Flow in a Team Sport Setting: Does Cohesion Matter?

Angus L. Mugford

IMG Mental Conditioning

L. Keith Tennant

University of Kansas

Date of Submission: February 1, 2005

Address Correspondence to Angus Mugford Ph.D.,

IMG Mental Conditioning, 5500 34th Street West,

Bradenton, FL 34210, United States of America.

Telephone: (941) 752-2437

Fax: (941) 752-2637

Email: amugford@imgworld.com

Abstract

The purpose of this study was to explore the relationship between the type and level of cohesion in competitive rowers and the interaction these characteristics may have with 'flow state'. The study utilized a cross sectional survey design with 121 Collegiate Division I rowers, who upon informed consent, voluntarily participated by completing the Group Environment Questionnaire (Carron, Brawley, & Widmeyer, 2002) and the Flow State Scale-2 (Jackson & Eklund, 2003). It was hypothesized that task and social cohesion would be positively associated with flow state. Overall, global flow and total cohesion yielded a statistically significant positive correlation (r=.34). Even though both social and task cohesion were significantly and positively associated with flow state, task cohesion produced significantly stronger positive relationships with flow subdimensions, specifically autotelic experience (r=.47), unambiguous feedback (r=.32) and paradox of control (r=.27). Rowers were in effect more likely to achieve a flow state through positive task cohesion rather than by having positive social characteristics.

The positive experiential state of 'flow', coined by Mihalyi Csikszentmihalyi, has received an increasing amount of attention in sport psychology research. Given the subjective nature of the flow experience, measuring and researching flow has been a difficult process, although as a global construct is defined as "the state in which people are so involved in an activity that nothing else seems to matter" (Csikszentmihalyi, 1990, p. 4). Anecdotal evidence strongly ties optimal and elite performances with flow. This connection has been further reinforced by Jackson and Roberts (1992) who suggested that athletes experience high levels of flow during their best performance. However, the focus and perspective of flow research has been on the individual subjective perception in individual and group pursuits with little identification or research into the phenomenon of flow exhibited and experienced in groups (Cosma, 1999; Jackson & Eklund, 2003).

Probably the greatest threat to the study of flow revolves around the difficulty of operationalizing the experience and providing sound construct validity. A major challenge has been the problem of assessing 'flow state' *in vivo* or *ex post facto*. Self assessment during the flow experience disrupts the experience itself, and is not conducive to flow in an athletic event. Development of the the Experience Sampling Method (Csikszentmihalyi & Larson, 1987) enabled researchers to sample time periods and obtain qualitative descriptions of the behavior and experience from a subject, but this is simply not appropriate for most sport settings. Jackson's development of the Flow State Scale (Jackson & Marsh, 1996) was tailored specifically to counter this intrusion relying instead on retrospective recall of the experience with a 36-item, 9 dimension inventory. Defining flow this way should lead to caution given the inherently subjective and qualitative nature (Csikszentmihalyi, 1992). The FSS has enabled researchers to understand and develop support for the efficacy of employing intervention strategies (Pates, Cummings & Maynard, 2002; Pates & Maynard, 2000) and should acknowledge its limitations, but not sacrifice the benefits of utilizing such data.

Given the focus on individual attributions and perceptions regarding each subjective experience of flow, minimal research has addressed flow as it is experienced in a team setting, shared among team members. It should be stressed that normative data collected for the Flow State Scale (FSS: Jackson & Marsh, 1996; FSS-2: Jackson & Eklund, 2003) and Dispositional Flow Scale (DFS: Jackson & Eklund, 2003) and the qualitative data used to develop this model in a sport setting (Jackson, 1992, 1995) was from a mix of team and individual sport athletes, but consistently utilizing an individual perspective. The few studies that have examined the team setting specifically, have found support indicating that flow is experienced by teams (Cosma, 1999) and that flow is higher in team athletes that feel more connected with each other (Kowal & Fortier, 1999). There remains a substantial gap in knowledge about flow as it relates to team members and the influence of flow on the performance and cohesive properties of teams.

Much of the recent research on cohesion is within the framework of the conceptual model proposed by Widmeyer, Brawley, & Carron (1985), who define cohesion as “a dynamic process which is reflected in the tendency for a group to stick together and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of member affective needs” (Carron, Brawley, & Widmeyer, 1998, p. 213). Their conceptual model incorporated and distinguished between ones attraction to the group, and the perception of how well the group was integrated, and also the social and task integration of the group. This framework was the foundation for the Group in Environment Questionnaire, or GEQ.

Although there is no existing published research addressing cohesion and its influence on flow state, there is an abundance of research regarding the influence of cohesion on group performance. Carron, Colman, Wheeler, and Stevens' (2002) meta-analysis summarized research on the performance-cohesion relationship in sport and found from 164 overall effect sizes that there was a significant moderate to large relationship ($ES = .66$, $p < .05$). The mechanisms underlying the impressive effect sizes reported by Carron et al. (2002) supported the idea that positive interactions within groups facilitated increased performance. For example, classic social psychology research showed group norms established for group performance (or productivity) were highly influential to the outcome (Schachter, Ellertson, McBride, & Gregory, 1951). Findings from the Schachter et al. (1951) study demonstrated that cohesive groups were significantly more affected by positive or negative statements for productivity. Thus, although a group might have high cohesion, it might display lower productivity than a group with low cohesion. To achieve best results, a highly cohesive team should establish positive norms for high productivity. Although athletes and teams do not spend much time in a flow state, can a team set positive norms that are a foundation to facilitate a flow experience? If so, can this be done individually or collectively? Although many such questions arise, it was not the purpose of the current study to establish a causal model of cohesion and flow state, but to identify the strength and direction of any relationship and ascertain supportive interview and subjective assessment of the experience of rowers.

The success of highly functional teams is evident in a wide variety of sports, from the Chicago Bulls professional basketball team of the 1990's, to the USA Olympic hockey team of 1980. Cosma (1999) demonstrated through qualitative and quantitative inquiry that soccer teams perceived a 'team flow' experience and this positively influenced team performance. As spectators or even participants, can team 'synergy' or 'momentum' be analogous to a team flow experience? An anecdotal example that eloquently described this relationship between cohesion and high team functioning was expressed by retired French soccer legend, Eric Cantona in his autobiography (Cantona & Fynn, 1996):

> The secret of football, and of team performance is harmony. True harmony is equivalent to perfection, to beauty. Think of the movement of a champion gymnast, or the perfect synchrony of a whole symphony orchestra playing together. Harmony can be everywhere: in music, in the mind and the body, in a football team's will to succeed; and it's the perfect understanding, this combining of forces that makes winning possible. Harmony in a team means everybody playing together and thinking as one. (p. 33)

This quote was also identified by Carron et al. (2002) as an excellent example of group cohesion, however there seems to be more in the description than cohesion describes since there seems to be an element of flow or high functioning that interrelates with cohesion. The description Cantona et al. used to express team harmony certainly seems to portray the importance of cohesion, that to be in harmony is to be playing together; however there also seems to be characteristics of flow in his description. Could harmony of the mind and the body suggest ‘action and awareness merging’, that a team's will to succeed and perfect understanding could be the ‘clear goals’ and ‘unambiguous feedback’ that play critical roles. Above all, it seems that this harmony, perfection and beauty describe an autotelic experience that is highly rewarding and enjoyable in its own right. This experience does not seem to be limited to sport, as experiences may be found in music (Steinhardt, 1998) and acting (Martin & Cutler, 2002) literature.

Despite such anecdotal evidence, there has been minimal research examining flow experienced by teams (Cosma, 1999; Kowal & Fortier, 2000), which has prompted this interest and recent inquiry. What would be the ramifications for facilitating team flow experience? How can this be done if it is a difficult state to capture in individuals? Of the existing studies that investigated flow in teams, there have been promising findings. Kowal & Fortier (1999) found that swimmers who felt connected to their teammates reported high instances of flow. Cosma (1999) looked specifically at the possibility that teams can experience a flow state, defined as, "a balance of skills and challenges which leads a team to successful attainment of their task with an autotelic experience" (p. v). Using a sample of five soccer teams (N= 104) and an adapted form of the FSS (Jackson & Marsh, 1996), Cosma's findings strongly supported the contention that soccer teams do experience flow and in a similar way as elite and recreational individual athletes. Additional findings demonstrated that the more playing time a team member had, the better the chance for the team to flow and it was also found that rather than experiencing 'team flow' in a fluctuating pattern over the duration of a game, flow was experienced consistently or constantly over the period.

Given the complexity of interactive team sports versus coactive and individual events, it seems extremely challenging for an athlete to achieve flow and for a team to collectively achieve flow. While flow seems to be the criterion variable in this investigation, it is the dynamic of cohesion between team members that might be of critical importance to the shared experience on the team which is the crux of the investigation. Therefore, the principal purpose of this study was to investigate the relationship between the type and level of cohesion in competitive rowers and the dimensions and degree of flow experienced by team members.

First it was hypothesized that there is a statistically significant positive relationship between the levels of 'task cohesion' and 'flow' subdimensions would be experienced by all crew members, and secondly, a statistically significant positive relationship between the level of 'social cohesion' and 'flow' subdimensions experienced by all crew members.

While there is evidence supporting the existence of flow experienced by team sport athletes (Cosma, 1999; Jackson, 1992, 1995), very little is known about the influence of team dynamics on the flow experience. Qualitative data has suggested that the interaction among teammates help individuals attain flow (Jackson, 1996) although it is uncertain how important this relationship is, it has also been supported that there is a 'team flow' experience (Cosma, 1999). Extensive research literature investigating the nature and influence of team cohesion has posited that task cohesion is positively related to performance success with an effect size of .509 and social cohesion and performance of .603 (Carron, Colman, Wheeler, & Stevens, 2002). This study examined task cohesion and flow state to determine the strength and nature of any relationship.

Methodology

The study utilized a cross-sectional survey design, each participant from a convenience sample of NCAA Division I rowing crews across a single period of data collection. It was with the consideration of ecological validity that existing rowing teams were used in this context however, it was acknowledged that the lack of a random sampling plan was a limitation.

Participants

Five Collegiate Division I female rowing teams (N = 121) were selected based on their participation in four mid-western regattas proximal to the researcher. With approval from the Human Subjects Committee, permission to gain access to rowing team members was achieved by contacting coaching staffs in advance of their arrival at the scheduled regatta. During this initial contact, the researcher took care to explain the purpose of the study and the nature and depth of commitment that would be required from voluntary participants. Based on granted access, the pools of athletes were provided an informed consent form and voluntary participants completed the FSS-2, and the GEQ. Despite a large traveling squad size, rowers were asked to consider their team as consisting only of the crew in the boat that they compete.

Rowing had an intuitive advantage over other team sports like basketball and volleyball, because the task was self-paced and the conditions of group interaction were more heavily controlled by the environment than many other sports. For example, there were no substitutions once the team performance had begun, there was a clear goal (to race the fastest time over the course), and unambiguous feedback to the crew members when cohesion levels were high or low (the oar blades hit the water at different times and the boat pace is slowed). There were no exclusion criteria based on full completion of the inventories.

Procedures

Prior communication was established between the primary researcher and the coaching staff of 5 mid-western NCAA Division I rowing squads. This attempt was initiated with dialogue to inform the coaching staff about the potential benefits of the research and what involvement would be required of the team. Once questions from the staff were addressed, the researcher met with the coaches at the regatta to discuss and prepare for administration of the inventories. The researcher addressed team members to provide instructions and gain informed consent approximately 30-45 minutes after the final race at the regatta site. They were each provided with a statement of informed consent, with assurances of confidentiality in regards to the information that they provided. Through a pilot study, it was decided that the most appropriate course of action was that after the team members were addressed by the researcher they were given an inventory (informed consent form, the FSS-2, GEQ and Performance Information

Form) on their journey home which varied from 'bus only' to 'bus and airplane'. This procedure was preferred by the coaching staff of each program and they each administered the inventories. Completion of the inventories took approximately 10 – 20 mins and was collected upon arrival at the terminal destination. At this point, the inventories were returned to the researcher in a prepaid envelope. The duration of time between competition and completing the inventory ranged from approximately 1 - 12 hrs since each squad was a 'visiting' team and had to travel a long distance from the venue.

This procedure differed slightly from similar research study protocols using the GEQ (Kozub & Button, 2000) and FSS-2 (Jackson & Eklund, 2003), that administered the tests immediately after respondents participated in their main activity. While research indicated that performance outcome influenced cohesion on task dimensions, pilot data suggested there were no statistically significant difference between GEQ dimensions taken after a practice session that was 48 hrs pre/post competitions as recommended by Terry, Carron, Pink, Lane, Jones, and Hall (2000). The logistical aspects of this data collection procedure were considered to outweigh the ideal administration on-site and under the direct supervision of the researcher.

Analysis of Data

In this investigation, the data obtained from the sample were analyzed using a simple Pearson Product-Moment Correlation coefficient (r). This measured the covariance of flow and cohesion dimensions, with an alpha (a priori) level of significance set at p <.05. Some specific comparisons were also analyzed between correlation coefficients both within a single sample using Hotelling's formula (Glasnapp & Poggio, 1985).

Results

Psychometric Properties

The overall alpha coefficients were very high for both the GEQ, .90, and the FSS-2, .94. Since both the GEQ and FSS-2 were comprised of multiple subdimensions, factor analyses were used to determine the number of factors observed in the data. Using a principal component analysis, there appeared to be one main component in each of these inventories. This was determined by observing the eigenvalues, scree plots and the interpretability of the factor solution. All four subdimensions of the GEQ heavily loaded onto one factor (ATG-S, .80; ATG-T, .83; GI-S, 81; GI-T, .82), which was interpreted as an overall measure of cohesion. As for the FSS, eight of the nine subdimensions loaded heavily onto one factor (CS, .80; AA, .73; CG, 67; UF, .79; CT, .74; PC, .80; LSC, .62; AE, .75) with the remaining dimension, transformation of time, loading very weakly (TT, .22). This is consistent with the literature, as Jackson & Eklund (2002) recommend excluding the time transformation scores from the global flow score due to its inconsistent and weak relationship with a higher order flow latent variable. This supports the contention that the factor found here is global flow. A second factor was also found, but only loaded transformation of time (TT, .80), loss of self consciousness (LSC, .44) and action awareness merging (AA, .32). It was unclear from this early data extraction what latent factor this accounted for and with an eigenvalue of 1.1, the stronger single factor model was given credence due to the literature support and parsimonious interpretability. The results are discussed in relation to each the 4-factor model of cohesion and 9-factor model of flow state. However, total cohesion and global flow factors were given particular focus due to the factor loading from this sample.

Cohesion and Flow State

Data from the GEQ and FSS-2 were calculated using Pearson Product Moment Correlation Coefficients. The descriptive statistics, as displayed in Table 1, indicated that mean scores for cohesion were higher than normative data for all subdimensions of cohesion, perhaps lending support to the choice of rowing for this research. Indeed, all cohesion subdimensions were scored significantly higher than the normative data (ATG-S: t (117) = 3.40, p = .000; ATG-T: t (117) = 6.13, p = .000; GI-S: t (117) = 2.56, p = .012; GI-T: t (117) = 4.64, p = .000) as did overall cohesion (t (117) = 5.03, p = .000). Of the flow dimensions, 5 of the 9 subdimensions and global flow had higher mean scores than the normative data, with challenge skill balance (CS: t (120) = 6.48, p = .000), clear goals (CG: t (120) = 9.63, p = .000) and concentration on task (CT: t = 5.87, p = .000) significantly higher than the population. Interestingly, of the four sample means that were lower than the normative data, unambiguous feedback (UF: t (120) = -2.88, p = .005) and loss of self-consciousness (CG: t (120) = -3.90, p = .000) were both significantly lower than the Jackson & Eklund (2002) data. These should be interpreted with some caution because the normative data were based on samples of male and female team sport athletes (N = 175) from international, national, school, and club involvement for 13 different sports. GEQ normative data was also based on a cross section of team sports from municipal, university, industrial, and Olympic levels, however this was further delimited to 23 different female sports (N = 197).

Table 1.

Descriptive Statistics for the Overall Sample Compared to Normative Data for the GEQ (Carron, Brawley, & Widmeyer 2002) and the FSS-2 (Jackson & Eklund, 2003).

Subdimension	Norm Data		Overall	
	M	SD	M	SD
		GEQ Scores		
ATG-S	31.10	(6.82)	33.90	(8.91)
ATG-T	26.49	(6.56)	29.98	(6.16)
GI-S	20.91	(6.40)	22.49	(6.76)
GI-T	31.93	(6.96)	34.96	(7.06)
Social	52.01	-	56.38	(14.21)
Task	58.42	-	64.94	(12.20)
Cohesion	110.43	-	121.32	(23.43)
		FSS Scores		
CS	3.75	(0.70)	4.16	(0.70)
AA	3.67	(0.77)	3.70	(0.84)
CG	3.98	(0.65)	4.50	(0.59)
UF	3.91	(0.57)	3.71	(0.74)
CT	3.75	(0.84)	4.15	(0.75)
PC	3.66	(0.73)	3.65	(0.87)
LSC	3.59	(0.83)	3.22	(1.01)
TT	3.46	(0.82)	3.37	(0.92)
AE	3.73	(1.03)	3.91	(1.15)
Global	3.72	(0.56)	3.82	(0.57)

Note: ATG-S (Attraction to Group-Social); ATG-T (Attraction to Group-Task); GI-S (Group Integration-Social); GI-T (Group Integration-Task); CS (Challenge Skill Balance); AA (Action Awareness Merging); CG (Clear Goals); UF (Unambiguous Feedback); CT (Concentration on Task); PC (Paradox of Control); LSC (Loss of Self-Consciousness); TT (Transformation of Time); AE (Autotelic Experience)

The correlational data in this overall sample yielded 18 statistically significant positive correlations between the 4 cohesion and 9 flow subdimensions (out of a possible 40), as observed in Table 2. Additional scales that compiled task (ATG-T and GI-T) and social (ATG-S and GI-S) dimensions and an overall cohesion and global flow score were also entered into the correlation matrix. Of these interactions, 16 of a possible 30 were statistically significant. Of all correlations (70), 21 of these were significant at the .01 level and above .30. Particularly strong were the relationships between task cohesive dimensions and the flow dimensions autotelic experience (r = .47), unambiguous feedback (r = .32) and global flow (r = .38). Individuals rating their attraction to the social aspect of the group (ATG-S) provided a significant positive relationship in five flow dimensions, specifically challenge skill balance (r = .23), unambiguous feedback (r = .19), loss of self-consciousness (r = .19), autotelic experience (r = .26) and overall, global flow state (r = .24).

To examine if there were differences between social and task cohesion dimensions Hotelling's formula (Glasnapp & Poggio, 1985) provided a way to test within-sample differences for 2 correlation coefficients. Here it was interesting to note that there was a significant difference between the social and task cohesion for 3 of the 9 flow subdimensions, specifically, unambiguous feedback (t (114) = 2.00, p = .048), paradox of control (t (114) = 1.99, p = .049) and autotelic experience (t (114) = 2.76, p = .007) and that task cohesion was significantly higher in each case. This suggested while limited, the relationship between cohesion and flow was not only stronger in task rather than social cohesion, but statistically significant in a few subscales of flow in competitive rowers. It should not be overlooked that global flow was significantly related to social (.225), task (.381) and overall cohesion (.335), but that this relationship was greater with task cohesion.

Table 2.

Correlations Between the Cohesion (GEQ) and Flow Dimensions (FSS-2) of the Overall Sample (N = 117).

	FSS-2									
GEQ	CS	AA	CG	UF	CT	PC	LSC	TT	AE	Global
ATG-S	.23*	.12	.11	.19*	.12	.08	.19*	.12	.26**	.24**
ATG-T	.30**	.12	.14	.32**	.16	.28**	.20*	.17	.44**	.37**
GI-S	.17	.09	-.02	.08	-.05	.11	.10	.14	.22*	.15
GI-T	.29**	.09	.22*	.27**	.18	.22*	.13	.12	.44**	.34**
Social	.22*	.12	.06	.16	.05	.10	.17	.14	.26*	.23*
Task	.32**	.11	.20*	.32**	.19*	.27**	.17	.16	.47**	.38**
Total	.30**	.13	.14	.26**	.13	.20*	.19*	.16	.41**	.34**

Note: ATG-S (Attraction to Group-Social); ATG-T (Attraction to Group-Task); GI-S (Group Integration-Social); GI-T (Group Integration-Task); CS (Challenge Skill Balance); AA (Action Awareness Merging); CG (Clear Goals); UF (Unambiguous Feedback); CT (Concentration on Task); PC (Paradox of Control); LSC (Loss of Self-Consciousness); TT (Transformation of Time); AE (Autotelic Experience)

* $p < .05$ (2-tailed) ** $p < .01$ (2-tailed)

Discussion

The relationship between global flow and total cohesion score yielded a strong positive correlation of .34 which sets the tone for the discussion. Indeed, global flow score was both statistically significant and positively related to social (r = .23) and task (r = .38) cohesion. This overall result provides a basis to support the research hypotheses, within rowing crews, that there was a significant relationship where high cohesion was positively associated with high flow state. While these are global scores, a breakdown into the subdimensions of cohesion and flow revealed more specific and interesting dimensions.

The concept of task cohesion is the integration or personal involvement with the group's task, productivity, goals and objectives, and overall bonding within the team around the group's task. It was hypothesized that this sense of bonding for completion of the task would be important in achieving a flow state, especially in a coactive sport where the sum and synchronicity of individual parts are key to the overall performance of the team. The findings from this study revealed that the overall sample had many significant correlations between task cohesion and flow state. Indeed, significant correlations with high task cohesion included 6 of the 9 subdimensions, with the highest being 'autotelic experience'(r = .47), subsequently, 'unambiguous feedback' (r = .32), 'challenge skill balance' (r = .32) and 'paradox of control' (r = .27), two further flow subdimensions, 'clear goals' (r = .20) and 'concentration on task' (r = .19) yielded weaker, yet significant correlations. Overall global flow produced a strong positive relationship for a psychological construct, with task cohesion (r = .38). These relationships indicate that if crew members rated their perceptions of task cohesion as being high, either through their personal attraction to the crew or perception of how well the crew performed their task together, they were more likely to report a high flow state. This flow state was particularly expressed through enjoyment of the task itself, understanding and interpreting feedback that they were doing well, and achieving their task goals, knowing that they had the skill to cope with the demand of the situation and a sense of automaticity and control over their performance. This was corroborated through interviews with crew members who consistently identified the importance of synchronization with each other, how important it was to gain feedback about their team performance, and how enjoyable it was when these factors occurred successfully. The following quote is an excellent and fairly typical example of this experience from a varsity rower of a 4-person crew that lost:

> In the boat it feels like I can hear the water, and the sound of the oars and I can feel myself pulling hard. I can see everyone doing it…that's what I think about. You can feel the swing. You can feel it going back and forth, that's really important. The moment it all comes together in a rhythm is just the best feeling in the world. When it's not together the boat really struggles and you strain to get that rhythm back.

The identification of unambiguous feedback (visual, auditory, and kinesthetic), task group integration ('seeing everyone doing it') and autotelic experience ('best feeling in the world') were very illustrative of the experience and how these were exhibited in rowing. It might seem obvious there is some direct overlap between the flow dimensions and the properties of the group. For example, between unambiguous feedback that directly related to the task synchronization of group members and autotelic experience from the group task synchronization. Correlational data support there was a relationship, but interview data also supported the interrelatedness of flow and cohesion dimensions make this high correlation logical. Could one posit there are features of team flow that are different from individual flow? With the example of rowing, might the difference between individual and team flow be a result of the cohesive and dynamic properties? Structural Equation Modeling could help identify the interaction and strength of relationships between flow state and cohesion subdimensions into an overall model of team harmony.

The concept of social cohesion is the integration or personal involvement with the social interactions within the group, and overall bonding within the team as a social unit. It was hypothesized that this sense of social bonding would be important in achieving a flow state, especially in an interactive sport where the sum and synchronicity of individual parts was key to the overall performance of the team. Carron et al. (2002) reported an even greater effect size between social cohesion and performance than with task cohesion, however, the findings from this study showed that the overall sample had fewer significant correlations between social cohesion and flow state than with task cohesion. Indeed, 4 of the 9 subdimensions were significant at .05, with the highest again, ‘autotelic experience’ (r = .26), ‘challenge skill balance’ (r = .23), ‘unambiguous feedback’ (r = .19) and ‘loss of self-consciousness’ (r = .19). Overall, global flow was also significantly and positively related to social cohesion (r = .24), which further supports the relationship depicted with task cohesion. It does seem as though the greater strength of the task cohesion and flow state relationship not only makes intuitive sense, but was supported by the research of Lenk (1969). This specifically emphasized the importance of task over social cohesion in the sport of rowing, where a crew became world and Olympic champions despite having a great deal of social conflict among the crew.

Further evidence of this difference between social and task cohesion was demonstrated in the current investigation where statistically significant differences were found between social and task cohesion across three different relationships with flow, specifically unambiguous feedback, paradox of control, and autotelic experience. What does this mean? Even though both social and task cohesion was significantly and positively associated with flow state, task cohesion produced significantly stronger positive relationships between these three flow subdimensions than was achieved with social cohesion criteria. Rowers in effect were more likely to achieve a flow state through positive task cohesion than by having positive social characteristics.

In view of the discussion based on the relationship between flow and cohesion, a conceptual model of 'team harmony' is in the process of being developed and further research in this area is highly advocated. Both research from the flow discipline and also from the field of team cohesion have an important part to play in understanding more about the complex and dynamic properties that are involved in this highly functioning group process. Use of a mixed model design certainly provides a greater ability to observe not only the qualitative descriptions of the experience and dynamics, but empirical support to help gain a broader perspective that result from constructing models and testing theory.

It is clear that flow research is relatively young in the field of sport. The lack of focus on team flow and the influence of group dynamics on the flow experience are startling. However, this presents a host of research opportunities that are exciting and beginning to be undertaken by academics in sport psychology. Rowing has provided a rich source of information that controls for environmental influence such as the lack of time out intervals, substitutions or random confounds from open skill play. The performance task is self-paced and the process interactive in nature. The skill of the opposition and officiating of referees had minimal impact on the performers which is of much greater concern when conducting research in open skill team sports such as soccer or hockey. However, other team sports provide great ecologically valid examples of highly functioning teams that appear to experience 'team flow'. How might these experiences differ? Division I level athletes provide insight into high level athletics, but what about other levels of competition? How would gender influence the relationship between cohesion and flow? Youth sports, recreational performers, even elite and professional performers? Given the difficult nature of some of these open skill environment sports and varying skill levels and motivational differences, qualitative research methods might provide more useful information and provide avenues for creative quantitative paradigms.

Limitations of the Study

At the outset of this study a great deal of acknowledgment was made toward undertaking a primarily quantitative study of flow and cohesion, each a theoretical abstract concept. In particular, attempting to discuss and observe flow as an unstable and transient experiential state that may or may not have occurred in a cross sectional survey designed study. However, based on the support of research literature and acceptable psychometric properties of the GEQ and FSS-2 these limitations were acknowledged.

The benefit of hindsight after the collection and analysis of data provides an opportunity to share practical recommendations for those undertaking a similar protocol. The ability to access participants immediately postperformance was desirable, although provisions for administering the inventories were left to some potential sources of bias and error. Each participant completed the questionnaire on their journey home under the guidance or lack of guidance of the coaching staff. Instructions outlining a protocol were designed to be flexible within a 12 hr period so that administration was as convenient as possible for the participants and coaching staff who acted as test administrators. This lack of consistency between teams could have resulted in significant differences between groups, as would the influence of group members monitoring how they were scoring each other's perception of cohesion or experience of flow.

Implications for Applied Sport Psychology

The idea that flow can be switched on and off at will is highly unrealistic for the vast majority of individuals, however, it seems that some athletes may display a greater degree of control over this state than others, such as elite martial artists. However, a criticism of flow research is that most athletes rarely enter this state of optimal functioning, so why focus on something that is a rare and highly complex experiential state? Existing flow research in sport has helped establish greater understanding of this phenomenon and attempted to offer coaches and performers practical recommendations to facilitate a flow experience (Jackson & Csikszentmihalyi, 1999; Pates, Cummings & Maynard, 2002). The complexity increases markedly for a team activity, but greater understanding may provide the opportunity for flow through psychological skills training that includes process goal setting, awareness control and utilization, concentration training, visualization, relaxation control and enjoyment. Indeed the additional perspective of cohesion as a strongly related construct can facilitate work undertaken to increase group integration and individual attraction to task cohesion.

Conclusion

This investigation supports the hypothesis that there is a strong, positive relationship between flow and cohesion in the team sport of rowing. Flow experienced in a team setting appears to hold the same properties as an individual flow state (Jackson, 1992; 1995) however; the present findings provided interview data to suggest that the group dynamics of the rowing crew have a critical role in the achievement and experience of flow as a team.

There is a great deal that is not fully understood about the concept of flow, particularly in a team setting. This investigation has only added to the questions and need to undertake further research in this fascinating, complex, and enjoyable phenomenon.

References

Cantona, E., & Fynn, A. (1996). *Cantona on Cantona* (p. 30). London: Deutsch.

Carron, A. V., Brawley, L. R., & Widmeyer, W. N. (1998). The measurement of cohesiveness in sport groups. In J. L. Duda (Ed.), *Advances in sport and exercise psychology measurement* (pp. 213-226). Morgantown, WV: Fitness Information Technology, Inc.

Carron, A. V., Brawley, L. N., & Widmeyer, W. N. (2002). *The Group Environment Questionnaire: Test Manual.* Morgantown, WV: Fitness Information Technology, Inc.

Carron, A. V., Colman, M. M., Wheeler, L., & Stevens, D. (2002). Cohesion and performance in sport: A meta-analysis. *Journal of Sport & Exercise Psychology, 24* (2), 168-188.

Cosma, J. (1999). *Flow in teams.* Unpublished doctoral dissertation, University of Illinois, Chicago.

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience.* New York: Harper Collins Publishers.

Csikszentmihalyi, M. (1992). A response to the Kimiecik and Stein and Jackson papers. *Journal of Applied Sport Psychology, 4,* 181-183.

Csikszentmihalyi, M., & Larson, R. (1987). Validity and reliability of the experience sampling method. *Journal of Nervous and Mental Disease, 179* (9), 526-536.

Glasnapp, D. R., & Poggio, J. P. (1985). *Essentials for statistical analysis for the behavioral sciences.* Columbus: Charles E. Merrill.

Jackson, S. A. (1992). Athletes in flow: A qualitative investigation of flow states in elite figure skaters. *Journal of Applied Sport Psychology, 4,* 161-180.

Jackson, S. A. (1995). Factors influencing the occurrence of flow state in elite athletes. *Journal of Applied Sport Psychology, 7,* 138-166.

Jackson, S. A. (1996). Toward a conceptual understanding of the flow experience in elite athletes. *Research Quarterly for Exercise and Sport*, *67* (1), 76-90.

Jackson, S. A., & Csikszentmihalyi, M. (1999). *Flow in Sports.* Champaign, IL: Human Kinetics.

Jackson, S. A., & Eklund, R. C. (2003). Assessing flow in physical activity: The Flow State Scale-2 and Dispositional Flow Scale-2. *Journal of Sport & Exercise Psychology, 24* (2), 133-150.

Jackson, S. A., & Marsh, H. W. (1996). Development and validation of a scale to measure optimal experience: The Flow State Scale. *Journal of Sport & Exercise, 18,* 17-35.

Jackson, S. A., & Roberts, G. C. (1992). Positive performance states of athletes: Toward a conceptual understanding of peak performance. *The Sport Psychologist, 6,* 156-171.

Johnson, S. (2004). *Mind wide open: Your brain and the neuroscience of everyday life*. New York: Scribner.

Kowal, J., & Fortier, M. S. (1999). Testing relationships from the hierarchical model of intrinsic and extrinsic motivation using flow as a motivational consequence. *Research Quarterly for Exercise & Sport, 71* (2), 171-181.

Kozub, S. A., & Button, C. J. (2000). The influence of a competitive outcome of perceptions of cohesion in rugby and swimming teams. *International Journal of Sport Psychology, 31,* 82-95.

Lenk, H. (1969). Top performance despite internal conflict: An antithesis to a functionalistic proposition. In J. W. Loy & G. S. Kenyon (Eds.), *Sport, culture and society: A reader on the sociology of sport* (pp. 393-396). Toronto: Collier-Macmillan.

Martin, J. J., & Cutler, K. (2002). An exploratory study of flow and motivation in theater actors. *Journal of Applied Sport Psychology, 14* (4), 344-352.

Pates, J., Cummings, A., & Maynard, I. (2002). The effects of hypnosis on flow states and three-point shooting performance in basketball players. *The Sport Psychologist, 16* (1), 34-47.

Pates, J., & Maynard, I. (2000). Effects of hypnosis on flow states and golf performance. *Perceptual and Motor Skills, 91* (3:2), 1057-1075.

Schachter, S., Ellertson, N., McBride, D., & Gregory, D. (1951). An experimental study of cohesiveness and productivity. *Human Relations, 4,* 123-138.

Steinhardt, A.(1998). *Indivisible by four: A string quartet in pursuit of harmony*. New York: Farrar Straus Giroux.

Terry, P. C., Carron, A. V., Pink, M. J., Lane, A. M., Jones, G. J. W., & Hall, M. P. (2000). Perceptions of group cohesion and mood in sport teams. *Group Dynamics: Theory, Research and Practice, 4* (3), 244-253.

Walker, J. T. (2002). *Exploring the influence of the individual's ability to experience flow while participating in a group dependent activity on the individual's satisfaction with the group's performance.* Unpublished doctoral dissertation, Clemson University.

Widmeyer, W. N., Brawley, L. R., & Carron, A. V. (1985). *The measurement of cohesion in sports teams: The Group Environment Questionnaire.* London, Ontario: Sports Dynamics.