

An Examination of Flow State Occurrence in College Athletes

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This study examined qualitative and quantitative aspects of flow within a group of college-age athletes. Forty-two athletes (27 males and 15 females) representing team sports (n = 28) (football, baseball, volleyball, softball, and basketball) and individual sports (n = 14) (swimming, track, wrestling, and triathlon) were interviewed on what factors they felt helped, prevented, and disrupted flow occurrence. Previous qualitative flow examination was extended (Jackson, 1995) and an interview format was developed in which an inductive analysis was performed. Raw data which were integrated into higher order themes and general dimensions resulted in nine factors helping flow, eight dimensions preventing flow, and six dimensions disrupting flow that synthesized the 148 themes suggested by the athletes. Results of the qualitative analysis revealed marked overlap to previous qualitative results, however this sample perceived flow to be less controllable than elite athletes. In addition, these athletes completed the Flow State Scale (Jackson & Marsh, 1996) to obtain a quantitative assessment of flow relationships. Results of a two-way MANOVA (gender x sport type) on FSS subscales resulted in a nonsignificant interaction ($p = .62$) and nonsignificant main effects for gender ($p = .45$) and sport type ($p = .11$). In addition, separate two-ANOVAs performed on FSS subscales and total FSS scores with Bonferroni test to correct for family-wise error rate, indicated only one significant main effect for sport within the action-awareness subscale ($F=9.62$, $p = .004$). College athletes appear to have similar experiences of flow states, regardless of gender or sport type. Results are discussed in terms of the importance of examining both qualitative and quantitative aspects of flow occurrence in athletes.

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Flow has been described as a state of optimal experience (Csikszentmihalyi, 1990) involving total absorption in a task at hand, and creation of a state of mind where optimal performance is capable of occurring. Csikszentmihalyi (1990) argued that there are particular activities that are more likely to produce flow, and personal traits that help people achieve flow more easily. A critical qualification of this state is that flow is not dependent upon the objective nature of challenges or the objective level of one's skills, but that flow is entirely dependent on one's perception of the challenges and their skill (Csikszentmihalyi, 1975). Recent research has examined possible associations between flow state and athletic performance (Jackson, Kimiecik, Ford, & Marsh, 1998; Jackson, 1992, 1993, 1995; Jackson & Roberts, 1992; Stein, Kimiecik, Daniels, & Jackson, 1995). The apparent association between flow state and peak performance (Jackson, 1992, 1993; Jackson & Roberts, 1992; Privette & Bundrick, 1991) makes understanding flow tantamount to the athlete, coach, and sport psychologist. Knowledge gained of these factors is important in helping athletes to prepare for optimal performance.

In explaining predispositions to experience flow, Csikszentmihalyi (1990) argued that particular activities that are more likely to produce flow, traits that assist in producing flow, and that there is a link between peak performance and peak experience (McInnman & Grove, 1991). Specifically, Csikszentmihalyi (1975) indicated that a skill-challenge balance was an essential precursor flow occurrence, and that flow was dependent upon the individual's ability to structure their consciousness so as to make flow possible. The complexities in examining flow relate to the concerns over qualitative and quantitative research approaches (Jackson & Marsh, 1996), yet the ability to effectively incorporate these approaches to the study of flow may have implications for applied sport psychology consultants. By identifying the psychological factors that enhance, inhibit, and disrupt flow, consultants and coaches may be better able to help athletes achieve optimal performance (Kimiecik & Stein, 1992).

Jackson (1992) provided information from in-depth interviews with elite figure skaters about specific factors related to flow occurrence. These skaters indicated that flow was facilitated by positive mental attitude, positive pre-competitive and competitive affect, maintaining appropriate focus, physical readiness, and partner unity. Factors perceived to prevent or disrupt flow were physical problems/mistakes, inability to maintain focus, negative mental attitude, and lack of audience response. Jackson (1995) later examined athletes' responses to questions about what facilitated, prevented, and disrupted flow in 28 elite athletes from seven different sports. Results of interview responses revealed 10 dimensions and included salient factors such as physical and mental preparation, confidence, focus, how performance felt, and optimal motivation, and arousal. In addition, 79% of the athletes surveyed felt that factors facilitating or preventing flow were perceived as controllable.

Jackson (1996) recently investigated athletes responses and found correspondence between dimensions of flow described by Csikzentmihalyi (1990) and athletes descriptions of their flow experiences. Through qualitative analysis of athletes interviews, those dimensions of flow represented most across the group's data were the autotelic experience of flow, total concentration on the task at hand, merging of action and awareness, and the paradox of control (Jackson, 1996). The autotelic dimension of flow has been defined as an intrinsically motivating participation in an activity for it's own sake and is an aggregate of all other flow dimensions (Jackson, 1996). One consistent finding has been that when the activity was perceived as enjoyable, athletes described their state of mind in similar terms (Jackson & Csiksentmihalyi. 1999). Jackson, Kimiecik, Ford & Marsh (1998) recently examined psychological correlates within trait and state flow. Results provided support for the construct of flow in that similar sets of predictor variables explained significant relationships with flow at both the subscale and global level. Specific predictors were perceived ability, anxiety, concentration disruption, anxiety-worry and intrinsic motivation to experience stimulation. Support for construct validity of flow scales was also demonstrated in that the flow trait challenge-skill balance was most highly correlated with the trait measure of perceived ability, and the authors concluded that high perceived ability is crucial to facilitating flow states (Kimiecik et al., 1998). It may be that less-skilled athletes are less likely to experience flow because both their actual and perceived level of skill are lower than elite athletes.

In an effort to quantitatively study flow, the Flow State Scale (FSS; Jackson & Marsh, 1996) was developed. The nine FSS scales of the 36-item instrument represent Csikzentmihalhi's (1990) nine dimensions of flow and each dimension is measured by four items. The approach in developing the FSS was to establish construct validity of an inventory designed to measure flow as a hypothetical construct. Confirmatory factor analysis supported the nine scales and a hierarchical model in which one global flow factor explained correlations between the nine FSS factors. Internal consistency estimates for the FSS scales were satisfactory ($\alpha M = .83$). The usefulness of a single global score compared to the set of nine FSS scores was not determined. In addition, it was proposed that future research use the FSS in determining various group differences (Jackson & Marsh, 1996).

Conceptual and methodological issues related to flow research have been noted (Kimiecik & Stein, 1992). Conceptual concerns such the nature of flow and how it occurs have been addressed in qualitative analyses of the flow concept (Jackson, 1995, 1996), yet other personal and situational variables such as gender and sport setting remain largely unexamined in their relationship with flow occurrence. Use of the FSS may help to clarify the qualitative relationships and complex construct of this concept.

The richness of the flow construct necessitates that measures are inclusive and incorpo-

rate both qualitative and quantitative approaches. Several dimensions of flow have been theoretically discussed and supported by research (Jackson, 1995, 1996; Jackson & Marsh, 1996; Jackson et al., 1998). In addition, sport and exercise psychology research has recognized the need for multidimensional and sport-specific measurements (Gill, Dziewaltowski, & Deeter, 1988; Vealey, 1986). Therefore, in order for researchers to assess flow in a more systematic fashion, it is necessary to incorporate quantitative assessment of this construct into investigation that may delineate systematic relationships between potential antecedents of flow.

The purposes of this study were to : (a) determine whether differences existed across gender or sport setting with regard to factors important to flow state, as measured by the Flow State Scale (Jackson & Marsh, 1996) and (b) extend the work of previous qualitative study of flow (Jackson, 1992, 1995, 1996) by examining factors which were relevant to helping, preventing, and disrupting flow in a sample of male and female college athletes from team and individual sports.

Method

Participants

Fifty male and 50 female college athletes were identified from a large Midwest university and were sent a letter asking if they would volunteer to participate in a study assessing psychological factors related to athletic performance. Athletes who responded to a letter of invitation asking if they would be willing to be interviewed about optimal sport experiences were included. The number of participants was the result of maximizing the overall N and an attempt was made to obtain equal males and females. The final number of participants in this study was 42 college-age athletes (27 males, 15 females). The mean age for participants was $M = 20.43$, $SD = 1.99$ with a range of 17 to 27 years. Athletes represented a range of different sports including team sports of football, baseball, volleyball, softball, and basketball ($n = 28$) and individual sport athletes of swimming, track, and wrestling ($n = 14$). In addition, one college student who was solicited was a national level triathlete, and based upon precedence from pervious flow study (Jackson, 1995, 1996) was included in this study as an individual sport athlete.

Instruments

Part I: Quantitative Analysis-Flow State Scale. The 36-item instrument of the Flow State Scale (Jackson & Marsh, 1996) was administered to athletes after their qualitative interviews. The Flow State Scale measures nine separate dimensions within flow, based upon previous qualitative analyses (Jackson, 1995) with elite athletes. Internal consistency esti-

mates for the nine scales have been reasonable ($M = .83$) and confirmatory factor analysis has shown support for the nine scales (Jackson & Marsh, 1996). In constructing the Flow State Scale, Jackson and Marsh (1996) indicated support for the multidimensionality of the flow construct by support of nine first-order factor model. In addition, the nine scales had reliabilities of at least .80, satisfying criteria for acceptable reliability.

Part II: Qualitative Analysis - Interview Guide. Following previous flow research formats (Csikszentmihalyi, 1975; Jackson, 1995) an interview was developed to provide detailed qualitative analysis of factors associated with flow state. Similar to Jackson's (1995) format, athletes were first asked to describe a performance in which he/she was in flow (This state was not identified to athletes as flow, but performances which were optimal or near optimal and were enjoyable). Athletes were subsequently asked three specific questions about flow: what factors help you to achieve flow, what are factors that prevent flow, and what disrupts flow during performance. After discussing factors that were believed to affect flow, athletes were also asked whether they perceived they could control these factors.

Procedures and Analyses

An interview guide was pilot tested on two college athletes not used in the current study to verify item clarity. All interviews were conducted face-to-face and were transcribed verbatim in preparation for data analysis. The interview procedure was more condensed than previous flow investigation (Jackson, 1995) as interviews lasted on average between thirty minutes to an hour due to the focus on the specific recall of performance during flow. After transcripts were finished, interview responses were read and transcribed into themes, and later compiled into sets of raw data themes (one set per question). These themes were quotes or paraphrases that described lengthy quotes.

Part I: Quantitative Analysis - Flow State Scale. A multivariate analysis of variance MANOVA (gender x sport setting) was conducted using gender and sport setting (individual and team sport) as independent variables and the nine FSS subscales and total FSS score as dependent variables. The interest within this study was to examine the multidimensional nature of the FSS. However, Jackson and Marsh (1996) indicated the possibility that distinct flow profiles of specific flow components could have important differences, yet result in the same global score. It is feasible that while no multivariate relationships are evident, meaningful univariate relationships may still yield important information on how athletes differ across gender and sport setting in specific flow-related components.

Therefore, an a priori decision was made to examine FSS subscales using a two-way (gender by sport setting) MANOVA, with follow up discriminant analyses on significant interactions and main effects. A decision was also made that if no significant MANOVA results

were found, separate two-way ANOVAs (gender by sport setting) on the nine FSS scores and total FSS would be analyzed. The rationale for this analysis was that while the multivariate relationship among the flow components may be nonsignificant, meaningful information may still be gained by determining differences across gender and sport setting for each individual component of flow. Since Jackson and Marsh (1996) have posited that the relative usefulness of global and specific components of FSS responses cannot be evaluated until the FSS instrument has been more extensively used and validated, both analyses were deemed appropriate. A family wise alpha level of .01 was adopted for all analyses and a Bonferroni correction was used to prevent alpha level inflation. Since the examination of gender and sport setting using the FSS was exploratory in nature, no specific hypotheses were adopted.

Part II: Qualitative Analysis - Inductive Content Analysis. Jackson (1996) has highlighted the importance of rich description of qualitative analysis that is inherently important to examining flow. Thus, inductive analysis (Jackson, 1995) was used to assess factors helping, preventing, and disrupting flow in this sample of athletes. The inductive analysis was used to integrate thoughts expressed by athletes into more coherent themes that link thoughts into higher order themes. This process involved examining raw themes and comparing them with all other themes at a particular level, integrating themes with similar meaning while separating themes with different meaning.

Three by five index cards were used to record raw data themes in order to organize the inductive analysis process. The initial level of qualitative analysis involved using the athletes' direct quotes, enabling a more valid description to depict this data theme, based directly on what athletes said. The entire quotation was written on one side on the card, and the summary statement was written on the other side. The reliability of the inductive content process was verified by having a person independent of this study examine all the cards to verify that summary statements accurately reflected athletes' quotations. Once this initial list of raw themes was complete, an inductive analysis was performed to generate a set of higher order themes for each question. Finally, a second inductive analysis was performed to further integrate themes into more general dimensions, which were used to put together a larger number of athletes' ideas to promote a further abstraction of specific themes.

As part of this qualitative analysis, methods for establishing data trustworthiness were deemed appropriate (Jackson, 1995) and it has been noted that use of certain techniques and careful analysis of data ensures greater credibility (Patton, 1990). This process included (a) detailed description in the data collection and analysis, (b) a reflexive journal which included detailed aspects of the logistics of the study, including decisions made during the study, their rationale, and (c) the involvement of three separate individuals including a peer debriefer, a reliability checker, and an auditor to form the basis of increasing truth value and transferability

of the data (Lincoln & Guba, 1985). The peer debriefer helped to identify biases and clarify interpretations of inquiry. The external checker clarified decisions on independent checking of data themes and their higher order themes compared to the investigator. The auditor examined all relevant documents pertaining to this study, providing verification of the acceptability of the conclusions.

Results

Part I: Quantitative Analysis- Flow State Scale

Results of the overall two-way (gender x sport setting) MANOVA resulted in a nonsignificant interaction ($p = .62$) and nonsignificant main effects for gender ($p = .45$) and sport setting ($p = .11$). As a result of the nonsignificant multivariate effects on FSS subscales, separate 2-way ANOVAs (gender x sport setting) were performed on the nine FSS subscales and global FSS scores to examine potential univariate effects on the individual flow state subscales.

Two-way ANOVA results indicated nonsignificant gender by sport interactions and nonsignificant main effects for the Flow State Scales of challenge-skill balance, clear goals, unambiguous feedback, paradox of control, loss of self-confidence, transformation of time, autotelic experience, and total FSS score. For action-awareness, the interaction was nonsignificant ($p = .71$) as was the main effect for gender ($p = .12$). However, there was a significant main effect for sport setting $F(1,38) = 9.62, p = .004$, indicating that team-sport athletes has a significantly higher level of action-awareness merging than individual sport athletes during flow. For the concentration subscale, there were trends toward significance on the interaction ($p = .051$), the gender main effect ($p = .054$) and the sport main effect ($p = .03$) which fell short of statistical significance at the .01 level under the family-wise Bonferroni alpha level. Intercorrelations among FSS scores and global scores are indicated in Table 1. Intercorrelations between global FSS scores and FSS subscales ranged from $r = .41$ (concentration of task at hand) to $r = .76$ (paradox of control) and were significant ($p < .005$), except for clear goals ($r = .21, p = .19$) and transformation of time ($r = .12, p = .45$). Intercorrelations between the higher order global FSS scores and first order FSS scores were lower (r 's between .12 and .76) compared to previously noted correlations (Jackson & Marsh, 1996).

Part II: Qualitative Analysis - Interview Results. One purpose of this study was to extend previous qualitative study (Jackson, 1995) of factors that were relevant to helping, preventing, and disrupting flow by examining collegiate athletes from team and individual sports. From the inductive content analysis there were nine major dimensions identified which were purported to help flow. These included; optimal pre-competitive preparation plans,

Table 1
Flow State Scale Intercorrelations With Global Flow State Scale Scores

Intercorrelation Matrix Flow State Scale Subscales										
Subscales	#Chall	Action	Goals	Feed	Conc	Cont	Self	Trans	Auto	Total
Chall	1.0									
Action	.35	1.0								
Goals	.13	.61	1.0							
Feed	.16	.12	.17	1.0						
Conc	.04	.38	.02	.27	1.0					
Cont	.54	.44	.17	.21	.18	1.0				
Self	.38	.24	.10	.20	.02	.65	1.0			
Trans	-.22	.20	-.32	-.05	.08	-.001	-.15	1.0		
Auto	.14	.31	.04	.33	.19	.42	.39	-.02	1.0	
Total	*.62	*.63	.21	*.45	*.41	*.76	*.70	.12	*.54	1.0

* Correlations significant at $p < .005$ level.

Chall = Challenge-Skill Balance, Action = Action Awareness Merging, Goal = Clear Goals, Feed = Unambiguous Feedback, Conc.= Concentration on the Task at Hand, Cont.= Paradox of Control, Self= Loss of self-consciousness, Trans.= Transformation of Time, Auto.= Autotelic Experience, Total = Total Flow State Scale Score.

confidence & positive thinking, optimal physical preparation, performance feeling good, focus, optimal environmental conditions, positive coach/team interaction, optimal pre-competitive arousal level, and motivated to perform. There were eight major dimensions purported to prevent flow including; nonoptimal confidence/positive thinking, nonoptimal physical preparation, performing poorly, inappropriate focus, nonoptimal environment/situation, negative/nonoptimal team interaction, overarousal before competition, and lacking motivation. Finally, qualitative responses from these athletes were grouped into six major dimensions purported to disrupt flow. These dimensions included; putting pressure on self and self-doubt, nonoptimal physical state, performance physical state, performance errors, inappropriate focus, nonoptimal environmental/situational influences, and problems with team performance.

Factors Facilitating Flow

Nine dimensions were formed which represented factors helping this sample of college athletes get into flow. There were 55 independent raw data themes from the 42 interviews to answer what helped athletes get into flow. A reliability checker independently classified raw data themes into 16 higher order themes, and these themes into nine general dimensions. There was 94% agreement at the raw data theme level, and 100% agreement at the higher order level. The six raw data themes which were classified different from the investigator were discussed, three were moved, two were re-worded, and the final theme was agreed to maintain its original placement. Table 2 lists the raw data themes, higher order themes, and general dimensions for factors helping flow. For all dimensions discussed, the order is by percentage of athletes represented.

Optimal Pre-competitive Preparation Plans. This dimension had the largest percentage of college athletes citing a theme within it (52.4%) and included 16.2% of all raw data themes. There were two higher order themes that made up this dimension: optimal pre-competitive plans, and being alone before competition. Thus, it appeared that for this sample, being optimally prepared before their event was an important factor in helping flow. Adherence to regular pre-performance mental preparation routines, which often meant being isolated from others, was a salient theme. For example, one athlete noted

I listen to music before a game. I always listen to the same tape ... I like to sit in the gym before each game by myself and picture myself doing positive things on the floor. This mental rehearsal process seemed to facilitate the enhancement of confidence as one-track athlete indicated, by mentally going through my event, I am more confident in my ability.

Optimal Physical Preparation. This dimension made up 48% of the athletes and included 6.7% of all raw data themes, which were isolated to one higher order theme of the same title. Being well prepared and rested appeared to be related to one's mental preparation for this sample. The following quote from a runner describes this relationship, "Being well-rested and well-prepared as well as having a lot of self-confidence helps me in my abilities."

Confidence and Positive Thinking. Thirty-three percent of the athletes mentioned a theme related to this dimension, constituting 6.8% of all raw themes. Three higher order themes were; confidence, positive thinking, and enjoyment of the activity. Confidence was linked with being able to eliminate ant negative thinking and focus solely on positive performance attributes. For example, one volleyball player indicated, "First, you have to have belief in yourself. You have to have confidence in yourself you can build into a rhythm."

Table 2
Factors Helping Flow

General Dimension	Higher Order Theme	Raw Data Theme
Optimal Precompetitive Plan	Optimal Precompetitive Plan	Being prepared mentally and physically <i>Being mentally prepared</i> Mentally preparing to remove anxiety Game plan rehearsal Mental rehearsal precompetitive performance imagery (2) Positive pre-game imagery Consistent pre-game mental routine (3 - 1 uncontrollable)
	Being Alone Before Competition	Being alone before my competition Being alone before competition Prefer to be by myself Being alone before game (4)
Confidence and Positive Thinking	Confidence	Confident about opponent Confident in ability to perform (2- 1 Uncontrollable) Confidence (4) Trust in my abilities <i>Confidence building before a game</i>
	Positive Thinking	Positive attitude Positive self-image Blocking out negative thoughts
	Enjoyment of the activity	Having fun Enjoyment
Optimal Physical Preparation	Having Optimal Preparation	Knowing you're prepared through practice Physically prepared for an event Having prepared physically Good pre-game nutrition Being physically rested (2) Being physically relaxed
Optimal Precompetitive Arousal	Relaxation	<i>Feeling excited before play</i>
	Getting energized to compete	Getting energized before a game (2) Getting oneself aroused before a game Mentally/physically relaxed in warm-up <i>Physically feeling good in warm-up</i> Good physical pre-game warm-up Vigorous physical warm-up (2)
Performance Feeling Good	Warm-up feeling good	Setting and accomplishing goals Having a clear game plan Motivated to play well for scouts
Motivated to Perform	Clear goals	Concentration Good mental focus (3) <i>Lack of concern for competitors</i>
Focus	High motivation Good focus	

(table continues)

Table 2. (continued)

General Dimension	Higher Order Theme	Raw Data Theme
	Performance feels automatic	Not trying as hard Performing skills automatically Performance is automatic (3- 1 uncontrollable)
Optimal Environmental Conditions	Environmental conditions	<i>Start of the game</i> Good environmental conditions Good awareness of the environment
Positive Coach/Team Interaction	Positive coach feedback	<i>Positive feedback from coach</i> <i>Receiving pep-talk from coach</i> Positive coach feedback in warm-up
	Positive team interaction	<i>Teammates getting pumped up</i> Positive interaction with team Talking with teammates Being around teammates

Notes. 1: Italics are factors which were uncontrollable. 2: Numbers in parentheses are number of athletes reporting

Optimal Arousal Level Prior to Competition. There was 29% of the sample that indicated that optimal arousal levels were essential to flow and this dimension represented 9.4% of all data themes. The higher order themes of relaxation and getting energized to compete made up this dimension. Similar to previous investigation of flow, certain athletes mentioned that physical relaxation was more important to achieving flow, while others favored inducement of increased arousal states to facilitate flow (Jackson, 1995).

Performance Feeling Good. Nineteen percent of the participants indicated that their performance during warm-up helped them to achieve flow. Specifically, this dimension was composed of the higher order theme warm-up feeling good, and contained 6.8% of all raw data themes. Results from this dimension differed from previous flow findings (Jackson, 1995) in that the higher order theme for this dimension was limited to performance in warm-up. The underlying theme in this dimension was that good physical preparation in warm-up was associated with the necessary mental preparation that was a prerequisite for flow states to occur.

Motivated to Perform. This dimension was related to having clearly established goals and a sense of motivation to perform within the athlete's event. Responses in this dimension made up 19% of all athletes and represented 4.5% of all raw data themes. Two higher order themes made up this dimension: clear goals and high motivation. These two themes were linked because athlete were motivated as a function of their pre-established goals and the importance of the given event.

Focus. For 17% of these athletes, good attentional focus was important to getting into

flow. This dimension represented 13.5% of all raw data themes and consisted of the higher dimensions of good focus and performance feels automatic. A theme among athletes in this dimension was that one needed optimal focus in order to increase one's level of performance. Effective focus seemed to be closely linked to heightened self-confidence. One football player effectively summarized this apparent association, "I have to be focused and totally aware of everything that is going on around me. This effects my confidence and I feel like my senses go up a notch when I play well."

Optimal Environmental Conditions. This theme made up 14% of the sample, and 4.1% of all raw data themes. This dimension was represented by a single higher order theme of the same title. The type of event played a role in how important environment was in helping achieve flow, especially in duration events. For example, one runner mentioned that temperature and scenery were important in longer races.

Positive Coach / Team Interaction. For 10% of the athletes, positive coach and team interaction was cited as an antecedent to flow. The higher order themes of positive coach feedback and positive team interaction made up this dimension and represented 9.5% of all raw data themes. While fewer athletes cited this dimension for helping flow, it was evident for several team athletes, positive social support of confident teammates and positive feedback from the coach prior to performance were associated. For certain athletes, teammates appeared to have an effect in optimizing pre-competitive arousal levels prior to competition.

Factors Preventing Flow

There were eight dimensions inductively formed to represent the factors that prevent athletes from getting into flow. There were 47 independent raw data themes elicited from the sample and a reliability checker independently classified raw data themes into 21 higher order themes, and higher order themes into the eight general dimensions. There was 100% agreement at the raw data theme level, and 98% agreement at the higher order theme level. A higher order theme (precompetitive distraction) was moved to another dimension after discussing that it was more appropriate with ideas in the dimension it was added (inappropriate focus). Table 3 shows the raw data themes, higher order themes, and general dimensions for factors preventing flow.

Non-Optimal Physical Preparation & Readiness. There were 48% of the athletes that mentioned a theme in this dimension, which had the highest percentage of athlete representation. There were five higher order themes in this dimension, which made up 30% of all raw data themes. Higher order themes for this factor were; not being physically prepared, not feeling good physically, poor nutrition, and fatigue. Obviously, in this dimension, when athlete did not feel optimally prepared, their sense of readiness for competition and confidence about

Table 3
Factors Preventing Flow

General Dimension	Higher Order Theme	Raw Data Theme
Nonoptimal Preparation / Readiness	Not being physically prepared	Insufficient preparation (4) Poor practices prior to competition
	Injury	<i>Becoming injured (2)</i>
	Not feeling good physically	<i>Physical illness (2)</i> Physical pain
	Poor nutrition	Poor nutrition (2)
	Fatigue	<i>Poor night's sleep (2)</i> Feeling physically tired (3) Being overtrained <i>Excessive travel to competition</i>
Nonoptimal Environment or Situation	Nonoptimal environmental conditions	<i>Temperature extremes (2)</i> <i>Poor weather conditions</i>
	External stress	<i>External stress</i>
	Dislike for event	Dislike for a particular event
	Situational stress	<i>Argument with parents</i> <i>Negative feedback from others</i> <i>Argument with coach (2)</i>
Nonoptimal Confidence	Nonoptimal confidence	Lack of confidence (2)
		Overconfidence
		Negative attitude
		Negative self-talk
		Having negative thoughts <i>Negative imagery</i>
Inappropriate Focus	Poor concentration	Inability to concentrate (2-1 uncontrollable) Lack of concentration (2)
	Losing focus	Being distracted by outside thoughts (2-1 uncontrollable) Not being focused on my race <i>Inability to eliminate distractions</i>
	Worry about external factors	Worry about competitors (3) Worry about competing against somebody better <i>Excess worry</i> <i>Worry about a large crowd</i>
	Precompetitive distraction	<i>Pre-race distractions</i> <i>Distractions before competition</i>
	Lacking Motivation to Perform	Low motivation Lack of challenge Lack of concern over outcome Opposition not a challenge (2)
Overarousal Before Competition	Excessive anxiety	Excessive anxiety (2)
Negative/Nonoptimal Team Interaction	Negative team interaction	<i>Teammates' bad attitudes</i> <i>Focus distracted by teammates (2)</i>
		<i>Not being around teammates</i>
Performing Poorly	Being isolated	
	Poor start	Poor start (2)

Notes. 1. Italics are uncontrollable factors. 2. Numbers in parentheses represent number of athletes responding

performing well declined. While the focus was on non-optimal physical factors, these were also related to psychological preparation factors. For example, several athletes mentioned that a poor night's sleep prior to competition negatively affected their physical readiness, but this lack of sleep was due to worry over the upcoming competition.

Inappropriate Focus. This dimension, representing 40% of all athletes, involved 25.3% of all raw themes and was comprised of the higher order themes; poor concentration, losing focus, worry about external factors, and precompetition distraction. In this dimension, inappropriate focus was a function of inability to gate out distractions or excessive rumination or concern over competitors. For some athletes the inability to focus was related to outside stressors. As one swimmer indicated, "If something happened that day to take my mind off the meet, it's harder to concentrate on swimming. It takes total focus." The other major theme was inappropriate attention focused on opponents. One triathlete indicated focus problems when there were many international competitors and a defensive player in football indicated focus problems when the opposition's offensive linemen were physically larger in size.

Non-Optimal Environment / Situation. Twenty-one percent of athletes interviewed referred to problems with nonoptimal environment or situation as preventing flow. Higher order themes within this dimension included non-optimal environmental conditions, external stress, dislike for event, and situational stress, and represented 13.4% of all raw data themes. Non-optimal conditions that influenced performance included temperature extremes, poor weather, uncontrollable external stressors, extensive travel and stress resulting from arguments with either a coach or parent. In addition, one swimmer indicated that his dislike for a particular distance event prevented him from achieving flow.

Non-Optimal Confidence / Positive Thinking. This dimension, representing 17% of athletes' responses, was made up of non-optimal confidence and negative thinking. These themes accounted for 10.4% of all raw data themes. Clearly, to those athletes who reported this response, non-optimal confidence levels were a factor in preventing flow. Problems with confidence referred to both lack of confidence (as a wrestler indicated), "If you go to the mat thinking you won't win", or as overconfidence (basketball player), "Cockiness can prevent me from playing well."

Lacking Motivation to Perform. This dimension, representing 14% of the athletes' responses and including 9% of all raw themes, included low motivation and lack of challenge. Thus, one particular aspect preventing flow appears to be a lack of skill-challenge balance as proposed by Csikzentmihalyi (1990). This was evident by the following comment from a basketball player, "It's hard to play when I have a lack of motivation and I don't consider the game to be a big deal."

Negative / Non-optimal Team Interaction. This dimension, involving 10% of athletes'

responses, contained 5.97% of all raw data themes and included the themes, negative team interaction and being isolated. Individual differences were important within this dimension, in that two athletes indicated that being around teammates with bad attitudes prevented flow, while for two other athletes, being isolated from teammates prevented flow.

Overarousal Before Competition. This dimension was unique from other factors because it was specific to excessive anxiety as a theme. Five percent of the athletes responses viewed excessive anxiety as preventing flow and this dimension represented 2.99% of all raw data themes. The two athletes who gave this response felt that if their anxiety was too high, there was little they could do to intervene in preparation to perform.

Performing Poorly. Five percent of the athletes cited performing poorly as preventing flow, with the responses fitting specifically within the title poor start and representing 2.99% of all raw themes. For the two athletes expressing this theme, flow prevention factors were unforced errors at the beginning of a game (basketball), and poor discus performance resulting in poor shot put performance (track and field).

Factors Disrupting Flow

Six dimensions were formed to represent factors that disrupt an athlete once in flow state. Results are presented with the 13 higher order and 46 raw themes from which they were developed. A reliability check gave 94% agreement and the raw theme level and 100% at the higher order level. One raw data theme was discussed and changed to a different higher-order theme suggested by the checker. Table 4 shows the raw data themes, higher order themes, and general dimensions for factors disrupting flow.

Non-Optimal Environmental and Situational Influences. This dimension had the most responses and consisted of 40% of all athletes and 37% of all raw data themes. The higher order themes included in this dimension were; mechanical failure, negative feedback from coach, negative refereeing decision, what opponents are doing, stoppage in play, and environmental distraction. Mechanical failure was relevant for a triathlete (bicycle), and swimming (goggles). Negative coach feedback was pertinent to team athletes distracted directly by the coach's feedback, or discrepancies between their evaluation and the coach's evaluation of performance. One basketball player felt that referees disrupted flow "My game gets thrown off when the referees start making bad calls and as a result I start missing baskets." In addition, several athletes specifically indicated that opponents were capable of disrupting flow. Runners were concerned about opponents' pace, while football players were concerned with either opponent's hard or illegal hits. Three football players and one wrestler remarked that stoppages in play had an effect on disrupting flow, which was related to disruptions in concentration.

Factors Disrupting Flow

General Dimension	Higher Order Theme	Raw Data Theme
Nonoptimal Environment/Situation	Mechanical failure	<i>Equipment malfunction</i>
	Negative feedback from coach	<i>Negative feedback from coach (2)</i> <i>Coach removes me from game (2)</i>
	Negative referee decision	<i>Poor calls by referees</i>
	What opponents are doing	<i>Competitors influencing the race pace</i> <i>Competitors passing me</i> <i>Getting hit hard by opponent</i> <i>Illegal hit by opponent</i>
	Stoppage in play	<i>Opponent's injury stops play</i> <i>Stoppage in play (3)</i>
	Environmental conditions	<i>Environmental disturbance</i> <i>Crowd distraction</i> <i>Distraction from specific person</i>
Nonoptimal Physical State	Nonoptimal physical state	<i>Physical injury (3-2 uncontrollable)</i> <i>Feeling pain during performance</i> <i>Feeling fatigued</i>
Problems with Team Performance	Problems with team	<i>Team performing poorly</i> <i>Teammates not serious</i>
Inappropriate Focus	Los of focus	<i>Loss of concentration</i> <i>Loss of focus (3 - 1 uncontrollable)</i> <i>Start thinking about outcome (2)</i>
	Performance-related worry	<i>Worry about what coach thinks</i> <i>Worry about making mistakes</i> <i>Worry about competitors performance</i>
Performance Errors	Performance errors	<i>Not playing well (5 - 1 uncontrollable)</i> <i>Performance errors</i> <i>Falling during race</i> <i>Overplaying/trying too much</i> <i>Poor transition to different event</i>
Putting Pressure and Self-Doubt	Putting pressure on oneself	<i>Putting pressure on oneself</i>
	Self-doubt	<i>Self-doubt</i>

Notes. 1. Italics are uncontrollable. 2. Numbers in parentheses represent number of athletes responding

Performance Errors. Twenty-one percent of the athletes cited performance errors as disrupting flow, which accounted for 19.6% of all raw themes. All responses fit into one higher order theme by the same title. Of the nine athletes who cited a theme within this dimension, such occurrences as falls (track), turnovers and missed third down conversions (football), missed moves (wrestling) and trying to do too much in performance (baseball) represented various performance errors.

Inappropriate Focus. In addition to preventing flow, inappropriate focus was mentioned by 21 % of the athletes as disrupting flow and accounted for 19.6% of all raw data themes. The two higher order themes that made up this dimension were loss of focus and

performance related worry. Inappropriate focus took the form of simple loss of concentration during the event, to having one's focus become occupied on the game outcome. Excessive worry was also related to inappropriate focus, as indicated by a volleyball player "I think a close scoring game makes me feel pressured and I start worrying about what the coach is thinking and that I can't screw up."

Non-Optimal Physical State. This dimension involving 17% of the athletes and comprising 15.2% of all raw data themes, included one higher order theme by the same title. The factors expressed within this theme included disruptive effects of flow from physical injury, pain during performance, and feelings of fatigue.

Putting Self-Pressure and Self-Doubt. Two athletes (5% of the sample) expressed disruptions of flow within this dimension (4.3% of all raw themes). Specifically, one baseball player felt his batting performance declined when he imposed increasing self-pressure and another volleyball player felt disrupted when she began to "second-guess" her performance.

Problems with Team Performance. Two athletes mentioned factors within this dimension which accounted for 4.3% of all raw themes and had a higher order theme of the same title. Responses within this dimension related to disruptions due to teammates performance and when there was the perception those teammates were not serious.

Perceived Controllability of Flow

In addition to being asked what factors helped, prevented, and disrupted flow, athletes were also asked whether they perceived flow to be controllable and rate each flow factor that was seen to help/prevent/or disrupt flow on its controllability. Table 5 shows the frequency of controllable versus uncontrollable flow factors. Overall, 64% of these athletes perceived flow to be a controllable state, while 36% said they felt that flow was uncontrollable. Several noted

Table 5
Frequencies of Perceived Controllability of Flow Factors

Factor	Controllable	Uncontrollable	Total N
Help Flow	60 (82.2%)	13 (17.8%)	73
Prevent	38 (58.5%)	27 (41.5%)	65
Disrupt	19 (42.2%)	26 (57.8%)	45
Total N	117 (63.9%)	66 (36.1%)	183

quotations are mentioned below that provide insight with this particular sample into the athletes' perceptions of flow controllability.

Certain athletes indicated that flow was a controllable state and that getting into flow was a conscious process. One triathlete indicated: I had total feelings of control over my body. I think you control it when you ask your body to do it and it responds with high energy. In addition, a baseball player indicated how flow was controllable: It was a great feeling knowing that I had stood up to the response and come through in the clutch. I had a feeling that I would come through. I wanted the chance to hit. Several athletes mentioned that flow was a controllable state to maintain, but achieving flow was not within their control. This seemed to be a more salient theme with team sport athletes than for individual sport athletes. For example, one basketball player indicated this theme in the following quote:

Sometimes it depends on things that you can't control. One game, the first time my guy took a shot I blocked it into the stands then made a jump hook. From then on I was feelin' it. It was weird because everyone around me seemed more sluggish and a gear behind me. I felt like I was in cruise control and still in control.

Certain athletes also mentioned that their individual flow state was more controllable than team performance and not always related to team outcome, as one volleyball player indicated:

We played a good team and I think that affects ability to achieve better performance. I remember running from spot to spot and it was fun even though we lost. It was the most enjoyable time I had.

A larger percentage of this sample felt that flow was uncontrollable than previous interviews (Jackson, 1995). Seventeen athletes who were interviewed indicated they felt flow was not a controllable state. These athletes indicated that it happened and one could maximize its chances of occurrence but not guarantee its occurrence. This was reflected by a comment football player's comment:

I don't have control over whether or not I reach that state. Every time you play you don't get there. You can be focused and not in that state. But at the same time, if you want to get there, you have to be focused.

In summary, this sample of college athletes indicated that while the majority (64%) felt flow was controllable, a larger proportion felt that flow was uncontrollable (36%), compared to elite athletes (79%) (Jackson, 1995). Athletes indicated that while important factors were controllable, the achievement of flow state was relatively less controllable.

Discussion

This is the first study the author is aware of that has examined flow experiences using the FSS across gender and sport settings as potential independent variables to the flow experience and that has combined the qualitative interview approach and quantitative assessment of flow. The major purposes of this study were to (a) quantitatively examine the variables of gender and sport setting and their potential influence on flow factors, as measured by the Flow State Scale (Jackson & Marsh, 1996) and (b) extend the qualitative findings of previous flow study (Jackson, 1995, 1996) with less elite athletes. From the qualitative interview data, nine dimensions were formed from raw data themes about what helped athletes get into flow, eight dimensions about factors preventing flow, and six dimensions about what disrupted the flow process. There were considerably fewer total independent raw data themes across these three factors (148) compared to Jackson's (1995) sample (295) due to the fact that interviews were shorter in duration. Jackson (1996) has indicated that more experienced athletes, by definition, have a larger reference base from which to draw upon when thinking about flow experiences. These athletes, then, may have been less proficient in recall of personal perceptions related to flow state.

Part I: Quantitative Results - Flow State Scale

Overall, the quantitative results from the flow state scale assessment provide empirical support for the construct of flow for males and females across team and individual sport settings. The nonsignificant MANOVA results for gender and sport setting indicated that college athletes experienced flow factors similarly, regardless of gender or sport setting. Jackson and Marsh (1996) indicated that the next step in examining the construct validity of the FSS was to examine various methods of inferring flow with the same respondents. This study examined flow both qualitatively and quantitatively with the same athletes, and the FSS responses were analyzed in both a multivariate and univariate fashion, to determine if gender or sport setting affected isolated FSS factors. The only significant result from the separate 2-way ANOVAs of the nine FSS scores and total FSS scores was a significant main effect for sport on action-awareness merging. With team athletes reporting a significantly higher level of action-awareness merging than individual sport athletes. Kimiecik & Stein (1992) indicated the need

to examine person and situation factors within flow. These differences between team and individual sport athletes reflect situational factors that may be pertinent in how athletes perceive flow. The finding of greater action awareness merging in team athletes may be attributed to the notion that for team sport athletes to perform at an optimal level, they must have a sense that performance is automatic, which is in turn related to better concentration levels. These aspects of flow may not be less important in individual sports, but may be taken for granted as necessary for effective individual sport performance, and responses from individual athletes may have reflected this result (Jackson, 1995). Such a conclusion is tenuous, because other situation factors (self-paced versus other-dependent sports, open versus closed skills) were not examined, yet may have influenced differences across team and individual sports. In addition, the same methodological and conceptual problem exists for quantitative analysis of flow as qualitative analysis of flow in that flow represents a process of several factor operating together rather than in isolation. Therefore, interpreting significant findings of FSS subscales may be empirically undermining the construct of flow (Jackson, 1995, 1996).

Correlation coefficients between total FSS scores and FSS factors support previous research indicating that the transformation of time component may be less important than other factors in determining flow (Jackson, 1996; Jackson & Marsh, 1996). However, in this study there was also a lower correlation between total FSS scores and clear goals ($r = .21$) indicating that for less elite athletes, clear goals may not be as related to helping flow occurrence. It also seems apparent from the correlation data that while there were moderate to high correlations between FSS totals and FSS factors ($r = .76$ for paradox of control; $r = .70$ for loss of self-consciousness), FSS results support Jackson and Marsh's (1996) contention that FSS responses cannot be explained very well by a single score or factor. Results also support that the FSS may be useful with a more specific athletic sample (Jackson & Marsh, 1996). Future investigation of flow will need to incorporate quantitative and qualitative methods in order to address the rich content of the flow process, yet investigate systematic relationships that may function as person (dispositional and state) and situational factors that may influence the flow experience in sport (Kimiecik & Stein, 1992). In general, the flow state scale results quantitatively supported the qualitative interview results. Male and female college athletes, across team and individual sport settings generally reported no differences in the manner in which they experienced flow. Findings from the current study extend the validity of the FSS in that qualitative scores were related to qualitative content analysis of flow occurrence in college athletes. Previous flow research (Jackson, 1995, 1996; Jackson & Marsh, 1996) by indicating that flow state can be experienced by less elite athletes (Stein et al., 1995) and also that less elite athletes have self-determination over flow, albeit comparatively less than elite athletes (Jackson, 1995). This study also supports the use of the flow state scale in assessing factors

related to flow. The finding that there were no multivariate differences between gender or sport setting on FSS scores indicates that flow factors are generally experienced in a similar manner by males and female college athletes across team and individual sport settings.

Part II: Qualitative Analysis Results

While there were some distinct differences in the current sample from previous flow interviews (Jackson, 1995, 1996) there were also many similarities from interview data. A discussion of each dimension follows:

1. *Confidence and positive thinking.* Having elevated confidence was a critical variable for achieving flow in these athletes and a closely noted theme was one's ability to maintain positive thoughts to facilitate confidence levels. Several athletes focused on their perceived confidence, which reinforces the importance of this variable in all levels of athletic performance (Jackson, 1995). This finding also supports that confidence may be more related to the perception of one's skills than to perception of challenge. These perceptions were not as strong for dimensions reported within preventing or disrupting flow.

2. *Optimal Physical Preparation.* This factor was relevant to all three factors related to flow, similar to response from elite athletes (Jackson, 1995). Obviously in order to achieve optimal performance, it was necessary for athletes to have sufficient physical preparation. Insufficient physical preparation was a salient issue when flow was prevented and to a lesser extent, when it was disrupted. Specifically, when flow was disrupted, it was more common for the result to be from injury, excessive pain, or exhaustion. This finding reinforces earlier findings on the importance of optimal physical states as a precursor to flow (Jackson, 1995). Recently, Jackson et al., (1998) found that cognitive anxiety was particularly strong in influencing state flow measures. Since confidence may provide a buffer against the debilitating effects of anxiety, this supports the importance of high confidence in facilitating flow.

3. *Optimal arousal prior to performance.* Athletes felt that achieving an optimal precompetitive arousal level was necessary for flow to occur. Two athletes mentioned that overarousal was a factor preventing flow however, underarousal was not mentioned as problematic by any athletes. Optimal arousal importance is well-documented in sport psychology (Weinberg & Gould, 1999) and this factor of flow appears to be associated with Hanin's (1992) individual zones of optimal functioning theory, in that flow appears more likely if athletes have achieved a pre-established optimal arousal zone prior to performance. By having athletes predict precompetitive arousal levels within the IZOF model (Hanin, 1989), coaches may be able to help athletes adjust precompetitive arousal levels to maximize the flow occurrences.

4. *How athletes' performance feels.* When athletes perceive their performance to be effective and feel good, they are much more likely to achieve flow. Conversely, poor perfor-

mance and errors are factors in prevention and disruption of flow. From Csikzentmihalyi's (1990) flow dimensions, when performance is perceived as good, immediate and unambiguous feedback provides information to the athlete regarding positive outcomes. When errors occur, negative feedback is provided regarding athlete's performance which raises self-doubt and preoccupation with outcome rather than performance.

5. *Motivated to perform.* A high intrinsic motivation level stems from athletes' perception of high skill-challenge balance (Csikzentmihalyi, 1990) and was reported with these college athletes as a factor in both helping and preventing flow. This factor supports the importance of intrinsic motivation as a psychological correlate of flow with less elite athletes (Jackson et al., 1998).

6. *Appropriate Focus.* This dimension has been referred to as one of the most frequently mentioned flow dimensions (Csikzentmihalyi, 1990; Jackson, 1995) and, for this sample, was reported with similar frequency (17-40% of the time) compared to elite athletes' reports (Jackson, 1995). Within this sample, inappropriate focus was related to increases in worry linked to self or others. This reinforces the finding that attentional changes are closely associated with heightened competitive anxiety (Martens, Vealey, & Burton, 1990)

7. *Optimal environmental conditions.* While this dimension was reported across all three factors of flow, no optimal environmental conditions had the largest impact on disrupting flow in this sample of athletes, and was the single largest element in disrupting flow (40% of the athletes reporting). Therefore, considering the performance environment appears to be imperative for helping flow, and coaches and athletes would appear to benefit from attentional refocusing strategies and interventions prior to and during competition.

8. *Positive coach / team interaction.* Similar to Jackson's (1995) interview results, this dimension was reported as relevant across all three-flow factors. However, in this sample, coach interactions appeared to have a more salient effect on helping, preventing, and disrupting flow performance. This may have been due to a greater reliance on coach feedback and interaction, since these athletes were less-elite. Since recent research in team building (Ebbeck & Gibbons, 1998) has shown to be effective as an intervention, the use of team building to facilitate flow factors may be an area for future flow investigation.

9. *Optimal pre-competition preparation plan.* In the current study, this dimension contained the largest percentage of athletes reporting it as important in achieving flow (52%). This finding was consistent with Jackson's (1995) results (64% of athlete reporting this dimension) and supports the importance of well prepared pre-competitive plans. This finding also reinforces the importance of such mental training interventions such as arousal regulation and mental imagery in preparing for optimal performance.

Jackson (1995) found an experience factor as a dimension in helping flow that was not observed in any themes within this set of athletes. Thus, less elite athletes may not have sufficient experience to replicate flow based upon previous flow experiences.

When results of these inductive analyses were compared with previous work with elite athletes (Jackson, 1995, 1996) there was considerable similarity in responses. All general dimensions for helping, preventing, and disrupting flow found in elite athletes were found in this sample, except for a reported experience factor in helping flow and reported problems with pre-competitive preparation in preventing flow. This study supported previous conclusions on the importance of confidence and positive thinking in achieving flow (Jackson, 1992, 1995). Jackson and Roberts (1992) reported that task involvement and high-perceived ability were associated with frequency of flow, and their results confirm the importance of perceived ability in the confidence in an athletic context. Confidence and positive thinking was less reported (38%) in the current sample compared with elite athletes (64%), but was closely associated with other reported themes (e.g. attentional focus). In addition, the salience of confidence as an important theme supports findings that indicate a positive relationship between flow and perceived ability (Jackson, 1995; Jackson & Roberts, 1992; Jackson et al., 1998; Stein et al., 1995).

Perceived Controllability of Flow

One interesting finding from the qualitative analysis was the percentages of college athletes who perceived flow as controllable. The percentage of athletes reporting flow as a controllable state (64%) was less than previously indicated by elite athletes (79%; Jackson, 1995). Jackson (1995) reported that higher perceived controllability of flow was invariably related to higher skill levels in elite athletes and the overall percentage of perceived controllability of flow versus uncontrollability in this study supports the notion that flow is perceived as more controllable for elite versus non-elite populations. Similar patterns emerged in this study compared to elite athletes (Jackson, 1995) in that a majority of factors disrupting flow were seen as uncontrollable.

One limitation of this study was that only two variables (gender and sport type) were examined for their effect on FSS scores. A more meaningful examination of flow factors may necessitate a more comprehensive examination of both situational and personal factors and their ability to predict flow occurrence (Kimiceik & Stein, 1992). The correlations between FSS subscales and total FSS global scores indicate that transformation of time may be a less pertinent factor in flow occurrence and the low correlation for clear goals may have been affected by the larger number of team sport athletes (28) compared to individual sport athletes (14). For team athletes, individual goals may be less relevant to individual flow occurrence

compared to individual sport athletes' performance (Kimiecik & Stein, 1992). Future studies that examine flow should investigate less-elite athletes to determine whether flow can be experienced in these populations. In addition, future studies should continue to examine the complex nature of flow by systematically comparing various methods of inferring flow.

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