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Dispositional Flow State among Open Skill Athletes: A Predictor and Quantification of Sport Performance

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Abstract

The present study was aimed to identify the role of Dispositional Flow Scale-2 (DFS-2) among open skill athletes. In order to achieve the objective of the study, Sixty (N=60) male university level open skill athletes of 19 to 25 years of age were selected to act as a subject. A prior consent was sought from all the subjects after being informed about the objective and protocol of a study. The sixty (N=60) subjects were segregated into three groups i.e. N_1= 20 Basketball, N_2=20 Handball, N_3=20 Football. To measure the level of Flow of the subjects, the Dispositional Flow Scale-2 (DFS-2) Questionnaire constructed by Jackson and Eklund (2004) was administered. One way Analysis of Variance (ANOVA) was employed to compare various sports groups i.e. open skill athletes. Where 'F' values were found significant, LSD (Least Significant Difference) Post-hoc test was applied to find out the direction and degree of differences. For testing the hypothesis, the level of significance was set at 0.05. Significant differences were found among various sport groups (basketball, handball, and football) on the sub-variables of DFS-2 i.e. unambiguous feedback, sense of control, loss of self-consciousness and overall dispositional flow scale-2. However, no significant differences were found on the sub-variables of DFS-2 i.e. challenge-skill balance, action-awareness merging, clear goals, concentration on the task at hand, transformation of time and autotelic experience.

Keywords*:* Dispositional Flow Scale-2 (DFS-2), Open Skill Athletes, Performance

Introduction

Understanding the psychological factors that accompany successful athletic performance is a high priority for applied sport psychology, with a major area of focus being mental links to optimal performance. To advance knowledge in this area, it is important to examine specific psychological constructs with theoretical relevance to optimal performance in order to understand what psychological processes might be contributing to the quality of performance. The first and primary construct examined was flow.

Flow is an optimal psychological state that occurs when there is a balance between perceived challenges and skills in an activity (Csikszentmihalyi, 1990). It is a state of concentration so focused that it amounts to absolute absorption in an act concentration so focused that it amounts to absolute absorption in an activity. Research on flow in sport and exercise has increased in recent years (e.g., Jackson, 1992; 1995; 1996; Jackson, Kimiecik, Ford, & Marsh, 1998; Jackson & Marsh, 1996; Kimiecik & Stein, 1992) encouraged the application of flow theory to physical activity settings. Based on their respective research findings, Jackson and Csikszentmihalyi (1999) have recently written a book describing flow in sport and how to attain this optimal mental state. Knowledge of factors associated with the attainment of flow is an important goal for those interested in the quality of athletes' experience and performance in competition.

Theoretically, flow, as an optimal mental state, would be expected to be associated with optimal athletic performance as well as providing an optimal experience. Flow is generally viewed as a peak performance state, and there is some support for this assumption (e.g., Jackson & Roberts, 1992; McInman & Grove, 1991). Jackson et al. (1998) have suggested that experiencing flow states frequently when involved in a specific activity promotes the desire to perform the activity for its own sake. In other words, the activity becomes autotelic (Csikszentmihalyi, 1975, 1990) that is, the reasons for participation are grounded in the process of involvement in the activity and not in attaining goals that are external to the activity. It appears that attaining flow during exercise may promote intrinsic motivation, which, in turn, has been shown to enhance persistence in participation (Ryan et al., 1997).

In contrast to the Jackson (1996) and Sugiyama and Inomata (2005) studies, Young investigated a sample that was gender and sport specific. Compared to the other samples, lower scoring on eight out of nine flow dimensions for elite tennis athletes could indicate that specific performance or situational demands, or a combination of both, influence the experience of flow. Young (2000) concluded that flow in tennis is an unstable and volatile state. The results of the Jackson (1996), Young (2000), and Sugiyama and Inomata (2005) studies have provided some evidence for the general importance of some flow dimensions. More research needs to be conducted that aims to detect similarities and differences in flow between sports with contrasting task characteristics. These findings would be valuable to develop sport-specific interventions that aim to increase critical flow dimensions to enhance flow state.

Material and Methods

Participants

For this purpose, Sixty (N=60) male university level open skill athletes of 19 to 25 years were selected to act as a subject. A prior consent was sought from all the subjects after being informed about the objective and protocol of a study. The sixty (N=60) subjects were segregated into three groups i.e. N_1= 20 Basketball, N_2=20 Handball, N_3= 20 Football.

Procedures

To measure the level of Flow of the subjects, the Dispositional Flow Scale-2 (DFS-2) Questionnaire constructed by Jackson & Eklund (2004) was administered.

Statistical Analysis

One way Analysis of Variance (ANOVA) was employed to compare various sports groups i.e. open skill athletes. Where 'F' values were found significant, LSD (Least Significant Difference) Post-hoc test was applied to find out the direction and degree of differences. For testing the hypothesis, the level of significance was set at 0.05.

Results

Table 1. Analysis of Variance (ANOVA) results with regard to (DFS-2) among open skill athletes (basketball, handball and football) on the sub-variable challenge-skill balance

Source of Variance	Sum of Squares	df	Mean Square	F-ratio	Sig.
Between Groups	60.400	2	30.200	2.441	.096
Within Groups	705.200	57	12.372		
Total	765.600	59			

F 0.05 (2, 57)

It can be ascertained from table 1 that results of Analysis of Variance (ANOVA) among various sport groups (basketball, handball, and football) with regard to open skill athletes on the sub-variable challenge-skill balance were found statistically insignificant (P>0.05). Since 'F' value was found insignificant, therefore, post-hoc test has not been applied to see the direction and degree of differences.

Table 2. Analysis of Variance (ANOVA) results with regard to open skill athletes (basketball, handball, and football) on the sub-variable action-awareness merging

Source of Variance	Sum of Squares	df	Mean Square	F-ratio	Sig.
Between Groups	66.533	2	33.267	2.264	.113
Within Groups	837.650	57	14.696		
Total	904.183	59			

F 0.05 (2,57)

It can be seen from table 2 that results of Analysis of Variance (ANOVA) among various sport groups (basketball, handball, and football) with regard to open skill athletes on the sub-variable action-awareness merging were found statistically insignificant (P>0.05).

Table 3. Analysis of Variance (ANOVA) results with regard to open skill athletes (basketball, handball, and football) on the sub-variable clear goals

Source of Variance	Sum of Squares	df	Mean Square	F-ratio	Sig.
Between Groups	126.233	2	63.117	3.004	.057
Within Groups	1197.500	57	21.009		
Total	1323.733	59			

F 0.05 (2,57)

It can be observed from table 3 that results of Analysis of Variance (ANOVA) among various sport groups (basketball, handball, and football) with regard to open skill athletes on the sub-variable clear goals were found statistically insignificant (P>0.05).

Table 4. Analysis of Variance (ANOVA) results with regard to open skill athletes (basketball, handball, and football) on the sub-variable unambiguous feedback

Source of Variance	Sum of Squares	df	Mean Square	F-ratio	Sig.
Between Groups	183.100	2	91.550	8.497*	.001
Within Groups	614.150	57	10.775		
Total	797.250	59			

*Significant at 0.05 level F 0.05 (2,57)

It is evident from table 4 that results of Analysis of Variance (ANOVA) among various sport groups (basketball, handball, and football) with regard to open skill athletes on the sub-variable unambiguous feedback were found statistically significant (P<0.05).Since the obtained F-ratio 8.497 was found statistically significant, therefore, Post-hoc test (LSD) was applied to find out the degree and direction of differences between paired means among various sport groups (basketball, handball, and football) with regard to open skill athletes on the sub-variable unambiguous feedback. The results of Post-hoc test have been presented in table 5 below.

Table 5. Comparison of Mean Values of Post-hoc test (LSD) among open skill athletes (basketball, handball, and football) with regard to sub-variable Unambiguous feedback

Group (A)	Group (B)	Mean Difference (A-B)	Sig.
Basketball (Mean=15.70)	**Handball**	3.40000	.007
	Football	3.95000*	.002
Handball (Mean=12.30)	**Basketball**	3.40000	.007
	Football	.55000	.869
Football (Mean=11.75)	**Basketball**	3.95000*	.002
	Handball	.55000	.869

A glance at table 5 showed that the mean value of basketball group was 15.70 whereas handball group had mean value as 12.30 and the mean difference between both the groups was found 3.40. The p-value sig .007 shows that the basketball group had demonstrated significantly better on unambiguous feedback than their counterpart's handball group. The mean difference between basketball and football group was found 3.95. The p-value sig .002 revealed that the basketball group had exhibited significantly better on unambiguous feedback than their counterpart's football group. The mean difference between football and handball group was found .550. The p-value sig .869 showed that the handball group had demonstrated better on unambiguous feedback than their counterpart's football group though not significantly.

Table 6. Analysis of Variance (ANOVA) results with regard to open skill athletes (basketball, handball, and football) on the sub-variable concentration on the task at hand

Source of Variance	Sum of Squares	df	Mean Square	F-ratio	Sig.
Between Groups	4.133	2	2.067	.204	.816
Within Groups	576.050	57	10.106		
Total	580.183	59			

F 0.05 (2, 57)

It can be seen from table 6 that results of Analysis of Variance (ANOVA) among various sport groups (basketball, handball, and football) with regard to open skill athletes on the sub-variable concentration on the task at hand were found statistically insignificant (P>0.05).

Table 7. Analysis of Variance (ANOVA) results with regard to open skill athletes (basketball, handball, and football) on the sub-variable sense of control

Source of Variance	Sum of Squares	df	Mean Square	F-ratio	Sig.
Between Groups	150.533	2	75.267	5.947*	.005
Within Groups	721.400	57	12.656		
Total	871.933	59			

*Significant at 0.05 level F 0.05 (2,57)

It can be observed from table 7 that results of Analysis of Variance (ANOVA) among various sport groups (basketball, handball, and football) with regard to open skill athletes on the sub-variable sense of control were found statistically significant (P<0.05). Since the obtained F-ratio 5.947 was found statistically significant, therefore, Post-hoc test (LSD) was applied to find out the degree and direction of differences between paired means among various sport groups (basketball, handball, and football) with regard to open skill athletes on the sub-variable sense of control. The results of Post-hoc test have been presented in table 8 below.

Table 8. Comparison of Mean Values of Post-Hoc Test (LSD) among open skill athletes (basketball, handball and football) with regard to sub-variable sense of control

Group (A)	Group (B)	Mean Difference (A-B)	Sig.
Basketball (Mean=15.60)	**Handball**	3.20000*	.023
	Football	3.50000*	.011
Handball (Mean=12.40)	**Basketball**	3.20000*	.023
	Football	.30000	.965
Football (Mean=12.10)	**Basketball**	3.50000*	.011
	Handball	.30000	.965

A glance at table 8 showed that the mean value of basketball group was 15.60 whereas handball group had mean value as 12.40 and the mean difference between both the groups was found 3.20. The p-value sig .023 shows that the basketball group had demonstrated significantly better on sense of control than their counterpart's handball group. The mean difference between basketball and football group was found 3.50. The p-value sig .011 revealed that the basketball group had exhibited significantly better on sense of control than their counterpart's football group. The mean difference between football and handball group was found .300. The p-value sig .965 showed that the handball group had demonstrated better on sense of control than their counterpart's football group though not significantly.

Table 9. Analysis of Variance (ANOVA) results with regard to open skill athletes (basketball, handball, and football) on the sub-variable loss of self-consciousness

Source of Variance	Sum of Squares	df	Mean Square	F-ratio	Sig.
Between Groups	167.433	2	83.717	5.425*	.007
Within Groups	879.550	57	15.431		
Total	1046.983	59			

F 0.05 (2, 57)

It can be ascertained from table 9 that results of Analysis of Variance (ANOVA) among various sport groups (basketball, handball, and football) with regard to open skill athletes on the sub-variable loss of self-consciousness were found statistically significant (P<0.05).Since the obtained F-ratio 5.425 was found statistically significant, therefore, Post-Hoc test (LSD) was applied to find out the degree and direction of differences between paired means among various sport groups (basketball, handball, and football) with regard to open skill athletes on the sub-variable loss of self-consciousness. The results of Post-hoc test have been presented in table 10 below.

Table 10. Comparison of Mean Values of Post-Hoc Test (LSD) among open skill athletes (basketball, handball, and football) with regard to sub-variable loss of self-consciousness

Group (A)	Group (B)	Mean Difference (A-B)	Sig.
Basketball (Mean=15.80)	**Handball**	1.05000	.701
	Football	2.90000	.074
Handball (Mean=16.85)	**Basketball**	1.05000	.701
	Football	3.95000*	.010
Football (Mean=12.90)	**Basketball**	2.90000	.074
	Handball	3.95000*	.010

A glance at table 10 showed that the mean value of basketball group was 15.80 whereas handball group had mean value as 16.85 and the mean difference between both the groups was found 1.05. The p-value sig .701 shows that the handball group had demonstrated better on self-consciousness than their counterpart's basketball group though not significantly. The mean difference between basketball and football group was found 2.90. The p-value sig .074 revealed that the basketball group had exhibited better on self-consciousness than their counterpart's football group though not significantly. The mean difference between football and handball group was found 3.95. The p-value sig .010 showed that the handball group had demonstrated significantly better on the loss of self-consciousness than their counterpart's football group.

Table 11. Analysis of Variance (ANOVA) results with regard to open skill athletes (basketball, handball, and football) on the sub-variable transformation of time

Source of Variance	Sum of Squares	df	Mean Square	F-ratio	Sig.
Between Groups	70.300	2	35.150	2.442	.096
Within Groups	820.300	57	14.391		
Total	890.600	59			

F 0.05 (2, 57)

It is evident from table 11 that results of Analysis of Variance (ANOVA) among various sport groups (basketball, handball, and football) with regard to open skill athletes on the sub-variable transformation of time were found statistically insignificant (P>0.05).

Table 12. Analysis of Variance (ANOVA) results with regard to open skill athletes (basketball, handball, and football) on the sub-variable autotelic experience

Source of Variance	Sum of Squares	df	Mean Square	F-ratio	Sig.
Between Groups	73.233	2	36.617	2.250	.115
Within Groups	927.700	57	16.275		
Total	1000.933	59			

F 0.05 (2, 57)

It can be ascertained from table 12 that results of Analysis of Variance (ANOVA) among various sport groups (basketball, handball, and football) with regard to open skill athletes on the sub-variable autotelic experience were found statistically insignificant (P>0.05).

Table 13. Analysis of Variance (ANOVA) results with regard to open skill athletes among (basketball, handball, and football) on the variable overall dispositional flow scale-2

Source of Variance	Sum of Squares	df	Mean Square	F-ratio	Sig.
Between Groups	3823.433	2	1911.717	7.757*	.001
Within Groups	14048.500	57	246.465		
Total	17871.933	59			

*Significant at 0.05 level F 0.05 (2, 57)

It can be observed from table 13 that results of Analysis of Variance (ANOVA) among various sport groups (basketball, handball, and football) with regard to open skill athletes on the variable overall dispositional flow scale-2 of open skill athletes were found statistically significant (P<0.05). Since the obtained F-ratio 7.757 was found statistically significant, therefore, Post-hoc test (LSD) was applied to find out the degree and direction of differences between paired means among various sport groups (basketball, handball, and football) with regard to open skill athletes on the variable overall dispositional flow scale-2. The results of Post-hoc test have been presented in table 14 below.

Table 14. Comparison of Mean Values of Post-Hoc Test (LSD) among open skill athletes (basketball, handball, and football) with regard to overall dispositional flow scale-2

Group (A)	Group (B)	Mean Difference (A-B)	Sig.
Basketball (Mean=139.30)	**Handball**	9.45000	.173
	Football	19.55000*	.001
Handball (Mean=129.85)	**Basketball**	9.45000	.173
	Football	10.10000	.136
Football (Mean=119.75)	**Basketball**	19.55000*	.001
	Handball	10.10000	.136

A glance at table 14 showed that the mean value of basketball group was 139.30 whereas handball group had mean value as 129.85 and the mean difference between both the groups was found 9.45. The p-value sig .173 shows that the basketball group had demonstrated better on overall dispositional flow scale-2 than their counterpart's handball group though not significantly. The mean difference between basketball and football group was found 19.55. The p-value sig .001 revealed that the basketball group had exhibited significantly better on overall dispositional flow scale-2 than their counterpart's football group. The mean difference between football and handball group was found 10.10. The p-value sig .136 showed that the handball group had demonstrated better on overall dispositional flow scale-2 than their counterpart's football group though not significantly.

Discussion and Conclusion

A thorough cogitation of all the variance tables with special references to flow of open skill athletes revealed significant differences among various sport groups (basketball, handball, and football) on the sub-variables i.e. unambiguous feedback, sense of control, loss of self-consciousness and overall dispositional flow scale-2. However, no significant differences were found on the sub-variables of DFS-2 i.e. challenge-skill balance, action-awareness merging, clear goals, concentration on the task at hand, transformation of time and autotelic experience. The outcome of the above results might be due to the inherent feedback in the activity, control over the demands of the activity without conscious effort, knows what is happening in mind & body, sense of balance between the perceived demands of the activity and the skills, enjoyable experience that is intrinsically rewarding and thoughts & feelings the players may have experienced while taking part in the competitions. These findings substantiate the assertion of Jackson et al. (1998) that the strongest associations between a self-report assessment of performance and flow state were with the autotelic experience and challenge-skill balance dimensions of flow. When considering the errors reported by the orienteering sample, several flow dimensions were significant predictors. One unexpected finding was a positive relationship between the flow dimension, unambiguous feedback, and a number of errors made. It seems that feedback regarding performance, when it focused on errors rather than positive aspects of performance, may have the unwanted effect of generating more errors. Kimiecik and Stein (1992) proposed a two-part experience form to

measure flow in golf, with the first questionnaire assessing possible antecedents of flow, such as confidence, concentration, expectations, and competency before playing the hole, whereas the second questionnaire examines key flow dimensions, such as challenges and skills, goals, concentration, and control to be filled out after the completion of the hole. A similar approach in sports that offer time for athletes to complete flow measures during the performance, such as tennis, would more clearly pinpoint antecedents of flow and provide more detailed information on the connection and interaction of flow and performance.

Significant differences were found among various sport groups (basketball, handball, and football) on the sub-variables i.e. unambiguous feedback, sense of control, loss of self-consciousness and overall dispositional flow scale-2. However, no significant differences were found on the sub-variables i.e. challenge-skill balance, action-awareness merging, clear goals, concentration on the task at hand, transformation of time and autotelic experience.

Conflict of Interest

The authors have not declared any conflicts of interest.

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