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Understanding Flow Occurrence: Contributions from the 2x2 Achievement Goal Framework

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UNDERSTANDING FLOW OCCURRENCE: CONTRIBUTIONS FROM THE 2X2 ACHIEVEMENT GOAL FRAMEWORK

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49 Pages

Flow is often described as an optimal state, a rewarding experience, and highly motivating. Yet, much of how flow occurs is not understood. Multiple factors have been found to be antecedents of flow, one of which is motivation. The purpose of this study was to determine if variations in motivation according to the 2x2 achievement goal theory resulted in differences in occurrence of flow. An experimental design was utilized. Currently training male and female runners (*N*=60, ages 18-44 years), were randomly assigned to one of the four different achievement goal groups and reported on the level of flow experienced during a 12-minute Cooper aerobic test. Written goal manipulations were used to influence participant's achievement goal states. Results revealed these manipulations to be ineffective, but a hierarchical multiple regression found that self-reported goal states were related to flow occurrence after accounting for both dispositional flow and achievement goals and RPE. Mastery goals, both approach and avoidance, were found to be positive predictors of flow. These findings suggest that mastery goals may be important for experiencing flow.

KEYWORDS: 2x2 framework, Achievement Goals, Flow, Goal Manipulation

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CHAPTER I

LITERATURE REVIEW

Flow

Flow, as defined by Csikszentmihalyi (2002), is a deeply rewarding experience characterized by an intense focus on an activity to the point of becoming totally absorbed by it, and excluding all other thoughts and emotions. It is a state of total absorption in and non-self-conscious enjoyment of an activity. Csikszentmihalyi and Csikszentmihalyi (1998, p. 24) additionally described flow as occurring "when all the contents of consciousness are in harmony with each other, and with the goals that define the person's self. These are the subjective conditions we call pleasure, happiness, satisfaction, enjoyment." Flow is an intrinsically rewarding experience and because flow is such an enjoyable state, people try to find ways to experience flow just for the sake of it.

Research on flow has identified nine dimensions of the experience, and these dimensions have since been categorized into either conditions of flow or characteristics of flow (Nakamura & Csikszentmihalyi, 2002). The conditions of flow are prerequisites of flow experiences. They are challenge-skill balance (i.e., a perception that the individual is being challenged but can meet that challenge if they extend themselves beyond their normal functioning), clear goals for the individual to strive towards, and unambiguous feedback that informs the athlete they are progressing toward their goals. The characteristics of flow are the things you would expect to feel and experience when in a flow state. They are the merging of action and awareness (i.e., thoughts and actions

seem to be happening simultaneously and the individual feels at one with the activity), total concentration on the task, a strong sense of control, loss of self-consciousness, the transformation of time, and an autotelic experience (i.e., the enjoyable and intrinsically rewarding aspect of flow). Flow can be measured at two levels: dispositional and state (Jackson, 2012). The dispositional level assesses the frequency with which a person typically experiences flow in a typical situation (school, sport, etc.). State flow assesses a person's experience of flow at a specific time in a specific activity.

Flow theory emerged from the study of positive psychology and has since been applied to the fields of work, school, leisure, and sport (Kowal & Fortier, 1999). In the realm of sport, specifically, researchers have investigated how flow is experienced by athletes (see Jackson, 2012). Typically, athletes experiencing flow score highly on the dimensions of challenge-skill balance, action and awareness merging, concentration on the task, clear goals, unambiguous feedback and autotelic experience, while the dimensions of loss of self-consciousness and time transformation are not as prevalent (Bernier, Thienot, Codron, & Fournier, 2009; Chavez, 2008; Canham & Wiley, 2003; Jackson & Marsh, 1996; Stavrou, Jackson, Zervas, & Karteroliotis, 2007).

Research in sport has revealed other noteworthy ways in which flow operates with athletes. For instance, flow is likely influenced by the activity and skill level of the athlete (Stavrou et al., 2007). A study by Jackson (1992) suggests that flow may be difficult to achieve, as 81% of elite figure skaters in the study reported that it did not happen "very often", though it is not clear what the exact frequency or infrequency of that statement means. Yet, the majority of elite athletes report that flow is to a certain degree controllable (Jackson, 1995; Sugiyama & Inomata, 2003; Chavez, 2008). The

factors found most frequently to be controllable include preparation, optimal arousal, and positive thinking.

Studies have also found that there are positive consequences associated with experiencing flow in sport beyond the experience of flow itself. For example, flow is connected to increased levels of well-being, positive subjective experience, and objective performance (Swann, Keegan, Piggott, & Crust, 2012). For athletes in flow, Engeser and Rheinberg (2008) argue that flow experiences should influence athletic performance in two ways. The first way is that flow is a highly functional state that should naturally help performance. The second is that experiencing flow motivates individuals to keep doing the activity and set higher and more challenging goals. These positive outcomes associated with experiencing flow (e.g., better performance) make understanding the determinants of flow an important goal for researchers and practitioners alike.

Understanding the factors that influence the occurrence of flow has been another line of research in sport (see Jackson, 2012). These studies have primarily utilized a qualitative approach. Jackson (1992), for example, interviewed 16 elite figure skaters about optimal skating experiences. The factors reported to be most important were positive thoughts and emotions, optimal motivation, appropriate focus, and optimal arousal, and for doubles skaters, unity with partner. Jackson (1995) followed up with another study among 28 elite level athletes from various sports and asked about factors influencing flow occurrence. In this study, the factors found most salient to flow experience include: mental and physical preparation, confidence, focus, motivation, feedback, and arousal. In a study involving tennis players, Young (2000) reported similar findings. In order of relative importance, the factors influencing flow were preparation,

positive mood, control of arousal, motivation, focus, situational/environmental conditions, and positive feedback. Sugiyama and Inomata (2005) also explored the psychological states leading to flow among 29 Japanese athletes. The responses were placed into six categories which are relaxed, self-confident, highly motivated, completely focused, lack of negative thoughts and feelings, and extremely positive. Additionally, since relaxed, self-confident and highly motivated were reported by most of the athletes, they suggest that those factors may be the primary elements for flow. Chavez (2008) investigated flow among NCAA athletes and found comparable outcomes. Overall, these factors can be classified as intrinsic (e.g. focus, motivation, arousal, thoughts, and emotions), extrinsic (e.g. environment, feedback, coach support, and leadership) or behavioral (e.g. preparation, imagery, self-regulation) (Swann et al., 2012). The studies in this line of research on the determinants of flow have also typically investigated the factors believed to prevent flow. Essentially, all the same factors were reported but in their negative form (e.g. optimal motivation facilitates flow but non-optimal motivation prevents it). Among all these studies, five factors found to influence flow were common to all of them: motivation, arousal, focus, preparation, and positive thought and emotions. The motivational influence is the focus of the present research.

Motivation as a Determinant of Flow

Regarding motivation, some scholars have taken a self-determination theory (SDT; Deci & Ryan, 2002) approach with a focus on psychological need satisfaction and different motives as predictors of flow. Intrinsic and self-determined forms of extrinsic motivation as well as perceptions of autonomy, competence, and relatedness have been found to be positively related to flow (Kowal & Fortier, 1999). Further, athlete

engagement has been found to partially mediate this relationship (Hodge, Lonsdale, & Jackson, 2009). Schuler and Brandstatter (2013), in a series of studies, have integrated SDT with motive disposition theory and found that dispositional motivation, when aligned with need satisfaction states, is even more predictive of flow than need satisfaction alone.

Another popular theoretical approach to understanding motivation in sport focuses on achievement goals (Harwood, Spray, & Keegan, 2008; Roberts, 2012; Roberts, Treasure, & Conroy, 2007). Much of the achievement goal research in the context of sport, especially early on, is based on the perspective of Nicholls (1989). According to his perspective, individuals seek to develop and demonstrate competence when participating in achievement settings, such as sport. Moreover, competency information can be defined in two ways. The first is connected to effort and is self-referenced, such that individuals feel successful and competent when they improve or master a task. This definition of success and failure is referred to as a mastery (or task-involved) achievement goal. The second achievement goal is other-referenced, so individuals feel successful and competent when they perform better than others. This definition of success and failure is referred to as a performance (or ego-involved) achievement goal. The outcomes associated with these different goals have been thoroughly reviewed by Roberts (2012). Some of the outcomes associated with mastery-involvement include: enjoyment, satisfaction, intrinsic interest, lower likelihood of pre-competition anxiety, maintaining concentration, commitment to practice, increased performance, increased effort, and need satisfaction. Outcomes of being performance-involved include: inverse negative relationship with enjoyment and satisfaction, greater

cognitive anxiety, concentration disruption, concern about mistakes, reduced effort, ill-being, negative affect, self-handicapping, aggression, and lower moral functioning.

Achievement goals have also been specifically connected with flow. For example, Jackson and Roberts (1992) investigated the relationship of goal-involvement and flow outcomes among 200 college athletes. Athletes who scored high in mastery-involvement experienced flow more than those who were low in mastery-involvement, while performance-involvement did not reveal any main effects on flow. Task-oriented motivational climate and task-involvement have also been found to be more predictive of dispositional flow than performance climates and performance-involvement (Moreno, Cervello, & Gonzalez-Cutre, 2010). In a recent study, Stavrou, Psychountaki, Georgiadis, Karteroliotis, and Zervas (2015) found task-involvement in athletes to be positively related to six dimensions of flow, namely challenge-skill balance, clear goals, feedback, autotelic experience, concentration, and sense of control, while performance-involvement was mostly irrelevant.

An alternative approach to exploring achievement goals, which has been gaining increasing attention in the context of sport, is based on the work of Elliot and colleagues who introduced approach and avoidance components to the previously dichotomous model of achievement goals to make a 2x2 achievement goal framework (Elliot, 1999, 2006; Elliot & Conroy, 2005; Elliot & McGregor, 2001). They argued that, in addition to the two definitions of achievement goal competence (i.e., mastery and performance), achievement goals are different based on how they are valenced (i.e., approach or avoidance). Approach goals seek to attain competence while avoidance goals seek to not demonstrate incompetence. Under this new framework, individuals can have mastery-

approach goals (e.g. to try my best, to improve), mastery-avoidance goals (e.g. to try not to perform worse than I am capable), performance-approach goals (e.g. to try to be better than everyone else), or performance-avoidance goals (e.g. to try not to perform worse than everyone else). Elliot and colleagues have also hypothesized that each achievement goal will predict a host of achievement-related outcomes. Generally, mastery-approach (MAp) goals will predict adaptive outcomes, while performance-approach (PAp) goals will predict relatively less adaptive outcomes. Performance-avoidance goals (PAv) are expected to result in the most maladaptive outcomes, while mastery-avoidance (MAv) will predict somewhat less maladaptive outcomes in comparison.

According to Elliot (1999), the adoption of these four types of goals has a number of antecedents, such as the need for achievement, fear of failure, competence expectancies, fear of rejection, need for approval, perceived motivational climate, and implicit theories of ability. Furthermore, individuals can pursue each of these goals simultaneously to varying degrees. It is believed that people have a predisposition to pursue certain achievement related goals in achievement contexts (i.e., dispositional goals); however, due to the dynamic nature of these goals and their antecedents, it is possible for individuals adopt any specific achievement goal or goals in a specific situation (i.e., state goals) (Harwood et al., 2008).

Research has provided support for the utility of the 2x2 framework and for the hypothesized relationships. For instance, a series of studies by Elliot and McGregor (2001), in the context of education, were some of the first to investigate the full 2x2 framework. Their studies sought to operationalize the MAv goals for inclusion in the achievement goal model (i.e., expanding on the trichotomous model) and to validate the

overall framework for use in future research. They found support for the inclusion of MAv goals, as well as the overall framework. MAp goals were positively linked with deep processing. MAv goals were related to disorganization, state test anxiety, worry and emotionality. PAp goals were positively linked to surface processing and exam performance, with PAv goals relating positively with surface processing, disorganization, state test anxiety, worry, and emotionality.

Emerging research in sport supports the hypothesized relationships outlined in the 2x2 achievement goal framework, as well. For example, in a study of young British athletes, Morris and Kavussanu (2009) found MAp goals significantly predicted enjoyment and negatively predicted concentration disruption and worry, while both avoidance goals were positively linked to concentration disruption and worry. PAp goals were not significantly related to any variable. Adie, Duda, and Ntoumanis (2008) investigated achievement goals in relation to challenge and threat appraisals (i.e. the likelihood that individuals will view a demanding and stressful event as an opportunity for growth or as potentially harmful to one's self) among 424 team sport athletes. MAp was strongly and positive associated with challenge appraisals and negatively associated with threat appraisals. MAv was a strong predictor of threat appraisals. PAp was related positively to both challenge and threat appraisals. Finally, PAv was strongly and negatively related to challenge appraisal but unrelated to threat appraisals. Another study by Adie, Duda, and Ntoumanis (2010), using a longitudinal design, supported their earlier findings and provided partial support for a connection with well-being. MAp goals positively predicted changes in well-being over time, while MAv negatively predicted well-being. PAp goals were positively associated with negative affect and PAv goals

were negatively associated with between-person mean differences in positive affect. Finally, Wang, Liu, Lochbaum, and Stevenson (2009) found individuals high in MAp and PAp goals to be high in perceived competence, higher in incremental beliefs, and higher in intrinsic motivation, while avoidance goals were unrelated to intrinsic motivation.

In summary, the achievement goals adopted by athletes have been linked to a number of achievement related-outcomes, including performance, enjoyment, satisfaction, well-being, cognitive appraisals, negative and positive affect, perceived competence, incremental beliefs, intrinsic motivation, state anxiety, worry, disorganization and cognitive processing (see Harwood et al., 2008; Roberts, 2012; Roberts et al., 2007). Some studies using a dichotomous model of achievement goals (i.e., mastery and performance goals) have provided evidence that achievement goals are connected to flow experience in athletes (e.g., Jackson & Roberts, 1992). No studies, however, have specifically looked at how motivation is related to flow from the perspective of the 2x2 achievement goal framework. This more recent perspective may offer additional insight into what the optimal motivation is for the occurrence of flow. The previously discussed evidence suggests that MAp goals may be the best suited for flow occurrence due to being connected with outcomes such as, enjoyment, satisfaction, challenge appraisals, perceived competence, positive affect, concentration, and intrinsic motivation. This seems to have a natural connection with the flow dimensions of challenge-skill balance, autotelic experience, and total concentration. Approach goals, generally, may experience flow more frequently than avoidance goals as avoidance goals are linked to state anxiety, worry, concentration disruption, negative affect and threat appraisal. These factors would likely prevent flow or easily disrupt it because of the

possible connections with the flow dimensions of total concentration, sense of control, challenge-skill balance, action and awareness merging, and loss of self-consciousness.

Purpose

This research is being conducted to investigate the relationship between achievement goals and flow. Specifically, the purpose of the study is to determine if the occurrence of flow is affected by the achievement goal adopted in a specific performance setting. It is hypothesized that MAp goals will lead to the highest occurrence of flow experience. Those adopting PAp goals will experience some flow, but less than those adopting MAp goals. Finally, those endorsing either avoidance goals will experience less flow compared to the two approach goals, with the PAv goals experiencing the least flow of all.

CHAPTER II

RESEARCH DESIGN

Participants

The sample was comprised of 60 male (*n*=32) and female (*n*=28) runners who were actively training. Actively training, for the sake of study participation, was defined as runners who have competed in an organized race within the past 12 months or who are planning to do so in the upcoming 12 months. This distinction was made to ensure the runners were experienced and skilled enough to meet the demands of the situation and were more likely to enjoy the running task. Participants ranged in age from 19 – 44 years (*M* = 25.23, *SD* = 7.33), and the majority (85%) self-identified as Caucasian. On average, the sample had participated in running nearly 8 years (*M* = 7.89, *SD* = 6.11), reported an average running distance of 13.85 miles per week (*SD* = 14.93) and trained at an 8:15 minute per mile pace (*M* = 8.25, *SD* = 1.9). The majority of participants preferred to race at the 5 kilometer (5K) distance (45%). The participants were recruited using flyers and word of mouth from locations around central Illinois where actively training runners were likely to be found (e.g., Kinesiology and Recreation students, recreation centers, health clubs, running clubs, etc.). Participation was voluntary and no compensation was provided. The recruitment of participants and all study methods were approved by the University Institutional Review Board.

Procedure

Volunteers were invited into the lab where they first signed a consent form. Next, participants were prescreened for risk using the American College of Sports Medicine (ACSM) guidelines. Only individuals who were classified as "low risk" using the guidelines (i.e., participants reporting 1 risk factor or less for cardiovascular disease) were permitted to continue in the study. Eligible participants then filled out a questionnaire regarding their dispositional achievement goal orientation (AGQ-S) and their disposition to experience flow (DFS-2). Participants were also asked to report some basic demographical information, as well as answer questions regarding their running performance history (e.g., What is your typical training pace? When did you last participate in an organized race? What distance do you prefer to race? How many miles per week do you run?).

Participants were told that they were going to complete a Cooper fitness test (Cooper, 1968), a 12-minute run test, and that we were interested in how they felt during this test. This test has been used as an assessment of aerobic capacity, and was selected as an achievement task because it provides a challenging physical activity that could be easily controlled and monitored in a laboratory setting, while being an activity that runners may find interesting and enjoyable and want to participate in. Participants were randomly assigned into one of four achievement goal groups: MAp, MAv, PAp, and PAv. The achievement goals for each group were manipulated using detailed written scripts (see below). Specifically, each participant was asked to read and study the script of the group they were assigned to prior to performing the running task. The performance-based goal manipulations were written to include normative comparison and

public demonstration components, as they have been identified as important to the performance-based goal construct (Ames, 1992). The PAp goal, in particular, emphasized the importance of trying to demonstrate better performance compared to others, whereas the PAv goal emphasized the importance of not demonstrating worse performance compared to others. Mastery-based goal manipulations were written to emphasize giving effort and using self-referenced comparisons to define success. The MAp goal emphasized the importance of wanting to demonstrate high levels of effort, personal improvement, and task mastery. The MAv goal emphasized the importance of not wanting to withhold effort, trying to avoid performing less well than in the past, and avoiding performing poorly (Elliot & McGregor, 2001). The procedures used to manipulate the achievement goals were adapted from previous work by Cury, Elliot, Sarrazin, Da Fonseca, and Rufo (2002), Elliot, Cury, Fryer, and Huguet (2006), and Ntoumanis, Thogersen-Ntoumani, and Smith (2009).

Performance-Approach. This research is being conducted to better understand how athletes perform on a running task. To do this we have asked a number of current runners to perform a 12-minute running test. The Cooper 12-minute run test is widely used to measure aerobic capacity. In our previous work, we have found that most runners are fairly comparable, but a percentage of runners really standout as excellent when compared to others. We are interested in how well you will perform on the fitness test. We intend to compare everyone based on the distance they are able run in the 12-minute period. Results from the test will identify the runners that are more fit and have greater aerobic capacity than their peers. Results from your test will be posted so everyone can see how you performed relative to everyone else in the study. You will also be able to see

how you performed relative to the other runners who have completed the test in the past. Based on previous research we know the people who perform in the top 20% have excellent fitness, so try to be in that group.

Performance-Avoidance. This research is being conducted to better understand how athletes perform on a running task. To do this we have asked a number of current runners to perform a 12-minute running test. The Cooper 12-minute run test is widely used to measure aerobic capacity. In our previous work, we have found that most runners are fairly comparable, but a percentage of runners really standout as being less able compared to others. We are interested in how well you will perform on the fitness test. We intend to compare everyone based on the distance they are able run in the 12-minute period. Results from the test will identify the runners that are less fit and have lower aerobic capacity than their peers. Results from your test will be posted so everyone can see how you performed relative to everyone else in the study. You will also be able to see how you performed relative to the other runners who have completed the test in the past. Based on previous research we know the people who perform in the bottom 20% have poor fitness, so try not to be in that group.

Mastery-Approach. This research is being conducted to better understand how athletes perform on a running task. To do this we have asked a number of current runners to perform a 12-minute running test. The Cooper 12-minute run test is widely used to measure aerobic capacity. In our previous work, we have found that runners who try hard, do well on the test. The runners who give a lot of effort during the test tend to run as fast as or faster than their typical running pace. It is helpful to think of this test as a 5K race and run like you are going for a personal best time. Focus on trying your hardest and

running as far as you are capable. With your best effort you will get an accurate assessment of your running ability. At the end, we will show you your pace so you can compare it with your previous performances, so try to do your best.

Mastery-Avoidance. This research is being conducted to better understand how athletes perform on a running task. To do this we have asked a number of current runners to perform a 12-minute running test. The Cooper 12-minute run test is widely used to measure aerobic capacity. In our previous work, we have found that runners who don't try hard, do not do well on the test. The runners who do not give a lot of effort during the test tend to run slower than their typical running pace. It is helpful to think of this test as a 5K race and to run so you avoid going slower than your typical pace. Focus on trying not to withhold effort and not running less far than you are capable. Without your best effort you will not get an accurate assessment of your running ability. At the end, we will show you your pace so you can compare it with your previous performances, so try not to do worse.

Prior to the start of the test, participants were allowed time to get familiar with the treadmill and warm-up. They were informed that: (a) the treadmill will be set at zero grade, (b) it has a maximum speed of 12.5 mph, and (c) that they will be able to change the speed at any time throughout the test. Immediately prior to beginning the test, the researcher reminded the participant what goal they should be pursuing during the run (e.g. remember your goal is not to perform worse than others) based on the group to which they were assigned. After the reminder, the 12-minute test began. The display on the treadmill was not visible to the runners but they were informed when 1 minute

remained. Distance traveled and maximum speed were recorded during the run and a heart rate monitor was worn to assess average and maximal heart rate.

Following the test, participants took a few minutes to cool down and were then given the Short Flow State Scale (SFSS) to complete, an assessment of their overall perceived exertion (RPE), as well as a follow-up manipulation check which assessed their goal state during the run. Upon conclusion, the participants were thanked, debriefed, and given the results of their performance.

Measures

Achievement Goal Questionnaire-Sport (AGQ-S). This scale has been found to be a valid and reliable measure of dispositional achievement goals in sport (Conroy, Elliot, & Hofer, 2003). It is a 12-item measure, answered on a 7-point scale by rating how much each statement is or is not like me (1 = *not at all like me,* 7 = *completely like me*), with three items pertaining to each of the four achievement goals: MAp (e.g. ‘‘It is important to me to perform as well as I possibly can’’), MAv (e.g. ‘‘I worry that I might not perform as well as I possibly can’’), PAp (e.g. ‘‘It is important to me to do well compared to others’’), and PAv goals (e.g. ‘‘I just want to avoid performing worse than others’’).

Short Flow State Scale (SFSS). This 9-item scale measures the experience of flow, in the moment, in a specific situation. The scale includes one item pertaining to each one of the nine flow dimensions (i.e., skill-challenge balance, merging of action and awareness, clear goals, feedback, total concentration, a sense of control, loss of self-consciousness, time transformation, and autotelic experience). “I was completely focused on the task at hand” is an example item reflecting total concentration. Responses are

scored on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). The SFSS was developed by Jackson and colleagues and has shown adequate reliability and validity (see Jackson, Martin & Eklund, 2008; Martin & Jackson, 2008).

Dispositional Flow Scale-2 (DFS-2). The DFS-2 was developed to determine how frequently an individual generally experiences flow in a given activity (Jackson & Eklund, 2002). It is a 36-item measure with nine subscales (e.g. the nine flow dimensions) of four questions each. Respondents indicate the frequency of each statement on a 5-point Likert scale, ranging from 1 (*never*) to 5 (*always*). Reliability and validity information supporting the psychometric properties of the scale are reported by Jackson and colleagues (Jackson & Eklund, 2002; Jackson et al., 2008).

Cooper 12-Minute Aerobic Test. This fitness test was developed in 1968 and was originally intended for military use (Cooper, 1968). The goal of the test is to run as far as you can in a 12-minute period. The total distance covered is used as an indicator of performance.

Borg Rating of Perceived Exertion Scale (RPE). This scale is a subjective way of measuring physical activity intensity level (Borg, 1998). It is based on all the physical sensations a person experiences during physical activity, including heart rate, increased respiration, increased perspiration, and muscle fatigue. Combining all these, the measure is one item, which respondents answer on a scale of 6 (*no exertion at all*) to 20 (*maximal exertion*). RPE is highly correlated with actual heart rate during physical activity, and has been shown to demonstrate good psychometric properties (see Borg, 1998).

Manipulation Check. Adapted from Elliot et al. (2006), participants were asked to respond to questions regarding the achivement goals they endorsed during the run test.

Specifically, participants responded to each of the following four items: (1) “My goal during the run test was to perform better than others”, (2) “My goal during the run test was to not perform worse than others”, (3) “My goal during the run test was to try to run better than I have berfore”, and (4) “My goal during the run test was to not run slower than I have before.” Response options ranged on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). This was used to whether or not the participant’s goal was congruent with the manipulation targeted by the written script. These items also functioned as a way to capture the runners’ achievement goal state.

CHAPTER III

ANALYSIS OF THE DATA

Preliminary Analyses

Initial screening of the data revealed a single missing data point in the key study variables. Specifically, one subject failed to report RPE. Little's MCAR test was non-significant (p = .28), indicating that this data point was missing completely at random. Expectation maximization was used to impute the missing value for this participant.

Basic descriptive statistics for the key study variables are presented in Table 1. The internal consistency estimates (α) for all multi-item measures indicated acceptable reliability (α > .70). The mean scores indicated that the participants were moderate to high on scores of the flow and achievement goal assessments, with average scores all above the scale midpoints. At the dispositional level, the participants most strongly endorsed a MAp achievement goal, and tended to report slightly greater endorsement of mastery goals relative to performance goals at the state level. The RPE scores indicated that the participants tended to work at a relatively high level of intensity during the running test.

Table 2 presents the bivariate correlations among all study variables. The only significant (p<.05) relationships with state flow were with dispositional flow (r=.48) and dispositional MAp (r=.28). In terms of dispositional flow, significant positive relationships were observed with the two approach goal states (MAp, r = .33; PAp, r =

.30) and with MAp at the dispositional level (r=.48). RPE (r=.28) and average run speed (r=.30) were also significantly related to dispositional flow.

Manipulation Check

The effectiveness of using the scripts to induce a particular achievement goal state was tested by comparing the reported achievement goal states across the four induced goal conditions using a series of ANOVAs. The idea was to determine if the most highly endorsed achievement goal state was consistent with the achievement goal being emphasized in the script. Thus, each of the achievement goal states were compared across the four goal induced conditions in a separate ANOVA.

The descriptive statistics for each of the goals by condition are presented in Table 3. Overall, the results showed that the manipulation of the achievement goals was ineffective. The scripts failed to generate significant differences in either of the mastery goals, MAp, F (3, 59) = .55, p = .77; MAv, F (3, 59) = .38, p = .65. Each of the performance goals, on the other hand, was significantly different across conditions, PAp, F (3, 59) = 3.34, p = .02; PAv, F (3, 59) = 2.70, p = .05. Still, post hoc Student Newman Keuls tests indicated that groups did not differ in the anticipated manner. The reported PAp state was statistically higher than MAv state in the PAp condition, but PAp state was not significantly different from PAv or MAp, and MAv was not significantly different from MAp or PAv. In the PAv condition, PAv was not significantly different from any of the other achievement goal states. The only significant difference was found between PAp and MAp. In this condition, however, PAp state was not significantly different from PAv or MAv, and MAp was not significantly different from MAv or PAv.

Main Analyses

Given the lack of support for the effectiveness of the achievement goal manipulation, a comparison of flow state across the induced goal conditions was not warranted. As an alternative, a multiple regression approach using all of the participants was adopted as a way to explore the links between achievement goals and flow state. While it was not the a priori data analytic approach, other researchers have used this strategy to predict various outcomes (e.g., Morris & Kavussanu, 2009). Further, a multiple regression approach has the benefits of examining the influence of all of the achievement goals simultaneously, which is actually more consistent with the theorizing of Elliot (1999) insomuch as all of the goals could be operating at any one point in time.

The actual analysis undertaken was a hierarchical multiple regression. The criterion variable was flow state. The participants' scores on dispositional flow, dispositional achievement goals, and their RPE during the running test were entered on Step 1 of the hierarchical regression as a way to control for any variations in flow state as a function of these dispositional variables and running intensity. The four achievement goal states, as reported in the manipulation check, were then added on Step 2. The number of cases to variable ratio is well below the recommended level outlined by Tabachnick and Fidell (2013), so any findings should be interpreted with caution.

An initial run of the regression revealed the existence of 4 extreme cases based on the standardized residuals. These outliers were removed and the analysis rerun. Results of this final hierarchical regression analysis are presented in Table 4. The set of predictors added on Step 1 as control variables significantly predicted flow state scores, $F(6,49) = 8.23$, $p < .01$, accounting for 50.2% of the variance. Dispositional flow ($\beta = .67$) and RPE

(β = -.32) were the only significant predictors. The addition of the achievement goal state scores on Step 2 significantly added to the prediction of flow state above and beyond the control variables entered on Step 1, $F(4,45) = 2.95$, $p < .01$, accounting for an additional 10.4% of the variance. In this model, dispositional flow (β = .50) and RPE (β = -.43) were the significant predictors of flow, as were MAp – state (β = .29) and MAv – state (β = .23). Although non-significant, both the performance goal states were negative predictors of flow in this model.

CHAPTER IV

CONCLUSION

Discussion

The purpose of this study was to test the relationship between achievement goals and flow. Specifically, the goal was to examine whether experimentally-induced achievement goals, based on the 2x2 achievement goal framework, would result in differences in the degree to which people experienced flow during a running task. It was hypothesized that the MAp focused goal would lead to the highest occurrence of flow. Those who adopted a PAp focused goals would experience some flow, but less than those who adopted a MAp goal. Lastly, those who endorsed either avoidance focused goals would experience less flow compared to the two approach goals, with the PAv focused goal experiencing the least flow of all. The plan was to compare flow experiences across the four goal groups, however, this was deemed inappropriate based on the manipulation check which assessed the effectiveness of the induced goal condition.

The study utilized an experimental design that sought to induce a particular achievement goal state through the use of a detailed manipulation script. Many researchers have used a similar design to manipulate achievement goal states in a variety of tasks including dart throwing, golf putting, an agility drill, and basketball dribbling (Elliot et al., 2006; Kavussanu, Morris, & Ring, 2009; Ntoumanis et al., 2009; Dewar, Kavussanu, & Ring, 2013). These studies have typically included a manipulation check in the design as a way to test whether the participants adopted the desired goal or not. A

common practice among researchers, when dealing with manipulations, is to remove the participants who are found to be incongruent with the manipulation (Dewar et al., 2013). Using this approach, previous studies have found using scripts to manipulate achievement goals to be effective. For example, Kavussanu et al., (2009) found 91% adherence among the MAp group, 91% among the PAp group, and 74% among the PAv group. In the present research, however, the manipulation was found to be entirely ineffective, and removing participants for incongruence would have eliminated more participants from the study than would have remained.

It is unclear why the manipulations used in this study were not effective. The manipulations were directly adapted from other research and included similar language (see Cury et al., 2002; Elliot et al., 2006; Ntoumanis et al., 2009; Kavussanu et al., 2009; Dewar et al., 2013). It may be that the task chosen for this experiment was not as vulnerable to goal manipulation as other tasks. The Cooper 12-minute run test is described as a test where you run as far as you can in 12 minutes. This could lead participants to naturally pursue a mastery goal. The performance manipulations may have been further weakened by running the tests individually as trying to be better than others, or to not be worse, could have been difficult to visualize. Whatever the reason, the manipulations were ineffective. As a result, an alternative method was taken to analyze the results.

The alternative approach utilized the responses to the post-exercise manipulation check as indicators of each participant's achievement goal state during the experiment, and analyzed them using a hierarchal regression model. In this model, RPE and dispositional flow were significant predictors of flow state. RPE was negatively related to

flow state, such that as people perceived the task to be less intense, they experienced more flow. This agrees with the challenge-skill condition of flow. These participants perceived themselves as having the skill necessary to meet the challenge of the task and the competency to perform the task without over exerting themselves. Running at too high of an intensity may disrupt or prevent flow from occurring because they lose focus on the task and focus on their feelings of exertion. Dispositional flow was positively related to state flow. Meaning that those who were able to experience flow during the run test, were also able to more frequently experience flow while running on a regular basis. Conceptually, it is expected that a high disposition for flow experience would be predictive of individual flow states.

The addition of state goals to the regression model was able to make the model more predictive and provide support for the proposal that achievement goals would serve as a factor predicting flow. The MAp goal was significantly and positively related to flow. Given the connection to many other adaptive outcomes, this relationship is expected. The PAp goal, though not significant, was negatively related to flow experience. PAp goals have been connected to both positive and negative outcomes thus a nonsignificant negative result is not surprising. The PAv goal was not significant either but was still negatively associated with flow, which is the direction you would expect from the pursuit of a PAv goal. Surprisingly, the MAv goal, which would be expected to have a negative relationship, was significantly and positively related to flow occurrence. A possible explanation for this comes from Ciani and Sheldon (2010), who found that athletes endorsing a MAv goal often use MAp explanations, such that, if they have the goal to not do worse, they'll explain that they "always want to be better" (p. 129). MAv

goals may also be salient in fewer achievement contexts (Elliot, 2005). In this study, MAv goals may become more MAp, due to the nature of the task, the tendency to explain MAv goals in MAp terms, and because MAv goals may not have been salient in this setting.

This experimental study tested the utility of the 2x2 achievement goal framework with a running task. Given the lack of support for the framework's proposed hypotheses, this result questions the usefulness of the 2x2 model in sport settings, especially in consideration of the MAv goal. It is theorized that the trichotomous model, which applies approach and avoidance conditions only to performance goals and not mastery goals, is better is some settings because MAv goals may only be relevant to perfectionists and older athletes trying to fight off the effects of aging (Elliot & Conroy, 2005). Considering this and the results of the study, the trichotomous model may have been a better fit. Though the original dichotomous model (Nicholls, 1989), could fit here as well since the results indicate that the effects of mastery goals were positive and the effects of performance goals were slightly negative. The valence of these goals didn't seem to matter as much in this study.

Limitations

This study has some limitations that should be addressed. First of all, the sample size was small. This limits the generalizability of the findings, and also means that the findings should be interpreted with caution. Additional participants would increase the power of the statistical analysis and increase the likelihood of finding significant results.

Another limitation is that the manipulation scripts were ineffective at inducing the desired goal states. Thus, the analysis of the data was based on the goal states reported in

the manipulation check. While the items of the check did pertain to state goals, the measure is not a validated state achievement goal questionnaire.

A third limitation is the running task used in the experiment. As discussed earlier, the Cooper 12-minute run may not have been an appropriate task to induce a MAv goal state. The nature of the task, to promote running as far as you can in the allowed time, could have encouraged MAp states and discouraged MAv. Also, most runners had not completed a Cooper 12-minute run test, thus it may not be reasonable to try not to do worse on a task you have not done before.

A fourth limitation is the measurement of flow in this study. Moneta (2012), has argued that the flow scales can "impose" flow upon the responders, which would cause them to report flow at a higher level than they actually experienced it. Thus, if some participants were experiencing flow more than others, then it might have been hidden by those who over reported their flow experience.

Conclusion

Overall, this research does contribute to the existing body of knowledge. Flow was positively associated with mastery goal states and negatively related to performance goal states after accounting for RPE and dispositional goals and flow. The unique contribution of the achievement goals state was rather small, but when all the factors influencing flow are considered, motivation is just one of many, so it may be expected for motivation to have a small contribution to the overall flow picture. Future research should consider including more variables (e.g. focus, arousal, positive thinking) in addition to motivation to better understand the optimal preparation needed to experience flow. Practically, athletes should try to foster mastery orientations and coaches should work to

build mastery motivational climates in order to experience the most adaptive outcomes from sport, including flow.

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TABLES

Table 1

Descriptive Statistics for Study Variables (N=60)

Variable	*M*	*SD*	possible range	α
Flow – State	3.99	.51	1-5	.73
Flow – Disposition	3.81	.45	1-5	.84
Mastery – Approach Goal – State	5.27	1.52	1-7	--
Mastery – Avoidance Goal – State	5.08	1.90	1-7	--
Performance – Approach Goal – State	4.98	1.58	1-7	--
Performance – Avoidance Goal – State	4.60	1.94	1-7	--
Mastery – Approach Goal – Disposition	6.03	.86	1-7	.78
Mastery – Avoidance Goal – Disposition	4.53	1.56	1-7	.86
Performance – Approach Goal – Disposition	4.85	1.33	1-7	.86
Performance – Avoidance Goal – Disposition	4.07	1.69	1-7	.90
RPE	15.47	2.40	6-20	--
Maximum HR (beats/min)	180.68	12.42	--	--
Distance Traveled (miles)	1.56	.86	--	--
Average Speed (mph)	7.26	1.56	--	--

Table 2

Bivariate Correlations Among Study Variables (*N*=60)

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Flow – State	-	.48*	.22	.15	.11	-.07	.28*	.04	.06	-.02	-.15	-.19	.19	.08
2. Flow – Disposition	.48*	-	.33*	.12	.3*	.11	.48*	.02	.19	-.07	.27*	.23	.22	.3*
3. Mastery – Approach Goal – State	.22	.33*	-	.3*	.14	.09	.03	-.03	.18	-.03	.29*	.13	.07	.06
4. Mastery – Avoidance Goal – State	.15	.12	.3*	-	.17	.33*	-.09	.1	.18	.3*	.12	.01	.09	-.1
5. Performance – Approach Goal – State	.11	.3*	.14	.17	-	.31*	.4*	.01	.53*	.15	.31*	.15	.21	.39*
6. Performance – Avoidance Goal – State	-.07	.11	.09	.33*	.31*	-	-.00	.23	.25	.45*	.09	-.01	-.06	-.05
7. Mastery – Approach Goal – Disposition	.28*	.48*	.03	-.09	.4*	-.00	-	.19	.4*	.04	.31*	.15	.2	.44*

Table Continues

Bivariate Correlations Among Study Variables (*N*=60)

8.	Mastery – Avoidance Goal – Disposition	.04	.02	-.03	.1	.01	.23	.19	-	.13	.54*	-.1	-.00	-.19	.06
9.	Performance – Approach Goal – Disposition	.06	.19	.18	.18	.53*	.25	.4*	.13	-	.5*	.25	.06	.18	.15
10.	Performance – Avoidance Goal – Disposition	-.02	-.07	-.03	.3*	.15	.45*	.04	.54*	.5*	-	-.02	-.04	-.24	-.23
11.	RPE	-.15	.27*	.29*	.12	.31*	.09	.31*	-.1	.25	-.02	-	.42*	.17	.56*
12.	Maximum HR	-.19	.23	.13	.01	.15	-.01	.15	-.00	.06	-.04	.42*	-	.24	.22
13.	Distance Traveled	.19	.22	.07	.09	.21	-.06	.2	-.19	.18	-.24	.17	.24	-	.44*
14.	Average Speed	.08	.3*	.06	-.1	.39*	-.05	.44*	.06	.15	-.23	.56*	.22	.44*	-

Notes. * Significant correlation at $p < .05$.

Table 3

Mean (SD) of Reported Achievement Goal State by Induced Goal Condition

	Reported Goal State			
Induced Goal Condition	MAp	MAv	PAp	PAv
Mastery- Approach Goal (MAp)	5.40 (1.35)	5.13 (1.85)	5.60 (1.40)	4.93 (1.49)
Mastery – Avoidance Goal (MAv)	4.87 (2.13)	5.53 (1.73)	4.93 (2.02)	5.00 (1.81)
Performance – Approach Goal (PAp)	4.93 (1.49)	4.13 (1.41)	5.87 (1.55)	5.00 (1.51)
Performance – Avoidance Goal (PAv)	3.60 (1.84)	4.60 (1.50)	5.53 (2.13)	4.67 (1.92)

Notes. Potential range of score for all scales is 1-7.

Table 4

Summary of Hierarchical Regression Analyses Predicting Flow State

Predictor	β	$p<$	sr^2
Step 1, $F(6,49) = 8.23$, $p < .01$, $R^2 = .50$			
Flow - Disposition	.67	.01	.33
Mastery – Approach Goal – Disposition	.08	.55	.00
Mastery – Avoidance Goal – Disposition	-.01	.96	.00
Performance – Approach Goal – Disposition	.11	.44	.01
Performance – Avoidance Goal – Disposition	-.12	.44	.01
RPE	-.32	.01	.08
Step 2, $F(4,45) = 2.95$, $R^2 = .61$, $\Delta R^2 = .10$, $p < .01$,			
Flow - Disposition	.50	.01	.15
Mastery – Approach Goal – Disposition	.22	.11	.02
Mastery – Avoidance Goal – Disposition	-.07	.56	.00
Performance – Approach Goal – Disposition	.03	.84	.00
Performance – Avoidance Goal – Disposition	-.10	.52	.00
RPE	-.43	.01	.13
Mastery – Approach Goal – State	.29	.01	.06
Mastery – Avoidance Goal – State	.23	.05	.04
Performance – Approach Goal – State	-.01	.91	.00
Performance – Avoidance Goal – State	-.12	.32	.01

APPENDIX A

INFORMED CONSENT

Understanding flow occurrence: Contributions from Achievement Goal Theory

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STUDY DESCRIPTION

The purpose of this research study is to examine the thoughts and feelings experienced while participating in an exercise test.

SUBJECTS

You are being asked to participate in this research project located in the Sport Psychology Laboratory in McCormick Hall because you are a man or woman between ages 18 and 44 years of age who is considered to be low risk for exercise using American College of Sports Medicine guidelines and are currently training to run in an event or ran in an event within the past year. The ACSM defines low risk for an adverse event during exercise as an individual that has one or less risk factors for cardiovascular disease.

PROCEDURES

You will participate in one session lasting 30-45 minutes. When you arrive for the testing session, you will provide consent and be asked to complete a medical history questionnaire to determine your risk during exercise based on risk factors for cardiovascular disease. If you have more than one risk factor, you will be excluded from participating in this study. If you are determined to be low risk you will complete a survey and will then participate in a maximal aerobic capacity test on a treadmill. The test is the Cooper 12-minute run test, which is performed by measuring the distance traveled in 12 minutes of time. During this test, your heart rate will be assessed using a heart rate monitor. Following the run, you will be asked to answer another survey in regards to your experience during the test.

Prior to the run, you will be given plenty of time to warm-up and become familiar with the treadmill. The grade will remain at 0% throughout the run. You will be able to see the up and down arrows to adjust the speed, but the remainder of the treadmill display will be covered so that you cannot see the actual speed selected. You can change the speed at any time throughout the running test. The treadmill has a max speed of 12.5 MPH, which is the equivalent of 4:48 min/mile pace. We do not believe this will be an issue during the test but if you believe you will want to go faster than this please inform us. During the exercise, your heart rate and speed will be monitored by a researcher and recorded. This is a timed test and you will not be able to see how long you have been running, however, you will be informed when one minute remains in the test.

Following the test, you will be given time to cool down and then you will be asked to complete a short final survey. This survey will ask you questions concerning

your thoughts and feelings during the run test specifically. Upon completion, you will be debriefed and given the results of your test.

RISKS

As with any investigational study, there may be adverse events or side effects that are currently unknown and it is possible that certain of these unknown risks could be harmful. However, the American College of Sports Medicine guidelines indicate that because you are classified as low risk based on your medical history, the chance of injury or an adverse event occurring as a result of the study or of exercise in general is very low. Additionally, heart rate will be monitored throughout the exercise sessions and any abnormal responses will result in the cessation of exercise. The maximal test may result in muscle soreness or discomfort, both during and following the exercise. Delayed muscle soreness can be treated using ibuprofen, rest and ice and/or heat application. The warm up and cool-down prior to and following exercise may also help to minimize both acute and delayed muscle discomfort. Please also note that exercise will be stopped immediately upon your request, no matter what the reason.

BENEFITS

Having the opportunity to participate in laboratory testing to assess your cardiovascular fitness and knowing the results of the testing may be a benefit of this research. At the end of the study, you will be told your fitness results and provided with information that may be used to enhance your health and fitness.

CONFIDENTIALITY

Any information about you obtained from this research will be kept as confidential (private) as possible. All records related to your involvement in this research study will be stored in a locked file cabinet. Your identity on these records will be indicated by a case number rather than by your name, and all the data collected will remain anonymous. Information related to your participation may be used for research purposes for a period of five years following the study completion, at which time it will be destroyed or deleted. You will not be identified by name in any publication of research.

VOLUNTARY CONSENT:

All of the above has been explained to me and all of my current questions have been answered. I understand that I am encouraged to ask questions about any aspect of this research study during the course of this study, and that such future questions will be answered by the researchers listed on the first page of this form. I understand that my participation in this study is voluntary and that my refusal to participate or my discontinuing participation at any time will result in no penalty or loss of benefits. Any questions I have about the study will be answered by the investigators of this project and any questions regarding my rights as a research participant will be answered by the Research Ethics & Compliance office (438-2529). By signing this form, I agree to participate in this research study. A copy of this consent form will be given to me.

_____ _____ _____

Participant's Signature Print Name Date

APPENDIX B

RESEARCH SURVEYS

Pre-Exercise Survey

The purpose of this research study is to understand athletes' running experiences.

As noted on the consent form you signed, *your participation in this study is completely voluntary. There are no penalties for choosing not to participate. Further, you may withdraw at any time, for any reason, without penalty.*

Please note, there are no right or wrong answers, your name is not on this survey, and nobody else will see your responses, so please be as honest as possible!

1. Running Background	
1.	How many years <u>total</u> have you participated in running? _____ *years*
2.	How many miles do you typically run per week on average? _____*miles*
3.	What is your typical training pace? _____ *min/mile*
4.	What was the last organized race you participated in? _____ *race* _____*date* And/or What is the next organized race you plan to participate in? _____*race* _____*date*
5.	What are your some of your personal best times? (estimate if unsure) _____Mile _____5K _____10K _____Half Marathon _____Marathon Others:_____
6.	What distance is your preferred race distance? _____Mile _____5K _____10K _____Half Marathon _____Marathon Others:_____

Personal Information						
1. How old are you? _____ *years*						
2. Circle your gender: *male* *female*						
3. How would you describe yourself? (*circle one*)						
African American	*Asian*	*Hispanic*	*Native American*	*White*	*Other*	

Please consider your thoughts and feeling about running and indicate the degree to which each of the following statements corresponds to you.							
	Not At All Like Me						*Completely Like Me*
1. It is important to me to perform as well as I possibly can.	☐	☐	☐	☐	☐	☐	☐
2. I worry that I may not perform as well as I possibly can.	☐	☐	☐	☐	☐	☐	☐
3. It is important for me to do well compared to others.	☐	☐	☐	☐	☐	☐	☐
4. I just want to avoid performing worse than others.	☐	☐	☐	☐	☐	☐	☐
5. I want to perform as well as it is possible for me to perform.	☐	☐	☐	☐	☐	☐	☐
6. Sometimes I am afraid that I may not perform as well as I'd like.	☐	☐	☐	☐	☐	☐	☐

7.	It is important for me to perform better than others.	☐	☐	☐	☐	☐	☐	☐
8.	My goal is to avoid performing worse than everyone else.	☐	☐	☐	☐	☐	☐	☐
9.	It is important for me to master all aspects of my performance.	☐	☐	☐	☐	☐	☐	☐
10.	I'm often concerned that I may not perform as well as I can perform.	☐	☐	☐	☐	☐	☐	☐
11.	My goal is to do better than most other performers.	☐	☐	☐	☐	☐	☐	☐
12.	It is important for me to avoid being one of the worst performers in the group.	☐	☐	☐	☐	☐	☐	☐

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

When participating in running…		*Never*	*Rarely*	*Sometimes*	*Frequently*	*Always*
1.	I am challenged, but I believe my skills will allow me to meet the challenge	☐	☐	☐	☐	☐
2.	I make the correct movements without thinking about trying to do so	☐	☐	☐	☐	☐
3.	I know clearly what I want to do	☐	☐	☐	☐	☐

4.	It is really clear to me how my performance is doing	☐	☐	☐	☐	☐
5.	My attention is focused entirely on what I am doing	☐	☐	☐	☐	☐
6.	I have a sense of control over what I am doing	☐	☐	☐	☐	☐
7.	I am not concerned with what others may be thinking of me	☐	☐	☐	☐	☐
8.	Time seems to alter (either slows down or speeds up)	☐	☐	☐	☐	☐
9.	I really enjoy the experience	☐	☐	☐	☐	☐
10.	My abilities match the high challenge of the situation	☐	☐	☐	☐	☐
11.	Things just seem to happen automatically	☐	☐	☐	☐	☐
12.	I have a strong sense of what I want to do	☐	☐	☐	☐	☐
13.	I am aware of how well I am performing	☐	☐	☐	☐	☐
14.	It is no effort to keep my mind on what is happening	☐	☐	☐	☐	☐
15.	I feel like I can control what I am doing	☐	☐	☐	☐	☐
16.	I am not concerned with how others may be evaluating me	☐	☐	☐	☐	☐
17.	The way time passes seems to be different from normal	☐	☐	☐	☐	☐
18.	I love the feeling of the performance and want to capture it again	☐	☐	☐	☐	☐
19.	I feel I am competent enough to meet the high demands of the situation	☐	☐	☐	☐	☐
20.	I perform automatically, without thinking too much	☐	☐	☐	☐	☐

21.	I know what I want to achieve	☐	☐	☐	☐	☐
22.	I have a good idea while I am performing about how well I am doing	☐	☐	☐	☐	☐
23.	I have total concentration	☐	☐	☐	☐	☐
24.	I have a feeling of total control	☐	☐	☐	☐	☐
25.	I am not concerned with how I am presenting myself	☐	☐	☐	☐	☐
26.	It feels like time goes by quickly	☐	☐	☐	☐	☐
27.	The experience leaves me feeling great	☐	☐	☐	☐	☐
28.	The challenge and my skills are at an equally high level	☐	☐	☐	☐	☐
29.	I do things spontaneously and automatically without having to think	☐	☐	☐	☐	☐
30.	M goals are clearly defined	☐	☐	☐	☐	☐
31.	I can tell by the way I am performing how well I am doing	☐	☐	☐	☐	☐
32.	I am completely focused on the task at hand	☐	☐	☐	☐	☐
33.	I feel in total control of my body	☐	☐	☐	☐	☐
34.	I am not worried about what others may be thinking of me	☐	☐	☐	☐	☐
35.	I lose my normal awareness of time	☐	☐	☐	☐	☐
36.	The experience is extremely rewarding	☐	☐	☐	☐	☐

Post-Exercise Survey

Please Answer Each of the Questions on the Following Pages.

Remember, there are no right or wrong answers and we will not share your responses with anyone else so please be as honest as possible!

Please answer the following questions in relation to the running experience you just completed. These questions relate to the thoughts and feelings you may have experienced during the activity. There are no right or wrong answers. Think about how you felt during the run, then answer the questions using the rating scale below.

During the 12-minute run test…		*Strongly Disagree*	*Disagree*	*Neither Agree nor Disagree*	*Agree*	*Strongly Agree*
1.	I felt I was competent enough to meet the demands of the situation	☐	☐	☐	☐	☐
2.	I did things spontaneously and automatically without having to think	☐	☐	☐	☐	☐
3.	I had a strong sense of what I wanted to do	☐	☐	☐	☐	☐
4.	I had a good idea about how well I was doing while I was involved in the task/activity	☐	☐	☐	☐	☐
5.	I was completely focused on the task at hand	☐	☐	☐	☐	☐
6.	I had a feeling of total control over what I was doing	☐	☐	☐	☐	☐
7.	I was not worried about what others may have been thinking of me	☐	☐	☐	☐	☐
8.	The way time passed seemed to be different from normal	☐	☐	☐	☐	☐
9.	I found the experience extremely rewarding	☐	☐	☐	☐	☐

People have different goals during participation. Please indicate which goal statement you agree with the most.

Please read each of the statements listed below and indicate how much you personally agree with the statement.

My goal during the run test was…	*Strongly Disagree*	*Partly Disagree*	*Disagree*	*Neutral*	*Agree*	*Partly Agree*	*Strongly Agree*
1. To perform better than others	☐	☐	☐	☐	☐	☐	☐
2. To not perform worse than others	☐	☐	☐	☐	☐	☐	☐
3. To try to run better than I have before	☐	☐	☐	☐	☐	☐	☐
4. To not run slower than I have before	☐	☐	☐	☐	☐	☐	☐

Try to appraise your feeling of exertion as honestly as possible, without thinking about what the actual physical load is. Your own feeling of effort and exertion is important, not how it compares to other people's effort. Look at the scales and the expressions and then give a number.

No Exertion at All	Extremely Light		Very Light		Light		Somewhat Hard		Hard		Very Hard		Extremely Hard	Maximal Exertion
6	7	8	9	10	11	12	13	14	15	16	17	18	19	20