An Examination of Arousal States in Novice
Whitewater Kayakers During a Weekend Instructional Experience

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ABSTRACT

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Csikszentmihalyi’s flow theory (1975) has been used for many years as the basis for understanding and explaining why people recreate, why they choose a given recreational activity, and why they enjoy what they do. However little research has been conducted to determine the point at which optimal arousal is first experienced in a given activity. This study provides insight into optimal arousal states through an examination of the change in psychological states of novice whitewater kayakers during a two day instructional experience. Data were analyzed using the original flow model (Csikszentmihalyi, 1975), Optimal Arousal theory (Ellis, 1973) and the Adventure Experience Paradigm to show that optimal arousal states are dynamic states that change for each person as their skill improves and they take on new challenges.

Approved: _________________________________

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>3</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>4</td>
</tr>
<tr>
<td>List of Figures</td>
<td>7</td>
</tr>
<tr>
<td>Chapter 1: Introduction</td>
<td>8</td>
</tr>
<tr>
<td>Background of the Study</td>
<td>8</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>9</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>9</td>
</tr>
<tr>
<td>Summary</td>
<td>10</td>
</tr>
<tr>
<td>Chapter 2: Review of the Literature</td>
<td>11</td>
</tr>
<tr>
<td>Optimal Arousal</td>
<td>11</td>
</tr>
<tr>
<td>Flow</td>
<td>12</td>
</tr>
<tr>
<td>Evolution of Csikszentmihalyi's Flow Model</td>
<td>16</td>
</tr>
<tr>
<td>Adventure Experience Paradigm</td>
<td>18</td>
</tr>
<tr>
<td>Research Questions</td>
<td>20</td>
</tr>
<tr>
<td>Summary</td>
<td>21</td>
</tr>
<tr>
<td>Chapter 3: Methodology</td>
<td>22</td>
</tr>
<tr>
<td>Introduction</td>
<td>22</td>
</tr>
<tr>
<td>Research Setting</td>
<td>22</td>
</tr>
<tr>
<td>Sample</td>
<td>23</td>
</tr>
<tr>
<td>Procedures</td>
<td>24</td>
</tr>
<tr>
<td>Instrumentation</td>
<td>25</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Optimal Arousal Theory of Play</td>
<td>12</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Original Flow Model</td>
<td>14</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Four Channel Flow Model</td>
<td>17</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Eight Channel Flow Model</td>
<td>18</td>
</tr>
<tr>
<td>Figure 5</td>
<td>Adventure Experience Paradigm</td>
<td>20</td>
</tr>
</tbody>
</table>
CHAPTER 1: INTRODUCTION

Background of the Study

Have you ever experienced a moment in sport or recreation when you felt in a state of *flow*? Imagine a raging river, the color of a chocolate milkshake, with water rushing past you as you sit in an eddy waiting for your chance to paddle out and surf a big wave. You feel nervous and excited at the same time. You wonder if you will have a fun, thrilling surf or if the wave will flip you upside down, throw you around, and require you to perform a kayak roll. You set your boat angle, take several strokes and drop into the trough of the wave. You immediately feel a tremendous amount of speed as the water rips past your boat. You feel your boat skipping across the surface of the water. Your attention is focused only on the movement of your boat as it carves effortlessly back and forth across the wave. You are not even thinking about the mechanics of what you are doing. You are simply doing it. Suddenly, you slip off of the wave, drift downstream to the side of the river and paddle hard to get back upstream to the eddy near the wave. Without realizing it, 10 minutes have elapsed in what seemed like only a few. You feel exhilarated and ready for more. The feeling that one experiences when dialed into a wave is a wonderful example of the phenomenon of *flow*.

Since the theories of optimal arousal (Ellis, 1973) and *flow* (Csikszentmihalyi, 1975) were originally proposed, a considerable amount of research has been conducted on experts who participate in a variety of autotelic activities—activities in which people participate for the sheer pleasure of the activity and not for any external rewards (Boniface, 2000; Csikszentmihalyi, 1975; Havitz & Mannell, 2005; Jones, Hollenhorst, Perna, & Selin, 2000; Moneta & Csikszentmihalyi, 1996). People with high levels of
experience and knowledge in activities like rock climbing, chess, surgery, music composition, and dancing have been studied to discover when, where, and what is required to create a flow experience (Csikszentmihalyi, 1990; Kiewa, 2001). Similar studies were conducted on elite athletes from a variety of team and individual sports, including basketball, track and field, swimming, and field hockey (Csikszentmihalyi, 1975; Jackson, Kimiecik, Ford, & Marsh, 1998; Jackson & Marsh, 1996; Jackson & Roberts, 1992; Marsh & Jackson, 1999; Stavro, Jackson, Zervas, & Karteroliotis, 2007). People who were not experts at a given activity have also participated in studies where they have worn pagers, and answered pages of questions to see when and where people experience flow (Csikszentmihalyi, 1975). Additional studies examined how participants perceived levels of competence and risk while floating through a cave in New Zealand during a blackwater rafting trip (McIntyre & Roggenbuck, 1998).

**Significance of the Study**

This study explores people and their perceptions as they begin to learn a new recreational activity that involves risk. This research suggests that a person who learns a new recreational pursuit, in which she or he has no prior knowledge or skill, can achieve a state of optimal arousal. Furthermore even after knowledge and skill are acquired their arousal states may fluctuate between anxiety and boredom.

**Statement of the Problem**

This study is based on the assumption that arousal states are dynamic and that throughout a 2-day introduction to whitewater kayaking class, participants will first experience anxiety, then optimal arousal, and later possibly boredom as they progress through the course. Finally, participants will seek out greater challenges for each skill in
an attempt to once again achieve optimal arousal. It is also possible that after learning a skill, perhaps even after being in optimal arousal, subjects may experience anxiety if they have trouble the next time they perform the task. As new kayaking techniques are learned subjects will experience anxiety, then with practice and application these feelings will change to optimal arousal. Optimal arousal will change to boredom with more practice until the skills are put to use at more advanced levels, at which point participants may experience either anxiety or optimal arousal.

**Summary**

Chapter 1 introduced the background and relevance of the research described within these pages. In addition, this chapter outlined the questions to be explored through this study. Chapter 2 reviews prior research related to this study. This chapter also describes important concepts related to the world of whitewater kayaking. Chapter 3 describes the research methods used to conduct this study. It explains how the sample was collected, how and where the instruments were issued, and how the data were analyzed. Chapter 4 provides an interpretation of the data and highlights significant findings. This chapter also describes problems with the research methodology specifically pertaining data collection. Chapter 5 discusses the results of this study, limitations of the study, potential applications of the findings, and recommendations for future research.
CHAPTER 2: REVIEW OF LITERATURE

The goal of Chapter 2 is to provide the reader with a review of prior theory and research on which this study was based. This chapter discusses the theories of optimal arousal (Ellis, 1973), flow (Csikszentmihalyi, 1975), and the Adventure Experience Paradigm (Martin & Priest, 1986) which are used to understand why people participate in adventure recreation activities and how they perceive their skill level and the risk of the activity.

Optimal Arousal

The optimal arousal theory of play, which was presented in the book Why People Play (Ellis, 1973), postulates that the human brain requires continual stimulation. Consequently, to achieve high levels of arousal people participate in activities that provide lots of stimulation. The level of arousal is determined by how much information the brain is receiving. Some people are more active than others, may require more arousal, and perhaps are more creative, so play becomes not only a way to use extra energy, but a means by which individuals become more adaptive in their undertakings (Ellis, 1973). If individuals feel under- or over-aroused their performance level will decrease, which tells adventure programmers that people search for activities that best fit their personal stimulation requirements (Priest & Gass, 2005). See Figure 1 for a graphic representation of the optimal arousal theory of play.
Interestingly, Rishe, Krenze, McQueen, and Krenz (1994) indicated that increases in arousal (also referred to as stress) has a detrimental effect on optimal performance.

**Flow**

Flow theory, an important concept to help adventure programmers and educators understand why people choose recreational activities, was developed by Mihalyi Csikszentmihalyi (1975). Moneta and Csikszentmihalyi (1996) defined *flow* as a psychological state where “the person feels simultaneously cognitively efficient, motivated, and happy” (p. 277). There are six conditions of *flow* experience.
(Csikszentmihalyi, 1975). The first is the merger of action and awareness. For example, kayakers in flow perform strokes and maneuver their boats without thinking about the performance. The second condition of flow is focus, where kayakers focus intensely on the task at hand. The paddlers’ stimulus fields become limited during such experiences. A third condition of flow is the loss of self-consciousness. For example, kayakers get so caught up in the moment that they forget about the fact that they have assignments due the next day and just revel in the moment. The fourth condition of flow is a sense of control. For example, kayakers who are able not only to keep their boats upright while side-surfing but are also able to perform spinning maneuvers while surfing will feel a great sense of control. The fifth characteristic of flow is that the goals of the activity are obvious and the feedback while performing the activity is direct and immediate. For example, paddling from one eddy to another without flipping over provides an immediate measure of success. The sixth dimension of flow is its autotelic nature. This means that participation in the activity is not mandatory and that repeated participation is not based on extrinsic rewards. The activity is performed because participants are intrinsically motivated to do so.

Another often cited indicator of flow is the balance of challenge and skill (Ellis, Voelkl, & Morris, 1994). If people perceive the challenge level of the activity to exceed their skill level, then they will experience anxiety. When people perceive their skill level to exceed the level of challenge for the activity, they will likely experience a state of boredom. Accordingly, this theory indicates that individuals participating in a given activity require some level of skill or knowledge to achieve flow, and that, when skill and challenge are balanced, participants are in flow. A study of flow during a challenge course
program (Hara, Bunting, & Witt, 2006) showed that participants experienced flow late in the challenge course experience. However, while some participants experienced flow in this study, others experienced anxiety.

![Flow Model Diagram](image)

*Figure 2. Original Flow Model (Ellis, Voelkl, & Morris, 1994, p. 339).*

Adventure recreation activities naturally provide opportunities to experience the conditions of flow described above. The goals of kayaking are clear. When performing specific skills feedback is immediate and unambiguous. Paddlers know that they have successfully performed an eddy turn when they are still sitting upright in the kayak after
having executed the turn. Adventure activities, like rock climbing and whitewater kayaking, lend themselves to a merging of action and awareness. A rock climber in a study conducted by Csikszentmihalyi (1975) stated: “The task at hand is so demanding and rich in its complexity and pull that the conscious subject is really diminished in intensity. Corollary of that is that all the hang-ups that people have or that I have as an individual person are momentarily obliterated…” (p. 43). Ewert and Hollenhorst (1990) stated that adventure recreation is a “search for competence” and a “valuation of risk and danger” (as cited in Priest, 1992). Competence (i.e., skill) and risk (i.e., challenge) are two major points by which flow is measured (Moneta & Csikszentmihalyi, 1996). Priest and Gass (2005) defined risk as, “the potential of losing something of value” (p. 18). They defined challenge as “the act of engaging personal competence in risky situations” (p. 18). They defined competence as “a combination of skill, attitude, knowledge, behavior, confidence, and experience” (p. 18).

A person’s sense of control in an activity, an important component of flow, is based on the amount of risk perceived to exist in the activity (Davis-Berman & Berman, 2002). Kiewa (2001) conducted a study of female rock climbers that revealed that the ability to control the structure of an activity contributed to a sense of flow. Another important consideration in understanding flow, though not a condition of flow, is the concept of self- affirmation. Many people choose activities in adventure recreation, like whitewater kayaking, as a way to understand who they are (Ellis, Voelkl, & Morris, 1994). Rock climbers strive for self-affirmation through control over their feelings, themselves (in their choice of activity, place to climb, etc.), and the environment (Kiewa, 2001), much the same as kayakers do.
Evolution of Csikszentmihalyi’s Flow Model

Research since 1975 has led to the evolution of Csikszentmihalyi’s original flow model. Newer models of flow include the four channel model of flow (Jones, Hollenhorst, Perna, & Selin, 2000) and the eight channel model of flow (Ellis, Voelkl, Morris, 1994). These models have emerged from attempts to better understand the phenomenon of flow.

Four Channel Model of Flow

The Four Channel Model of Flow was developed to address optimal experience during a given day rather than flow experience over a length of time. This model of flow considers flow experiences to occur when scores in measuring flow are above the mean of all scores. Responses at or below the mean are considered to represent apathy (Ellis et al., 1994). Having a score above the mean suggests that the moment or experience was of a higher value than normal on a given day. Where scores indicate that there was more challenge than skill, respondents are considered to have experienced anxiety. When scores indicate more skill than challenge, then participants were considered to have experienced boredom. After scores have been categorized into flow, anxiety, apathy, or boredom, an analysis of variance was conducted to examine variations among the six conditions and among the four channels of flow. Research conducted on kayakers by Jones, Hollenshorst, Perna, and Selin (2000) indicated that the four channel model of flow is better at predicting flow and explaining variance for several of the flow conditions than the original model.
Figure 3. Four Channel Flow Model (Ellis, Voelkl, & Morris, 1994, p. 339).

Eight Channel Model of Flow

According to Ellis, Voelkl, and Morris (1994) other models describing flow have been developed and used to further assess the relationship between challenge and skill from Experience Sampling Method data. These data were put into eight- and even sixteen-channel models to better describe what research participants were experiencing. The eight- and sixteen-channel models of flow improve the researcher’s ability to define flow, especially when compared to other investigations of challenge and skill.
Adventure Experience Paradigm

Martin and Priest (1986) adapted Ellis’ (1973) theory of optimal arousal and Csikszentmihalyi’s (1975) flow model in creating the Adventure Experience Paradigm. Adventure is described as “voluntary engagement in novel, uncertain, and most often emotionally intense recreational activity” (Holyfield, Jona, & Zajicek, 2005, p. 175). The Adventure Experience Paradigm posits that individuals can experience five different emotional and physical states during an adventure experience (see Figure 4.). These five states include: (a) exploration and experimentation, (b) adventure, (c) peak adventure, (d)
misadventure, and (e) devastation and disaster. Exploration and experimentation occur when competence is high and risk is low, and conditions are good for participant learning. The state of adventure is found when the risk increases slightly as participants apply new-found skills. Participants can find peak adventure when there is an even match of risk and competence, and is such a delightful experience that, once experienced, participants will seek it out again. The condition of misadventure happens when the risks of the activity are greater than the participants’ competence and a small accident occurs, like flipping while doing an eddy turn. During the misadventure stage participants can still learn from the experience. Devastation and disaster is the next step, where the risks of the activity are high and participants’ competence is very low. At this stage, injury or death is usually the result.

The Adventure Experience Paradigm is unique, because it draws a distinction between real risk versus perceived risk, and real competence versus perceived competence. To understand this, consider beginning kayakers who perceive that performing a wet exit at the lake is very dangerous and that they have little skill for this activity. The reality of this situation is that the risk is very low because the instructor is next to the boat ready to perform a rescue if necessary. And, kayakers soon discover that a wet exit is easy to perform as they smoothly exit the kayak. The opposite also can occur when, for example, kayakers perceive their skill to be high when indeed they are low and the risks associated with kayaking a particular stretch of river are low when indeed they are high. Kayakers will likely experience misadventure or possibly devastation and disaster if they flip their kayak, wet exit, and must swim to shore. In this situation kayakers may lose their kayaks and other gear and possibly get hurt or killed.
Research Questions

This study was designed to determine levels of arousal experienced by beginning kayakers as they progress from beginning skill instruction to intermediate skill instruction over the course of a weekend introduction to whitewater kayaking class. Subjects in this study completed surveys to identify their emotional states in relation to the theories of optimal arousal (Ellis, 1973), flow (Csikszentmihalyi, 1975) and the Adventure Experience Paradigm (Priest and Martin, 1986). In particular this research addressed...
these questions:

1. Can beginning kayakers achieve a state of optimal arousal?

2. At what point(s) do beginning kayakers experience anxiety during paddling instruction?

3. At what point(s) during paddling instruction do beginning kayakers experience boredom?

4. Is optimal arousal static or dynamic?

**Summary**

Chapter 2 provided an overview of pertinent prior research which would be helpful to understanding why and how this study was connected. The next chapter describes the methodology used for this study.
CHAPTER 3: METHODOLOGY

Introduction

This chapter offers a description of the methodology used in this study. It explains the study design, the site and sample, the instrument used, how the data were collected, and how data were analyzed.

The Research Setting

This study was conducted on Youghiogheny Lake and on the middle section of the Youghiogheny River (Middle Yough) in southwestern Pennsylvania. Youghiogheny Lake provides an excellent place to teach and practice basic kayaking skills that students need to be proficient performing before tackling whitewater. The Middle Yough is a great place to practice beginning whitewater maneuvers. This section of river is rated as Class II. According to the International Scale of River Difficulty  (Bechdel & Ray, 1997) rivers are classified into six categories. Class I is the easiest with small waves and few obstructions, and Class VI is the most difficult and is typically only run by teams of experts, with all precautions taken, during optimal river conditions. The relatively gentle current on this section of river provides a good environment to practice maneuvers like eddy turns and peel outs. It also allows for relatively easy rescue of boaters who accidentally swim after capsizing and wet exiting their kayaks. The water level for the Middle Youghiogheny was listed by American Whitewater (2007) as being 2.1 feet, which is a decent water level for teaching beginners. Whitewater kayaking was chosen to test subjects’ levels of flow experience because it is an adventure recreation activity. This trip was designed as an introduction to whitewater kayaking class using the American Canoe Association (ACA) whitewater kayaking curriculum.
Sample

This study relied on a convenience sample of students participating in a weekend kayaking trip through the Ohio University Outdoor Pursuits program. Participation in the trip was voluntary. There were 11 male and female participants for this trip. Two of the eleven participants were females. These students ranged in age from 18-26 years old. Most participants who attend Outdoor Pursuits trips are typically comprised of Ohio University students (n=9), although members of the greater Athens community are also welcomed (n=2). Both instructors for this class were experienced paddlers with prior experience on the Middle Yough. The lead instructor is certified by the ACA as a Whitewater Kayak Instructor Trainer. The assistant instructor is certified by the ACA as a Whitewater Kayak Instructor.

Students participating in this study were beginning kayakers who started their weekend of instruction on Youghiogheny Lake, learning basic kayak strokes (e.g., the forward stroke, the sweep the brace) and maneuvers (e.g., wet exits, bow rescues, and kayak rolls). After students demonstrated understanding of these skills, they were taken to the section of river described above to practice these newly acquired techniques on moving water. The next step in the instructional progression, which began Sunday morning, was for the students to learn how to perform eddy turns, peel outs, and ferries, which combine the techniques learned at the Lake on Saturday. On Sunday afternoon students were introduced to surfing in the trough of a wave and practiced the techniques learned earlier in the day on more challenging and faster moving water.

On the Wednesday prior to the trip, participants and instructors discussed the trip itinerary, logistics, and filled out the appropriate paperwork. During this time the research
project was discussed in detail and trip participants were asked to participate. All participants were willing to participate and filled out the Ohio University Informed Consent for Participation in Research form.

**Procedures**

On Friday, after setting up camp and a campfire was built, participants and the instructors were re-introduced. Expectations for the research, kayaking, and the weekend in general were discussed. The research project was discussed again, and the Pre-River Survey was given to participants to fill out. This survey consisted of thirteen questions that were related to demographics, kayaking, and arousal states.

Saturday, Day 1 of the course, was devoted to teaching basic kayaking techniques and maneuvers on Youghiogheny Lake. Techniques taught and measured at the lake included wet exits, bow rescues, and the kayak roll. Participants received instruction on other pertinent techniques, like power and turning strokes. However, these additional skills were not evaluated for this study. After instructions for a technique were given, and the technique was demonstrated, a survey card for that technique was issued for each participant to fill out. This card was designated as T1 and was used to measure initial perceptions, prior to a subject performing the technique for the first time. Once these survey cards were collected, participants attempted the technique for the first time, and then were issued a second survey card (T2) to assess what state of arousal they had actually experienced while performing the technique. Other assessments for these techniques were conducted on Sunday after each had been tried or practiced on moving water.

Sunday, Day 2 of the course, was spent learning kayak techniques and maneuvers
on moving water and whitewater. Moving and whitewater techniques that were taught and measured included eddy turns, peel outs, ferries, and surfing. These techniques are critical components of running a whitewater river and also provide opportunities for experiencing a variety of arousal states. A wet exit is the technique that a kayaker uses to safely get out of a kayak when it has flipped over. A bow rescue is the technique used to rescue a kayak when it flips over so that the kayaker does not need to use the wet exit technique. This technique requires that the person, upside down in her/his boat, wait for another kayaker (the “rescuer”) to place the front of the kayak (the bow) in the middle of the overturned kayak so the upside down kayaker may grab the bow and roll upright. A kayak roll is the technique that kayakers use to right their boat on their own when it has flipped over.

Eddy turns are used to get into eddies (areas of calm water found throughout a river, caused by obstructions, such as rocks, in the current). Peel outs are used to get out of an eddy and into the current. A ferry is a technique used to move a boat laterally across a river without moving up or down stream. Surfing is a technique borrowed from ocean surf boarders to play in parts of the river known as waves and holes. “Holes” occur when water “forms a reverse current when it flows over a submerged object such as a ledge or boulder” (Bechdel & Ray, 1997, p. 5).

**Instrumentation**

To capture instances of optimal arousal among participants, a modified version of the Experience Sampling Method was used for this study. Typically the Experience Sampling Method relies on the same questionnaire at each random data collection points (Moneta & Csikszentmihalyi, 1996). However, for this study, the questionnaire was
modified slightly to better fit each given application. Based on a study by Jones, Hollenhorst, Perna, and Selin (2000), where research was conducted on eight different points throughout the Canyon section of the Cheat River, the current research instrument was given at specific times and places throughout two days of kayaking instruction and was not issued randomly as per original ESM usage. The instrument used by Jones, Hollenhorst, Perna, and Selin (2000), which had twenty questions to validate the four channel model of flow, was issued at specific points on the Cheat Canyon. This study measured participants at specific points during their experience using a two-question survey which were not necessarily determined by the river. In an effort to catch the specific points on the river where participants were experiencing the various stages of arousal, this instrument was issued before a technique was attempted, after it was attempted, and after further practice by each participant.

During each day of instruction (Saturday and Sunday), students were asked to fill out multiple two-item surveys assessing perceived skill and perceived challenge on a 7-point Likert-type scale (see Daily Survey, Appendix C). There were eight techniques that were evaluated during this study: wet exits, bow rescues, kayak rolls, eddy turns, peel outs, ferries, surfing, and overall kayaking ability. Survey cards for each skill were issued 3-5 times throughout the course, depending on the technique. Each administration of the survey cards took roughly 1-2 minutes. The survey cards were designed to evaluate participants’ perceived levels of challenge and their perceived levels of skill while performing particular kayaking techniques.

This method is a modification of the Experience Sampling Method, as developed by Csikszentmihalyi and others (McIntyre & Roggenbuck, 1998 p. 407) that has been
used by a variety of researchers to study flow experiences (Csikszentmihalyi & Moneta, 1996; Jones, Hollenhorst, Perna, & Selin, 2000; McIntyre & Roggenbuck, 1998; Voelkl & Ellis, 1998). It is important to use short questionnaires which are spaced far apart to encourage boaters to participate in research and to maintain their on-going participation (Jones, et al., 2000). To minimize interruptions, Jones et al. (2000) only surveyed kayakers at eight different rapids on the Canyon (Class III-IV) section of the Cheat River in West Virginia. While using the ESM to study risk and competence of participants on a Blackwater rafting trip, McIntyre and Roggenbuck (1998) used five data collection points in the Waitomo cave system. For the above reasons, this study used two-question Likert-type surveys spread throughout each day.

Participants’ skill levels were assessed (using bow rescues again as an example) at a given data point with the question, “How skillful did you feel while doing a bow rescue?” (see Appendix C). Participants’ challenge levels for a given data point were measured with the question, “How challenged did you feel while doing a bow rescue?” (see Appendix C).

As noted earlier, an autotelic experience is defined as an experience that a person wants to do again and again for the sake of the activity itself, and not because it benefits anyone or provides a source of income. The Final River Survey attempted to determine whether this was an autotelic experience for participants of this trip with the last two questions: (a) “Do you want to go kayaking again in the future?” (b) “If you answered yes to the above question, how soon would you like to go again?”

Data Collection Procedures

Because this study measured changes in arousal states throughout an ACA
kayaking skills-based course, participants were measured during eight different kayaking techniques and not at eight different points throughout the river. Survey cards for each skill were initially administered after each technique had been described but before the participants had a chance to practice them. The survey cards were administered to the subjects again throughout the weekend after subjects performed a given technique. For example, on Day 1, students received instruction on how to perform a bow rescue. After the instruction, but before students had a chance to try the bow rescue, they were asked to fill out a two-question Daily Survey card concerning bow rescues. This was used to determine initial perceptions of challenge and skill for the activity. After filling out the first bow rescue survey card participants were asked to pair up; each person performed the skill; and a new copy of the survey card was issued again (T2). Each card was labeled with the participants’ ID number (ex. #1), the name of the skill (e. g. bow rescue), and a time designation (T1= indicating Time 1, or the first time that the survey card was issued).

Data Analysis Procedures

All data were analyzed using Statistical Package for the Social Sciences (SPSS) 14.0 for windows. Analyses included bivariate correlations of challenge and skill scores, and data points were plotted in graphs for each participant and for each kayaking technique. For example scores from T1-T5 were plotted on a graph for Participant 1 for the bow rescue technique. These graphs allowed the researchers to analyze when and where participants were in relation to the three different arousal states within the Flow Model (Csikszentmihalyi, 1975) and to visually describe changes in these states each time the instrument was issued. The three arousal states (boredom, optimal arousal, and
anxiety), based on flow (Csikszentmihalyi, 1975) were indicated on the graphs by two lines drawn that divided the graphs into three parts. Boredom and optimal arousal were divided by a line beginning at point (2, 0) and continuing through point (7, 5) (see Appendix E). Optimal arousal and anxiety were divided by a line beginning at point (0, 2) and continuing through point (5, 7) (see Appendix E).

Data for this study were measured at the individual level to determine differences in arousal states over the course of the weekend. Bivariate correlations were used to determine significant differences between challenge and skill; however, little of the output was statistically significant. The data were re-entered in a different format to analyze information at the personal experience level, and though correlation analyses still showed few statistically significant differences, the graphs now depicted the data in a much more descriptive manner. Due to these limitations, it was decided that it would be better to view this study as a descriptive case study. Graphs and written descriptions of the data points plotted on the graphs were used to contextualize the data collected during this study and helped provide a more appropriate basis for analyzing the data.

Flow theory postulates that when levels of challenge and skill are matched, subjects experience flow, or, as used in this study, optimal arousal. This can be graphically represented: When skill scores (x-axis) are within two points of challenge scores, there is a match for optimal arousal (see Appendix E). When participants experience more skill than challenge they will experience boredom (two points more on the x-axis than on the y-axis). If participants experience more challenge than skill they will feel anxiety. Optimal arousal is indicated by challenge and skill scores being within two points of each other, based on evidence from an on-going flow study by Dr. Robin
Mittelstaedt (personal communication, March 25, 2008).

Information from two of the data points, kayak rolls and surfing, has been withheld from the results, after careful consideration, because there were not enough data collected to provide adequate analysis.

**Summary**

Chapter 3 described how three different instruments, the Pre-River Survey, the Daily Survey, and the Final River Survey were used for this study to determine when and where the three states of optimal arousal occurred for novice kayakers, and also to analyze the resulting data with the use of graphs. The next chapter presents the results of this study.
CHAPTER 4: RESULTS

Introduction

This research examined whether optimal arousal is a dynamic state that changes as participants increase in their skills and strive to achieve optimal experiences. To gain insight into how participants felt concerning each of the kayaking skills, participant perceptions were assessed with a question on skill and a question on challenge. The following analyses provide insight into how perceptions of skills and challenges can vary for a given technique and give some indication of why this is so. Variations in perceptions, as stated above, are based on a host of influences from experiences prior to the trip, to interactions with the environment, and even from things that happen one moment to the next. For example, if a person flips her/his kayak over while attempting to perform a peel out she/he will be more timid the next time, which could lead to poor paddling technique and flipping over again; or the participant may not want to attempt the technique again which is particularly common if a beginning paddler swims out of the kayak.

Participant Demographics

The sample for this study was comprised of 11 participants. Four of the participants (Participants 4, 5, 9, 10) had prior kayaking experience and two had received prior instruction (Participants 4 and 5). Inter-subject responses varied greatly in this study. The data provide interesting evidence at the individual level concerning how participants’ perceptions can change as they gain skills for a given activity and then take on increasing challenges to match their skill level.
Analysis

Several correlations of the kayaking data were statistically significant. When data from all eleven of the participants for eddy turn skills from Time 4 were compared to eddy turn challenges from Time 4 there was a significant correlation of -.615 (p = .044). This is a negative relationship that indicates that as skills for the bow rescue increase the challenge of doing a bow rescue decreases which is a cornerstone idea of flow and the Adventure Experience Paradigm (Priest and Martin, 2005). This same negative relationship was found when skill and challenge data from all of the participants for Time 3 of the peel out was compared and showed a significant correlation of -.671 (p = .024). For the bow rescue tends to feel high levels of challenge, in fact \( r = .671^2 \) 45.02% of the variation in perceived skill levels can be explained by perceived challenges.

Contextualization

Participant 1

With the exception of data from the bow rescue Participant 1’s results indicate that he felt more challenged than skilled by the kayak techniques, with 16 out of the 25 responses matched for being in optimal arousal. This means that even though this person felt challenged by the kayaking techniques, he also believed that throughout the weekend he had enough skill to cope with these challenges, and that optimal arousal may have been achieved by this person, particularly while performing the three river maneuvers.

After having the wet exit described Participant 1 felt anxious (skill = 2, challenge = 6) about trying this technique (Time 1), but after trying it once felt that it was much easier than first perceived with a score (skill = 6, challenge = 3) indicating a sense of boredom (see Appendix E). When this subject got off of the river and answered questions
about the wet exit (Time 3) he felt particularly skillful (7) though not very challenged (1). By Sunday night (Time 4), however, this person’s scores suggest that he, while still in boredom, felt more challenged and slightly less skillful at this activity than during Time 3.

These scores follow the tenets of flow in that people are typically nervous about a new activity or technique before trying it. As skills increase, the perceived challenges decrease, and the participants move from anxiety, hopefully to flow, and then to boredom. At this point people typically seek out new challenges; for kayakers this means either paddling harder rivers or trying different boats in order to re-experience flow.

On Saturday morning, after having learned how to get out of his kayak, and having received instruction on how to perform a bow rescue, Participant 1 felt slightly more challenged (4) than skilled (3) by this new technique (see Appendix E). After trying the bow rescue once, this person felt even more challenged (6), than skilled (2). Time 3 was issued to Participant 1 after he tried the bow rescue several more times at the lake. The scores from Time 4, issued immediately after getting off of the river, placed this individual in the anxiety region of the graph, with a high challenge score (5) and a low skill score (2). Time 5, which was part of the Post River Survey, was given during dinner on the way home from the river suggests that Participant 1 still felt much challenged by the bow rescue (5), but upon reflection felt more skillful putting his perceptions of bow rescue ability on the borderline between optimal arousal and anxiety.

The bow rescue data, for Participant 1, does not follow the typical optimal arousal progression. Instead, it suggests that something happened while Participant 1 practiced his first bow rescue; perhaps he did not perform the technique correctly and had to
perform a wet exit, or maybe his rescuer did not “rescue him quickly enough, or maybe this was just a case of the student having issues with being upside down and underwater while in a kayak. These are very common issues for beginning kayakers.

On Sunday, after putting on the river and paddling downstream several hundred yards Participant 1 was given instruction on how to perform an eddy turn and then filled out the appropriate survey card (Time 1). Participant 1 felt that the challenge of this whitewater technique was high (6) and that his skill for it was medium/low (3) (see Appendix E). After trying the eddy turn Participant 1 felt that the challenge was much lower than first thought (3) and that he was much more skillful (4), which indicates his having been in optimal arousal. Data from Time 3 and Time 4 were suggestive of optimal arousal with both having the same score of (skill = 5, challenge = 4). Times 3 and 4 could not have been optimal arousal experiences because they were perceptions of challenge and skill measured after the subject was done kayaking.

After experiencing and practicing how to lean the kayak, turning and moving in water, and receiving instruction on how, Participant 1 felt that performing a peel out would be challenging (5) and that his skill for this technique would be medium-low (3), which is on the borderline between optimal arousal and anxiety (see Appendix E). After performing the peel out for the first time this subject found the technique to be much easier than first thought with a challenge score of (3) and a skill score of (5). Time 4 suggests that after some reflection this participant felt more challenged at the end of the day after kayaking, than while actually performing the technique, with a perfect match for optimal arousal.
Participant 1 listened to the description of how to perform a ferry, and then based on experience with moving water thus far, decided that the challenge of this technique was at a medium level (4) and his skill for it was at a medium-high level indicating a potential for optimal arousal (see Appendix E). After trying the ferry Participant 1 decided that he was more skilled (5) than challenged (3) by the technique thus resulting in a score on the line between optimal arousal and boredom. Participant 1 practiced this skill several more times at this same spot and after completing another ferry survey card indicated that he was less challenged (2) by performing a ferry at this section of river than during the prior measurement, and that skill was the same (5) suggesting this person was in a state of boredom. Scores from Time 4 (skill = 6, challenge = 3) suggest that this subject was still in a state of boredom even after trying this technique in harder more pushy current. However, after riding in a van and eating dinner at the end of the trip, he then decided that he had less skill (5) but the same amount of challenge (3), thereby putting him on the border between optimal arousal and boredom.

Friday night’s score for overall kayak ability (pre-instruction perceptions) indicate that Participant 1 was on the border between anxiety and optimal arousal when paddling a kayak (see Appendix E). On Saturday night after eating dinner and having time to reflect on a day of kayaking Participant 1 felt he was in optimal arousal with a challenge score of (3) and a skill score of (4). When this subject filled out the Final River Survey, after dinner, on the way home to Ohio University he decided that kayaking provided a perfect match of skill (4) and challenge (4) for optimal arousal.
Participant 1’s perceptions about overall kayaking ability changed between pre- and post-attempt, and were possibly influenced by prior experiences in a boat on a river or a lake, and then later on after reflection, these perceptions changed again.

On the Final River Survey Participant 1 said that he would go kayaking again, and that he would go out again in two weeks for an Ohio University river rescue class. These two answers suggest that this was an autotelic experience for this individual.

Participant 2

Participant 2’s answers typically matched skill and challenge for optimal arousal (10 total) with more answers weighted towards boredom (8) than anxiety and several on the borderline between the two (5). Bow rescues provided the highest number of matches for optimal arousal, and ferries were potentially boring for this person. Participant 2’s overall perceptions suggest that the he felt challenged by kayaking.

While sitting in a kayak, after receiving instruction on how to perform a wet exit, Participant 2 believed that he would experience a medium-high challenge for the task (5) and would be equally skillful (5) at the technique (see Appendix E). After flipping his kayak over and performing a wet exit, however, this participant felt he was not really challenged (2) and was less skillful (4) than initially perceived, suggesting a state between optimal arousal and boredom. Scores from Time 3, issued after getting off of the river on Sunday, suggest a state of high optimal arousal (skill = 6, challenge = 5), and yet when Participant 2 answered the same questions again, at dinner on the way home, decided that he was bored with the wet exit (skill = 6, challenge = 2).

After having the bow rescue described and seeing it demonstrated Participant 2 felt that he was more skillful (5) than challenged (3), and after trying it at the lake felt
bored with this technique (skill = 6, challenge = 2) (see Appendix E). Later, after flipping over and waiting for a bow rescue at the lake several more times, Participant 2 felt more skillful (5) than challenged (4), with a match for optimal arousal. After exiting the river, and after reflecting about this technique, this participant felt slightly less skillful (4), and more challenged (5). On the way home after dinner, he changed his perception again to being more skilled (5) than challenged (4). Times 4 and 5 were matches for optimal arousal.

For all four of the surveys answered concerning eddy turns Participant 2 felt more skillful than challenged with skill scores varying between 5 and 6 and challenge scores between 3 and 4 (see Appendix E). Participant 2’s initial perception (Time 1) of this technique suggested that he would be in a state of optimal arousal while performing the eddy turn, but after trying it (Time 2) considered it to be boring (skill = 6, challenge = 2). Scores from Time 3, after paddling a kayak for a weekend, put Participant 2 on the borderline between optimal arousal and boredom (skill = 6, challenge = 4), and by Time 4 he was once again bored with the eddy turn (skill = 6, challenge = 3).

The initial perception (see Appendix E) of Participant 2 was that he would be equally skillful and challenged (skill = 4, challenge = 4) by performing a peel out. After doing a peel out this subject felt more skillful (6) than first thought, but the technique was also challenging (5), indicating that the first attempt at this technique led to an optimal arousal experience. At the end of the day on Sunday (Time 3 and Time 4), after performing this technique many more times, the subject felt much more skillful than challenged by this technique with two matches for boredom.
After receiving instruction on how to perform the ferry technique Participant 2 believed (see Appendix E) that he had medium-high skills (5) and would experience medium-low (3) challenge. After the first experience with this technique Participant 2 felt bored (skill = 6, challenge = 2). After several more tries, his skill level (6) remained the same, but the challenge (5) had increased indicating a match for optimal arousal. Data for this participant, once on dry land at the end of the weekend, suggest that his skill level had increased again though the challenge level had remained the same. Time 5, issued after dinner on the way home, indicates that Participant 2 now considered his skill for this technique high (7) and the challenge medium-low (3).

Friday night perceptions of skill (2) and challenge (5) suggest that Participant 2 was anxious about his overall kayak ability. After dinner and a day on the lake Participant 2 now indicated that his overall kayak ability could lead to optimal arousal experiences (skill = 5, challenge = 6). Yet on the way home on Sunday Participant 2 believed that his overall kayaking ability was on the borderline between optimal arousal and anxiety.

When answering the last two questions of the Final River Survey Participant 2 said that he would go kayaking again, in fact he would participate in the Ohio University Outdoor Pursuits roll clinic the very next week. This person further stated that he would like to go kayaking again, “before it gets too cold in the rivers.” These answers indicate that kayaking was an autotelic experience for this subject.

Participant 3

Scores from Participant 3 suggest that the kayaking techniques learned during this instructional experience produced optimal arousal. Eighteen sets of skill and challenge scores, for the total responses, were matches for optimal arousal, one for boredom, and
one for anxiety with five on the borderlines between the three states. The graphs suggest that when this person performed the three river techniques (eddy turns, peel outs, ferries) that he was provided with the greatest opportunity for optimal arousal.

Before getting in a kayak, but after receiving instruction on how to do a wet exit, Participant 3 believed that he would be more skillful (6) than challenged (4) by this technique, putting him on the line between optimal arousal and boredom (see Appendix E). After performing a wet exit this subject felt slightly less skillful (5), but still challenged, thus being a match for optimal arousal. After two days of paddling a kayak this participant felt more skillful (6) and less challenged (3) by doing a wet exit, perhaps even bored with this maneuver.

The idea of staying upside down in a kayak and waiting for another boat to come rescue him, left Participant 3 feeling more challenged (6) than skillful (3), or feeling anxious (see Appendix E). However, after trying this technique, he felt equally high levels of skill (6) and challenge (6) which is a good match for optimal arousal. After practicing the bow rescue some more at the lake Participant 3 felt slightly more skilled (6) than challenged (5) by waiting for a bow rescue. As this participant got off of the river, and had more time away from the river to think about the bow rescue, he decided that perhaps there was even less challenge (4), but that he had the same level of skill (6). Scores from Time 5 indicate that further time away from the river left Participant 3 feeling more balanced between skill (6) and challenge (5), suggesting the possibility of optimal arousal for this activity.

Times 1 and 4 had the same scores (skill = 4, challenge = 5) in regards to perceptions of the eddy turn for Participant 3, which indicates that initially this technique
could, and perhaps did produce a state of optimal arousal (see Appendix E). When Participant 3 performed the eddy turn for the first time, the resultant scores were a match for high flow (skill = 6, challenge = 6). After practicing the eddy turn for a day this participant concluded that the technique was an equal match of medium levels of skill (4) and challenge (4), with a potentiality for optimal arousal.

Initial perceptions of performing a peel out (see Appendix E) put Participant 3 on the borderline between optimal arousal and anxiety (skill = 3, challenge = 5). After doing a peel out, Participant 3 felt that he had a skill level (5) that matched the challenge level (5), indicating optimal arousal. When this participant completed the survey card after getting off of the river he still felt matched in skill (5) and challenge (5), suggesting that performing this technique produced a state of optimal arousal. Interestingly, after more time had passed by Participant 3 believed that the peel out was slightly more challenging (6) than he was skillful (5), though he was still matched for optimal arousal by this technique.

Instructions for how to perform a ferry, received while in a kayak on the river, left Participant 3 feeling that he would be less skillful (4) than challenged (5), which suggests that performance of this technique could lead to a state of optimal arousal (see Appendix E). When this subject tried this technique in the relatively calm moving water on the first part of the river he decided that this technique was more challenging (6) than first thought but that his skill level was the same as the initial perception (4). Once he performed the ferry several more times at the same spot on the river Participant 3 believed that his skill at performing the ferry technique (5) matched the challenge (5). After practicing this maneuver for a day in a variety of river currents Participant 3 decided that his skill was
slightly less that before (4) but that the challenge was the same (5). However, several hours later he felt that the challenge of the activity (5) was matched with his skill (5), indicating that this technique could lead to optimal arousal.

On Friday night, before getting into a kayak for the first time Participant 3 believed that his overall kayak skill would be at a medium level (4) and the challenge produced by paddling a kayak would be medium-low (3), suggesting that kayaking could lead to an optimal arousal experience (see Appendix E). After a day of kayaking on the lake, and after eating dinner, Participant 3 decided that the overall challenge of kayaking would be higher (5) than his skill (4). Sunday night, however, this person decided that the challenge of kayaking (6) was evenly matched with his skill (6) suggesting that kayaking led to optimal arousal.

Participant 3’s responses strongly suggest that kayaking provided an autotelic experience. When asked if he would go kayaking again in the future, Participant 3 said, “YES!!!!!!!” This person’s answer for how soon he would go kayaking again was “Tomorrow good for you?”

Participant 4

Participant 4 had scores which wavered between optimal arousal and boredom indicating that this person was ready for more challenge. There were eight sets of matches (of skill and challenge) for optimal arousal, eight sets of matches for boredom and four sets of scores on the borderline between the two. The two river techniques, peel outs and ferries, provided the most challenge for this person.

Participant 4 had received prior instruction in whitewater kayaking before this trip, so after she received instruction on how to perform a wet exit at the lake her scores
indicated that her skill would be high (6) and the challenge of the technique would be nearly as high (5) (see Appendix E). After she performed the wet exit for the first time on this trip she perceived that her skill for the task was even higher (7) and the challenge was slightly less (4). At the end of the trip when Participant 4 completed the questions from Time 3 and Time 4 she indicated that she was bored with the technique (skill = 7, challenge = 1).

Initial perceptions by Participant 4, probably based on her prior kayaking education and experience, were that her skill would be medium-high (5) and that the challenge for the technique would be equally medium-high (5), suggesting that this could be an optimal arousal producing activity (see Appendix E). When she performed the bow rescue at the lake this subject felt more skilled (6) than challenged (4). After practicing this technique several times this person perceived that she still had the same level of skill (6) and experienced the same level of challenge (4). Scores from Time 4, issued after getting off of the river on Sunday, indicate that this participant felt bored with the bow rescue technique (skill = 7, challenge = 3). Interestingly, perhaps after considering her performance of the technique in moving water, Participant 4 felt that both her skill at (6) and the challenge (6) of the bow rescue were high.

Initial perceptions for the eddy turn, held by Participant 4, were that her skill for the task would be high (6) and the challenge of the task would be low (2), suggesting that based on her prior kayaking experience that she would be bored with this technique (see Appendix E). After performing her first eddy turn of the weekend this person still believed that she had skill for the technique (5), but that the challenge was a little more than first perceived (4), potentially having experienced optimal arousal. A day of
practicing this technique left the participant feeling that she still had the same level of skill (5) and experienced the same level of challenge (4). Several hours later, after dinner on Sunday evening Participant 4 perceived that she had the same level of skill (5), but that the challenge of the eddy turn had been reduced (3).

Scores from Time 1 of the peel out, for Participant 4, indicated that she thought her skill would be high (6) and the challenge would be at a medium level (4) (see Appendix E). Unfortunately the researchers did not get an assessment for Time 2, however scores from Time 3 (skill = 4, challenge = 5) suggest that the peel out proved to be more challenging than Participant 4 remembered. Time 4, issued after dinner on Sunday night suggest that more time, and possibly thought, left this person feeling even more challenged by the peel out (skill = 4, challenge = 6).

Prior whitewater kayaking experience, potentially, helped Participant 4 to feel a medium-high level of skill and a low level (2) of challenge before practicing the ferry (see Appendix E). Upon performing her first ferry of the weekend Participant 4 felt even more skillful (6) and not very challenged (2) indicating that the ferry in the calm water near the beginning of the river was boring. After practicing this technique some more, this participant felt even more skillful (7) and more challenged (4), though still potentially bored. By the end of the day on whitewater this participant now felt very challenged (7), and less skillful (5), and after further contemplation (Time 5) even less skillful (skill = 3, challenge = 6); perhaps performing the ferry at the end of the trip in the pushier water at the bottom of Ramcat was too challenging.

On Friday night Participant 4 perceived that she would have a medium-low skill level (3) and would be very challenged (7) by the sport of whitewater kayaking (see
Appendix E). On Saturday evening, after a day of kayaking on the lake, Participant 4 felt that she had a medium skill level (4) and was less challenged (3) than she thought that she would be. On Sunday, after dinner and several hours from the river, this participant believed that she had a medium level of skill (4), and that whitewater kayaking provided a medium level of challenge (4).

Participant 4’s answers to the last questions of the Final River survey suggest that kayaking, for her, was an autotelic experience. When asked if she would go kayaking in the future Participant 4 responded, “For sure!” In response to the question how soon she responded “Tomorrow!”

Participant 5

The scores, matched sets of skill and challenge, from Participant 5 indicate that this person was bored and really needed more challenge. This person had twenty sets of scores that were matches for boredom, two for optimal arousal, and two sets on the border between the three states of optimal arousal.

Initial perceptions for the wet exit were that when Participant 5 tried the wet exit for the first time this weekend he would have a medium-low skill level (3) and the technique would provide a low level of challenge (1) (see Appendix E). After doing the wet exit, and even later perceptions (Time 2, Time 3, and Time 4) suggest that this participant is very bored with this technique (skill = 7, challenge = 1).

Participant 5’s scores for the bow rescue suggest a high level of competence for this person, and that he was probably bored with this technique (see Appendix E). Prior to performing the bow rescue at the lake Participant 5 perceived that he had a high skill level (6) for this technique, and that the challenge level would be low (2). After
performing his first bow rescue of the weekend Participant 5 felt that his skill level (6) and the challenge (2) were at the same level as Time 1. When Participant 5 completed the survey again at Time 3, after practicing the technique again at the lake, he felt that he had even more skill (7) than challenge (1). For reasons unknown this participant felt slightly less skillful at the next issuance of the instrument (skill = 6, challenge = 1), yet by Time 5 was back to levels of high boredom (skill = 7, challenge = 1).

Before performing the eddy turn Participant 5 perceived that he would have a high level of skill (6) and would experience a low level of challenge (1) (see Appendix E). Upon trying this technique this participant indicated that actual and perceived levels of skill (6) and challenge (1) for this technique were the same. After a whole day on the river and lots of practice with this technique (Time 3 and Time 4) Participant 5 still felt the same levels of skill (6) and challenge (1).

Initial perception scores for the peel out Time 1 indicate that Participant 5 would feel a high level of skill (6) and a low level of challenge (1) when he performed the technique (see Appendix E). When Participant 5 had performed the technique for the first time of the weekend he decided that his skill was slightly less than first thought (5) but that the challenge was indeed low (1). After a day of using this technique Participant 5 still felt bored (scores for Time 3 and Time 4 skill = 6, challenge = 1).

Before performing the ferry for the first time of the weekend Participant 5 perceived that he had a high skill level (6) and would not be challenged by the technique (1) (see Appendix E). Each of the remaining data points (Time 2, Time 3, and Time 4) confirmed this belief with the same levels of skill (6) and challenge (1).
On Friday night, prior to paddling for the weekend, Participant 5 believed that he would have a low level of skill overall for kayaking (2) and that that overall kayaking would provide would have a medium-low level of challenge (3) (see Appendix E). Saturday evening, after a day of kayaking on the lake and having eaten dinner, this person felt even more skill in regards to overall kayaking (skill = 4, challenge = 3). On Sunday, after working on the same skills as the other participants but also after side surfing in a hole and attaining back up through the Ramcat rapid, this subject perceived that he had a medium level of skill (4) and had experienced a high level of challenge (6).

Participant 5 had been on two instructional kayaking trips prior to participating in this study so many of his scores indicate boredom as this person is ready for more challenging whitewater. Participant 5’s responses to the last two questions of the Final River Survey indicate that kayaking was an autotelic activity. When asked if he would go kayaking again this participant responded, “Yes, Please!!” In response to the question of how soon Participant 5 wrote, “Tomorrow!!”

**Participant 6**

Data sets of skill and challenge from Participant 6 are relatively inconclusive, though they bounce back and forth between optimal arousal and boredom. For this person there were eight sets of matches for optimal arousal, eight for boredom, and three sets on the line in between. Based on the scores, this participant experienced the highest number of optimal arousal experiences on the river and felt anxiety on the lake.

After receiving instruction and seeing a demonstration of the wet exit Participant 6 felt anxious that this technique would be more challenging (6) than he was skillful (2) (see Appendix E). After doing a wet exit, however, this subject felt that he was bored
with a skill level of (6) and a challenge level of (3). These are interesting scores because the first time he tried to swim to the surface of the water without actually exiting the kayak and had to be rescued with the “hands of god” technique (where the instructor rolls both boat and person back upright). When this subject got off of the river on Sunday and filled out the wet exit survey again he felt that the challenge was even less (1) and his skill level was high (7), meaning that the wet exit was boring. Participant 6 later decided, while filling out the survey several hours later, that he was less skilled (5) and the challenge was greater (6), and a match for optimal arousal.

Participant 6 believed, after receiving instruction and seeing a demonstration, that doing a bow rescue would be slightly more challenging (4) than he was skillful (3), but after trying this technique once, he was suddenly anxious (skill = 2, challenge = 6) (see Appendix E). Time 3 shows that after practicing this technique some more Participant 6 felt that, while he had a medium-low level of skill (3) for doing a bow rescue, the challenge was equally medium-low (3), potentially leading to optimal arousal. Thinking about this technique after getting off the river left this person feeling anxious (skill = 2, challenge = 5), yet several hours later and many miles away from the river he felt bored with this technique (skill = 6, challenge = 2).

Initial perceptions of skill (3) and challenge (6) for the eddy turn indicate that Participant 6 was anxious about doing this technique (see Appendix E). Once Participant 6 had done an eddy turn, he felt more skillful (4) and less challenged (3), than first thought. Later, upon exiting the river, this person felt that both skill and challenge had increased (skill = 5, challenge = 4). After dinner Sunday night Participant 6 decided that he was bored with doing eddy turns (skill = 6, challenge = 3).
Instructions for doing a peel out left Participant 6 more challenged (5) than skillful (3), in a state on the cusp between anxiety and optimal arousal (see Appendix E). Once this participant had performed a peel out, he felt more skilled (5) than challenged (3). When this person got out of his boat and completed the third peel out survey, Time 3, there was a perception that skill for doing the activity (5) and the challenge of the activity (3) had not changed. At Time 4 Participant 6 marked scores that indicated boredom with doing a peel out (skill = 6, challenge = 2).

Participant 6 felt that he had similar levels of skill (5) and challenge (4), which could lead to optimal arousal, before trying a ferry (see Appendix E). After performing a ferry Participant 6 decided that the challenge (2) was less but that his skill (5) was the same, suggesting boredom. Later, after more practice in the same place on the river, that skill was the same but that the challenge had declined (skill = 5, challenge = 2). When this participant filled out the survey, after exiting the river on Sunday, he believed that both skill and challenge for the technique had increased (skill = 6, challenge = 3), but at dinner later that night that both skill and challenge had both diminished (skill = 5, challenge = 2). The last three times (Time 3, Time 4, and Time 5) were all matches for boredom.

On Friday night before paddling a kayak Participant 6 felt more challenged (4) by the idea of kayaking, than he had skill (2) (see Appendix E). After a day of instruction on the lake and having eaten dinner Participant 6 felt slightly more skillful (4), than challenged by kayaking (3). On the way home on after a weekend of paddling this person had experienced high challenge (6) and medium-high skill (5) for overall kayaking ability.
For most of the initial perceptions, Participant 6 indicated feeling more challenged by the activities than he had skill to perform them, suggesting a tendency towards anxiety before doing activities in a kayak.

When Participant 6 answered the last questions from the Final River Survey he indicated that, “Yes” he would go kayaking again; and his answer for “when” stated, “I’m not sure, maybe in a few months but I would probably kayak in a lake and not a river.” These answers do indicate that this was not an autotelic experience for this subject.

Participant 7

The matched sets of scores of skill and challenge for Participant 7 indicate that he felt more challenged than skillful when kayaking, with a tendency towards anxiety. Eight sets of scores were matches for anxiety, seven for optimal arousal, and three on the border between the two states. There were three scores matched for boredom though four sets of scores were on the line between optimal arousal and boredom. This person felt more anxious while performing the techniques taught on the river, and more in optimal arousal with the techniques taught on the lake.

After receiving instruction on how to perform a wet exit Participant 7 perceived that his skill would be medium-high (5) and the challenge for this technique would also be medium-high (5), indicating the this could be a optimal arousal producing activity (see Appendix E). Participant 7 tried the wet exit for the first time and decided that his skill was at a medium level (4) and the challenge was low (2). On Sunday after getting off of the river this person believed that his skill for the activity had increased (6), and so had the challenge (5). Several hours later, after dinner, Participant 7 changed his mind and
decided that the perceived skill level was the same (6), but that challenge had decreased (4).

When Participant 7 had performed several wet exits, instructions for the bow rescue left him feeling more skillful (5) than challenged (3) by the technique (see Appendix E). When Participant 7 filled out the survey questions after trying the bow rescue for the first time he felt much more skilled (6) than challenged (2). Participant 7 practiced this technique some more, along with everyone else, and decided that this was a potential match for optimal arousal (skill = 5, challenge = 4). After exiting the river Participant 7 decided that the bow rescue provided slightly more challenge (5) than he had skill (4). Then after dinner on Sunday this person decided that she/he was bored with doing bow rescues (skill = 6, challenge = 3).

Instruction and the previous day’s experience on the lake helped Participant 7 to feel slightly more skilled (5), in preparation for performing the eddy turn, than challenged (4) (see Appendix E). After trying his first eddy turn this subject felt more skilled (6), than challenged (3) suggesting boredom now for this technique. When he left the river on Sunday, this person felt that the challenge had increased slightly (4), but that his skill was the same (6). Interestingly this subject felt far more challenged (5), than skillful (2), suggesting that the eddy turn might cause a certain amount of anxiety.

The idea of going from the calm water of the eddy into the current led Participant 7 to feel some anxiety for this technique with a perception of low skill (2) and high challenge (5) (see Appendix E). Once this participant tried the peel out, he felt slightly more skillful (3), but still fairly challenged (5). Later perceptions (Time 3 and Time 4),
once away from the river on Sunday, were the same match for anxiety (skill = 2, challenge = 5).

After receiving instruction and seeing a demonstration on how to perform a ferry, Participant 7 felt that his skill for this technique (3) would be slightly less than the challenge level (5), and would give him the chance for experiencing optimal arousal (see Appendix E). Performing a ferry left this participant feeling more challenged (5) than skilled (3). Doing this technique several more times at the same spot left Participant 7 feeling even less skilled (2) for the same amount of challenge (5), indicating a feeling of anxiety. When this person completed the survey upon exiting the river he felt the same amount of anxiety (skill = 2, challenge = 5). Several hours later, with a full stomach this participant indicated that he felt even more challenged (6) for the same amount of skill (2), suggesting that performing a ferry was an anxiety producing kayak technique.

On Friday night, before getting in a kayak Participant 7’s scores indicated that there was a certain level of anxiety about kayaking (skill = 2, challenge = 5). Saturday, after a day of kayaking on the lake this subject felt that the challenge level had remained the same (5), but that he had a higher skill level (3) (see Appendix E). Sunday, after eating dinner while on the way back to Ohio University, this participant believed that the challenge of kayaking had increased another point (6), and that his skill had increased even more (5), suggesting that this person might have experienced optimal arousal somewhere over the course of the weekend.

Participant 7’s responses to the last questions of the Final River Survey, “YES!” and “Soon” suggest that kayaking was an autotelic activity for this person.
Participant 8

Matched scores of skill and challenge, when graphed, suggest that Participant 8 experienced optimal arousal while kayaking. Sixteen of the twenty-five scores were matches for optimal arousal, none for anxiety or boredom; five were on the border between optimal arousal and anxiety; and four were on the border between optimal arousal and boredom. This participant found the techniques learned on the river to be more challenging than those learned on the lake.

When Participant 8 filled out Time 1 for the wet exit survey, he believed that the challenge (5) was slightly higher than his skill (4), yet upon trying this technique in the lake decided that it was easier than first perceived (skill = 5, challenge = 3) (see Appendix E). When this participant completed Time 3, after getting off of the river on Sunday, he felt that they were more skilled (5) than challenged (4). After dinner on Sunday, Participant 8 believed that he had experienced even levels of skill (4) and challenge (4) which suggests that this could have been an optimal arousal producing maneuver.

Experience from the wet exit and instructions on how to perform a bow rescue led Participant 8 to feel that he had a medium level of skill (4) and would find a low level of challenge (2) for this technique (see Appendix E). The first attempt at a bow rescue for this person proved to be slightly more challenging with a score of (3), though the skill level remained the same (4). More practice on the lake with flipping over and waiting for a bow rescue did not change perceptions, for Participant 8, at all (skill = 4, challenge = 3). When Participant 8 completed the next survey, Time 4, for this technique he felt that the challenge had increased slightly (4) but that the skill level remained the same (4),
which suggests there was a potential for optimal arousal. Several hours away from the river, and after eating dinner, this person felt that he was slightly more skillful (4) than challenged (3) by the bow rescue.

All of Participant 8’s responses about the eddy turn suggest that this might have been an optimal arousal producing activity for him. Time 1, issued after receiving instruction and seeing a demonstration, indicates that this subject felt that his skill would be medium-low (3), and the challenge would be slightly higher (4) (see Appendix E). After this participant performed the eddy turn he felt slightly less challenged (3) with an even match of skill (3) for the technique. On Sunday after getting off of the river Participant 8 felt even more skillful (4) than challenged (3), and several hours later after dinner, felt evenly matched on skill (4) and challenge (4) levels.

Instructions and demonstrations on how to perform a peel out, given on the river, left Participant 8 feeling medium-low levels of challenge (3) and skill (3) (see Appendix E). After performing his first peel out this participant felt a medium level of challenge (4) and a medium-low level of personal skill for this technique. After getting off the river on Sunday this participant’s scores indicate that he felt more skillful (5) than challenged (3) by the peel out. Several hours later his scores indicated feeling an equal level of skill (3) and challenge (3). All of the scores listed above were close matches for optimal arousal.

When Participant 8 received instruction on how to perform a ferry he perceived having a medium level (4) of skill and a low level (2) of challenge (see Appendix E). Participant 8’s first attempt at a ferry produced a feeling of low skill (2) and medium-low challenge (3). More practice of the ferry technique at the same place left this participant feeling more challenged (4) and more skilled (3). Results from Time 4 and Time 5 were
the same indicating that Participant 8 felt more challenged (4) than skilled (2), placing him on the borderline between optimal arousal and anxiety.

On Friday night Participant 8’s scores indicated feelings of low skill (1) and medium-low challenge (3), putting him on the borderline between optimal arousal and anxiety (see Appendix E). After a day on the lake this person felt more skilled (2), but also more challenged (4), which left him on the borderline between optimal arousal and anxiety. After dinner on Sunday night Participant 8 felt that he was still at the same levels of skill (2) and challenge (4).

For the last two questions of the Final River Survey Participant 8 wrote that “yes” he would go kayaking again, but “After a long nap, and after I am in slightly better shape. Also, I would like to do some further reading on kayaking.” These answers suggest that kayaking could be an autotelic experience in the future, but currently it is not.

Participant 9

Score sets of challenge and skill for Participant 9 indicate that kayaking provided this person with many opportunities for optimal arousal. When this person’s scores were charted on the graphs there were fifteen matches for optimal arousal, one for anxiety, with two matched scores on the border between optimal arousal and anxiety. These scores also included two matches for boredom and had four sets of scores on the line between optimal arousal and boredom. Participant 9 had the greatest number of opportunities for optimal arousal while performing the river techniques, but found the ferry to be less challenging.

Participant 9 had prior kayaking experience, having kayaked on the Upper New and Greenbrier rivers in West Virginia and having done some sea kayaking, though he
had not received any formal kayaking instruction prior to this weekend. When this participant filled out Time 1 for the wet exit, just before he tried this technique for the first time of the weekend, this person’s perceptions were that he had a medium level of skill (4), and would experience a medium-low level of challenge (3) (see Appendix E). After performing the wet exit Participant 9 felt that he had the same level of skill (4) and had experienced the same level of challenge (3) as first thought. At the end of the weekend when this person completed the surveys for Times 3 and 4 he indicated that he was skillful (6), in regards to the wet exit and had experienced a medium-low level of challenge (3).

When Participant 9 received instruction on how to perform a bow rescue he felt that he would have a low level of skill (2) and would experience a medium level of challenge (4) for this technique (see Appendix E). After his first performance of the bow rescue at the lake Participant 9 discovered that he had a medium-high level of skill (5) for this technique, and that he had been equally challenged (5), which suggests that he may have experienced optimal arousal. More practice of the bow rescue at the lake led to this person feeling that he had a medium level of skill (4) for this technique and that he had experienced a medium-low level of challenge. On Sunday, when Participant 9 completed Time 4 after getting off of the river, he indicated that he had a medium level of skill (4) and had experienced a high level of challenge (6) with this technique. Later that night when Participant 9 completed Time 5 for the bow rescue technique his scores indicated that he might have experienced optimal arousal (skill = 5, challenge = 6).

When Participant 9 received instruction, on the river, for how to perform an eddy turn he perceived that his skill level would be at a medium level (4) and the challenge
would also be at a medium level (4) (see Appendix E). When he filled out the instrument for Time 2, after performing an eddy turn, this participant felt that he had a medium skill level (4) and a medium level of challenge (4). Further experience with the eddy turn left Participant 9 feeling even more skill (5), yet the same amount of challenge (4). With the issuance of Time 4 for the eddy turn Participant 9 believed that the eddy turns provided a medium challenge (4) for which he had an equal level of skill (4).

Instructions and demonstration of the peel out technique led Participant 9 to feel that he would experience matched levels of skill (4) and challenge (4) (see Appendix E). After performing a peel out Participant 9 still believed that the technique had a medium level of challenge (4) and that he had a medium level of skill (4). The scores from Time 3 indicate that after a day of performing the peel out on whitewater this person felt slightly more challenged (5) than skilled (4), though later that night he felt the balance of skill (4) and challenge (4) again.

Initial perceptions of the ferry technique by Participant 9 were that he would have a medium-high level of skill (5) for a medium-low level of challenge (3) (see Appendix E). When Participant 9 had performed his first ferry he was left with the feeling that he had the same levels of skill (5) and challenge (3). Later contemplations (Time3 and Time 4) of skill and challenge for the ferry technique, by Participant 9, suggest that he felt more skillful (6) and more challenged (4). All four sets of score for this person's ferry ability were on the borderline between optimal arousal and boredom.

On Friday night, before the first day of kayaking Participant 9’s scores indicate that his initial perceptions for kayaking were that he would have a medium-low level of skill (3) and would experience a low level of challenge (2) for kayaking overall (see
Appendix E). Saturday night, after a day on the lake, this person believed that he had a medium level of skill (4) and had experienced a medium-high level of challenge in regards to overall kayaking. Participant 9’s scores for Time 3 suggest that he might have experienced anxiety with a high challenge level (7) and a medium skill level (4).

Participant 9’s answers for the last two questions of the Final River Survey suggest that this weekend of whitewater kayaking was an autotelic experience. When asked if he would go kayaking again this person answered, “Yes.” Participant 9’s response to “when” was that he would paddle again when he had time off from work.

Participant 10

When scores of skill and challenge were matched up on the graphs they indicated that Participant 10 experienced optimal arousal during this instructional experience. There were eleven matches for optimal arousal, four matches for anxiety, with two on the border in between optimal arousal and anxiety. This person’s scores included four matches for boredom, with four sets on the line between optimal arousal and boredom. This subject’s scores suggest that while there were many opportunities for optimal arousal the techniques learned on the river provided more challenge than those learned on the lake.

Participant 10 also had prior kayaking experience on the Upper New river and on the Greenbrier as well as having done some sea kayaking, so it is important to take this into consideration when analyzing this person’s survey responses. When this person completed the survey for Time 1, for the wet exit, her scores indicated a medium-high level of skill (5) and a medium level of challenge (4) (see Appendix E). Answers to Time 2 indicate that this participant experienced medium-low levels of challenge (3) for her
medium level of skill (4). After two more days in a kayak Participant 10 felt a higher level of skill (6) and less challenged (2) by the wet exit, further contemplation however (T4) left her feeling more challenged (skill = 6, challenge = 4).

Prior to trying the bow rescue for the first time on the lake Participant 10’s perceptions were that she had a medium level of skill and would experience a medium-high level of challenge (5) (see Appendix E). When Participant 10 performed the bow rescue for the first time her perceptions improved to being higher in skill (6) and having experienced less challenge (3). More practice of the bow rescue technique, Time 3, had this person feeling the same level of skill (6) but higher levels of challenge (6). After exiting the river on Sunday Participant 9 believed that she had a high level of skill (6) and experienced a low level of challenge in regards to the bow rescue. Later, however, this participant felt more skill (7) and more challenged (4).

When Participant 10 received instructions on how to perform an eddy turn she felt that she would have a low level of skill (2) and would experience a medium-high level of challenge (5) (see Appendix E). Her first performance of the eddy turn gave this person the perception that she had a medium level of skill (4) and that she had experienced a medium-low level of challenge (3). As this participant got ready to leave the river she indicated that she still had a medium level of skill, but had experienced a medium-high challenge (5) with the eddy turn. Later that night Participant 10 felt that perhaps the challenge of the eddy turn was even higher (6), but that she still had the same level of skill (4).

Prior to attempting her first peel out, but after receiving instruction and seeing it demonstrated on the river, Participant 10 believed that she would have a low skill level
(2) for the technique and that the challenge would be medium-high (5) (see Appendix E). After performing the peel out the subject believed that she had a medium-high level (5) of skill and had experienced a medium-low level of challenge (3). With further practice of this technique, Time 3, on the river this participant felt that there was a medium level of challenge (4) for her medium-low level of skill (3). By the time she was on her way home from the river this person decided that she had a medium level of skill (4) when performing the peel out and that it provided her with a high level of challenge (6).

Initial perceptions for Participant 10, concerning the ferry, were that she would have a low level of skill (2) and that she could expect a medium-high level of challenge (5) (see Appendix E). When she performed the ferry for the first time this subject discovered that she had a medium-high level of skill (5) and experienced a medium-low level of challenge (3). This score remained the same for Time 3. Upon exiting the river on Sunday this person felt that she had a lower level of skill (3) and felt more challenged (4) by the technique. On the way home, after eating dinner, Participant 9 decided that she had a higher level of skill (5) and had experienced the same amount of challenge (4) for this technique.

Though Participant 10 had prior kayaking experience, her scores for overall kayaking suggest that paddling kept getting harder for her (see Appendix E). On Friday night the subject perceived that she would have a medium level of skill (4) for paddling a kayak and that she would experience a medium-low level of challenge (3). A day of paddling on the lake led this person to believe that she had experienced an equal amount of skill (4) and challenge (4). After another day of paddling a kayak on whitewater Participant 10 felt even more challenge (7) for her level of skill (4).
The answers that Participant 10 provided for the last two questions of the Final River Survey suggest that kayaking did provide her with an autotelic experience. When asked if she would go kayaking again she answered “Yes.” This person’s response to “when” she would go kayaking again was “ASAP.”

Participant 11

After all of the data were plotted on graphs, the pairing of challenge and skill from Participant 11’s scores indicated that there was ample opportunity for this subject to experience optimal arousal. Plotted scores revealed twelve matches for optimal arousal, three matches for anxiety, with two set on the line between optimal arousal and anxiety. The scores also showed four matches for boredom, with three sets of scores on the borderline between boredom and optimal arousal. While this person found many opportunities for optimal arousal, techniques learned on the lake tended to be boring, and techniques learned on the river provide a fair amount of challenge.

Participant 11’s initial perceptions for the wet exit were that the challenge would be medium-high (5) and his skill would be medium-low (3), placing him on the borderline between optimal arousal and anxiety (see Appendix E). After this participant performed his first wet exit he felt the same way (skill = 3, challenge = 5). On Sunday when this participant got off of the river he felt much more skillful (6) and less challenged (2) than on Saturday; and several hours later felt even better about this technique (skill = 7, challenge = 2).

Bow rescue instruction and demonstration helped lead Participant 11 to feel a medium level of skill (4) and a medium high level of challenge (5) (see Appendix E). The first try of the bow rescue for this person, Time 2, left him feeling less challenged (3)...
and more skillful (5). After more practice Participant 11 felt the same amount of skill (5) and challenge (3) for this technique. After getting off the river (Time 3 and Time 4) and further contemplation the participant thought that this activity might even be boring (skill = 6, challenge = 3).

On the river instruction for eddy turns left Participant 11 feeling anxious (skill = 2, challenge = 6) (see Appendix E). After doing the eddy turn for the first time this participant’s perceptions changed to feeling slightly less challenged (5) and more skillful (4). Upon exiting the river on Sunday Participant 11 felt even more skillful (5) but slightly more challenged (6). Several hours later when this participant answered the same survey again he felt the same amount of skill (5) and less challenge (3).

Initial perceptions of the peel out by Participant 11 indicate that he was anxious before trying this technique (skill = 2, challenge = 6) (see Appendix E). After this person’s first performance of the peel out he felt more skillful (4) and less challenged (5), potentially leading to optimal arousal. This participant’s results about the peel out, after leaving the river, were that his skill had decreased (3) and the challenge had increased (6). Interestingly, at dinner several hours later, this person’s scores indicated that he felt more skill (5) and less challenge (4).

Participant 11’s initial perceptions of the ferry technique were that his skill was at a medium level (4) and that the challenge was medium-high (5) (see Appendix E). After trying this technique for the first time this person felt more skillful (5) and less challenge (4). When this person exited the river on Sunday he felt a little less skillful (4) and yet challenged a little more (5). After dinner on Sunday night, on the way back to Ohio
University, Participant 11 felt more skillful (5) and more challenged (6) by the ferry technique. All of these scores fell within the range of optimal arousal.

On Friday night Participant 11’s initial perceptions about kayaking overall, were that his skill would be medium-low (3) and the challenge would be equally medium-low (3) (see Appendix E). After a day of kayaking on Yough Lake, on Saturday, this participant felt he had more skill (4) but that the challenge had also increased (5). On the way home from the river Participant 11 felt even more skillful (5) and that the challenge had also increased (6). Each of these scores suggests that kayaking, overall, could provide optimal arousal for this person.

On the Final River survey Participant 11 stated that he was, “not sure” whether he would paddle a kayak again and did not answer the question about when he would consider kayaking in the future. This information suggests that kayaking was not an autotelic experience for this subject.

A corollary to affectation, as described in the introduction of this thesis, suggests that it is also important for instructors to consider the teaching progression. Participants in this study received instruction and practiced the bow rescue on the lake, then later practiced this technique in whitewater. After receiving one bow rescue, during a practice session for this technique, in the small waves in the Ramcat rapid raised confidence, as observed by the researchers, levels of confidence increased in most of the participants. Not only did they want to try the bow rescue again but they also wished to try front surfing and ferries in more powerful current.
CHAPTER 5: SUMMARY, DISCUSSION, LIMITATION AND RECOMMENDATIONS

Summary

The data collected from this study provide an interesting perspective into how a beginning kayaker perceives challenge and skill for a variety of techniques used in whitewater kayaking. These data provide empirical evidence that optimal arousal is a dynamic process. This chapter discusses the limitations of the study, how to overcome these issues in future research, and new research possibilities.

Discussion

The results from this study were descriptions of data plotted on graphs, which were lengthy, making it challenging to understand what the data indicate. For this reason the most productive way to understand the results of this study would be to revisit the research questions and then describe the implications for practitioners and future research.

Can a beginning kayaker achieve a state of optimal arousal?

While more information needs to be collected to definitively say yes or no, reading the description of the results for each data point and for each participant indicates that optimal arousal did occur.

At what point(s) do beginning kayakers experience anxiety during paddling instruction?

Most of the kayakers experienced anxiety either while performing a kayak technique where she/he was upside down in the kayak, like a bow rescue, or while performing turning maneuvers, like the peel out, in whitewater. Typically initial
perceptions indicated anxiety amongst the participant, before trying a skill, but anxiety often occurred later in the progressions as well for reasons that were not able to be determined with the instruments.

At what point(s) during paddling instruction do beginning kayakers experience boredom?

Many of the kayakers experienced boredom after practicing wet exits and bow rescues several times at the lake.

Is optimal arousal static or dynamic?

Again, while the instrument did not provide enough information to definitively say that optimal arousal occurred, based on matching of challenge and skill and on the increase of challenge, by the instructors, as paddlers progressed in their ability, it appears that optimal arousal is dynamic. Participants’ scores varied greatly from one data point to the next for a variety of reasons.

Limitations of the Study

The data do not delve into enough of the various components of flow to determine, definitively, whether any of the participants ever truly achieved flow. Voelkl, Ellis, Walker (2003) suggest that recent research indicates that skill and challenge do not predict flow as well as well as some of the other flow dimensions. There was also a problem in that the responses could not be validated. For example, were these scores true indicators of anxiety, flow, and boredom?

Problems with the instrument and with the data being incomplete are due, in part, to the instrument not having been tested prior to this study. Consequently, this study ultimately must be viewed as a pilot test, and future research needs to be conducted to
address limitations identified in the methods used in this study. When analysis of the data began the researchers discovered that while the Daily Survey gave great insight into the perceptions of skill and challenge of the participants, reasons for these perceptions were not included. Using Participant 4 as an example, if a participant scored high levels of skill (6) and low levels of challenge (2) after performing the first ferry in “calm” moving water, then by Time 3 scores medium-high on skill (5) and high for challenge (7), thus putting this person on the borderline between optimal arousal and anxiety, there is no information as to what changed the subject’s perceptions. Did this participant flip over while trying the ferry in pushier current, thus leaving her feeling more challenged and less skillful? Being upside down in a kayak in calm water, not to mention while in the commotion and noise of whitewater, can cause lots of anxiety, as expressed by several of the bow rescue and wet exit scores. Notes concerning who did what (like successes and failures, when they did it, and where these events occurred) need to be included.

The primary researcher has made the argument above that the last two questions from the final river survey were sufficient to cover whether this trip may have been an autotelic experience for any of the participants, but this could be argued otherwise. The Daily survey was created intentionally to be short so that more data could be collected at a variety of points repeatedly over the course of the weekend and to reduce impact on the participant’s psychological states and willingness to continued participation. After this weekend it was decided by the primary researcher and his committee that the present research project would serve as a pilot study with more research to be conducted in the near future.
There was also an issue in this research project in that the test sample was a convenience sample. Subjects for this research were not chosen completely at random. Participants came from the Ohio University population, not the larger City of Athens community, and it was comprised of students who received information about the trip either through Campus Recreation or the Recreation Studies department. Several of the subjects were on the trip because of a requirement in a Recreation Studies class to participate in an Outdoor Pursuits trip, and their instructor was one of the researchers. Four of the participants had prior experience and/or had received instruction in whitewater kayaking.

This sample was too small to provide quantitative data with statistical significance. Another issue with the sample might be that the participants were selected through the Ohio University Outdoor Pursuits program which offers trips for the purpose of recreation, and not necessarily for education. This poses a problem because people who are not participating in an educational course are not necessarily trying to improve skills and/or to attain optimal arousal. Instead these clients may be seeking out new and thrilling experiences which might best be described by the extraordinary experience theory (Arnould and Price, 1993). Extraordinary experiences differ from flow experiences by being “unusual events,” and are “characterized by high levels of emotional intensity and experience” (Arnould & Price, 1993, p. 25).

Even though this was not a perfect sample comprised completely of beginners, the data does provide strong evidence that as skill progresses, challenge decreases, and that challenge and skill are valid indicators of arousal states. Consider Participant 5, who had prior whitewater kayaking education from one of the researchers, most of his scores
indicated boredom, as they should; he had paddled on this section of river before and had performed these same techniques in the same spots prior to this trip. While the less experienced participants went back and forth between feelings of anxiety, optimal arousal and boredom, this participant’s scores suggest boredom with the exception of T3 for overall kayaking, where his scores were on the border between optimal arousal and anxiety, possibly from trying new harder techniques. The researchers had to work hard to provide challenges for this person, like leading him through attainment moves back up through Ramcat rapid, and side surfing in the hole at the top of the rapid.

It would have been helpful to have had more information on Participants 9 and 10 as to what type of instruction they had already received and what skills they had already learned and practiced. More information would have provided a clearer picture on why they perceived skill and challenge as they did. It would also be helpful to know how many wet exits, bow rescues and kayak rolls participants performed when not intentionally practicing these techniques to provide insight into how comfortable participants are with being upside down in their kayaks. Anecdotally it could be stated that people who are comfortable being upside down in a kayak, will be confident in performing a kayak roll, and that someone who is comfortable performing a kayak roll will feel more skillful and less challenged by many of the maneuvers performed on the river.

**Recommendations for Future Research**

The best way to correct the issues found with the instruments would be to use a mixed methods approach to gathering data. The Daily Survey cards provide snapshots of how challenged and skillful the participants felt throughout their instructional experience,
but it would also be helpful to include video recordings of interviews after participants have had successes and failures. These interviews would provide visual data on how a person was really feeling, and the interviews could delve more deeply into other conditions of flow like feelings of control, and why the subject is feeling a certain way.

Sample issues could be dealt with by recruiting from further out into the student population at Ohio University to get a better demographic mix. To get participants who were not looking for exciting adventures that provided unique new experiences the sample could be limited to a Department of Recreation Studies class where the participants would more likely be there to improve their techniques and to achieve a flow experience by continuing to seek out more challenge. This idea goes in hand with research conducted by Boniface, which suggests that beginners cannot experience flow because they find an experience too demanding and experience high levels of anxiety (as cited in Beard and Wilson, 2006).

The difficulty achieving statistical significance while analyzing the data could be corrected by allowing more people to participate in the trip or by conducting the study on more trips, in the future, at the same location with the same instructors. Another way to achieve statistically significant differences would be to collect more data for each technique. For example, instead of issuing the wet exit instrument four times, issue it seven to ten times; this should provide enough data for a good correlation.

Data from this study could also be analyzed to see frequency of flow in male versus female participants. The next study should look at bow rescue data to see if Times 3-4 are in flow, which would indicate that trying the bow rescue in moving water improves feelings of skill for the bow rescue. The next study could also compare bow
rescues with surfing and ferries to see if the skill levels for the latter skills improve after
participants practice the bow rescue in moving water.

Another point to consider is whether this instrument would work better for the
Adventure Experience Paradigm than it did for flow. Perhaps a new flow scale could be
developed to show change over time for increasing skill levels for example a Class I
paddler improving to where she is comfortable with kayaking in Class III whitewater.

Differences in scores from the last two times that each survey was issued may have
been affected by time, meaning that time distorts perceptions. Another possibility is that
interactions with other participants can change perceptions. Though the final issuance of
the survey came a long time after leaving the river, and even though results from this
issuance cannot be defined as flow, these data could provide insight into how experiences
are remembered. Further research for adventure programming should be conducted to see
how conversations with others after a trip can affect how an experience is remembered,
and how that affects self-efficacy. For example, will these conversations encourage or
discourage a person from trying this activity again and what can be done to improve
retention?

Recreational programmers need to consider how past experience and group
interaction influence states of flow for their participants. Prior research has shown that
moods change throughout outdoor recreational activities, and these moods are affected by
environmental variables as well as psychological variables (Borrie & Roggenbuck, 2001).
Past experiences, both good and bad, influence how a person perceives and deals with a
new experience, and recreation programmers should take this into consideration when
running an adventure program (Davis-Berman & Berman, 2002). How people perceive a
given situation is also based on social contexts. People are most happy when they are around others, and how a person perceives her or himself is often largely based on interaction with others (Csikszentmihalyi, 1990). Arnould and Price (1993) indicate that those recreation providers that provide hedonistic experiences really need to consider what message they convey since this can affect the experience of the participants. This concept applies to kayaking instructors as well where emotions of fear, conveyed through a variety of means from kayaking carnage stories to facial expressions as examples, can increase levels of anxiety in students thus preventing them from experiencing flow.
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APPENDIX A: INFORMED CONSENT FORM
Ohio University Informed Consent for Participation in Research
Project Title:

An Examination of Arousal States in Beginning Whitewater Kayakers during a Weekend Instructional Experience

I am requesting your permission to include you in a study that I am conducting in collaboration with the Ohio University Outdoor Pursuits program. The goal of the study is to assess participant perceptions of challenge and competence as you progress from beginner to more advanced levels of expertise in whitewater kayaking during the Outdoor Pursuits kayaking trip.

If you grant permission, I will ask you to complete a series of surveys assessing your perceptions of challenges associated with whitewater kayaking and your level of competence in whitewater kayaking throughout the course. I foresee no risks to participants in this study. Your identity will be kept confidential by assigning you a code name while analyzing data and reporting the findings of the research. The names of participants will not appear in any professional report of this research. Participation in this research is completely voluntary. You may decide not to participate in the study, and you may withdraw from the study at any time. There will be no negative consequences for you if you decide to withdraw from this study.

Please feel free to phone me at 614-563-5887, or email me at ed234003@ohio.edu if you have any questions about this research. Please retain one copy of this form for your personal records. Thank you very much for assisting me with my research.

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Graduate Teaching Assistant
Department of Recreation Studies
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Having read the above, and having had an opportunity to ask any questions I agree to participate in this study. A copy of this form has been given to me for my future reference. If you have any concerns about your selection for this study, or treatment during the research, please contact Jo Ellen Sherow, Director of Research Compliance, Ohio University, (740)593-0664.

I agree that all 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.

__________________________________        _______________________________
Participant’s Full Name (please print)                Participant’s Birth Date (month/day/year)

__________________________________        _______________________________
Researcher’s Signature                                       Date
APPENDIX B: PRE-RIVER SURVEY

1. Have you been on an Outdoor Pursuits trip before?  ___ Yes  ___ No

2. What swimming skill level are you?

   Non-swimmer___  Beginner___  Intermediate___  Advanced___

3. Have you gone kayaking before?  ___ Yes  ___ No

4. If you answered “yes” to the above, please describe your past kayaking experience.

5. Have you received kayaking instruction before?  ___ Yes  ___ No

6. If you answered “yes” to the above please describe your past kayaking instructional experience(s).

7. How skillful do you feel at kayaking?

   Low 1  2  3  4  5  6  7 High
8. How challenging does kayaking seem to you?

Low 1           2           3           4           5           6           7 High

9. How anxious do you feel about kayaking?

Low 1           2           3           4           5           6           7 High

10. How risky do you feel kayaking is?

Low 1           2           3           4           5           6           7 High

11. How old are you?

12. What year are you in school?

13. Gender?

___ Male       ___ Female
APPENDIX C: EXAMPLE OF MEASUREMENTS IN DAILY SURVEY

NAME:_________________________________T1

**Bow Rescue:**
How skillful did you feel while doing a bow rescue?
Low1 2 3 4 5 6 7High
How challenged did you feel while doing a bow rescue?
Low1 2 3 4 5 6 7High

NAME:__________________________________T1

**Eddy Turn:**
How skillful did you feel while doing an eddy turn?
Low1 2 3 4 5 6 7High
How challenged did you feel while doing an eddy turn?
Low1 2 3 4 5 6 7High

NAME:_________________________________T1

**Ferries:**
How skillful did you feel while doing a ferry?
Low1 2 3 4 5 6 7High
How challenged did you feel while doing a ferry?
Low1 2 3 4 5 6 7High

NAME:__________________________________T1

**Wet Exits:**
How skillful did you feel while doing a wet exit?
Low1 2 3 4 5 6 7High
How challenged did you feel while doing a wet exit?
Low 1 2 3 4 5 6 7High
APPENDIX D: FINAL RIVER SURVEY

How skillful do you feel at kayaking?

Low 1 2 3 4 5 6 7 High

How challenging does kayaking seem to you?

Low 1 2 3 4 5 6 7 High

How anxious do you feel about kayaking?

Low 1 2 3 4 5 6 7 High

How risky do you feel kayaking is?

Low 1 2 3 4 5 6 7 High

Overall, how skilled do you feel with doing a Wet Exit?

Low 1 2 3 4 5 6 7 High

Overall, how challenged do you feel with doing a Wet Exit?

Low 1 2 3 4 5 6 7 High
Overall, how skilled do you feel with doing a Bow Rescue?

Low  1  2  3  4  5  6  7  High

Overall, how challenged do you feel with doing a Bow Rescue?

Low  1  2  3  4  5  6  7  High

Overall, how skilled do you feel with doing a Kayak Roll?

Low  1  2  3  4  5  6  7  High

Overall, how challenged do you feel with doing a Kayak Roll?

Low  1  2  3  4  5  6  7  High

Overall, how skilled do you feel with doing an Eddy Turn?

Low  1  2  3  4  5  6  7  High

Overall, how challenged do you feel with doing an Eddy Turn?

Low  1  2  3  4  5  6  7  High
Overall, how skilled do you feel with doing a Peel Out?

Low 1 2 3 4 5 6 7 High

Overall, how challenged do you feel with doing a Peel Out?

Low 1 2 3 4 5 6 7 High

Overall, how skilled do you feel with doing a Ferry?

Low 1 2 3 4 5 6 7 High

Overall, how challenged do you feel with doing a Ferry?

Low 1 2 3 4 5 6 7 High

Overall, how skilled do you feel with Surfing?

Low 1 2 3 4 5 6 7 High

Overall, how challenged do you feel with Surfing?

Low 1 2 3 4 5 6 7 High
Do you want to go kayaking again in the future?

If you answered “yes” to the above question, how soon would you like to go again?
Participant 9 Eddy Turn Skills vs. Participant 9 Eddy Turn Challenges
Participant 6 Overall Kayak Challenge vs. Participant 6 Overall Kayak Skill

- The graph shows a linear relationship between the two variables.
- Points are marked at various positions along the line, indicating individual data points.

Axes:
- X-axis: Participant 6 Overall Kayak Skill
- Y-axis: Participant 6 Overall Kayak Challenge