, benefited from the use of motivational self-talk.

These results were extended by Hatzigeorgiadis et al. (2004) in a study on water polo skills examining the differences in self-talk used in different throwing tasks. During an accuracy task of throwing the ball at a target, both motivational and instructional self-talk groups improved, but instructional self-talk was viewed as more beneficial by the participants. In an additional task of throwing the ball for distance, motivational self-talk showed an improvement over instructional self-talk.

These studies generated what has since been referred to as the matching hypothesis (Hardy, Roberts, & Hardy, 2009). The matching hypothesis theorizes that athletes' use the most beneficial self-talk for their activity. This tends to be instructional/cognitive for activities requiring specific skills and learning or motivational self-talk for endurance and strength activities.

Research on more specific purposes for self-talk has also been conducted in general population samples. Brinthaupt, Hein, and Kramer (2009) developed a measure of self-talk that assesses four areas: social assessment, self-reinforcement, self-criticism, and self-management. St. Clair Gibson and Foster (2007) also postulated that functions of self-talk include a self-reflective and awareness component as well as an outsider perspective and analysis of the activity.

In summary, athletes tend to use self-talk as either an instructional or motivational tool. Instructional self-talk tends to be used more with tasks requiring accuracy and precision or learning a skill. Motivational self-talk is more frequently used in endurance and strength tasks to improve focus and control arousal.

Self-talk in Endurance Athletes

In endurance events, it has been demonstrated that self-talk increases in frequency as the challenge of the event becomes more difficult. In a study of marathon runners, the race is the hardest between half and three quarters of the way through the race, according to post race evaluations (Schuler & Langens, 2007). When marathon runners were trained to use self-talk, it was used most frequently during the race between half and three quarters of the way. When compared with the control group, the group utilizing self-talk reported fewer psychological difficulties during the race.

It has also been observed that self-talk occurs both during practice and in competition (Hardy, Hall, & Hardy, 2005). Self-talk occurs most frequently during competition as opposed to post- or pre-competition. The same was found true regarding practice, where there was a higher frequency of self-talk, as opposed to preparing for practice or evaluating oneself after practice.

A few studies have examined how self-talk can aid distance runners. In one such study, cross country runners were asked to perform a one mile time trial prior to a self-talk intervention and a subsequent one mile time trial post (Weinberg et al., 2012). The researchers found self-talk to be effective, with particular effectiveness from motivational self-talk and a combination of motivational and instructional self-talk when chosen by the athlete. This finding suggests self-talk may have a greater value when athletes are allowed to use words and phrases that are important to them.

In a different study, a self-talk intervention was conducted on an individual training for the 3000m steeplechase over the course of six training sessions (Diaz-Ocejo, Kuitunen, & Mora-Merida, 2013). In an effort to prevent an athlete's slowing during every 4th stage in the event, instructional self-talk was implemented during six training sessions. The result of this intervention was an improvement across all segments of the race, with the greatest improvement during the 4th stage. The results of this study demonstrate the importance that effective self-talk strategies in practice can have on performances in competition.

In summary, research on self-talk demonstrates that it can play a vital role in achieving better performances in athletic activities. It seems logical that different tasks may benefit more from different types of self-statements. Certain self-statements at times

can even be detrimental to performances. Instructional self-talk, while used more to enhance precision performances and learn skills, can still have a use in endurance events. For an endurance event such as cross country, it may be that motivational self-talk is of greater benefit than instructional self-talk, particularly as the event becomes difficult and more encouragement is needed to perform well.

Definition of Flow

Of particular interest when studying sport psychology is the achievement of optimal performance. The concept frequently associated with the highest performances is flow. Achieving a flow state can occur in a variety of activities, and has been studied as an attribute in work, play, athletics, and even social situations. Athletes commonly refer to a flow state as “being in the zone” and athletics is a prime area for flow states to be studied. Flow has been described as the complete involvement in an activity where optimal experiences can occur (Csikszentmihalyi, 1990).

There are nine components that contribute to the occurrence and experience of flow (Csikszentmihalyi, 1990; Jackson & Csikszentmihalyi, 1999). The most important attribute of flow is the *challenge-skills balance*. This component is having the skills or confidence in one’s skills to meet the challenge of the task. If the challenge is too low, the individual will be too bored to achieve flow. If the skills are not developed enough to meet the challenge put forth, the individual will suffer more anxiety which precludes optimal performances.

Another component of flow is *action-awareness merging*. This is the harmony between the mind and body interaction. Having *clear goals* with *unambiguous feedback* is critical to the evaluation of the challenge and skills involved in the task. *Concentration*

on the task at hand, sense of control, loss of self-consciousness, and transformation of time are also an important part in being able to reach flow. The final component of flow is an *autotelic experience*. This is the rewarding and addictive aspect of flow that encourages individuals to continue to engage in particular activities again and again.

Given its components, sport is a prime situation to study flow. Challenges and skills are easily observable. Goals can be well defined, and feedback can come in a number of forms depending on the nature of the activity. Concentration, control, and focus are at a high for an athlete fully engaged in competition.

Flow in Athletes

In a study with athletes, the proper challenge-skills balance has been observed to better facilitate flow states (Stavrou, Jackson, Zervas, & Karterliotis, 2007). Results from Stavrou et al. demonstrated that flow is more likely when the athlete is in a relaxed state as opposed to one of apathy. This study further found that the way athletes perceive the challenges as well as their own evaluation of their skills plays a valuable role in challenge-skills balance. The value of an individual's perception of challenges and skills is also supported by Moneta and Csikszentmihalyi (1996). Athlete self-confidence thus is an important factor in flow states.

Individual differences have been observed to play a role in flow states. Using the Big Five personality traits, one study found flow to be less common for those with high neuroticism (Ullén et al., 2012). The same study also found there to be a lack of correlation between flow proneness and intelligence. Further research has this and found a number of other characteristics that correlate with flow (Ross & Keiser, 2014). For example, high conscientiousness and extraversion have been observed to positively

correlate with likelihood of flow. Agreeableness was observed to have a negative correlation with flow, while openness appeared to not be related to flow.

Another question in flow research is whether self-paced or externally-paced tasks facilitate flow differently. A self-paced sport is one where the individual has control over the speed of the event. Externally-paced sports are ones where the speed of competition is determined by events that occur during the course of play. Originally proposed by Kimiecik and Stein (1992), this difference was examined by Koehn, Morris, and Watt (2013) with skilled tennis players. The study examined the difference in flow between serving (self-paced) and ground stroke returns (externally-paced). Originally, it was hypothesized that self-paced tasks would be more facilitative of flow due to the self-determined nature of the onset of performance, whereas externally-paced tasks are dependent on other events and less facilitative of flow. This was not supported by Koehn et al.'s (2013) study. These findings were consistent with those from Russell (2001), which found college athletes to have similar experiences with flow regardless of whether they were participating in a team sport or an individual sport.

An interesting aspect of flow is controllability and perceived controllability of situational factors which can facilitate or debilitate flow. Previous studies have found that a majority of athletes believe flow can be controlled or partially controlled (Jackson 1992). Some factors that facilitate flow are controllable such as training, focus, and relaxation, while other factors like physical state, environment, teammates, and competition are less controllable (Chavez, 2008; Jackson, 1992). Studies supporting the controllability of flow suggest that it can be manipulated by well-trained athletes to produce better results. Individual differences may play a role in the controllability of

flow, as not all athletes believe it to be controllable (Swann, Keegan, Piggott, & Crust, 2012).

The course of flow during a continuous event has been studied with relation to marathon performances. Schuler and Brunner (2009) had participants self-evaluate their flow every ten kilometers during the forty-plus kilometer event in a post-race survey. Their findings showed a decrease in flow experience between each of the ten kilometer intervals with a sharp decrease between twenty and thirty kilometers. This is theorized to be due to the greater mental and physiological strain making a flow state more difficult to achieve. More interestingly, the researchers found that flow experience did not contribute to race performance. It did, however, contribute to high motivation to continue training and racing in the future.

In summary, a number of factors contribute to the flow experience. Although there is no evidence that some sports are more facilitative of a flow state than others, a sport with clear goals and feedback along with situations where challenges are appropriate to the skill level seems to contribute best to achieving flow states. Flow has been shown to have great value to athletes trying to reach full potential. Further understanding of flow in competition and training can help athletes find flow on a regular basis.

Relationship between Self-talk and Flow

Self-talk and flow have both been researched and found to have valuable links to higher level athletic performances. Both concepts have a number of similar principles and functions, yet little research has been done to investigate the links between these two performance-enhancing principles. Therefore, it is of value to investigate the links

between self-talk and flow. In a study of endurance-related sports activities, a number of mental skills were significantly correlated with flow using the Dispositional Flow Scale (DFS; Jackson, Thomas, Marsh, & Smethurst, 2001). This included self-talk in general, but types of self-talk were not investigated with that study. Thus there are definitive links between self-talk in flow, but what aspects of self-talk content are facilitative of flow remains to be investigated.

Research on self-talk has examined a number of principles including what is said, how it is said, and what effects it has for the individual. After much study on the differences of positive and negative self-talk, researchers have shifted focus to instructional and motivational self-talk and the tasks that they are best used for. Both instructional and motivational forms of self-talk have been shown to be effective for a variety of tasks. However, instructional self-talk seems to be most effective for learning skills, precision, and fine motor tasks (Theodorakis et al., 2000). Motivational self-talk seems to be more useful during endurance and strength tasks when mental fatigue is more likely to occur. Both of these self-talk methods have been observed as useful to athletes in training and competition (Hardy et al., 2005).

Flow has been identified as a combination of factors coming together for an individual to achieve an optimal experience. Which athletic events are more prone to achieving flow is still an open question. Some studies have theorized that a self-paced task such as distance running would be more prone to flow states than would an externally-paced task (Kimiecik & Stein, 1992; Koehn et al., 2013). Further research is needed to provide support to this theory. Longer endurance events like a marathon have

shown flow to dwindle as the event progresses, but flow does encourage positive practice habits (Schuler & Brunner, 2009).

Taylor (2014) investigated the relationship between types of self-talk and flow in competition. A significant correlation between motivational self-talk and flow was found in track athletes competing in middle and long distance events during an indoor track meet. A strong negative relationship between negative self-talk and flow was also found.

The functions of self-talk and flow overlap in a number of ways. Two of the functions of self-talk are to reduce anxiety and to build confidence (Hatzigeorgiadis et al., 2009). Lower levels of anxiety are associated with an increase in flow (Stavrou et al., 2007). One way this can be achieved is through the use of motivational self-talk which has been used to lower anxiety. In flow, the challenge-skills balance relies on the individual having confidence in his or her skill set to rise to the challenge. Again, motivational self-talk is a useful way for an individual to increase confidence level.

Distance running, frequently a self-paced task, has additional attributes that may lend it to being highly suitable to flow states. Since most events have markers, with time splits every so many miles or kilometers, athletes are able to monitor their progress throughout the race. This feedback during an event can be useful for monitoring the progress athletes are making towards the goals they set forth before the event. This feedback frequently comes in the form of covert self-talk encouraging the self to keep it up or pick it up.

In summary, self-talk and flow have a number of similarities and overlapping principles that make studying them in unison a logical step in the progress of sport psychology literature. Motivational self-talk is used to provide self-efficacy during an

event and self-efficacy is a key component to the flow experience. Self-talk can be used as a feedback tool to evaluate progress towards goals during competition and practice, which is another aspect of the concept of flow.

Purpose and Hypotheses

By examining previous work in the areas of flow and self-talk, a number of overlaps between the two fields become apparent. Researchers have studied both self-talk and flow at length, yet little has been done to study them as overlapping principles.

The purpose of this study is to investigate if these apparent links across in athletic performances both via training and competition in endurance running. From a review of literature involving self-talk and flow a number of hypotheses can be proposed:

Hypothesis 1: Those who experience flow in training will be more likely to experience flow in competition. Flow is considered by many athletes to be controllable or partially controllable (Jackson, 1992). One would expect athletes, who are able to adjust some situational factors to facilitate flow, would do so in both practice and training environments. Additionally, individual differences have been found to contribute to flow which would also add to an expectation that the same athletes would experience flow in practice and competition settings (Ross & Keiser, 2014; Ullén et al., 2012).

Hypothesis 2: Instructional self-talk will be more prevalent in training than in competition. Instructional self-talk is expected to be used more in practice than in competition settings since the purpose of practice is to learn skills as opposed to the application of those skills in competition (Mallet & Hanrahan, 1997).

Hypothesis 3: Motivational self-talk will be more prevalent in competition than in training. Motivational self-talk has been shown helpful as a tool for both performance as well as lowering competition anxiety and improving focus (Hatzigeorgiadis et. al., 2009).

Hypothesis 4: Flow in both practice and competition will be correlated with a greater use of motivational self-talk as compared to instructional self-talk. This would be consistent with Taylor (2014), who found motivational self-talk to have a stronger, positive correlation with flow than instructional self-talk in competition.

CHAPTER II

Method

Participants

Thirty-two distance runners (50% men, 50% women) were recruited from three university track and field teams in the Tennessee area. All teams participated in the National Collegiate Athletic Association at the Division I level. Average age of participants was 20.38 years ($SD = 1.96$) with a range of 18 to 25 years. Approval for this study was granted for this study by the Institutional Review Board from Middle Tennessee State University (Appendix A).

Measures

Demographics and race information. This form included gender, age, ethnicity and years of running experience. Race information asked participants for their personal record for the event run, goal time prior to the event, and actual time post event (Appendix B).

Motivational and instructional self-talk. Self-talk was be measured by a collection of self-statements developed by Donohue et al. (2000). These statements originated as an intervention for a group of runners. Instructional self-statements were suggested by a collegiate cross country coach. Motivational self-statements came from four runners who identified them as self-talk they had used in races. A later study used these self-statements to identify whether motivational or instructional self-talk would be more beneficial for cross country athletes (Miller & Donohue, 2003).

There are 40 motivational self-statements (Appendix C) and 26 instructional self-statements (Appendix D) rated on a 5-point scale (1 = *never*, 5 = *very frequently*).

Examples of motivational self-talk include, “You can do it,” and “You feel the need for speed.” Instructional self-statements are items such as, “Pump your arms,” and “Breathe nice and relaxed.” Both scales are measured by average score. A previous study by Taylor (2014) found high levels of reliability for both the motivational self-talk ($\alpha = .98$) and instructional self-talk ($\alpha = .94$) items. This study found high levels of reliability for the scales both in training for motivational self-talk ($\alpha = .98$) and for instructional self-talk ($\alpha = .94$). The reliability was similarly high in racing for motivational self-talk ($\alpha = .98$) and instructional self-talk ($\alpha = .96$).

Disposition to flow experiences. The Dispositional Flow Scale-2 (DFS-2; Jackson & Ecklund, 2002) measures an athlete’s tendency to reach a flow state. It was derived from the previously created Flow States Scale (FSS; Jackson & Marsh, 1996) used to measure flow in physical activity. It has been further adapted to be specific to racing by Taylor (2014) and for the purposes of this study, training as well. There are nine subscales; each with four items (Appendix E). There is one scale for each of the nine aspects of a flow state: Challenge – skills 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. Each item is rated on a 5-point scale regarding how often it was experienced during an activity (1 = *Never*, 5 = *Always*). Participants whose average score is 3 (*sometimes*) or greater indicate that some degree of flow was experienced. Athletes with averages of 3 or greater on the subscales of challenge-skills balance, clear goals, and unambiguous feedback are considered to have reached a flow state during the task. Previous research (Taylor, 2014) indicates reasonable internal consistency with $\alpha = .8$ to $.9$, depending on the subscale. For this

study the average scores on the DFS-2 had high reliability in training ($\alpha = .94$) and in racing ($\alpha = .94$).

Procedure

Research was conducted at collegiate cross country practices and meets. The first stage took place following a practice session and the second stage took place following a cross country meet. Participants provided their student ID numbers on the packets to match the data from each session and provide a level of confidentiality. In the first research stage, the participants completed the informed consent, demographic form, race information, motivational self-talk, instructional self-talk, and DFS-2 with respect to the training session. Additionally, participants completed the Self-Talk Scale (Brinthaupt et al., 2009) for purposes unrelated to the present study. In the second research stage, participants completed race information, motivational self-talk, instructional self-talk, and DFS-2 with respect to the competitive event.

CHAPTER III

Results

Descriptive Statistics

Descriptive statistics are shown in Table 1 for motivational self-talk, instructional self-talk, and DFS-2 scales from training and racing administrations. An analysis of gender differences using *t*-tests showed no significant differences on these measures.

Table 1

Descriptive Statistics

	Mean	Standard Deviation	α
TFlow	3.78	.51	.94
RFlow	3.74	.57	.94
TMotive	2.88	1.06	.98
RMotive	2.95	1.13	.98
TInstruct	3.47	.78	.94
Rinstruct	3.28	.98	.96

Note. $N = 32$; TFlow = Training Flow; RFlow = Race Flow; TMotive = Training Motivational Self-talk; RMotive = Race Motivational Self-talk; TInstruct = Training Instructional Self-talk; Rinstruct = Race Instructional Self-talk.

Correlation analysis was conducted for each of the scales and is reported in Table 2. Several significant correlations were found. As the table indicates, flow in training was significantly and positively correlated with instructional self-talk and motivational self-talk in training. Strong, positive-correlations were also observed between training and racing flow, as well as for the training and racing motivational self-talk and instructional self-talk scores.

Table 2

Correlations of Test Variables

	TInstruct	TMotive	RFlow	RInstruct	RMotive
TFlow	.460**	.508**	.537**	.414*	.377*
TInstruct		.829**	.279	.767**	.799**
TMotive			.281	.882**	.783**
RFlow				.410*	.317
RInstruct					.884**

Note. $N = 32$; * $p < .05$, ** $p < .01$

Note. TFlow = Training Flow; RFlow = Race Flow; TMotive = Training Motivational Self-talk; RMotive = Race Motivational Self-talk; TInstruct = Training Instructional Self-talk; RInstruct = Race Instructional Self-talk.

Test of Hypotheses

Hypothesis 1: Those who experience flow in training will be more likely to experience flow in competition. This prediction was tested by examining the correlation from DFS-2 overall scores from the training survey to the DFS-2 scores from the competition survey. Table 2 presents correlations for each of the major scales in the study. As expected these scores were significantly correlated ($r(30) = .537, p = .002$), indicating that flow in practice was related to flow in competition.

Hypothesis 2: Instructional self-talk will be more prevalent in training than in competition. This was tested with a matched-pairs t -test comparing the scores on the training instructional self-talk scale to the competition instructional self-talk scale scores (Table 3). This hypothesis was not supported. Although the data were in the predicted

direction, this study did not show instructional self-talk being more frequent in training than racing.

Table 3

Instructional Self-talk Matched Pairs

	<i>N</i>	<i>M</i>	<i>SD</i>	t-cal	t-crit	<i>df</i>	<i>p</i>
TInstruct	32	3.46	.78	.40	1.83	31	.077
RInstruct	32	3.27	.98				

Hypothesis 3: Motivational self-talk will be more prevalent in competition than in training. This prediction was tested with a matched-pairs *t*-test comparing the scores on the training motivational self-talk scale with the competition motivational self-talk scale scores (Table 4). This hypothesis was not supported. Athletes reported similar rates of motivational self-talk during training and racing.

Table 4

Motivational Self-talk Matched Pairs

	<i>N</i>	<i>M</i>	<i>SD</i>	t-cal	t-crit	<i>df</i>	<i>p</i>
TMotive	32	2.88	1.06	.13	-.66	31	.513
RMotive	32	2.95	1.13				

Hypothesis 4: Flow in both practice and competition will be correlated with a greater use of motivational self-talk as compared to instructional self-talk. This was tested by examining the correlations of motivational and instructional self-talk with the DFS-2 subscales in both the training and competitive sessions using the Fisher *r* to *z*

transformation. There was no significant difference in the correlations of practice flow and motivational or instructional self-talk ($z = -.24, p = .810$). Likewise, the correlations of competition flow with motivational and instructional self-talk did not differ significantly ($z = .41, p = .341$). Thus, hypothesis 4 was not supported.

Supplementary Analyses

Although not hypothesized, differences were noticed in self-talk usage based on ethnicity of the participants (Table 5). African and African-American runners reported using significantly more motivational self-talk in training and in competition compared to Caucasian runners. The same was true for instructional self-talk in training and competition. Despite the greater amounts of self-talk, flow experience in training and competition did not differ between ethnicities.

Table 5

Differences in Self-talk between Ethnicities

	White ($n = 18$)		Black ($n = 13$)		t	p	95% CI
	M	SD	M	SD			
TFlow	3.70	.41	3.87	.63	-.84	.413	-.58, .25
RFlow	3.72	.47	3.78	.72	-.29	.777	-.55, .41
TMotive	2.32	.80	3.59	.96	-3.89	.001	-1.94, -.592
RMotive	2.32	.73	3.79	1.09	-4.25	.000	-2.20, -.75
TInstruct	3.12	.63	3.92	.78	-3.03	.006	-1.34, -.25
RInstruct	2.79	.72	3.91	.97	-3.52	.002	-1.78, -.48

Note. TFlow = Training Flow; RFlow = Race Flow; TMotive = Training Motivational Self-talk; RMotive = Race Motivational Self-talk; TInstruct = Training Instructional Self-talk; RInstruct = Race Instructional Self-talk

CHAPTER IV

Discussion

Self-talk has been researched and applied in the sport psychology domain in an attempt to enhance athletic performances. Separating self-talk into motivational and instructional types has helped define when and how self-talk can be used most effectively (Hatzigeorgiadis et al., 2004). In endurance tasks, motivational self-talk can be particularly effective by increasing confidence and self-efficacy (Theodorakis et al., 2000). Self-talk has also been known to be utilized by athletes across training and competition settings (Gammage et al., 2001). Flow, the concept of achieving optimal performance, has also been studied for its relationship with endurance athletes (Schuler & Brunner, 2007; Taylor, 2014). This study aimed to draw links between the uses of self-talk and flow and to examine how these are related in training and competition settings. It was expected that flow would be correlated across settings, instructional self-talk would be employed more in training and motivational self-talk would be employed more in competition. It was also expected that flow would have a stronger relationship with motivational self-talk than it would with instructional self-talk.

This study found that flow in training was strongly correlated with flow in competition. Instructional self-talk was not observed to be used more in training than in competition and motivational self-talk was not observed to be used more in competition than in training. This study also did not observe a link between motivational self-talk and the achievement of flow in training or in competition as compared to instructional self-talk. An interesting relationship was found in the study between self-talk usage and

ethnicity. Africans and African-Americans reported using more instructional and motivational self-talk than did Caucasians.

Flow is complete involvement in an activity and the state where optimal experience can occur (Csikszentmihalyi, 1990). For an athlete, being able to achieve flow reliably and consistently can be a great help to performance. Many athletes believe flow has some degree of controllability (Jackson, 1992). Individual differences also contribute to the way athletes experience flow and the likelihood of achieving it (Ross & Keiser, 2014; Ullén et al., 2012). Flow would then be expected to be achieved to similar levels by each athlete regardless of setting. The findings from this study support the individual differences interpretation. Athletes who experienced flow in training also experienced flow in competition.

Previous research has suggested self-talk increases for individuals as tasks become increasingly more challenging. Thus, difficult runs may produce more self-talk than easy runs (Schuler & Langens, 2007). Type of self-talk has varied based on the setting and the type of athletic endeavor. Instructional self-talk is utilized more for skill development (Mallet & Hanrahan, 1997). With this knowledge, it was expected that instructional self-talk would be more prevalent in training than in competition. Conversely, motivational self-talk is used for boosting confidence in competition and was expected to be used more frequently in competition than in training (Hatzigeorgiadis et al., 2009). Neither of these hypotheses was supported, as individuals tended to use similar rates of instructional and motivational self-talk regardless of setting. The data suggested that instructional self-talk might be used more in training than in competition; however, additional research is needed to provide a stronger test of this prediction.

Distance running is predominately a strength and endurance task and, in these tasks, individuals tend to utilize motivational self-talk to a greater degree than instructional self-talk (Theodorakis et al., 2000). Previous studies have also found motivational self-talk to have stronger, positive correlations with flow than instructional self-talk in competition (Taylor, 2014). The present study did not find a difference between the usage of motivational self-talk and instructional self-talk in either the competition setting or the practice setting. This was not expected considering previous studies; however the difference could be due to the level of the runners. This study used all NCAA division I runners as opposed to Taylor (2015) which used all NCAA division III runners. Strong, positive correlations between self-talk and flow in both training and competition suggest that the type of self-talk is not as important as self-talk in general to the achievement of flow. However, considering some research has shown flow can decrease as a competition becomes more difficult, this may contribute some confounding factors in this line of research (Schuler & Brunner, 2009). In this study for instance, participants raced events ranging from 800 meter to 5000 meters. Those who ran longer races may have had more difficulty experiencing flow late in the race than 800m runner.

Interestingly, there were differences in the use of self-talk based on ethnicity. This study found participants who were either African or African-American reported greater use of both instructional and motivational self-talk than Caucasians. This was true in both the training and competition settings. Differences were not observed with regards to flow meaning that despite using more self-talk, African and Africa-American participants had similar rates of flow to the Caucasian participants. This could be because Black runners take a greater enjoyment in running than whit runners. Previous research has suggested

that self-talk tends to occur more when there is more pleasure in the activity (Taylor, 2014). Another possibility is the age of African runners in the NCAA tends to be a few years older than American runners and perhaps had more experience which could result in an increase in self-talk. Researching this further with other self-talk measures could provide more information as to why Black runners used more self-talk than white runners in this study.

Limitations and Future Research

The most limiting factor of this study was the number of participants. Even with three different college teams participating, it was challenging to have athletes fill out surveys at both a practice and a meet. Part of this challenge was runners who were injured at different times during the season and missed practices or meets where data were collected. Consequently, these athletes filled out one survey, but not both and their data were unusable. This is unfortunate since greater support for the hypotheses may have been found had more participants finished the study, as some data were trending in the predicted direction. Future studies should attempt to account for this by planning on studying larger groups, more groups, or have an organized plan for athletes to report back to the research as opposed to needing to be tracked down athlete by athlete.

Generalizability remains an under-researched area in the sport psychology literature. College athletes are the most accessible participant group and are likely the group to benefit the most from the knowledge of research. Questions remain about flow and self-talk in recreational running groups. Flow is known to occur at a lower rate for recreational athletes, but it is unclear whether self-talk training improves flow states for these athletes (Gammage et al. 2001). Flow and self-talk have not been studied together

outside of endurance runners. It would be interesting to know if links are similar in team sports such as soccer or basketball.

This study attempted to collect data to examine if goal time and actual race time from competitions had any relationship to flow and self-talk. Due to small number of participants and missing data, these times could not be used. Achieving goals are an important part of athletics, but do not specifically require being in a flow state. Future studies should look at the relationship of flow and performance to know how much goal achievement means to the flow experience and how that experience relates to the use of motivational or instructional self-talk.

Future studies may want to research differences in ethnicities and the use of self-talk. This study did not predict any difference in self-talk or flow based on racial background and had limited participants of each. Further research studying how different ethnicities and how each group uses self-talk would be interesting. Finally, research could also examine the specific circumstances or situations, such as regular season versus championship meets, that generate self-talk in training or racing contexts, as opposed to the type of self-talk that tends to be used in these contexts.

Summary

This study adds to the knowledge for coaches and athletes to aid them in efforts to maximize performances. This study suggests self-talk and flow are significantly related regardless of practice or competition setting. Additionally, the type of self-talk did not seem to change the likelihood of achieving a flow state in this study. As expected, flow in practice is likely to be similar in competition. Further research is needed to fully understand the links between self-talk and flow and whether self-talk actually aids in achievement of

flow states. The findings from this study do support the use of self-talk and flow as important factors for endurance athletes looking to strengthen their performances.

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APPENDICES

APPENDIX A

IRB Approval Letter from Middle Tennessee State University

12/8/2014

Investigator(s): John Woodman, Dr. Tom Brinthaup
Department: Psychology
Investigator(s) Email Address: jaw8a@mtmail.mtsu.edu; tom.brinthaup@mtsu.edu

Protocol Title: Relationship between self-talk and flow in athletic training and competition settings

Protocol Number: #15-140

Dear Investigator(s),
Your study has been designated to be exempt. The exemption is pursuant to 45 CFR 46.101(b)(2) Educational Tests, Surveys, Interviews, or Observations.

We will contact you annually on the status of your project. If it is completed, we will close it out of our system. You do not need to complete a progress report and you will not need to complete a final report. It is important to note that your study is approved for the life of the project and does not have an expiration date.

The following changes must be reported to the Office of Compliance before they are initiated:

- Adding new subject population
- Adding a new investigator
- Adding new procedures (e.g., new survey; new questions to your survey)
- A change in funding source
- Any change that makes the study no longer eligible for exemption.

The following changes do not need to be reported to the Office of Compliance:

- Editorial or administrative revisions to the consent or other study documents
- Increasing or decreasing the number of subjects from your proposed population

If you encounter any serious unanticipated problems to participants, or if you have any questions as you conduct your research, please do not hesitate to contact us.

Sincerely,

Lauren K. Qualls, Graduate Assistant
Office of Compliance
615-494-8918

APPENDIX B

Demographics and Race Information

Student ID Number (for tracking the data) _____

Age: _____

Sex: M F

Ethnicity: _____

Years of Running Experience: _____

Race (if applicable)

Distance of today's race: _____

Personal best before today's race: _____

Goal time for today's race: _____

Actual time for today's race: _____

APPENDIX C

Motivational Self-talk (Racing)

The following is a list of statements identified by other athletes and a coach as motivating them to do their best. Rate how often you used each of the following phrases to motivate yourself during the race on the following scale:

1 = never, 2 = infrequently, 3 = occasionally, 4 = frequently, 5 = very frequently.

Motivational Self-talk (Training)

The following is a list of statements identified by other athletes and a coach as motivating them to do their best. Rate how often you used each of the following phrases to motivate yourself during the training session on the following scale:

1 = never, 2 = infrequently, 3 = occasionally, 4 = frequently, 5 = very frequently.

APPENDIX D

Instructional Self-talk (racing)

The following is a list of instructional/running technique factors identified by other athletes and a coach as helping them to accomplish their “perfect run”. Rate how often you used each of the following phrases to motivate yourself during the race on the following scale:

1 = never, 2 = infrequently, 3 = occasionally, 4 = frequently, 5 = very frequently.

Instructional Self-talk (training)

The following is a list of instructional/running technique factors identified by other athletes and a coach as helping them to accomplish their “perfect run”. Rate how often you used each of the following phrases to motivate yourself during your training session on the following scale:

1 = never, 2 = infrequently, 3 = occasionally, 4 = frequently, 5 = very frequently.

APPENDIX E

DISPOSITIONAL FLOW SCALE-2 (racing)

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:

DISPOSITIONAL FLOW SCALE-2 (training)

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 training session. 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 practice and circle the number that best matches your experience.

1	2	3	4	5
Never	Rarely	Sometimes	Frequently	Always

When participating in my training session: