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Exploring the difference of decision-making style among hybrid, individual and partner sports

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Abstract
Background and Study Aim: There are several factors that affect an athlete's decision while making it in a sports context. These are the factors that are in the athlete's immediate environment, including the coach, their teammates, their parents, and other support networks. For a number of reasons, sports provide an outstanding setting for the study of decision making. Sports decision-making includes a variety of decision agents (coaches, officials, players, fans, etc.), duties like play-calling and ball distribution, penalty kicks, and instances within play, such as timeouts and player substitutions. The purpose of this study was to explore the differences of decision-making style among hybrid, individual and partner sports
Material and Methods: A quasi-experimental study was conducted on one hundreed sixty-two (N=162) female subjects (age 21-25 years) from Guru Nanak Dev University, Amritsar, Punjab, India. All the subjects were informed about the objective and protocol of the study. The subjects were purposively divided into three groups: Group-A: Hybrid Sports (N_1=49), Group-B: Individual Sports (N_2=91) and Group-C: Partner Sports (N_3=22). Purposive sampling was used keeping in view of administrative feasibility. The data was collected through the administration of Decision-Making Style Questionnaire as constructed by Scot and Bruce (1995).
Statistical Analysis: G*Power version 3.1.9.7 was used to analyze the power and to compute sample size with graphics options. The normality of the data was checked by using the Shapiro-Wilk Test of Normality. Under the data analysis, exploration of data was made with descriptive statistics and graphical analysis. Analysis of Variance (ANOVA) was used for the present investigation. The level of significance was set at 0.05. The statistical techniques were used to analyze the data on Statistical Package for Social Science (SPSS) version 26.0.
Results: The result of the study shows that the Rational: The f-ratio is 2.034, and the p-value is .134. The result is not significant at p.05, Avoidant: The f-ratio is .422, and the p-value is .657. The result is not significant at p.05, Intuitive: The f-ratio is .003, and the p-value is .997. The result is not significant at p.05, Dependent: The f-ratio is .054, and the p-value is .948. The result is not significant at p.05, Spontaneous: The f-ratio is .774, and the p-value is .463. The result is not significant at p.05. and Decision-Making Style: The f-ratio is .155, and the p-value is .857. The result is not significant at p.05.

Keywords: Decision-making style, hybrid sports, individual sports, partner sports

Introductions

Sports psychology affects performance in sports, exercise, and physical activity. It explores the mental aspects of sports, such as motivation, confidence, focus, and the impact of stress on athletes. The goal of sports psychology is to help athletes achieve optimal performance by addressing the mental and emotional factors that impact their performance. Sports psychology is essential for athletes because it helps them understand the impact of their mental state on their performance. It also helps athletes develop mental skills that can improve their performance and lead to success.

The athlete must want to develop her mental game without being motivated to satisfy an external reason. Likewise, an athlete who consults with a sports psychologist simply to appease the coach will not fully benefit from mental training. The science of human movement is commonly used to enhance the movements of players. Even the athletes sampled blood & chartered their biorhythms (Straub, 1980) [13]. Singer (1980) [12] believed that psychology was, and still was, an aspect of sports. This realization is very new in this part of the world & most often does not even include athletes. Vipene (2005) [15] also described sports psychology as a science dealing with physical performance emotional aspects. This is an attempt to describe and predict an athlete's actions in the competitive sports climate.

Fig 1: Sports psychology to improve their performance

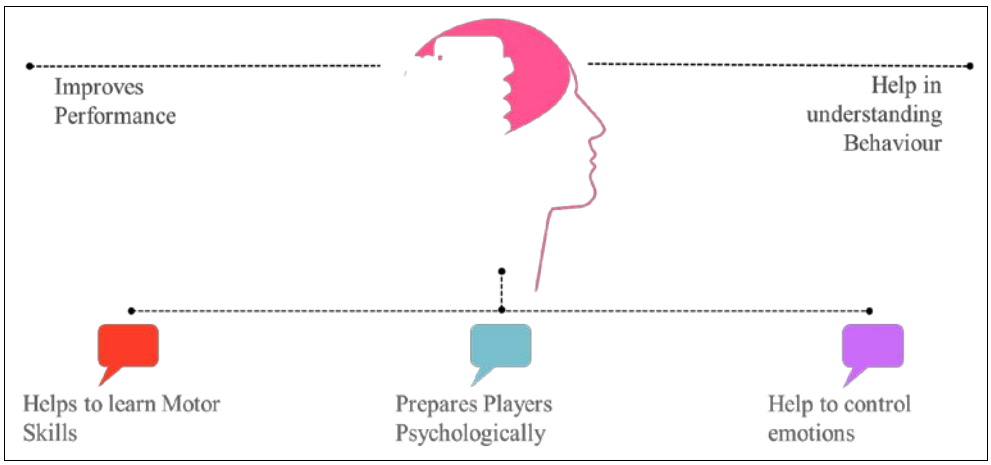

Fig 2: Importance of spots psychology

The resulting evidence presents decision-making as a deliberate process of selection, in which expert players excel in their capability to extract and process cues from the environment (Muller S., 2006) [9] recognize and interpret familiar patterns of play (Lorains M., 2013, Tenenbaum G., 1996) [8, 14] form expectations by computing situational probability (Abernethy B., 2001, Loffing F., 2014) [1, 7]. These processes of selection are viewed as an intermediate agent between what a player perceives (perception) and how a player responds to the play unfolding about them. Decision-making is the use of information provided by one's current situation combined with one's ability to apply their knowledge about the situation to plan, select, and execute an appropriate goal-directed action or set of actions (Causer J., 2014, Williams A., 2013) [4, 16]. Decision-making is also considered as the capability of players to choose functional actions from a vast number of possible actions that emerge from the environment to achieve a specific goal (Hastie R., 2001) [6]. Thus, accurate decision-making has been identified as an important factor for successful performance in team sports (Baker J., 2003) [3]. However, it is hypothesized that the quality and accuracy of decisions can be influenced by different co-variables, such as age, the relative age effect, or expertise (Sierra-Díaz M., 2017, Araújo D., 2019) [11, 2] as well as acute factors, such as fatigue (Russell S., 2019) [10].

Material and Methods

Participants

A quasi-experimental study was conducted on one hundreed sixty-two (N=162) female subjects (age 21-25 years) from Guru Nanak Dev University, Amritsar, Punjab, India. All the subjects were informed about the objective and protocol of the study. The subjects were purposively divided into three groups: Group-A: Hybrid Sports (N_1=49), Group-B: Individual Sports (N_2=91) and Group-C: Partner Sports (N_3=22). Purposive sampling was used keeping in view of administrative feasibility. The data was collected through the administration of Decision-Making Style Questionnaire as constructed by Scot and Bruce (1995) [17]. The distribution of subjects is listed below:

Table 1: Distribution of subjects

Guru Nanak Dev University, Amritsar (N=162)		
Hybrid (N_1=49)		
Korfball	Ball Badminton	Pencak Silat
(n_1=21)	(n_2=14)	(n_3=14)
Individual (N_2=91)		
Boxing	Athletics	Fencing
(n_1=26)	(n_2=45)	(n_3=20)
Partner Sports (N_3=22)		
Badminton	Table Tennis	Tennis
(n_1=8)	(n_2=8)	(n_3=6)

Procedures for selecting the sample

G*Power version 3.1.9.7 was used to analyze the power and to compute size with graphics options.

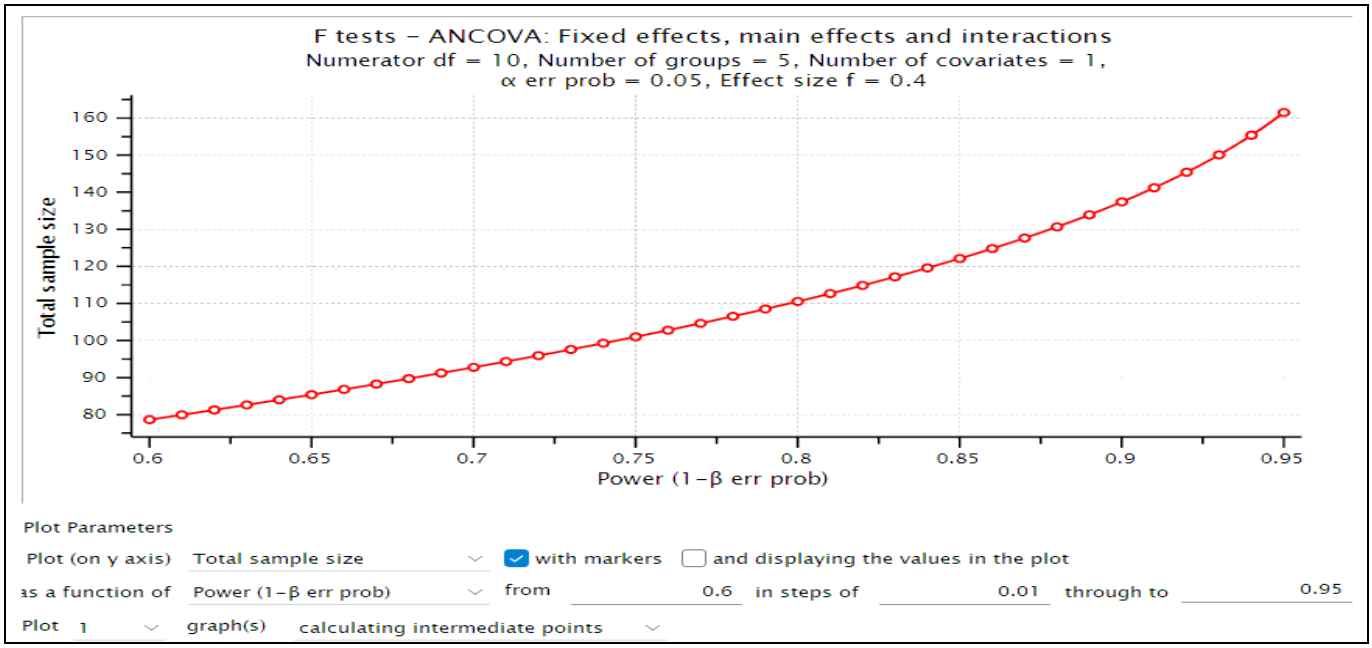

Fig 3: Protocol of power analyses

Sampling and Research Design

Purposive sampling is a specific type of sampling method that relies on data collection from population members who are conveniently available to participate in the study were utilized for the purpose of this study. This is an exploratory study that has employed the method of data collection and analysis quantitatively. The aim of this study was to find out the significant differences of Decision-Making Style (*viz.*, Rational, Avoidant, Intuitive, Dependent and Spontaneous), among Hybrid, Individual and Partner Sports.

Decision-Making Style Measurements

The data was collected through the administration of Decision-Making Style Questionnaire as constructed by Scot and Bruce (1995) [17], following five sub-variables of Decision-Making Style were finally selected for inclusion in the present study.

Variables

For the purpose of the present investigation following variables were selected. There were five items to access each of the styles. It uses 5-point likert scale. The respondent was asked to indicate whether she agrees or disagrees with each statement on a 5-point scale ranging from strongly disagree to strongly agree:

Decision-Making Style

1. Rational
2. Avoidant
3. Intuitive
4. Dependent
5. Spontaneous

Ethical considerations

Ethical considerations were deliberated for the purpose of this study. During the research data collection and presentation, the investigator considers the following principles:

- Integrity
- Dignity
- Autonomy
- Confidentiality
- Responsibility
- Competence
- Justice and Privacy

Statistical Analysis

G*Power version 3.1.9.7 was used to analyze the power and to compute sample size with graphics options. The normality of the data was checked by using the Shapiro-Wilk Test of Normality. Under the data analysis, exploration of data was made with descriptive statistics and graphical analysis. Analysis of Variance (ANOVA) was used for the present investigation. The level of significance was set at 0.05. The statistical techniques were used to analyze the data on Statistical Package for Social Science (SPSS) version 26.0.

Results

Table 2: Descriptive, ANOVA and Multiple comparison of hybrid, individual and partner sports with regards to sub-variable, "Rational"

Descriptive				
	N	**Mean**	**Std. Deviation**	**Std. Error**
Hybrid Sports				
Individual Sports	91	20.9451	2.28698	.23974
Partner Sports	22	20.7727	2.15874	.46025
Total	162	20.6420	2.62482	.20622

ANOVA					
	Sum of Squares	**DF**	**Mean Square**	**F**	**Sig.**
Between Groups	27.666	2	13.833	2.034	.134
Within Groups	1081.569	159	6.802		
Total	1109.235	161			
Multiple Comparisons					
Variables	**Groups**	**Mean Difference (I-J)**	**Std. Error**		**Sig.**
Hybrid Sports	Individual Sports	-.92465	.46214		.139
	Partner Sports	-.75232	.66934		.533
Individual Sports	Hybrid Sports	.92465	.46214		.139
	Partner Sports	.17233	.61963		.962
Partner Sports	Hybrid Sports	.75232	.66934		.533
	Individual Sports	-.17233	.61963		.962

- Hybrid Sports had a mean value of 20.0204 and Individual Sports had a mean value of 20.9451. This demonstrates that the Individual Sports group performed better than Hybrid Sports group on "Rational".
- Hybrid Sports had a mean value of 20.0204and Partner Sports had a mean value of 20.7727. This demonstrates that the Partner Sports group performed better than Hybrid Sports group on "Rational".
- The Individual Sports group had a mean value of 20.9451, whereas Partner Sports had a mean value of 20.7727. This reveals that the Individual Sports group performed better than Partner Sports group on "Rational".

Table 3: Descriptive, ANOVA and Multiple comparison of hybrid, individual and partner sports with regards to sub-variable, "Avoidant"

Descriptive					
	N	**Mean**		**Std. Deviation**	**Std. Error**
Hybrid Sports	49	20.8571		2.41523	.34503
Individual Sports	91	20.9121		2.00914	.21061
Partner Sports	22	20.4545		1.73829	.37060
Total	162	20.8333		2.10072	.16505
ANOVA					
	Sum of Squares	**DF**	**Mean Square**	**F**	**Sig.**
Between Groups	3.749	2	1.874	.422	.657
Within Groups	706.751	159	4.445		
Total	710.500	161			
Multiple Comparisons					
Variables	**Groups**	**Mean Difference (I-J)**		**Std. Error**	**Sig.**
Hybrid Sports	Individual Sports	-.05495		.37358	.989
	Partner Sports	.40260		.54107	.759
Individual Sports	Hybrid Sports	.05495		.37358	.989
	Partner Sports	.45754		.50089	.660
Partner Sports	Hybrid Sports	-.40260		.54107	.759
	Individual Sports	-.45754		.50089	.660

- Hybrid Sports had a mean value of 20.8571 and Individual Sports had a mean value of 20.9121. This demonstrates that the Individual Sports group performed better than Hybrid Sports group on "Avoidant".
- Hybrid Sports had a mean value of 20.8571 and Partner Sports had a mean value of 20.4545. This demonstrates that the Hybrid Sports group performed better than Partner Sports group on "Avoidant".
- The Individual Sports group had a mean value of 20.9121, whereas Partner Sports had a mean value of 20.4545. This reveals that the Individual Sports group performed better than Partner Sports group on "Avoidant".

Table 4: Descriptive, ANOVA and Multiple comparison of hybrid, individual and partner sports with regards to sub-variable, "Intuitive"

Descriptive					
	N	**Mean**		**Std. Deviation**	**Std. Error**
Hybrid Sports	49	20.5918		2.28143	.32592
Individual Sports	91	20.6044		2.08102	.21815
Partner Sports	22	20.6364		1.91598	.40849
Total	162	20.6049		2.10989	.16577
ANOVA					
	Sum of Squares	**DF**	**Mean Square**	**F**	**Sig.**
Between Groups	.030	2	.015	.003	.997
Within Groups	716.686	159	4.507		
Total	716.716	161			
Multiple Comparisons					
Variables	**Groups**	**Mean Difference (I-J)**		**Std. Error**	**Sig.**

Hybrid Sports	Individual Sports	-.01256	.37619	.999
	Partner Sports	-.04453	.54486	.997
Individual Sports	Hybrid Sports	.01256	.37619	.999
	Partner Sports	-.03197	.50440	.998
Partner Sports	Hybrid Sports	.04453	.54486	.997
	Individual Sports	.03197	.50440	.998

- Hybrid Sports had a mean value of 20.5918 and Individual Sports had a mean value of 20.6044. This demonstrates that the Individual Sports group performed better than Hybrid Sports group on "Intuitive".
- Hybrid Sports had a mean value of 20.5918 and Partner Sports had a mean value of 20.6364. This demonstrates that the Partner Sports group performed better than Hybrid Sports group on "Intuitive".
- The Individual Sports group had a mean value of 20.6044, whereas Partner Sports had a mean value of 20.6364. This reveals that the Partner Sports group performed better than Individual Sports group on "Intuitive".

Table 5: Descriptive, ANOVA and Multiple comparison of hybrid, individual and partner sports with regards to sub-variable, "Dependent"

Descriptive					
	N	**Mean**		**Std. Deviation**	**Std. Error**
Hybrid Sports	49	20.2449		2.07696	.29671
Individual Sports	91	20.2967		1.94648	.20405
Partner Sports	22	20.4091		1.68068	.35832
Total	162	20.2963		1.94294	.15265
ANOVA					
	Sum of Squares	**DF**	**Mean Square**	**F**	**Sig.**
Between Groups	.409	2	.205	.054	.948
Within Groups	607.368	159	3.820		
Total	607.778	161			
Multiple Comparisons					
Variables	**Groups**	**Mean Difference (I-J)**		**Std. Error**	**Sig.**
Hybrid Sports	Individual Sports	-.05181		.34632	.989
	Partner Sports	-.16419		.50159	.948
Individual Sports	Hybrid Sports	.05181		.34632	.989
	Partner Sports	-.11239		.46434	.971
Partner Sports	Hybrid Sports	.16419		.50159	.948
	Individual Sports	.11239		.46434	.971

- Hybrid Sports had a mean value of 20.2449 and Individual Sports had a mean value of 20.2967. This demonstrates that the Individual Sports group performed better than Hybrid Sports group on "Dependent".
- Hybrid Sports had a mean value of 20.2449 and Partner Sports had a mean value of 20.4091. This demonstrates that the Partner Sports group performed better than Hybrid Sports group on "Dependent".
- The Individual Sports group had a mean value of 20.2967, whereas Partner Sports had a mean value of 20.4091. This reveals that the Partner Sports group performed better than Individual Sports group on "Dependent".

Table 6: Descriptive, ANOVA and Multiple comparison of hybrid, individual and partner sports with regards to sub-variable, "Spontaneous"

Descriptive					
	N	**Mean**		**Std. Deviation**	**Std. Error**
Hybrid Sports	49	20.6327		1.82225	.26032
Individual Sports	91	20.8242		2.05260	.21517
Partner Sports	22	21.2727		2.18614	.46609
Total	162	20.8272		2.00180	.15728
ANOVA					
	Sum of Squares	**DF**	**Mean Square**	**F**	**Sig.**
Between Groups	6.222	2	3.111	.774	.463
Within Groups	638.938	159	4.018		
Total	645.160	161			
Multiple Comparisons					
Variables	**Groups**	**Mean Difference (I-J)**		**Std. Error**	**Sig.**
Hybrid Sports	Individual Sports	-.19152		.35520	.865
	Partner Sports	-.64007		.51446	.463
Individual Sports	Hybrid Sports	.19152		.35520	.865
	Partner Sports	-.44855		.47625	.643
Partner Sports	Hybrid Sports	.64007		.51446	.463
	Individual Sports	.44855		.47625	.643

- Hybrid Sports had a mean value of 20.6327 and Individual Sports had a mean value of 20.8242. This demonstrates that the Individual Sports group performed better than Hybrid Sports group on "Spontaneous".
- Hybrid Sports had a mean value of 20.6327 and Partner Sports had a mean value of 21.2727. This demonstrates that the Hybrid Sports group performed better than Partner Sports group on "Spontaneous".
- The Individual Sports group had a mean value of 20.8242, whereas Partner Sports had a mean value of 21.2727. This reveals that the Partner Sports group performed better than Individual Sports group on "Spontaneous".

Table 7: Descriptive, ANOVA and Multiple comparison of hybrid, individual and partner sports with regards to sub-variable, "Decision-Making Style"

Descriptive					
	N	**Mean**		**Std. Deviation**	**Std. Error**
Hybrid Sports	49	103.0408		5.79497	.82785
Individual Sports	91	103.5824		5.54390	.58116
Partner Sports	22	103.5455		5.54400	1.18198
Total	162	103.4136		5.59130	.43929
ANOVA					
	Sum of Squares	**DF**	**Mean Square**	**F**	**Sig.**
Between Groups	9.785	2	4.893	.155	.857
Within Groups	5023.505	159	31.594		
Total	5033.290	161			
Multiple Comparisons					
Variables	**Groups**	**Mean Difference (I-J)**		**Std. Error**	**Sig.**
Hybrid Sports	Individual Sports	-.54160		.99598	.863
	Partner Sports	-.50464		1.44253	.941
Individual Sports	Hybrid Sports	.54160		.99598	.863
	Partner Sports	.03696		1.33540	1.000
Partner Sports	Hybrid Sports	.50464		1.44253	.941
	Individual Sports	-.03696		1.33540	1.000

- Hybrid Sports had a mean value of 103.0408 and Individual Sports had a mean value of 103.5824. This demonstrates that the Individual Sports group performed better than Hybrid Sports group on "Decision-Making Style".
- Hybrid Sports had a mean value of 103.0408 and Partner Sports had a mean value of 103.5455. This demonstrates that the Partner Sports group performed better than Hybrid Partner Sports group on "Decision-Making Style".
- The Individual Sports group had a mean value of 103.5824, whereas Partner Sports had a mean value of 103.5455. This reveals that the Individual Sports group performed better than Partner Sports group on "Decision-Making Style".

Conclusions

- **Rational:** The f-ratio is 2.034, and the p-value is .134. The result is not significant at p.05.
- **Avoidant:** The f-ratio is .422, and the p-value is .657. The result is not significant at p.05.
- **Intuitive:** The f-ratio is .003, and the p-value is .997. The result is not significant at p.05.
- **Dependent:** The f-ratio is .054, and the p-value is .948. The result is not significant at p.05.
- **Spontaneous:** The f-ratio is .774, and the p-value is .463. The result is not significant at p.05.
- **Decision-Making Style:** The f-ratio is .155, and the p-value is .857. The result is not significant at p.05.

Declaration of competing interest

All authors declare there are no potential financial, personal, or otherwise conflicts of interest.

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