THE RELATIONSHIP BETWEEN PRE-COMPETITIVE ANXIETY AND OCCURRENCE OF FLOW IN FEMALE COLLEGIATE CLUB ROWERS

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This thesis entitled 
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The purpose of this study was to examine the relationship between pre-competitive anxiety and flow in female collegiate club rowers. Eleven participants from the Ohio University Women’s Club Rowing Team volunteered during two separate regattas. Participants completed the Competitive State Anxiety Inventory – 2 (CSAI-2) to assess state anxiety before each regatta and the Flow State Scale – 2 (FSS-2) following each regatta to assess flow.

Results show no significant difference in anxiety between regattas. A significant difference was found in total flow ($p = 0.01$) and challenge-skill balance ($p = 0.001$).

Correlations examined relationships between anxiety and flow. Self-confidence had the highest correlation with flow at the SIRA Regatta and also moderate correlations between flow and anxiety. Pearson’s correlations were also run within sub-scales of the CSAI-2 and the FSS-2. Results for these correlations show several moderate and strong relationships within sub-scales.
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Chapter 1

Introduction

Sport psychology is a science that utilizes the techniques and principles of psychology specifically in physical activity settings (Cox, 1998). The still evolving field of sport psychology pulls from the research and knowledge of several other areas of psychology, including social psychology and psychophysiology, to help coaches and athletes understand the elements of themselves and those around them pertaining to sport, performance, and exercise.

Currently, the field of sport psychology deals with many different issues that face athletes. Sport psychologists seek to work with athletes in areas such as team dynamics and recovery from injury in order to optimize their abilities. However, although looking to understand and solve the issues facing athletes today is an important part of sport psychology, it is the question of why humans participate in sport in the first place that is becoming increasingly important.

Participation in sport has been one of the most significant forms of human expression. For centuries, men and women sought to display their power through feats of speed and strength. Ancient athletes would undergo months of strict training in order to prepare for the early athletic games (Csikszentmihalyi, 1990). Following that same tradition, modern athletes also undergo such strict training. It is not uncommon for today’s Olympians or even high school and college athletes to give their time and money over to grueling preparation for an upcoming competition. Athletes risk their bodies and their health daily in order to prepare to be the best in their area of concentration. They
undergo daily pain and sacrifices in hopes it will all pay off in one major competition. But the reality is that even though most athletes are willing to sacrifice their minds and their bodies for the gains of competition, most of them will never experience a world renowned win or celebrity status.

The grueling nature of sport begs the question of its purpose. If sport requires tremendous sacrifices for often little gain, why do humans still seek participation? This question is one that fuels current sport psychology research in the area of flow.

Csikszentmihalyi (1990) hypothesized that all humans seek optimal experience in life, which means that somehow, sport must offer some sort of optimal experience. He later developed a theory that referred to this optimal experience as flow. His theory suggests the reason most athletes continue in participation in sport is because of the flow experience.

According to Csikszentmihalyi (1990), in order for flow to occur there must first be the presence of two conditions. The first is that the athlete's perceived skill must be equal to the perceived challenge. The second is that the perceived challenge and perceived skill required for the challenge must be greater than average (Csikszentmihalyi, 1990). It would follow then that when an athlete's perceived skill is less than the perceived challenge, it would create a high amount of arousal within an athlete. The arousal would most likely manifest itself in the form of apprehension or anxiety. Also, if an athlete's perceived skill level were greater than the perceived challenge, there would be a lack of enough arousal. This lack of arousal would most likely manifest itself in the form of boredom or apathy (Weinberg & Gould, 2003).
In relationship to the idea that each athlete has an optimal level of arousal, leading to an optimal experience, is the theory of individual zones of optimal functioning. This theory states that athletes each have an optimal level of arousal in which they are able to perform at their best. Outside of these "zones" of arousal, an athlete's performance is less than optimal (Weinberg & Gould, 2003). This zone of arousal can differ from athlete to athlete, however it is likely that most athletes fall somewhere around the middle, and that a very high level of arousal or a very low level of arousal would cause poor performance in the athlete. This study specifically looks at anxiety as a form of arousal and how levels of pre-competitive anxiety alter one’s ability to function optimally, therefore also affecting one’s ability to experience a state of flow.

Purpose of the Study

An athlete’s optimal level of arousal is necessary for optimal experience. It has been suggested that one form of arousal that has a negative effect on performance is anxiety (Martens, Vealey, & Burton, 1990). The purpose of this study is to examine the relationship between levels of pre-competitive anxiety and occurrence of flow in female collegiate rowers. Evaluations of both pre-competitive anxiety and occurrence of flow were taken in members of the Ohio University Women’s Crew team during two separate regattas.

The first regatta at which members of the Ohio University Women’s Crew team were assessed was chosen for its high profile in the United States rowing community. The Southern Intercollegiate Rowing Association (SIRA) Regatta is currently the second
largest regatta in the U.S. and was chosen to provide a situation where a higher level of anxiety existed naturally in the environment.

The second regatta at which members of the Ohio University Women’s Crew team were assessed was a low profile regatta. Although this regatta is not the smallest regatta the team attends, it is substantially smaller than the SIRA regatta. It was chosen for its smaller size and its position in the season in order to provide a situation in which anxiety was thought to be less inherent.

The two regattas were chosen because of their position in the season, occurring one after another, and their perceived level of anxiety occurrence. Participants completed the CSAI-2 prior to their race and the FSS-2 after their race in order to obtain both their levels of pre-competitive anxiety and their occurrence of flow. Comparisons were made to see if, in fact, there was a difference in levels of anxiety between races and if flow occurred based on level of pre-competitive anxiety.

Significance of Study

This study has significance for several reasons. Research in the area of flow is still very new, this study will add to the current research in order to further establish the theory. Another reason for this study’s significance is its focus on the sport of rowing and its focus on female athletes. The results of this study have relevance in the athletic community as a whole, and more specifically in the lives of coaches and athletes. Relevance also exists in the execution of this study. Information is gathered in a field setting rather than a laboratory setting, this allows for real-life experiences. Lastly,
research on flow in sport may also be used as a jumping point for research on flow in other disciplines. This will help to add to the total body of flow research.

Not only is the field of sport psychology still establishing itself, but the theory of flow in the context of sport is also establishing itself. Although flow theory has the potential to be very important in the lives of athletes and coaches, there is still little research in this area, leading to little knowledge of the theory within the athletic community. This study will add to the current body of flow research within the sport context.

Rowing is a sport that is becoming widely practiced in high schools, colleges, and communities. It is a sport that not only requires physical mastery, but also mastery of equipment and an extreme amount of teamwork. While in a race, a rower must pull their 12-foot oar as hard as they possibly can while maintaining balance in a two-foot wide, 60-foot long boat and matching exactly the movements of seven other rowers. Rowing requires both the aerobic and anaerobic systems to be working together, which means that training must be done to both systems. It requires extreme focus, energy, and dedication. By identifying a correlation between levels of anxiety and occurrence of flow in female rowers, coaches and other members of the athletic community will be able to start taking the necessary steps to eliminate negative amounts of anxiety in athletes. This will help further involvement in sport, which is proven to have several physiological and psychological benefits.

Another way this study is significant is its specificity to females. Sport is becoming increasingly important in the lives of females, which is helping to create an
increased number of athletic programs available for females. The study of females in sport is necessary to understand how they are affected and how they perceive competition and challenge. This will help researchers understand females and their uniqueness.

If it is true humans participate in sport because of the potential of optimal experience, then the understanding of optimal experience and what inhibits it is of great importance to coaches and athletes. The results of this research may shed light into the area of how anxiety may affect competitiveness. This information will guide coaches and athletes in their preparation for competition, as well as give them insight into their own minds. If flow can be understood, it could change the face of competition.

The field nature of this study will allow for greater understanding of what goes on in real life situations. Although flow can be studied in a lab setting where there is a greater ability to control the environment, it is rare for actual competition to occur in the lab. In order to educate the athletic community on flow and optimal experience, it is necessary to look at what happens during actual events. The pressures in this study happened naturally as a result of outside factors. Most of these outside factors are common in the sport of rowing, however could not have been recreated in a lab setting. Distractions inherent to competitive regattas, and athletic event in general, are important to take in account when attempting to understand anxiety and flow occurrence. Lastly, further research done on flow in the sport context will help spur flow research in other disciplines. The elements of flow experienced by athletes are said to also occur during the mastery of non-sport disciplines, such as writing, music, or outdoor pursuits, also (Csikszentmihalyi, 1990). Understanding the flow experience and eventually
developing methods to facilitate the flow experience will be useful in all areas of mastery.

Statement of the Problem

Scientific evidence is lacking concerning relationship between anxiety and the flow experience in competitive rowing. This study was designed to evaluate the following questions:

1. Does the SIRA regatta create a significantly greater amount of pre-competitive anxiety in members of the Ohio University Women’s Club Crew team than the Governor’s Cup regatta?

2. Is there a significant difference in flow in members of the Ohio University Women’s Club Rowing team between the SIRA Regatta and the West Virginia Governor’s Cup Regatta?

3. Are high levels of pre-competitive anxiety correlated with low total flow occurrence during competition?

4. Are high levels of anxiety correlated with lower experience of the specific flow dimensions challenge-skill balance, total concentration, clear goals, and sense of control?

Delimitations

The results of this study were established by the following delimitations:

1. The study evaluated only female collegiate club rowers at Ohio University.

2. The study evaluated self-reported levels of anxiety and the perception of flow.
3. Data was collected at two of the clubs regattas.

Limitations

The results of this study were interpreted after careful consideration of the following limitations:

1. Compliance of the subjects.
2. Subject mortality.
3. Data collection environment.

Assumptions

1. The test instruments were reliable.
2. All subjects self-reported honestly.
3. Regattas are able to produce distinctly different levels of anxiety.

Null Hypotheses

$H_{01}$: There is no significant difference in levels of pre-competitive anxiety in Ohio University women’s crew team members between the Southern Intercollegiate Rowing Association Regatta (SIRA) and the West Virginia Governor’s Cup Regatta.

$H_{02}$: There is no significant difference between the flow state measures of total flow, challenge-skill balance, clear goals and feedback, total concentration, and sense of control in Ohio University women’s crew team members between the Southern Intercollegiate Rowing Association Regatta (SIRA) and the West Virginia Governor’s Cup Regatta.

$H_{03}$: There is no significant relationship between pre-competitive anxiety and the individual dimensions of flow labeled challenge-skill balance, total concentration, clear
goals, and sense of control, as well as total flow levels in Ohio University women’s crew team members between the Southern Intercollegiate Rowing Association Regatta (SIRA) and the West Virginia Governor’s Cup Regatta.

Definition of Terms

Anxiety. A negative emotional state characterized by nervousness, worry, and apprehension and associated with activation or arousal of the body (Weinberg & Gould, 2003).

Arousal. The degree of activation of the organs and mechanisms that are under the control of the body’s autonomic nervous system (Cox, 1998).

Optimal Experience. A general term used to describe pleasurable experiences in sport. It is not always classified by a win or a loss as much as it is by the athlete’s perception of the experience. Optimal experience is subjective, meaning that it is experienced differently by each performer (Horn, 2002).

Flow. A state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it (Csikszentmihalyi, 1990). It is said to occur when there is a balance between one’s perception of the challenge and ability needed to meet the challenge (Jackson & Csikzentmihalyi, 1999). Flow is comprised of nine separate dimensions, these dimensions are challenge-skill balance, merging of action and awareness, clear goals and feedback, concentration on the task at hand, sense of control, loss of self-consciousness, time transformation, and an autotelic (intrinsically rewarding) experience (Nicholls, Polman, & Holt, 2005).
Total Flow. Also known as global flow. This refers to the overall experience of flow, rather than the experience of the individual dimensions of flow. When calculating total flow on the FSS-2, you add the averages of the nine individual dimensions of flow and once again find the average (Jackson & Eklund, 2004).

IZOF. The Individual Zones of Optimal Functioning theory states that top athletes have a zone of optimal state anxiety in which their best performance occurs, outside this zone, poor performance occurs. When an athlete experiences too much or two little anxiety, they are unable to perform at their best (Weinberg & Gould, 2003).

Regatta. A regatta is a boat race or series of boat races. This can include both powered and unpowered craft. The term regatta may describe either a rowing race or sailing race, however it is not usually used to describe a race between powerboats. The term is also used to describe the festivities that occur during the lead up to the races, often a large social event for the town in which the regatta takes place (www.wikipedia.com).
Chapter 2

Review of Literature

Sport psychology is defined as (a) the study of the psychological and mental factors that influence and are influenced by participation and performance in sport, exercise, and physical activity and (b) the application of the knowledge gained through this study to everyday settings (LeUnes & Nation, 2002). Sports psychology seeks to find answers and information in such areas as motivation, aggression, behavior, performance, and anxiety. But perhaps the most intriguing question to sport psychologists is what causes continued participation in sports, and what exactly is it that athletes experience when they participate.

As mentioned in the prior introduction, it seems as though there is very little gain for participation in sport. One must go through incredible amounts of pain and sacrifice in order to prepare for a competition that might not merit a win or even an enjoyable experience. What makes it even worse is that the excitement of competition often causes athletes to experience an extreme amount of stress and anxiety, making the day before a competition, or even the week before a competition, almost unbearable to some. According to researcher Mihaly Csikszentmihalyi (1990), humans seek that which provides enjoyment and fulfillment in their lives. Or, in short, humans seek something that he refers to as an optimal experience. Therefore, in order for humans to give themselves over completely to discipline and pain to gain athletic greatness or more often athletic mediocrity, there must be some sort of optimal experience involved at some point.
Currently, flow theory is commonly described as the psychological state of being in the zone, because most athletes are able to identify more clearly what is meant by that. Although flow theory is not a huge area of research, there are a few researchers that have seen it as a major area of interest in the field of athletics and taken it on as a main area of research. According to research done by Jackson and Csikzentmihalyi (1999) when an athlete is able to experience flow, it allows him or her to work through the pain and makes all the training worth it (Jackson & Csikzentmihalyi, 1999).

Flow theory states that flow is achievable when two situations are present. The first being that an athlete’s perceived skill must be equal to his or her perceived challenge and the second being that an athlete must perceive the skill needed and the challenge presented as greater than the average skill and challenge (Jackson & Csikzentmihalyi, 1999). This then suggests that an athlete who perceives his or her skill level to be below what is necessary to accomplish the challenge will experience anxiety and an athlete who perceives his or her skill level to be above what is needed accomplish the challenge will experience boredom or apathy, suggesting that for flow state to occur, there must first be an optimal level of arousal present.

The basic construct of flow theory falls in line with another theory called the individualized zones of optimal functioning theory. The individualized zones of optimal arousal theory states that top athletes have a zone of optimal state anxiety in which their best performance occurs, outside this zone, poor performance occurs. When athletes experience too much or two little anxiety, they are unable to perform at their best.
(Weinberg & Gould, 2003). This could possibly be because too much or too little anxiety inhibits flow, therefore inhibiting optimal experience and optimal concentration needed for one to perform at his or her best.

The purpose of this study is to look at pre-race anxiety levels in collegiate female rowers and experience and occurrence of flow during a race to see if very high and very low levels of anxiety are correlated with a limited flow experience during a race. The hypothesis for this study is that rowers who experience a mid-level of pre-race anxiety will have the highest occurrence of flow during their race, and rowers who experience very high and very low levels of pre-race anxiety will have low levels of flow occurrence during their race.

The individualized zones of optimal functioning theory suggests that each athlete has his or her own individual zone of optimal functioning, and it is expected that there will be a variance of pre-race anxiety levels that are correlated with high levels of flow occurrence, but the focus will be on very high and very low levels of pre-race anxiety and if there is a clear cut-off point that is considered too high or too low to facilitate flow experience.

**Flow**

The question of what causes true happiness has been contemplated for centuries. In 300 A.D. philosophers such as Aristotle and Plato spouted their hypothesis about true happiness being at the root of human desires. Through the development of technology and the improvement of health, societies all over the world still seek to find happiness and fulfillment. Csikszentmihalyi (1990) says that happiness is a condition that must be
prepared for, cultivated, and defended privately by each person. He also says that people who learn to control their inner experience will be able to determine the quality of their lives, which is as close as any of us can come to being happy (Csikszentmihalyi, 1990). During the moments when we feel as though we are in control of our lives, we are said to not only be feeling simply happy, but we are said to be having what is referred to as an optimal experience.

Csikszentmihalyi (1990) attributes happiness, or feeling of optimal experience, to an ordering of one’s consciousness. He says that during most normal activities one does during the day, their consciousness, or attention, must be attending to multiple different tasks. We struggle to overcome that disorder, which causes states such as stress and anxiety. However, when we are able to focus that energy, or attention, to one specific task, making it the most important task at hand, we can then organize our consciousness. This organization in turn provides what Csikszentmihalyi (1990) calls an ordered conscious. This order, or balance, is commonly described as being a feeling of flow, suggesting that one’s mental processes flow in order, from one part to the next.

Csikszentmihalyi (1990) had always been curious as to what exactly it is people are experiencing when they are having an optimal experience. He interviewed artists, athletes, chess masters, surgeons, and many other people who had spent time doing precisely what they loved to do in order to become masters of their specific craft. In 1975 Csikszentmihalyi (1990) proposed flow theory as an explanation for the extreme sense of enjoyment and pleasure felt by someone during an activity or a performance. He describes flow as a state in which people are so involved in an activity that nothing else
seems to matter; the experience itself is so enjoyable that people will do it even at great
cost, for the sheer sake of doing it (Csikszentmihalyi, 1990).

Although the original theory was not specific to athletes, nor is the current way it
is used, it is most often used in reference to athletic experience. Optimal Experience is a
general term used to describe pleasurable experiences in sport. It isn’t always classified
by a win or a loss as much as it is by the athlete’s perception of the experience. Optimal
experience is subjective, meaning that it is experienced differently by each performer
(Horn, 2002). Some athletes may not win, and may not have expected to win, however
they may have done a personal best or maybe it was the first time they completed a task
without getting a cramp in their side.

Athletes commonly refer to this state of enjoyment, or feeling of optimal
experience, as being in the zone. The more official explanation of this theory breaks it
down into more organized components, it states that the zone, or a state of flow, is a rare
and dynamic state characterized as the experience of self-rewarding and enjoyable
involvement (Young & Pain, 1999). It is a very positive psychological state that can
occur if two dynamics are present. The first dynamic is that the athlete must perceive his
or her ability to be equal to the task, and the second dynamic that the athlete must
perceive the task at hand to require more than his or her average skill level (Horn, 2002).

The purpose of any type of training is to reach a certain level of physical and
mental preparedness, therefore facilitating an optimal experience. For most athletes, this
training can be done in many different ways. Some athletes would consider physical
strength to be the most important, while some would consider a mental edge over their
opponents to be the key. In some cases, athletes would consider peak preparation in both areas to be the most desirable outcome. Either way, it is obvious that an athlete is in search of more than just the pain of preparation, but also a pleasurable experience during or after competition.

Most research on the experiences of athletes is based around the emotions, traits, and states of consciousness that inhibit optimal experiences and peak performances (Horn, 2002). However, the question remains as to what motivates a person to reach that optimal experience. Many athletes report that they would consider an optimal experience or a peak performance to be one that gives them a sense of pleasure or a sense of enjoyment in the task, therefore allowing them to perform as if there were nothing inhibiting their performance. Many suggest that pain is not an issue, and distractions don’t exist during these optimal performances. Activities become almost fun even though they are putting a large amount of physical strain on the body.

Csikszentmihalyi (1990) proposed that there are nine different dimensions that are characteristics of flow. These dimensions are a challenge-skill balance, merging of action and awareness, clear goals, unambiguous feedback, concentration on the task at hand, sense of control, loss of self-consciousness, time transformation, and an autotelic (intrinsically rewarding) experience (Nicholls et al., 2005). Each of these dimensions is key in being able to understand what is actually happening during a peak, or optimal, performance. They describe and define what an athlete feels during their performance.

Although there is not a specific number of dimensions that must be experienced in order to consider oneself in a state of flow, certain parts of these dimensions are thought
to be inherently necessary because of their basic construct. Most of the flow components are either experienced together, or are facilitators of other experiences. These dimensions are intertwined, with some being more common than others. For example, autotelic experience is described as an intrinsically motivating participation in an activity for its own sake. It is considered to be an aggregate to all other flow states (Russell, 2001).

Although the experience of these factors can vary broadly among athletes, there are nine general facilitators of flow and eight general inhibitors. The facilitators are an optimal performance plan, confidence and positive thinking, optimal physical preparation, optimal pre-competitive arousal, performance feeling good, motivation to perform, focus, optimal environmental conditions, and positive coach/team interaction. The inhibitors of flow are non-optimal physical preparation and readiness, non-optimal environment or situation, inappropriate focus, lack of motivation to perform, over arousal before competition, negative or non-optimal team interaction, poor performance, and non-optimal confidence (Russell, 2001).

Dimensions of Flow

*Challenge-skill balance.* According to Csikszentmihalyi’s (1990) definition of flow, one of the key factors is a balance between an athlete’s perceived ability and their perceived challenge (Weinberg & Gould, 2003). The most important factor of this dimension is that it refers directly to the athlete’s subjective perception of his or her ability to do the task at hand and his or her perception of the challenge, instead of the actual challenge or ability itself. If the two of these are not balanced in the mind of the competitor, it will most likely hinder or completely stop the onset of flow. If the
perceived challenge is greater than the perceived skill, it leaves the athlete feeling anxious or worried that her or she will not be able to complete the task without pain or embarrassment, or possibly not complete the task at all. If the perceived challenge is less than the athlete’s perceived ability, then it likely leaves the athlete with feelings of boredom or apathy. Conditions such as anxiety and boredom are not optimal for an athlete, which then leads to the prevention of flow.

*Merging of action and awareness.* A merging of action and awareness leads to a feeling of complete oneness with a task (Weinberg & Gould, 2003). During this stage, a participant switches his or her focus from outside sources, or internal distractions, and is only aware of the task to be completed. At this point, the athlete and the activity become one and actions become automatic. This dimension of flow can be thought of as being put on auto-pilot. The body has been trained to do a certain set of actions, and the mind simply takes control and completes the task exactly the way it has been learned.

The process of merging action and awareness in itself is a flow, or a seeming effortless movement. During the process of complete physical exertion, and possibly the need for complex thought processes, mental training allows all of those extra concentrations to be dismissed. This dimension is one that represents the difference between everyday life and flow. In everyday life, when we are completing normal activities and going about our daily business, we see our actions as separate processes. One might contemplate the need to take out the trash while her or she is washing dishes. There is a separation between what they are doing and what they are thinking about, but this separation disappears as a part of this flow dimension.
Clear goals. Csikszentmihalyi (1990) says that during competition, or the completion of a related task, it is possible to achieve such complete involvement because goals are clear. It is common for an athlete to set goals before the start of a task and also to modify or add to those goals during the actual completion of that task. During this dimension of flow, goals that are set before the completion of a task become very clear and easy to concentrate on. Long-term goals and short-term goals are understood with appropriate boundaries for that moment and that competition (Horn, 2002).

Unambiguous feedback. During the flow experience, feedback is perceived to be immediate. This dimension allows the athlete to understand the changes going on within their body and make adjustments accordingly. Athletes can sometimes become confused by what their body or their mind is telling them, but in this dimension everything is understood. This dimension is sometimes grouped closely to the dimension of clear goals because often one can use such feedback to constantly alter and account for changing goals. For example, a runner goes into a marathon having previously decided on an average time for each mile. Once they have started running, they come into a state in which they are fully aware of their pace and their body’s reaction to that pace. That way, if later in the race they get a sudden burst of energy, they are able to slightly modify their average mile time. This ability to network goals and feedback together creates organization within an athlete’s consciousness, which, once again, creates the essential ordered conscious that is so important to the flow experience (Horn, 2002).

Total concentration. R.C. Lehman once described a conversation he had with a rower after a race, the quote said this, “I met a solid rowing friend and asked about the
race. ‘How fared it with the wind,’ I said, ‘When stroke increased the pace? You swung it forward mightily, you heaved it greatly back. Your muscles rose in knotted lumps, I almost heard the crack. And while we roared and rattled too, your eyes were fixed like glue. What thought went flying through your mind, how fared it, Five, with you?’ But Five made answer solemnly, ‘I heard them fire a gun, no other mortal thing I heard until the race was done.’” (http://archive.museophile.org/rowing/quotes.html).

According to Csikszentmihalyi (1990), total concentration on the task at hand is one of the most common descriptions of the flow experience. This dimension of flow refers to an athlete’s ability to separate his or her self from all distractions. Attentional focus is switched from all outside noises and all thoughts of to-do lists or romance, and is focused onto the task at hand. As considered in the above introduction, this is one of the dimensions that are essential because so many of the other dimensions are simply individual embodiments of this dimension and vice versa. Using the example above of the rower, total concentration resulted when merging of action and awareness caused the stroke to become so automatic and there was a balance of challenge and skills. Csikszentmihalyi (1990) also says that this dimension is a complete release of all other troubling or distracting thoughts, simply nothing else matters but the completion of the task.

*Sense of control.* This dimension is not only about having a sense of control, but also by lacking the fear of being out of control (Csikszentmihalyi, 1990). Jackson (1996) says that the key to this dimension once again rests on the person’s perception of his or her control, instead on the actual amount of control a person really has. For this
dimension to occur, an athlete must also perceive that he or she has the ability to change the amount of control her or she has, and the direction of the performance or the competition if need be.

This dimension increases with activities that are greater in risk and skill level. When one is participating in something that requires a large amount of skill, and the rest of it is seemingly left up to chance, one enjoys being in control of the situation that much more. For example, rock climbers may have a lot of skill, but even more important is their control over the forces that lay in front them, knowing that they are not only in control of their skill, but also those forces that exist outside of their skill (Csikszentmihalyi, 1990).

*Loss of self-consciousness.* As previously stated in the above dimensions, in order to experience a state of flow, one must be able to eliminate outside distractions. However, something that has not been clearly pointed out is the factor of self. In an average day one encounters multiple distractions, but the most common distraction to encounter, is that of self-consciousness. Daily we consider how we look, or meditate on conversations we have had throughout the day. As an athlete, this can come in the form of self-consciousness during performance (Horn, 2002). Athletes often consider what their coaches, competition, and public are viewing; however in this dimension, the self disappears (Jackson, 1996). A completely enjoyable experience leaves no room for doubting ones self or being concerned about what others are thinking.

It is important to note, however, that an athlete can remain without self-consciousness and still be aware of thoughts and feelings. It does not require a loss of
self, simply a loss of consciousness of one’s self. One becomes uninterested in how he or she are being represented, and he or she becomes more interested in the task that is being completed. Constantly considering how everyone else is doing, or how you want to be perceived as doing, can inhibit concentration on the actual task (Csikszentmihalyi, 1990).

Time transformation. This is commonly described as a loss of time reference. If one is running a certain distance, even though he or she might be aware of how far he or she has gone, total absorption in the activity eliminates his or her ability to consider time. The old saying, “Time flies when you are having fun” applies in a vague sense here. Even though most athletes would not directly consider competition to be a fun activity, one does consider it enjoyable (Horn, 2002).

In many ways, however, this dimension can be contradictory. For example, runners who are known for loving their sport can often tell you exactly how long they have been running. The important factor to remember when considering this dimension is that even though athletes might know how long they have been doing something, the important part is they do not directly feel as though they have been withstanding the physical and mental stress for that amount of time (Csikszentmihalyi, 1990).

Autotelic experience. This is the key element to optimal experience because it represents the definition of flow. When athletes are in flow they are completing a task simply for the sake of the task. This is what an autotelic experience is; it is a feeling that the entire reason for participation is participation itself. Autotelic experience is most commonly referred to as the end result of flow. It is the experience and the feeling one gets when they are experiencing all of the other elements of flow.
Facilitators and Inhibitors of the Flow Experience

Studies conducted by Jackson (1992, 1996) support Csikszentmihalyi’s theory of flow. Findings suggest that athletes experience flow at least some of the time during practices and competition, and that experience of flow is what makes them desire to continue training and competing (Horn, 2002). Researchers were then faced with the challenge of figuring out what facilitates and inhibits this flow experience, hoping that by finding out this information, they could put it to use in the production of flow experience.

According to research done by Jackson in 1995, there are specific facilitators and inhibitors to flow (Weinberg & Gould, 2003). This research again supports Csikszentmihalyi’s theories of flow as stated in his book Flow (Csikszentmihalyi, 1990). In effort to again examine these aspects of the flow experience, William D. Russell of Eastern Illinois University did a study to once again test Csikszentmihalyi and Jackson’s theories. Russell (2001) found that there are nine different categories that are integral facilitating and inhibiting of flow.

Optimal pre-competitive preparation plans. According to Russell’s (2001) study, having prepared optimal pre-competitive plans is the most common facilitator of the flow experience. This study showed that there are two higher order themes that go along with this factor; these themes are optimal pre-competitive plans and being alone prior to competition.

According to athletes that were interviewed, when they have prepared strategy, plans and routines, and thought thorough possible bad circumstances prior to competition, they were less anxious during the game because they were already prepared
for both likely and unlikely events. Also, being alone before competition or practice allowed them to focus by listening to music, or practicing once again with mental rehearsal the competition that was about to happen. Mental rehearsal is optimal right before a competition because it does not cause physical exertion like actual practice would, therefore allowing the athlete to “practice” without wearing themselves out before their competition (Behncke, 2004). Athletes often become better at this the more they do it, eventually it can be done efficiently and become part of an athlete’s general preparation.

*Optimal physical preparation.* Russell’s study (2001) suggests only one higher-order theme in this category, and it is that of being well rested and prepared in strength and body. Athletes who have trained their muscles for their sport and competition, do not have to worry about having enough strength, also, being well rested allowed focus and attention the day of competition.

On the reverse of this, of course, is opportunity for the lack of optimal physical preparation to be an inhibitor of flow. Russell’s study (2001) found four higher-order themes in this dimension. These themes were: not being physically prepared, not feeling good physically, poor nutrition, and fatigue. Their sense of readiness and competitive edge of competition decreased when they did not feel as they had optimally prepared in these areas. This created a sense of anxiety, because athletes were afraid they would not be able to perform optimally. An inability to focus mental attention on internal mental rehearsal because of need to attend to external inefficiency creates a disorder in order of consciousness. This disorder in turn inhibited their ability experience flow.
Confidence and positive thinking. Thirty-three percent of athletes that participated in Russell’s study (2001) mentioned themes related to this dimension. Overall, there were three higher-order themes associated with this dimension being a facilitator of flow; these themes were confidence, positive thinking, and enjoyment of the activity. For the purpose of this research, confidence was defined as “being able to eliminate any negative thinking and focus solely on positive performance attributes” (Russell, 2001, p.91).

Sport psychologists usually define self-confidence as the belief that you can successfully perform a desired behavior (Weinberg & Gould, 2003). Components include not only the ability to execute the behavior, but also the ability to utilize psychological skills needed, the ability employ perceptual skills such as decision making, and the level one’s physical preparedness. All these together give athletes confidence in them, which then leads to a positive thought process about the upcoming event and their performance in the upcoming event. They become confident about whom their opponent is and develops a positive attitude and thought process.

Self-confidence has many benefits when someone has the right amount. It can arouse positive emotions, facilitate concentration, affect goals, increase effort, affect game strategies, and affect psychological momentum. However, over confidence or under confidence can actually undermine one’s performance by creating self-doubt and eliminating the desire to take risks.

When self-confidence is non-optimal, it can lead to negative self-talk, which causes stress and eventually motivation for an athlete to not give their best during a
competition (Russell, 2001). Self-fulfilling prophecy is often used as an example in this situation. If someone is expecting to do poorly, their psychological barrier to achievement is what caused them to do poorly, it might have never had to do with their actual levels of preparation. This can work also as a facilitator, when you believe that you can do well, and then you often have a mindset that allows you to do well.

*Coach/team interaction.* For most athletes whose participation is largely team based, this is an important factor. Because it is so important that team based athletes must trust one another in order for their performance to go well, lack of trust or feelings of inadequacy from teammates or coaches can cause anxiety or apathy toward the upcoming competition. When one has the support of teammates, and knows that their teammates and their coaches are confident in their abilities, it can boost the athlete’s confidence. When teammates participate together in mental rehearsal or positive self-talk, it unites them as a team more strongly.

A team is often a group of people who spend most of their time together. In many ways, that group of people becomes an athlete’s support system, or a type of family. Just as a parent or sibling who is untrustworthy or degrading can cause disorder in mental processing, so can a struggle with a teammate or a coach. Also, a team can help with optimal pre-competitive arousal before competition. This arousal can stimulate heart-rate variability, blood flow, and positive self-talk in all athletes; in a sense they can almost feed off of one another’s energy (Russell, 2001).

Negative interactions can prevent flow by creating anxiety. This can lead to a feeling of isolation, which prevents athletes from working with one another. The two
components that were considered to be the most important inhibitors of flow in this dimension were feelings of isolation and bad attitudes of teammates, which inhibited optimal levels of pre-competitive arousal.

*Optimal arousal level.* Twenty-nine percent of the athletes in Russell’s study (2001) stated that optimal arousal prior to competition was essential to the onset of flow. Athletes suggested two higher-order themes in this dimension; these themes are relaxation and getting energized prior to competition. Athletes strive to be relaxed prior to competition because that relaxation allows for less physical exertion, leaving energy for competition. However, the integration of becoming energized prior to the activity, allows for excitement about the upcoming challenge, preparation of one’s muscles, and being ready for the game.

Non-optimal physical arousal refers to either being over aroused, which again creates high levels of anxiety, or under arousal, which can lead to a lack of physical preparation for play. Not being aroused physically can inhibit one’s muscles from being ready for action; players can be slow or sore prior to competition. Over arousal inhibits the body’s relaxation, which can cause the heart to beat too fast and feelings of physical discomfort such as nausea and headaches (Russell, 2001).

*Performance feeling.* This dimension mainly refers to the feeling of warm-up performance. Prior to most competition, athletes participate in a general warm-up, in which the main focus is to increase heart rate, then stretching, then a sport specific warm-up. A positive feeling is desired through all of these warm-ups, from a feeling of endurance and strength in the basic warm up, to a feeling of good technique and ability
during a sport-specific warm-up. The two main prerequisites for this dimension were good physical feeling, and optimal mental preparation (Russell, 2001).

On the other hand, when the warm-up feels bad, it again causes pre-competitive anxiety. A study done by Humara (1999) states that anxiety forms when an individual doubts his or her ability to cope with the situation that causes him or her stress. Dealing with a warm-up, an athlete might come into competition day with some minor doubts about his or her ability, but chalk it up to nervousness. Maybe they feel slightly nauseous, but talk themselves into believing they will be able to deal with it once the game or competition starts. However, if during the warm up they are still having bad feelings and are unable to get rid of their negative physical state, then they gain the perception that they are not prepared to cope with the task that lies ahead. Unpreparedness and over arousal cause anxiety, but it seems as though the belief that one is unable to cope with the coming stress is more prevalent during their warm-up.

Motivation. The two higher-order themes for this dimension are clear goals and motivation to perform. The definition of motivation is the direction and intensity of one’s effort. It deals with what a person seeks out, what causes them to perform, and where they are focusing their effort. Central to this dimension is the concept of intrinsic, also called internal, motivation. Intrinsic motivation is often considered one of the main factors in the flow experience. Intrinsic motivation can be defined in three different areas; these areas are knowledge, accomplishment, and stimulation (Jackson, 1996).
Knowledge-When an individual engages in an activity for the pleasure and satisfaction he or she experiences while learning, exploring, or trying to understand something new (Weinberg & Gould, 2003).

Accomplishment-When a person engages in something for the purpose of experiencing the pleasure of mastering difficult skills (Weinberg & Gould, 2003).

Stimulation-When one engages in an activity in order to experience pleasant stimulations (Weinberg & Gould, 2003).

All three of the themes of intrinsic motivation are based around the self. When an athlete does something for the purposes of self, they are also motivated by self and motivated to please self. This causes increased performance because intrinsic rewards are immediate and gratifying.

Once again, the opposite response is extrinsic motivation. This is a focus on motivation caused by external forces such as teammates, parents, or coaches. Characteristics of external motivation are integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation.

Integrated regulation-When an activity is important because of its valued outcome instead of a sole interest in the activity (Weinberg & Gould, 2003).

Identified regulation-The activity is highly valued and accepted and is therefore performed willingly even though the activity is not pleasant itself (Weinberg & Gould, 2003).

Introjected regulation-The activity itself is not self-determined, however it is motivated by other internal pleasures (Weinberg & Gould, 2003).
External regulation-When a behavior is controlled completely by external sources (Weinberg & Gould, 2003).

Amotivation-A participant experiences neither internal nor external motivation to complete and activity, therefore providing a feeling of incompetence and a lack of control (Weinberg & Gould, 2003).

Lack of motivation accounts for a lack of intrinsic motivation, a low motivation to perform at all, or a perception of a lack of challenge. Both a lack of motivation and an extrinsic motivation to perform can inhibit flow.

*Focus.* For most athletes in Russell’s study (2001) who considered this to be an important factor, they said that focus was important because it made the performance easy to prepare mentally for, and allowed the actions to seem automatic. High levels of focus are connected with high levels of self-confidence because it seems as though basic senses needed in order to participate in the event increase due to heightened focus.

Once again, inappropriate focus is linked to inhibition of flow in that poor concentration, losing focus, a worry about external factors, and pre-competitive distraction can lead to a lower level of confidence and a feeling of being unprepared. Disrupted focus creates an inability to concentrate totally on the task at hand, which is one of the eight dimensions of flow.

*Environment.* Athletes desire optimal environmental conditions. For athletes that compete outdoors, such as soccer players or rowers, their surrounding environment can make or break their performance. When athletes experience optimal conditions, they are not concerned about their surroundings. Their motivation can stay intrinsic, and their
focus can remain on the task at hand instead of being concerned with adapting to the conditions (Russell, 2001).

Lack of optimal environment can lead to external stress, dislike for the event, and situational stress. These can be stressors such as weather being too hot or too cold, however it can also pertain to the specific situation. Athletes often feel out of control of their situations, which inhibits their ability to manipulate their play. Feelings of unfairness can cause anxiety and even anger, which then leads to apathy. If an athlete feels there is nothing they can do to make an event fair, then often they would rather not participate instead of looking like a fool.

Factors that Interrupt Flow

Although all the above-mentioned dimensions are known to either inhibit or facilitate the onset of the flow experience, there are also some related dimensions that are known to disrupt flow once it has started. Using the same research done by Russell (2001), factors that disrupt flow once it has begun are non-optimal situational and environmental influences, non-optimal physical state, problems with team performance, inappropriate focus, performance errors, and pressure and self-doubt. Here is a brief overview of disrupting factors.

*Non-optimal situational and environmental influences.* Once competition has started, multiple situations are capable of occurring. Athletes who participated in Russell’s (2001) study identified six factors that can be the main cause of their disruption. These factors are mechanical failure, negative feedback from coach, negative refereeing decision, what opponents are doing, stoppage in play, and environmental distraction.
Athletes describe this feeling by saying their game was thrown off, or they were suddenly made aware of errors. Situations in which an athlete is made aware of negative feedback or negative situations can cause a lack of confidence, which once again lead to anxiety therefore causing the disruption in flow.

*Performance errors.* Performance errors can be a problem for athletes who participate in sports that involve strategy and for athletes who’s performance involves simple execution of practiced tasks. Things that can be considered performance errors can be situations such as kicking the ball to a player of the opposite team, or falling during a race. Athletes commonly wonder if they will be able to recover from their mistakes, or if they will later be blamed for their error. And athlete who is taken out of the game for making a mistake experiences immediate negative feedback. Ferraro (1999) states that shame and embarrassment are constant threats in sports because the games are often played in front of people. This puts a burden on the athlete to perform optimally, and if for some reason they feel that they are not, this can disrupt their flow experience.

*Inappropriate focus.* Many times during a performance, an athlete’s focus can switch from the task at hand to any number of other distractions. For some this can be a loss of concentration, or the presence of worry can create an inability to focus on what needs to be done, causing an athlete to worry. Becoming so occupied on the outcome of the task at hand can inhibit one’s ability to focus and feel the execution of the task (Russell, 2001).

*Non-optimal physical state.* This disruption generally either occurs during competition, or is recognized once competition has started. It can take the form on in-
competition injury or feelings of fatigue. Pain is a factor that is usually either suppressed of highly concentrated on during flow, however when the pain is seen as inhibiting optimal performance, it causes disruption (Russell, 2001).

**Self-pressure and self-doubt.** One’s confidence in his or her ability can be very important to one’s experience of flow. An inability to eliminate pressure on one’s self and self-doubt can cause a decrease in confidence, therefore creating an imbalance between challenge and skill. Doubting one’s ability then causes the disruption in flow (Russell, 2001).

**Problems with team performance.** Once again, this is an extrinsic situation. Even though athletes might be performing at their optimal level and involved in an optimal experience, external issues can create problems. Problems with team performance can be interpreted as either a lack of skill of the person, an increase in skill of the opponent, or a thought that teammates are not taking the performance seriously. These perceptions can cause anxiety, anger at teammates, and doubt in the ability of the team (Russell, 2001).

**Autotelic personality.** Although it is commonly thought that everyone is capable of experiencing flow, researchers have found that certain people are able to experience flow more often than other due to certain personality qualities. Since an autotelic experience is an experience that in done simply for its own sake, then an autotelic personality would be one that is able to have the autotelic experience more often simply because of their traits possessed. The autotelic personality exists within an internationalist framework, where the traits of one’s personality interact with various
factors in the sport context to create an overall feeling of flow (Jackson, Ford, Kimiecik, & Marsh, 1998).

People who have autotelic personalities are people who are more easily able to order their consciousness. They are not easily distracted by outside forces and are able to attend to or focus on what they are doing (Csikszentmihalyi, 1990). Autotelic personalities often have a high level of self-confidence and intrinsic motivation. They find reward for their actions as internal instead of external.

Although some people do seem to have a genetic predisposition to the autotelic personality, it seems as though the personality traits are often learned over time. One can be taught to be attentive, and one can be raised to have high levels of confidence and self-efficacy. People who are raised in well-ordered, organized families often exhibit traits of the autotelic personality (Csikszentmihalyi, 1990).

*Individualized Zones of Optimal Functioning (IZOF)*

There are several theories about exactly how the presence of anxiety affects performance, however the two most commonly accepted in the field of sport psychology are the Inverted-U hypothesis and the Individualized Zones of Optimal Functioning model.

The Inverted-U hypothesis states that arousal and performance are related in the form of an inverted U, suggesting that at low levels of arousal and high levels of arousal an athlete experience poor performance (Weinberg & Gould, 2003). This hypothesis, however, does not account for individual differences among athletes.
The Individualized Zones of Optimal Arousal model suggests that, like the Inverted-U hypothesis, an athlete experiences poor performance when they have low levels of arousal and high levels of arousal. However, the IZOF also suggests that this varies among athletes. Presented by Russian sport psychologist Yuri Hanin (Weinberg & Gould, 2003), the IZOF says that individual athletes have their own personal zone of optimal arousal. When they experience an amount of arousal that is within that zone, they might also experience optimal performance. However when they experience an amount of arousal that is either lower or higher than their zone, they are not able to perform optimally.

Research done in the area of this theory suggests that athletes who are able to get into their zone within a few days prior to their competition perform significantly better during competition than athletes who are unable to get into their zone (Woodman, Albinson, & Hardy, 1997). Although methods on finding an athlete’s optimal level or arousal are still being investigated, it does seem to be clear that all athletes have an individual zone, and it is possible for that zone to be different than other athletes. Also, it seems to be clear that if athletes are able to get into that zone, even if they aren’t able to clearly define the boundaries of it, their experience during competition will be more optimal.

In the context of this theory, when an athlete is able to reach flow, they are most likely within the boundaries of their zone. And when an athlete experiences non-optimal levels of arousal, either too much or too little, they are outside their zone boundaries and are unable to reach flow.
Arousal, Anxiety, and the Stress Process

The term anxiety is commonly confused with the term arousal. Understanding the difference between the two terms, however, is necessary in order to fully understand flow. Cox (1998) refers to arousal as “the degree of activation of the organs and mechanisms that are under the control of the body’s autonomic nervous system” (p. 86). Arousal is a term that refers to the intensity of this activation within one’s body or mind (Martens et al., 1990). It is important to note that this type of activation is a non-specific activation of either the physiological or psychological nature. Arousal can be perceived as either positive or negative, however, it might also be perceived as neither (LeUnes & Nation, 2002).

The term anxiety refers to a specific type of arousal. Weinberg and Gould (2003) define anxiety as “a negative emotional state characterized by nervousness, worry, and apprehension and associated with activation or arousal of the body” (p. 86). This negative type of arousal can result in several uncomfortable physical and mental symptoms, which include increased heart rate and negative thoughts.

There are two different types of anxiety, the first is trait anxiety and the second is state anxiety. Trait anxiety is considered to be an element of one’s personality. It is when a person is more likely to view events and situations as threatening; therefore they respond to them in a way that is not proportionate with the amount of danger presented (Weinberg & Gould, 2003). People who have high levels of trait anxiety as a part of their personalities tend to view regular situations throughout their day to be of higher importance than someone who naturally has a lower level of trait anxiety.
State anxiety, also referred to as A-state, refers more specifically to one’s mood. It is an emotional state that occurs or is provoked by a specific situation (Weinberg & Gould, 2003). It is often immediate and is characterized by fear and tension (Cox, 1998). Persons with higher levels of trait anxiety often also experience higher levels and frequencies of state anxiety due to their tendency to perceive normal events as more threatening than necessary (Hanton, Thomas & Maynard, 2002). State anxiety is not permanent, however it can last for varying different lengths of time depending on the person and the situation. There are five factors that, presented in any combination, might be responsible for an increase in one’s state anxiety. These five factors are a threat to one’s ego, a threat of personal harm, ambiguity, disruption of routine, and a threat of a negative social evaluation (Cox, 1998).

Closely linked to the ideas of arousal and anxiety is the term stress. Stress is similar to arousal in that it is a non-specific response to the presence of a stressor (Cox, 1998). Stressors can be either positive or negative, such as moments of extreme happiness or the presence of a threat, however in all situations, the body responds the same way.

Cox (1998) explains that there are four different types of stress, which are identified as eustress, distress, hyperstess and hypostress. Eustress, which is known more commonly as good stress, presents itself in the form of joy or happiness. Distress, commonly known as bad stress, is in the form of anxiety of worry. Hyperstress, or overstress, presents itself when the amount of stress one feels exceeds their ability to deal with it successfully. Hypostress, on the other hand, is a form of understress, which
presents itself in situations where one is bored, or lacks an appropriate amount of sensory stimulation (Cox, 1998).

Both the ideas of stress and anxiety are closely related to one’s perception of their ability to perform, or meet the needs, of a given situation. Several models of both the stress process and anxiety process have been brought forth from the research to explain each of these responses. McGrath (1970) refers to the perceived environmental demand as the *objective demand*. According to his stress process (see Figure 1), each one considers the objective demand in a given situation. They then perceive there to be either a balance or an imbalance between the objective demand and their ability to meet that demand. If an imbalance is determined, this imbalance then elicits a stress response (Martens et al., 1990).

![Figure 1. McGrath’s Stress Process Model](image)

Spielberger, however, came up with a different model (see Figure 2). While McGrath’s model (see Figure 1) requires simply an imbalance, Spielberger’s model requires specifically that the objective demand must exceed one’s ability to meet that
demand (Martens et al., 1990). Once an inability has been established, the situation is then perceived to be a threat to that person. A state anxiety reaction is the result of that person’s perceived threat.

![Stress Process Model](image)

Figure 2. Spielberger’s Stress Process Model (Note. From Competitive Anxiety in Sport (p. 8), by R. Martens, R. S. Vealey, & D. Burton, 1990, Champaign, IL: Human Kinetics. Copyright 1990 by Human Kinetics Publishers, Inc.. Reprinted with permission.).

Although the individual components of each of these models are different, the end results seem to be very similar. In both cases, one must start with a situation in which there is a demand placed on them. After the situation is given, that person must then appraise the situation and decide if they are capable of meeting the demands, then based on that appraisal, a response is elicited.

When put in the context of sport, this anxiety or stress response can be very debilitating to an athlete’s ability to compete (Martens et al., 1990). When one feels anxious, his or her muscle tension increases along with his or her heart rate. This increase in muscle tension can create early fatigue and inability to react quickly in a competitive situation (Weinberg & Gould, 2003). In order to come up with an anxiety
model specific to sport situations, Martens, Vealey, and Burton (1990) came up with the Competitive Anxiety Model (see Figure 3). By looking at the models of McGrath and Spielberger, they were able to break the competitive anxiety process into three subcomponents, which are a starting stimulus, a mediator, and a response.

Although this model is independent of the McGrath and Spielberger models, it borrows some of their terminology. The stimulus described in this process is the objective demand. It is used to refer to the variables that present themselves prior to evaluation of the threat. The mediator is the threat itself, referring to one’s appraisal of their ability to meet the environmental demand. The response is the state anxiety reaction that occurs directly after one has perceived their inability to meet the demand placed on them (Martens et al., 1990).

![Figure 3. Competitive Anxiety Model](Note. From Competitive Anxiety in Sport (p. 9), by R. Martens, R. S. Vealey, & D. Burton, 1990, Champaign, IL: Human Kinetics. Copyright 1990 by Human Kinetics Publishers, Inc. Reprinted with permission.).

State anxiety in sport is referred to as precompetitive anxiety (Cox, 1998). When looking at precompetitive state anxiety, sport psychologists adhere to a multidimensional theory, stating that precompetitive state anxiety presents itself in two forms. The first
form is cognitive state anxiety, which refers to the extent one worries or thinks about the upcoming competition (LeUnes & Nation, 2002). The second, somatic state anxiety refers to the amount of physiological activation involved with the anxiety. It is important to keep in mind that somatic anxiety refers more specifically to an athlete’s perception of their physical arousal and not to an athlete’s actual level of physical arousal (Weinberg & Gould, 2003).

Researchers have found there to be a relationship between competitive state anxiety and an athlete’s performance (Weinberg & Gould, 2003). There are several reasons for this. First, the amount of arousal an athlete feels physically can affect their ability to perform tasks. Over-arousal can cause one’s hands to become shaky, or their knees to buckle. Under-arousal can cause a lack of adrenaline, therefore leaving the athlete physically unprepared to meet the demands of performance and competition (Weinberg & Gould, 2003). Also, negative thoughts or worries can cause a lack of focus. If an athlete is not able to focus on the task at hand, then their ability to respond to demands becomes limited. Worry can also lead to physical sickness, such as vomiting or diarrhea (Cox, 1998). Another way anxiety can affect performance is related to an athlete’s self-confidence. In a meta-analysis conducted by Craft, Magyar, Becker, & Feltz (2003), it was found that low self-confidence has the greatest affect on performance. According to their research, self-confidence acts a mediator between cognitive and somatic anxiety, suggesting one of two situations. The first being that when an athlete perceives themselves as not able to complete an upcoming task, it causes worry which then leads to further somatic anxiety. The second situation is that negative
thoughts then lead to low self-confidence, which then causes poor performance in athletes.

According to research done by Martens et al. (1990), competitive anxiety follows what they refer to as the competitive process. There are four basic components to their competitive process; these components are the objective competitive situation, the subjective competitive situation, the response, and the consequences.

The first component of the competitive process model is the objective competitive situation (OCS). This component specifically identifies the objective demand talked about in the Martens et al. (1990) competitive anxiety model. The objective demand in each situation is determined based on the desired outcome for the participant. This can be a performance goal or simply a personal best. When the participant assesses the OCS, all components of the competitive situation must be taken into account. This includes not only the environment, but also the nature of the task, possible rewards, and people in the audience. This portion of the process is important because it is the environment, which contains the possible threat, therefore leading to the second part, the subjective competitive situation.

The way in which one “perceives, accepts, and appraises the OCS” (Martens et al., 1990, p. 17) is referred to as the subjective competitive situation, or SCS. There are several factors that direct the way one appraises the OCS, these factors include feelings and emotions, personality traits, and even relationship issues. Although the SCS is difficult to measure because it is based on the individual and the situation, it is important
to understand people’s perceptual differences when considering how a situation might affect them.

The next part of the Martens et al. (1990) competitive process is the response. Once a situation have been presented (OCS) and appraised (SCS), one must then respond based on their appraisal. Martens et al. (1990) suggest that a person is able to respond at three different levels, these levels are behavioral, physiological, and psychological. Behavioral responses can appear in the form of performance, such as performing poorly or performing well, while physiological responses include increased sweating or muscle tension. Psychological responses might be increased state anxiety.

Lastly, the competitive process model considers the consequences. For many competitors, consequences are considered in terms of positives and negatives, or winning and losing. How one ends up in response to the first three stages of this process can greatly affect their continued participation in competitive situations.

Looking back to the theory of flow, several of its dimensions can be interrupted, or prevented from happening due to low self-confidence, cognitive state anxiety, or somatic state anxiety. For example, low self-confidence might cause an athlete to perceive his or her skill level as less than what is needed for a specific competition, which may or may not be realistic. As the competition time comes closer, those feelings of low self-confidence might cause worry and an interruption in focus. This inability to properly focus could prevent certain dimensions of flow from occurring, namely total concentration, and it might prevent an athlete from setting clear goals. This inability to focus and set goals might then cause somatic anxiety to occur. The athlete might develop
an upset stomach or cramps in response to increased arousal in their autonomic nervous system. Whether or not the original lack in self-confidence and the presence of anxiety was realistic, meaning whether or not the athlete was actually lack appropriate skill level to complete the challenge, it affected the athlete’s performance negatively.
Chapter 3
Methods

Participants

Eleven members of the Ohio University Women’s Rowing team, who participated in the winter training and spring race season of 2006, volunteered. The age range for participants was 18 to 23 years. Experience level ranged from 1-7 years of competitive rowing experience to one season of experience. All participants were healthy and passed a swim test according to Ohio University Club Sport’s standards. Participants were excluded from participation if they left the team before the end of winter training and/or did not attend the one-week training camp during Ohio University’s Spring Break.

Instrumentation

CSAI-2 (Competitive State Anxiety Inventory – 2). This is an assessment of pre-competitive anxiety and is one of the most commonly used inventories for this type of research (Hanton et al., 2004). It assesses somatic anxiety, cognitive anxiety, and self-confidence. The CSAI-2 was administered before competition to assess levels of pre-competitive anxiety. Participants rate their anxiety responses over the constructs of cognitive anxiety, somatic anxiety, and self-confidence. There were 27 total items, nine items representing each category. Each item was rated on a Likert scale ranging from 1 to 4, with one representing “not at all” and four representing “very much so.” Examples of items included, “I am concerned about this competition” and “My body feels tense.” The internal consistency for the subscales of this scale has been reported between 0.79 and 0.90 (Mellalieu, Hanton, & O’ Brien, 2004). An internal consistency of 0.80 to 0.89
was found for the subscales under the cognitive anxiety construct and 0.72 to 0.84 for somatic anxiety (Hanton, Thomas, & Maynard, 2004; Mellalieu et al., 2004). All subscales were used in the evaluation of participants.

**FSS - 2 (Flow State Scale - 2).** This scale was developed by Jackson and Marsh in 1996 (Jackson et al., 1998). It is used to assess the degree to which an athlete experienced both total flow and also the nine individual dimensions of flow during one specific competitive event. This instrument uses a five-point Likert scale to assess the nine different dimensions of flow. Examples of items on this scale include, “I am challenged, but I believe my skills will allow me to meet the challenge” and “I am aware of how well I am performing.” The FSS-2 has been observed to be valid, with a goodness-of-fit value of 0.89 for the nine dimensions of flow and 0.88 for total, or global, flow. Reliability, or internal consistency, ranged from 0.80 to 0.86, with a mean of 0.83 (Jackson & Eklund, 2004).

The FSS-2 gives a score for all nine dimensions of flow and for total flow. According to Jackson et al. (2004), however, the individual dimensions of challenge-skill balance, total concentration, clear goals, and sense of control have been shown to have the strongest relationship with total flow. In a canonical correlation analysis, canonical loading values were shown to be challenge-skill balance (.91), total concentration (.80), clear goals (.72), and sense of control (.71). In order to narrow the focus of this study, results report relationships found between anxiety subscales and those individual dimensions of flow shown to have the strongest relationship with total flow.
Procedure

Data collection occurred on two separate occasions. The first was at the Southern Intercollegiate Rowing Association Regatta (SIRA) and the second was at the West Virginia Governor’s Cup (Gov Cup) Regatta. The same subjects were asked to complete the questionnaire at each regatta, and the same data procedure was followed each time. The first regatta (SIRA), during which questionnaires were administered, was a high-profile regatta known for its high level of competition; this was intended as it was assumed to be a high-anxiety situation for the team. The second regatta in which questionnaires were administered was the W.V. Governor's Cup Regatta that was a lower profile regatta; this was intended as it was assumed to be a low-anxiety situation for the team.

These regattas were also chosen for their position and proximity to one another in the season. The SIRA regatta took place on Friday, April 14, 2006 and Saturday, April 15, 2006 and the West Virginia Governor’s Cup Regatta took place on Saturday, April 29, 2006. The SIRA regatta, hosting over 60 teams each year, is only the second regatta of the season for members of OUWC and it is the first regatta of the season that includes more than 5 teams. It presents a high level of competition, meaning several of the athletes who participate are on athletic scholarships and are revered as some of the top rowers in the country. At this point in the season, athletes have been rowing on the water for only two weeks and have only attended one regatta prior to this race. Teams travel from all over the country to compete at SIRA and the rules that must be followed by each team are very strict. For novice rowers, this is the largest regatta in their short history of
competition, and for many of them it is the first time they have come into contact with varsity, school sponsored, programs. Ohio Women’s Crew has never placed in the finals at SIRA, however the team has done well in semi-final races several times in the past.

The W.V. Governor’s Cup Regatta hosts between 10 and 15 teams each year and takes place the weekend after the SIRA regatta. When compared to SIRA, Gov Cup presents a moderate level of competition, meaning the teams that attend are fast and talented, however few teams have scholarship athletes. The teams that attend Gov Cup typically finish in the middle range at SIRA. Most teams who come to Gov Cup are club programs. Ohio Women’s Crew has won several finals races at this regatta in the past.

Regattas generally start early in the morning, with a coach and coxswain’s meeting occurring at first light. This meeting is to inform the coaches and coxswains of the rules and the course. Maps of the course, as well as bow numbers and race schedules are given out. Prior to a race, a given boat generally meets for their pre-race preparation about 45 minutes before launch time, which is 45-60 minutes prior to the race time. Upon meeting before their race, athletes in each boat line up according to actual boat order and run for ten minutes. After running, uniform changes and other needs are addressed. Athletes then circle up to stretch and plan race strategy. This same procedure is followed for each boat, at each regatta. Each participant preceding the season signed informed consent.

The Competitive State Anxiety Inventory - 2, CSAI-2, was used to assess levels of pre-competitive anxiety in the athletes. Data collection was blind and administered within one hour of each rowers launch time, while rowers were stretching at
their pre-race meeting. Members of OUWC were given instructions about how to fill out each questionnaire and asked to complete the questionnaire and return it to their coxswain. After each rower was done with their race, they were given the FSS-2 scale within an hour after they finished. This questionnaire assessed occurrences of flow according to the nine separate dimensions during the competition. Once again, participants were asked to fill out their questionnaire according to the directions provided and then return it to their coxswain. Questionnaires took approximately 10 minutes to read and complete.

Data Analysis

The purpose of this study was to observe if there is a significant relationship between the occurrence of flow and the presence of pre-competitive anxiety. Paired $t$-tests were used to assess differences in occurrences of anxiety between the SIRA Regatta and the Gov Cup Regatta. A paired $t$-test was also used to assess differences in levels of flow between the SIRA Regatta and the Gov Cup Regatta. Pearson’s Product Moment Correlations were used to assess relationships between anxiety and occurrences of flow.
Chapter 4

Results

Purpose of Study

This chapter reports the results of the data collection and analysis of that data. The purpose of this study was to examine levels of pre-competitive anxiety and occurrence of flow in female collegiate club rowers during two separate competitive spring regattas. Regattas where data was collected were the Southern Intercollegiate Rowing Association Regatta, hosted on Friday, April 14, 2006 and Saturday, April 15, 2006 and the West Virginia Governor’s Cup Regatta, hosted on Saturday, April 29, 2006. These regattas were chosen specifically due to their proximity to one another and their position in the schedule.

Due to the small sample size used in this study, paired \( t \)-tests were used to determine differences in pre-competitive anxiety and flow occurrence at two separate regattas. A Pearson’s Product Moment Correlations were used to examine the relationships between three components of pre-competitive anxiety, total flow and four (challenge-skill balance, total concentration, clear goals, sense of control) of the nine dimensions of flow.

These data indicate that anxiety levels were moderate at both regattas, and there was no statistically significant difference in pre-competitive anxiety levels between the two regattas. However, there were significant differences between flow levels. These correlations point to a relationship between pre-competitive anxiety and flow.
Null Hypotheses

In order to answer the original research questions presented, the following null hypotheses were considered:

H$_01$: There is no significant difference in levels of pre-competitive anxiety in Ohio University women’s crew team members between the Southern Intercollegiate Rowing Association Regatta (SIRA) and the West Virginia Governor’s Cup Regatta.

H$_02$: There is no significant difference between the flow state measures of total flow, challenge-skill balance, clear goals and feedback, total concentration, and sense of control in Ohio University women’s crew team members between the Southern Intercollegiate Rowing Association Regatta (SIRA) and the West Virginia Governor’s Cup Regatta.

H$_03$: There is no significant relationship between pre-competitive anxiety and the individual dimensions of flow labeled challenge-skill balance, total concentration, clear goals, and sense of control, as well as total flow levels in Ohio University women’s crew team members between the Southern Intercollegiate Rowing Association Regatta (SIRA) and the West Virginia Governor’s Cup Regatta.

Results

The first research question proposed in this study was that of differing anxiety levels exist between the SIRA Regatta and the W.V. Gov Cup Regatta. It was originally hypothesized that the SIRA Regatta would create a greater amount of pre-competitive anxiety in participants than the W.V. Gov Cup Regatta due to its larger size, position in the season, and greater emphasis on performance goals. Results (see Table 1) of a paired
$t$-test revealed no significant difference in levels of pre-competitive cognitive anxiety ($t(10) = 0.896; p = 0.391$) and pre-competitive somatic anxiety ($t(10) = 0.851; p = 0.415$). Also, no significant difference was found in pre-competitive levels of self-confidence ($t(10) = 0.763; p = 0.463$).

Table 1

Means and Standard Deviations for CSAI-2 at the SIRA Regatta and the W. V. Gov Cup Regatta.

<table>
<thead>
<tr>
<th></th>
<th>SIRA Regatta</th>
<th>W.V. Gov Cup Regatta</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Cognitive Anxiety</td>
<td>20.8182</td>
<td>5.47391</td>
</tr>
<tr>
<td>Somatic Anxiety</td>
<td>19.6364</td>
<td>7.31126</td>
</tr>
<tr>
<td>Self-Confidence</td>
<td>21.6364</td>
<td>6.65241</td>
</tr>
</tbody>
</table>

Note. Maximum score = 36; Minimum score = 9.

The second research question presented in this study questioned whether the levels of individual dimensions of flow, which are labeled challenge-skill balance, total concentration, clear goals, and sense of control, and levels of total flow differ between the SIRA Regatta and the W.V. Gov Cup Regatta. A paired $t$-test was conducted for each dimension and for total flow. Results show that levels of total flow differed significantly ($t(9) = -3.272; p = 0.01$), as did challenge-skill balance ($t(9) = -4.587; p = 0.001$). There
was no significant difference found within the dimensions of total concentration \( (t(9) = -1.83; p = .101) \), clear goals \( (t(9) = -1.561; p = 0.153) \), and sense of control \( (t(9) = -1.953; p = 0.083) \). This suggests that total flow occurrence was significantly greater at the Gov Cup Regatta than it was at the SIRA Regatta, as well as the dimension of Challenge-Skill Balance.

**Table 2**

*Description Statistics for Participants Who Completed the FSS-2 at the SIRA Regatta and the W. V. Gov Cup Regatta.*

<table>
<thead>
<tr>
<th></th>
<th>SIRA Regatta</th>
<th>W. V. Gov Cup Regatta</th>
<th>( t )</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenge-Skill Balance</td>
<td>3.45</td>
<td>3.942</td>
<td>-4.587</td>
<td>0.001*</td>
</tr>
<tr>
<td>Total Concentration</td>
<td>3.65</td>
<td>4.025</td>
<td>-1.830</td>
<td>0.101</td>
</tr>
<tr>
<td>Clear Goals</td>
<td>4.15</td>
<td>4.325</td>
<td>-1.561</td>
<td>0.153</td>
</tr>
<tr>
<td>Sense of Control</td>
<td>3.37</td>
<td>3.775</td>
<td>-1.953</td>
<td>0.083</td>
</tr>
<tr>
<td>Total Flow</td>
<td>3.56</td>
<td>3.994</td>
<td>-3.272</td>
<td>0.010*</td>
</tr>
</tbody>
</table>

*Note.* Maximum score = 5; Minimum score = 1. Significance is denoted with an (*). The third hypothesis for this study was examined using a Pearson’s correlations.

Table 3 shows a correlation matrix for the individual components of pre-competitive anxiety and the individual dimensions of flow, including total flow, at the SIRA Regatta.
Strong positive correlations were found between pre-competitive self-confidence and total flow ($r = 0.826$), as well as pre-competitive self-confidence and challenge-skill balance ($r = 0.807$). Moderate positive correlations were found between pre-competitive self-confidence and the individual flow dimensions of total concentration ($r = 0.604$), clear goals ($r = 0.776$), and sense of control ($r = 0.731$).

These data show that pre-competitive cognitive anxiety had moderately negative correlations with total flow ($r = -0.527$) and the individual flow dimensions of challenge-skill balance ($r = -0.621$) and total concentration ($r = -0.689$). Pre-competitive cognitive anxiety was also found to have weak inverse relationships with the individual flow dimensions of clear goals ($r = -0.164$) and sense of control ($r = -0.318$). Pre-competitive somatic anxiety was found to have moderately negative correlations with total flow ($r = -0.504$) and the individual flow dimension of challenge-skill balance ($r = -0.609$). Weak negative correlations were found between pre-competitive somatic anxiety and the individual flow dimensions of total concentration ($r = -0.474$), clear goals ($r = -0.247$), and sense of control ($r = -0.349$).
Table 3

Correlations Between CSAI-2 Subscales and FSS-2 Individual Dimensions and Total Flow

<table>
<thead>
<tr>
<th></th>
<th>SIRA Regatta</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Challenge-Skill Balance</td>
</tr>
<tr>
<td>Cognitive Anxiety</td>
<td>-0.621*</td>
</tr>
<tr>
<td>Somatic Anxiety</td>
<td>-0.609*</td>
</tr>
<tr>
<td>Self-Confidence</td>
<td>0.807**</td>
</tr>
</tbody>
</table>

*Note:* Moderate correlations are considered to be >0.5 and >-0.5, and are denoted with an (*). High Correlations are considered to be >0.8 and >-0.8, and are denoted with an (**).

A Pearson’s product correlation assessed the relationship between total flow and the individual dimensions of flow at the SIRA Regatta (see Table 4). These data show a strong positive correlation between total flow and challenge-skill balance \((r = 0.903)\), as well as moderate correlations between total flow and total concentration \((r = 0.734)\), clear goals \((r = 0.558)\), and sense of control \((r = 0.885)\).
Table 4

*Correlations Between Total Flow and Individual Dimensions of Flow*

<table>
<thead>
<tr>
<th></th>
<th>SIRA Regatta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenge-Skill</td>
<td></td>
</tr>
<tr>
<td>Balance</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Concentration</td>
<td></td>
</tr>
<tr>
<td>Clear Goals</td>
<td></td>
</tr>
<tr>
<td>Sense of Control</td>
<td></td>
</tr>
<tr>
<td>Total Flow</td>
<td>0.903**</td>
</tr>
<tr>
<td></td>
<td>0.734*</td>
</tr>
<tr>
<td></td>
<td>0.558*</td>
</tr>
<tr>
<td></td>
<td>0.885*</td>
</tr>
</tbody>
</table>

*Note.* Moderate correlations are considered to be >0.5 and >0.5, and are denoted with an (*). High correlations are considered to be >0.8 and >0.8, and are denoted with an (**).

A Pearson’s correlation was also run to determine the relationship between the subscales of the CSAI-2 at the SIRA Regatta (see Table 5). A moderate positive correlation was found between pre-competitive cognitive anxiety and pre-competitive somatic anxiety \( r = 0.78 \). Moderate negative relationships were found between pre-competitive self-confidence and pre-competitive cognitive anxiety \( r = -0.586 \) and pre-competitive self-confidence and pre-competitive somatic anxiety \( r = -0.7 \).

Table 5

*Correlations Between CSAI-2 Subscales*

<table>
<thead>
<tr>
<th></th>
<th>SIRA Regatta</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive Anxiety</td>
<td></td>
</tr>
<tr>
<td>Somatic Anxiety</td>
<td></td>
</tr>
<tr>
<td>Self-Confidence</td>
<td></td>
</tr>
<tr>
<td>Cognitive Anxiety</td>
<td>0.78*</td>
</tr>
<tr>
<td></td>
<td>-0.586*</td>
</tr>
<tr>
<td>Somatic Anxiety</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>-0.774*</td>
</tr>
</tbody>
</table>

*Note.* Moderate correlations are considered to be >0.5 and >0.5, and are denoted with an (*). High correlations are considered to be >0.8 and >0.8, and are denoted with an (**).
A Pearson’s correlation matrix was again used at the W.V. Gov Cup Regatta in order to determine the relationship between flow states and the pre-competitive anxiety subscales (see Table 6). Results show moderate negative correlations between pre-competitive cognitive anxiety and total flow \((r = -0.616)\), as well as with the individual flow dimensions of challenge-skill balance \((r = -0.703)\) and total concentration \((r = -0.073)\). Weak negative correlations were established between pre-competitive cognitive anxiety and the individual flow dimensions of clear goals \((r = -0.097)\) and sense of control \((r = -0.263)\). Weak negative correlations were established between pre-competitive somatic anxiety and the individual flow dimensions of challenge-skill balance \((r = -0.244)\) and sense of control \((r = -0.066)\), as well the total flow \((r = -0.198)\). Weak positive correlations were established between pre-competitive somatic anxiety and the individual flow dimensions of total concentration \((r = 0.341)\) and clear goals \((r = 0.129)\). Pre-competitive self-confidence was found to have a moderate positive relationship with the individual flow dimension of challenge-skill balance \((r = 0.563)\) and weak positive correlations with total flow \((r = 0.372)\), total concentration \((r = 0.219)\), sense of control \((r = 0.347)\), and a weak negative correlation with clear goals \((r = -0.128)\).
Table 6

*Correlations Between CSAI-2 Subscales and FSS-2 Individual Dimensions and Total Flow*

<table>
<thead>
<tr>
<th>W.V. Gov Cup Regatta</th>
<th>Challenge-Skill Balance</th>
<th>Total Concentration</th>
<th>Clear Goals</th>
<th>Sense of Control</th>
<th>Total Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Anxiety</td>
<td>-0.703*</td>
<td>-0.073</td>
<td>-0.097</td>
<td>-0.263</td>
<td>-0.616*</td>
</tr>
<tr>
<td>Somatic Anxiety</td>
<td>-0.244</td>
<td>0.341</td>
<td>0.129</td>
<td>-0.066</td>
<td>-0.198</td>
</tr>
<tr>
<td>Self-Confidence</td>
<td>0.563*</td>
<td>0.219</td>
<td>-0.128</td>
<td>0.347</td>
<td>0.372</td>
</tr>
</tbody>
</table>

*Note.* Moderate correlations are considered to be >0.5 and >-0.5, and are denoted with an (*). High Correlations are considered to be >0.8 and >-0.8, and are denoted with an (**).

A Pearson’s product correlation was run to assess the relationship between total flow and the individual dimensions of flow at the W.V. Gov Cup Regatta (see Table 7). Results of this test show a high positive correlation between total flow and challenge-skill balance \((r = 0.931)\), as well as moderate correlations between total flow and total concentration \((r = 0.786)\), clear goals \((r = 0.587)\), and sense of control \((r = 0.74)\).
Table 7

Correlations Between Total Flow and Individual Dimensions of Flow at the W.V. Gov Cup Regatta

<table>
<thead>
<tr>
<th></th>
<th>Challenge-Skill Balance</th>
<th>Total Concentration</th>
<th>Clear Goals</th>
<th>Sense of Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Flow</td>
<td>0.931**</td>
<td>0.786*</td>
<td>0.587*</td>
<td>0.74*</td>
</tr>
</tbody>
</table>

Note. Moderate correlations are considered to be >0.5 and <-0.5, and are denoted with an (*). High Correlations are considered to be >0.8 and <-0.8, and are denoted with an (**).

A Pearson’s correlation was also run to determine the relationship between the subscales of the CSAI-2 at the W.V. Gov Cup Regatta (see Table 8). A moderately positive correlation was found between pre-competitive cognitive anxiety and pre-competitive somatic anxiety ($r = .781$). Moderately negative relationships were found between pre-competitive self-confidence and pre-competitive cognitive anxiety ($r = -0.577$) and pre-competitive self-confidence and pre-competitive somatic anxiety ($r = -0.412$).
Table 8

*Correlations Between CSAI-2 Subscales at the W.V. Gov Cup Regatta*

<table>
<thead>
<tr>
<th>W.V. Gov Cup Regatta</th>
<th>Somatic Anxiety</th>
<th>Self-Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Anxiety</td>
<td>0.781*</td>
<td>-0.577*</td>
</tr>
<tr>
<td>Somatic Anxiety</td>
<td>N/A</td>
<td>-0.412</td>
</tr>
</tbody>
</table>

*Note.* Moderate correlations are considered to be >0.5 and >-0.5, and are denoted with an (*). High Correlations are considered to be >0.8 and >-0.8, and are denoted with an (**).
Chapter 5
Discussion

The purpose of this study was to examine the relationship between pre-competitive anxiety and flow in female collegiate club rowers during varying levels of competition. Results of this study suggest that although anxiety did not differ significantly between two separate regattas, relationships exist between anxiety and flow.

Results for the first hypothesis show that no significant difference in anxiety was found in rowers between the SIRA Regatta and the W.V. Gov Cup Regatta (see Table 1). The way the regatta schedule was set up for the Ohio University Women’s Rowing team put the SIRA Regatta as the second race the team attended during the competitive spring season. The first regatta they attend is usually composed of five or fewer teams, while the SIRA Regatta is currently the second largest spring regatta in the country. SIRA hosts over 60 teams each year; these teams represent some of the most competitive schools in the sport as well as some of the least competitive schools in the sport.

The second race used in this study is the W.V. Gov Cup Regatta, which is the third race in the season. It was hypothesized this regatta would cause a weaker anxiety response than the SIRA Regatta. This regatta takes place the weekend after the SIRA Regatta. The W.V. Gov Cup Regatta was expected to create a weaker anxiety response in rowers because it took place directly after the shock of the SIRA Regatta, because it a 1-day event compared to SIRA, which is a 2-day event, and because there are less teams, about 15 in all.
Although the raw data shows a small difference, there are several possible reasons for the lack of significance. It is important to first observe that levels of anxiety for both regattas fell in the middle of the overall possible range of scores. Possible scores for the CSAI-2 range anywhere from 1 to 40. Results for this study (see Table 1) show the mean anxiety level for the SIRA Regatta to be $M=20.8182$ and the mean anxiety level for the Gov Cup Regatta to be $M=20.0000$. This suggests that neither regatta produced a high anxiety response in participants. A possible reason for this can be found when looking at the sample of participants who volunteered for this study. Eleven out of 25 members of OUWC chose to take part in this study. No reward was offered and participants were told there would be no repercussions for them if they decided not to participate. Pre-race preparation at a regatta involves several steps. It is possible the athletes who chose to participate in this study were also those athletes who were comfortable with the upcoming competition and the associated pressures, and therefore felt comfortable using their pre-race time to assist the study instead of using that time for mental focus. It is also possible those who chose not to participate did so because they had a high level of anxiety and decided to use their pre-race time to focus and mentally prepare for the upcoming competition.

Another reason for lack of significance could have been the average years of experience of the participants. Most of the subjects were in their first year of participation, which suggests that each regatta could have presented about the same amount of anxiety due to their not knowing what to expect. A third reason could have been the design of the regattas. As said before, the SIRA Regatta is the second largest...
spring regatta in the country. Due to its size and popularity, it is run efficiently. Race
times do not change, thorough explanations and instructions are given at the beginning of
each day, and officials are formally trained. The W.V. Gov Cup regatta is smaller and
less competitive, but it is run less efficiently. Occasionally race times will be rearranged,
coxswains are not required to weigh in, and officials sometimes do not know all the rules.

Perhaps the primary reason for the lack of a significant difference in anxiety
levels between regattas was the lack of subjects. When this study was originally planned
it was hoped all members of the team would participate. However, due to the hectic
nature of the regattas, several girls decided not to participate at the last minute, which
could have also been due to above-mentioned factors. Further research in this area
should include all members of teams to control for varying levels of anxiety and research
should be done within a much larger sample size. It is possible a reward of some sort
could be offered, which would give incentive to break normal routine and pre-race
preparation for the purpose of research. This would help to ensure that results more
accurately represented the experiences of all rowers.

In addition to hypothesizing a difference in anxiety in rowers between regattas, a
difference in flow was also expected. Individual flow dimensions known to be the best
predictors of total flow are challenge-skill balance, total concentration, clear goals, and a
sense of control (Jackson & Eklund, 2004), therefore these dimensions along with total
flow were assessed. Although there was no significant difference in levels of pre-
competitive anxiety between regattas, there was some significance found in occurrence of
flow. A significant difference was found in total flow ($p = 0.01$), as well as the
dimension of challenge-skill balance ($p = 0.001$). Also, sense of control was found to have a moderate difference ($p = 0.083$), although no significance at the $<0.05$ level was found.

The design of the regattas could account for some of the difference between strength of the flow dimensions. Part of the reason the SIRA Regatta was expected to cause more anxiety was due to the competitive level of the regatta. SIRA Regatta presents a very large challenge, and, in comparison to larger programs, less of a chance for a small team such as OUWC to succeed. It is likely members of OUWC entered this regatta with the perception that although they might do well, they were not going to win a gold medal. On the other hand, the W.V. Gov Cup Regatta presented an opportunity to win. There were fewer teams, a lower level of competition, and a history of doing well. It makes sense that participants had a greater balance between perceived skill and perceived challenge at the Gov Cup Regatta than they did at the SIRA Regatta.

Jackson and Eklund (2004) found challenge-skill balance to be the greatest predictor of total flow. It would follow that if there was a significant difference between challenge-skill balance between regattas, there would also be a significant difference in total flow. It is also worth pointing out that although significance was not found for total concentration, clear goals, or a sense of control, they did increase at the W.V. Gov Cup Regatta. This suggests that the increase in total flow was not caused by challenge-skill balance alone, but also by the other dimensions of flow.

In order to establish relationships between variables, the next series of analyses were correlations. Table 3 presents the correlations between the individual components
of pre-competitive state anxiety and the individual dimensions of flow, along with total
flow, at the SIRA Regatta. As seen in the first row, cognitive anxiety had a moderate
negative correlation with the sub-components of challenge-skill balance ($r = -0.621$) and
total concentration ($r = -0.689$), as well as total flow ($r = -0.527$). Cognitive anxiety had
been suggested to have the strongest relationship with occurrence of flow, as compared to
somatic anxiety, in past research (Jackson et al., 1998; Martens et al., 1990) due to the
strong psychological nature of the flow states. Although a stronger correlation between
cognitive anxiety and clear goals ($r = -0.164$) and sense of control ($r = -0.318$) would
have been expected, the correlations between challenge-skill balance, total concentration,
and total flow suggest there to be at least a moderate relationship between cognitive
anxiety and flow occurrence.

The second row of Table 3 shows the correlations between pre-competitive
somatic anxiety and flow at the SIRA Regatta. Here we see a moderate negative
relationship between somatic anxiety and challenge-skill balance ($r = -0.609$), as well as
total flow ($r = -0.504$).

In both cases, cognitive and somatic, the correlations are negative. This suggests
that as cognitive and somatic anxiety decrease; the individual dimensions of flow
increase, and global flow increases. As discussed before, cognitive anxiety can produce
negative self-thoughts and worry. Somatic anxiety can produce muscle tension and
increased heart rate. Both types of anxiety can create an imbalance in perceived ability
verses the perceived skill needed. They can produce an inability to concentrate and feel
in control of the situation. Worry and obsessive negative thoughts can control one’s mind and confuse their goals.

Self-confidence correlations were significant across the board. High positive correlations were found between self-confidence and challenge-skill balance, as well as with self-confidence and total flow. Moderate correlations were found between self-confidence and total concentration, clear goals, and sense of control. According to Martens et al. (1990), self-confidence tends to have an inverse relationship with cognitive and somatic anxiety, meaning when someone has a high level of self-confidence, they tend to have lower levels of cognitive and somatic anxiety. Because of this, while we would expect to see negative correlations between cognitive and somatic anxiety and flow, we would expect to see positive correlations between self-confidence and flow. Suggesting that as cognitive and somatic anxiety decrease, self-confidence and therefore flow increase. With the increase of self-confidence comes a greater belief in one’s ability, therefore facilitating the optimal, or flow, experience.

According to Jackson and Eklund (2004) the individual dimensions of flow that are the greatest predictors of flow are challenge-skill balance, total concentration, clear goals, and sense of control, in that order. In order to test this, a Pearson’s correlation was run to see the relationship between total flow and the flow components. A very strong correlation was found between total flow and challenge-skill balance. One of the major parts of the definition of flow is that there must be a balance in one’s perception of their ability and their perception of the ability needed, so it is to be expected that there is a
strong relationship between total flow and the challenge-skill balance sub-component of flow.

Although the second strongest relationship was expected to be between total flow and total concentration, it was instead found between total flow and sense of control \((r = 0.885)\). Total concentration then came in to have the third strongest relationship, followed by clear goals.

Martens et al. (1990) have suggested that all the sub-scales of the CSAI-2 are independent of one another, however it is also stated that relationships have been found in pre-competitive situations. In order to test the relationships between the pre-competitive anxiety sub-components, a Pearson’s correlation was run. Results show a relationship between all sub-components. In the case of cognitive and somatic anxiety, if the two forms of anxiety were independent of each other, then it would be expected we would see a lower correlation. However, at the SIRA Regatta the relationship is demonstrated to be fairly strong, suggesting that in this situation, cognitive and somatic anxiety is not completely independent of one another.

Self-confidence is shown to have moderate negative correlations with cognitive and somatic anxiety, however the stronger of the two relationships is with somatic anxiety. As shown in Table 3, self-confidence is highly correlated with flow and somatic anxiety was shown to have the weakest correlation with flow. It is strange to see here that out of the two forms of anxiety, somatic anxiety has the stronger relationship with self-confidence. These results suggest an athlete’s self-confidence, or belief in their
ability, is more greatly affected by how they feel physically as compared to how they feel mentally.

Correlation results for the Gov Cup Regatta show moderate negative relationships between pre-competitive cognitive anxiety and challenge-skill balance ($r = -0.703$), total concentration ($r = -0.073$), and total flow ($r = -0.616$). Weak correlations were found between pre-competitive cognitive anxiety and clear goals ($r = -0.097$) and sense of control ($r = -0.263$) and total concentration ($r = -0.073$). At the SIRA Regatta the strongest relationship was found between cognitive anxiety and total concentration, however at the Gov Cup Regatta, cognitive anxiety and total concentration had the weakest relationship. Somatic anxiety at the Gov Cup Regatta was expected to have negative correlations with components of flow. No significance was found between somatic anxiety and the components of flow, and also a positive correlation was found between somatic anxiety and total concentration and clear goals. Self-confidence was found to have a moderate correlation with only challenge-skill balance ($r = 0.563$) and a negative correlation was found between self-confidence and clear goals.

The correlation results found at the Gov Cup Regatta were not at all expected. It was expected that since there was no significant difference in anxiety between the two regattas, the relationships would also remain the same. Paring with the idea that as anxiety decreases flow will increase, and self-confidence has a positive relationship with flow occurrence, is the assumption that correlations between flow and anxiety will be all negative and correlations with self-confidence will be all positive. This is not what was found at the Gov Cup Regatta. Although there was not a significant difference in anxiety
levels between regattas, the small decrease or lack of high anxiety could account for these strange relationships. It is possible that in the absence of enough anxiety, there cannot be a relationship established between anxiety components and flow states. Another possible reason for this correlation outcome is that the increase in flow could have been caused by something other than a decrease in anxiety. It could have been caused by anything from coach-team interaction to team cohesion.

The correlations between total flow and the individual dimensions of flow for the Gov Cup Regatta were found to be high in the case of total flow and challenge-skill balance ($r = 0.931$), and moderate in the cases of total concentration ($r = 0.786$), clear goals ($r = 0.587$), and sense of control ($r = 0.74$). This differs from relationships found at the SIRA Regatta in that sense of control was found to be third strongest relationship instead of the second. A possible reason for this difference could be the design of the regattas. At the SIRA Regatta, although races run as scheduled, it is difficult to keep in order with the officials due to the extreme amount of rules and the large number of teams. If your boat does not pass a complete inspection, you are sent back to fix it, which could cause you to miss your race. There is often an official directing you, and the direction is not always comforting. At the Gov Cup Regatta, however, there are less teams and the race is run less efficiently. Instead of worrying if you will make it to your race, you are worrying that your race will happen at a different point in the regatta. Considering these differences, it would follow that a sense of control would be a larger factor at the SIRA Regatta due to size of the regatta, the amount of rules that must be followed, and the
ability to concentrate despite disorganization would be a larger factor at the Gov Cup Regatta.

Table 8 represents correlations within the CSAI-2 sub-scales. As stated before, it was expected results would show a positive relationship between the two anxiety sub-scales and negative relationships between anxiety sub-scales and self-confidence. Moderate relationships were found between cognitive anxiety and somatic anxiety ($r = 0.781$) and cognitive anxiety and self-confidence ($r = -0.577$). A weak negative correlation was found between somatic anxiety and self-confidence ($r = -0.412$). These relationships are weaker than the relationships found at the SIRA Regatta, however they follow the same pattern of strength. Once again, it is possible that due to the slight decrease in anxiety at the Gov Cup Regatta, it was more difficult to establish relationships between the components, or they played less of a role in the athlete’s overall view of the regatta.

**Conclusions**

Conclusions of this study show that although anxiety levels did not differ between regattas, total or global flow occurrence did. As suggested by Martens et al. (1990), challenge-skill balance was found to be the best predictor of total flow, however in this study it was unclear as to whether total concentration or sense of control was the second strongest predictor of total flow and it was suggested that it is dependent on the situation. Several moderate relationships were found between flow states and anxiety, suggesting that as anxiety decreases, flow increases. Also it was found that as self-confidence
increases so do flow states. Due to the results of the Gov Cup Regatta correlations, it might also be suggested that flow can occur due to factors not directly related to anxiety.

*Strengths and Limitations*

When looking at the results of this study, it is obvious there are several strengths and weaknesses of the research. This research was conducted outside a laboratory and in the setting of actual competition. Although this did create several limitations, it is a strength because in an actual competitive environment one is unable to control all factors. In any real-time sport situation, one must deal with changes in schedule and real pressures that are associated with the specific competition; many of those pressures cannot be re-created in a laboratory setting. Therefore, it is necessary to see what the results from a real-time competitive setting look like.

Another strength of this study is that it uses a population that has not been researched much in the area of flow, or many other areas of sport psychology. By looking at rowers, we have gained insight into a population of athletes who deal with extreme physical and mental conditions during any competition. Also, because rowing takes place on water, the sport is unpredictable. This factor can lead to higher anxiety and several other factors that could affect optimal experience.

Although, as mentioned above, a real-time sport setting was necessary in order to gain insight into the minds of athletes in an environment that could not be perfectly simulated, it also lead to several limitations in research. One of these limitations was the ability to get athletes to fill out questionnaires instead of following their normal pre-race pattern. It is possible that due to the hectic nature of the regatta, and the importance of the
competition, many members of the team chose to place adequate mental preparation over participation in the study. While rowers who participated were capable of understanding the necessity of research on their sport, their primary concern was their upcoming competition.

Also, due to the fact that research was conducted at only two regattas during the spring season, and only with Ohio University Women’s Crew, there was a very small window in which to gather data. During this process, if a rower made a mistake on a questionnaire, or they forgot to fill out one of their questionnaires, or even if they had to use the restroom and ran out of time to fill it out before their race, they were excluded from the study. This made it difficult to get a larger sample size.

Lastly, mean anxiety responses in participants fell in the middle of the possible range. This shows that participants did not experience a high amount of anxiety at either regatta. As mentioned above, there are several possible reasons for this outcome. This is a limitation because instead of creating a high anxiety situation in a lab setting, the level of anxiety each regatta provoked had to be assumed based on common opinion. No research has been found that has assessed the anxiety levels of rowers at the regattas members of OUWC attend.

Recommendations

As mentioned above, the primary limitation of this study was the number of participants. Further research examining the relationship between flow and anxiety should include a much larger sample size taken from several different teams at different universities, regattas, and competitive levels. A larger sample size would allow for
stronger relationships to be established. Also, all members of the teams involved should be strongly encouraged to participate, if not required. While researchers might not be able to offer a reward for participation, it might be possible to work with a team’s coaching staff to arrange for some sort of team reward during practice or during the training week. A combination of involving more teams, more regattas, and more members of each team should increase the size of the study and better represent rowers as a whole. Also, in order to understand the flow and anxiety relationship in males, it might be beneficial to run a similar study with male rowers.

If this study were to be conducted again, it is suggested that the researcher contact coaches and rowers, possibly just take poll, to learn more about possible anxiety levels expected for each regatta. In this study it was assumed that the SIRA regatta would create higher anxiety levels than the Gov Cup regatta, however that did not turn out to be true. It would have been beneficial to further look into common opinions about these regattas in order to back up that assumption.

Another suggestion for further research would be that the person conducting the research not be directly connected, especially from a coaching standpoint, with the team who is participating in the study. During the pre and post race events of a regatta a coach is necessary. In order to keep participants confidential, a coach who is also the researcher, must stay away from the team during crucial parts of race preparation and debriefing. This not only alters the organization of events before and after the race, but it also gives rowers more to do in the same amount of time. Instead of just stretching and
getting dressed, they then also had to complete a questionnaire. If the coach were not involved in the study, this disorganization would be much less of a factor in participation.

Another aspect of this research that could be explored in the future is the effect the coaches have on the team. Several coaches often surround a rowing team at a regatta. Coaches are important to a team because they spend time training and preparing the team and often are the ones who set goals and cast vision. It is suggested that future research look into how the anxiety levels of the coaching staff affect the rowers. This could be done by creating a series of questions on the demographics page about how rowers perceive the anxiety levels of the coaches around them. It is possible relationships can be established between a rower’s level of anxiety and a coach’s level of anxiety.

The idea of performance might also be related to the relationship between coach’s anxiety levels and the athlete’s anxiety levels. Further research might examine the rower’s perception of success. Does the rower perceive success in terms or winning and losing, or more by way of success in personal goals? Also, relationships might be found between a coach’s perception of success and an athlete’s perception of success. An athlete’s perception of good performance, whether it be outcome based or personal, might have an effect on anxiety or flow.

Looking specifically with the concept of anxiety in athletics, further research should look deeper into the trait-state relationship of the anxiety experience. Research in the area or flow and anxiety should evaluate participant’s state anxiety, as well as their trait anxiety. This will give insight into whether an athlete who has naturally has high state anxiety also experiences high trait pre-competitive anxiety. If relationships can be
established between state and trait anxiety in athletics, steps can be taken to help athletes deal with a natural tendency towards pre-competitive anxiety.

If further relationships between anxiety and flow can be established in rowers, it would also be suggested research be conducted to see if relaxation techniques would decrease anxiety and therefore facilitate flow. If these relationships can be established through research, coaches and athletes will be able to directly deal with what is inhibiting their flow experience, leading to a greater opportunity for optimal experience. Teams might consider developing relaxation programs, or possibly deal with any other factors about flow.

Lastly, it is suggested that flow research be conducted in different sports, but that each study be sport specific. As in rowing, several sports are unexplored in the area of flow and in many other aspects of sport psychology. Studying several different sports, both individual and team, in a real setting can give important information about flow and optimal experience. If athletes have access to this information they will better be able to facilitate their own optimal experience, leading to a greater experience of sport, of life, and of the human experience.
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Appendix A

INFORMED CONSENT FORM
Informed Consent

**Title of Research:** The Relationship between Pre-Competitive Anxiety and Occurrence of Flow in Female Collegiate Club Rowers

**Principal Investigator:** Robin Bramsen

**Department:** Recreation and Sport Sciences

Federal and university regulations require signed consent for participation in research involving human subjects. After reading the statements below, please indicate your consent by signing this form.

**Explanation of Study**

You have been asked to participate in a study investigating anxiety and flow in competitive rowing, because you are a member of the Ohio University Women’s Crew Team. Flow is considered to be the optimal experience in sport; however, you might more commonly refer to this state of enjoyment, or feeling of optimal experience, as being in “the Zone.” It is a very positive psychological state that can occur if two dynamics are present. The first dynamic is that the athlete must perceive their ability to be equal to the task, and the second dynamic that the athlete must perceive the task at hand to require more than their average skill level.

You will be asked to fill out surveys assessing your levels of anxiety and flow prior to and immediately after two competitive regattas. You will be asked to complete the Competitive State Anxiety Inventory – 2, CSAI-2, immediately prior to your launch time at each of the two races. After you have raced, you will be asked to complete the Flow State Scale Inventory – 2, FSS-2, immediately after your races. The surveys you will be asked to fill should take about 15 minutes of your time. The duration of your participation in this study will last approximately three weeks.

**Risks and Discomforts**

The actual administration of the questionnaires provides minimal expected discomfort or risk. However, due to the nature of the competition itself, there are risks and discomforts associated with participation in the competition.

**Benefits**
This study will benefit you by providing insight into your own personal psychological experience both prior to and during your race. It will also give you insight into the experience of flow itself and possibly lead to the exploration of ways you can maximize your optimal experience in the future.

**Confidentiality and Records**

You will be assigned a subject number and your identity will be kept completely confidential during the collection and analysis of your recorded information. As discussed above, questionnaires will be administered and collected by someone who is not directly involved in the analysis of information.

**Compensation**

You will receive no compensation for participation in this study.

**Contact Information**

If you have any questions regarding this study, please contact (Robin Bramsen, RB126400@ohio.edu, 513-225-1302/ Dr. Andrew Krause, Krausea@ohio.edu, (740) 593-4651).

If you have any questions regarding your rights as a research participant, please contact Jo Ellen Sherow, Director of Research Compliance, Ohio University, (740)593-0664.

I certify that I have read and understand this consent form and agree to participate as a subject in the research described. I agree that known risks to me have been explained to my satisfaction and I understand that no compensation is available from Ohio University and its employees for any injury resulting from my participation in this research. I certify that I am 18 years of age or older. My participation in this research is given voluntarily. I understand that I may discontinue participation at any time without penalty or loss of any benefits to which I may otherwise be entitled. I certify that I have been given a copy of this consent form to take with me.

Signature ____________________________ Date ________

Printed Name ____________________________
Appendix B

COMPETITIVE STATE ANXIETY INVENTORY – 2
Competitive State Anxiety Inventory-2 (CSAI-2)

Directions: A number of statements which athletes have used to describe their feelings before competition are given below. Reach each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now – at this moment. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer that describes your feelings right now.

<table>
<thead>
<tr>
<th>Much</th>
<th>Not at</th>
<th>Somewhat</th>
<th>Moderately</th>
<th>Very</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>So</td>
<td>So</td>
<td></td>
</tr>
</tbody>
</table>

1. I am concerned about this competition
2. I feel nervous
3. I feel at ease
4. I have self doubts
5. I feel jittery
6. I feel comfortable
7. I am concerned that I may not do as well in this competition as I could
8. My body feels tense
9. I feel self-confident
10. I am concerned about losing
11. I feel tense in my stomach
12. I feel secure
13. I am concerned about choking under pressure
14. My body feels relaxed
15. I am confident I can meet the challenge
16. I am concerned about performing poorly ........ 1........ 2........ 3........ 4
17. My heart is racing........................................ 1........ 2........ 3........ 4
18. I’m confident about performing well............ 1........ 2........ 3........ 4
19. I’m worried about reaching my goal .......... 1........ 2........ 3........ 4
20. I feel my stomach sinking............................ 1........ 2........ 3........ 4
21. I feel mentally relaxed .................................. 1........ 2........ 3........ 4
22. I’m concerned that others will be disappoint with my performance .......... 1........ 2........ 3........ 4
23. My hands are clammy..................................... 1........ 2........ 3........ 4
24. I’m confident because I mentally picture myself reaching my goal.................. 1........ 2........ 3........ 4
25. I’m concerned I won’t be able to concentrate........ 1........ 2........ 3........ 4
26. My body feels tight....................................... 1........ 2........ 3........ 4
27. I’m confident of coming through under pressure .......................................... 1........ 2........ 3........ 4
Appendix C

FLOW STATE SCALE – 2
### Activity Experience Scale (DFS-2)

Please answer the following questions in relation to your experience in your chosen activity. These questions relate to the thoughts and feelings you may experience during participation in your activity. 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 experience each characteristic during your activity and circle the number that best matches your experience.

#### Rating scale

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**PLEASE CIRCLE ANSWER**

When participating in [name activity]:

1. I am challenged, but I believe my skills will allow me to meet the challenge.
   - 1
   - 2
   - 3
   - 4
   - 5

2. I make the correct movements without thinking about trying to do so.
   - 1
   - 2
   - 3
   - 4
   - 5

3. I know clearly what I want to do.
   - 1
   - 2
   - 3
   - 4
   - 5

4. It is really clear to me how my performance is going.
   - 1
   - 2
   - 3
   - 4
   - 5

5. My attention is focused entirely on what I am doing.
   - 1
   - 2
   - 3
   - 4
   - 5

6. I have a sense of control over what I am doing.
   - 1
   - 2
   - 3
   - 4
   - 5

7. I am not concerned with what others may be thinking of me.
   - 1
   - 2
   - 3
   - 4
   - 5

8. Time seems to alter (either slows down or speeds up).
   - 1
   - 2
   - 3
   - 4
   - 5

9. I really enjoy the experience.
   - 1
   - 2
   - 3
   - 4
   - 5

10. My abilities match the high challenge of the situation.
    - 1
    - 2
    - 3
    - 4
    - 5

11. Things just seem to happen automatically.
    - 1
    - 2
    - 3
    - 4
    - 5

12. I have a strong sense of what I want to do.
    - 1
    - 2
    - 3
    - 4
    - 5

13. I am aware of how well I am performing.
    - 1
    - 2
    - 3
    - 4
    - 5

14. It is no effort to keep my mind on what is happening.
    - 1
    - 2
    - 3
    - 4
    - 5

15. I feel like I can control what I am doing.
    - 1
    - 2
    - 3
    - 4
    - 5

16. I am not concerned with how others may be evaluating me.
    - 1
    - 2
    - 3
    - 4
    - 5

17. The way time passes seems to be different from normal.
    - 1
    - 2
    - 3
    - 4
    - 5

CONTINUES OVER
### Rating scale

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**PLEASE CIRCLE ANSWER**

When participating in ____________________________ (name activity):

<table>
<thead>
<tr>
<th>18. I love the feeling of the performance and want to capture it again.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. I feel I am competent enough to meet the high demands of the situation</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20. I perform automatically, without thinking too much.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>21. I know what I want to achieve.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>22. I have a good idea while I am performing about how well I am doing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>23. I have total concentration.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>24. I have a feeling of total control.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>25. I am not concerned with how I am presenting myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>26. It feels like time goes by quickly.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>27. The experience leaves me feeling great.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>28. The challenge and my skills are at an equally high level.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>29. I do things spontaneously and automatically without having to think</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>30. My goals are clearly defined.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>31. I can tell by the way I am performing how well I am doing.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>32. I am completely focused on the task at hand.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>33. I feel in total control of my body.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>34. I am not worried about what others may be thinking of me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>35. I lose my normal awareness of time.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>36. The experience is extremely rewarding.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>