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Development of a Behavioural Assessment System for Achievement Motivation in Soccer Matches

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Abstract

The aim of present investigation was to develop the behavioural instrument for measuring the achievement motivation in sport matches. According to 5-stage behavioural measurement system, the instrument was established and was applied for Iran national soccer team among three matches. The results have revealed the good validity, intra-rater, and inter-rater reliabilities for measuring motivational behaviours in sport contexts. In addition, the repeated measure analysis of variance has shown the applicability of new instrument for studying the association of achievement behaviours with successful performance, through significant differences between achievement behaviours in different matches with varied outcomes ($p<.05$).It seems the developed instrument is applicable for coaches to discriminate achievement behaviours of players during the match and select their strategy and players' substitutions according to their trends and behaviours for success.

KEYWORDS: achievement behaviours, performance, observation, soccer, analysis

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Introduction

Motivation in sport is a critical component of both learning and successful performance. In general, motivation is defined as the intensity and direction of behaviour. The intensity of behaviour refers to the degree of effort required to complete a task, and the direction of behaviour is the way a goal is achieved in a specific situation (Gill, 1999). Studies relating to sport and physical activity participation have investigated various types of motivation including; achievement motivation, participation motivation, intrinsic motivation, and extrinsic motivation (Biddle & Mutrie, 2005).

In achievement motivation research, motivation is defined on the basis of an individual's success in achieving a goal according to his/her goal orientation (Duda, 2001; Duda & Hall, 2001). Motivational orientation is associated with an athlete's desire for achievement, for example, some athletes take on challenge, hard work, and persistence; whereas, others avoid challenge, and exert little effort (Gill, 1999). The importance of achievement motivation for successful performance and behaviour is supported by a number of theories including self-efficacy, attribution, self-determination, and achievement goal (Williams, 2001). Additionally, previous studies have demonstrated a link between motivation and effort, persistence, skill development (Escarti & Gutierrez, 2005; Ferrer-Caja & Weiss, 2000; Shafizadeh, 2007), and teaching styles (Amorose & Horn, 2000; Yoo, 1999).

When studying motivation in sport, it is important to consider both the quantity and quality of motivation. Quantity refers to how much the athlete achieves a goal and quality is inferred from the athletes' sustained and positive engagement in the sport. In spite of the linkage between these two factors, the motivational process is more important than the motivational outcome, in other words, poor or good performance is not the best indicator of motivation (Williams, 2001). As a result, it is important to identify the inherent characteristics of behaviour rather than the outcome of behaviour.

Research suggests that the quality of an athlete's motivation can be inferred from his/her behaviours. For example, highly motivated athletes try hard, seek out challenge, persist in the face of diversity, and perform up to their ability level on a reasonably consistent basis (Williams, 2001). To date, the only tools for assessing achievement motivation in sport settings are questionnaires or inventories. They include the Sport Orientation Questionnaire (Gill & Deeter, 1983), the Task and Ego Orientation in Sport Questionnaire (Nicholls, et al, 1985), and the Competitive Orientation Inventory (Vealey, 1986).These instruments use a self-report method for assessing motivation and thus depend on the perceived feelings of previous experiences. One of the problems with these methods is that athletes may give what they perceive to be socially desirable

responses (Thomas & Nelson, 2005); they may not be able to accurately express their feelings, and are they limited to closed answers (Klein, 2000). Consequently, since, achievement motivation is not a belief, attitude or feeling, and motivational behaviours are critical in the theoretical structures of motivation, it is important to develop a more objective means of monitoring and assessing athletes' performance.

An alternative assessment tool that is commonly used in sport psychology research is systematic observation (Cohen, et al, 2000). A classic example of this type of research can be seen in the seminal work of Smith, Smoll, and Hunt (1977). They used systematic observation to investigate the relationship between coaches' behaviours and young athletes' reactions to these behaviours. This resulted in the development of an instrument called the Coaching Behaviour Assessment System (as cited in Morrow, et al, 2000). Other investigators that have applied observational methods for their research in sport and exercise psychology include: Brewer and Jones (2002) in Rugby Union, Bloom, et al (1999) in teaching behaviours of a Division I basketball coach, Gee and Sullivan (2006) in aggressive behaviours in ice hockey, Shafizadeh (2008) for aggressive behaviours in soccer, Morgan, et al (2005) in the study of teaching behaviours and motivational climate in physical education classes, Baker,et al (2005) for studying cognitive characteristics in ultra-endurance tri-athletes, Chaverri, et al (2008) for the analysis of hidden patterns in team sports, and Bloomfield, et al (2005) for studying temporal patterns in soccer.

The purposes of the present study were two fold. Firstly, we aimed to develop a valid and reliable tool for the objective measurement of achievement motivation in athletes in soccer. Secondly, we aimed to assess the applicability of this new instrument for distinguishing between achievement behaviours according to different performance outcomes. Thus, we hypothesize that validity and reliability scores will demonstrate that this assessment tool can distinguish between the motivational behaviours of players in different matches and also predict successful performances according to match results.

Methods

Participants

A panel of eight experienced sport scientists who lectured and researched in sport psychology were selected to determine face validity. Reliability was assessed by observing 10 players of the Iranian national soccer team. They were non-randomly selected from the national team's camp. The first investigator with one other match analyst carried out the observations.

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Instrument

The instrument that was developed in the present study was the Behavioural Assessment System for Achievement Motivation in Soccer Games (BASAM-SG). It consisted of 6 items categorised into 3 subscales including persistence, commitment, and intensity of behaviour.

Observation and analysis was from recordings of soccer matches using the Sports Performer Software (Premier Concepts Pty Ltd, Australia). This software is able to count the frequency and duration of movements on the basis of defined criteria. It permits the collection and immediate analysis of data gathered from the observation of soccer matches from either live or DVD recordings. The computer keyboard was configured to permit the recording of multiple and overlapping frequency behaviours (how many) and duration behaviours (how long) through pressing the appropriate keys.

Procedure

The process for establishing the systematic observation instrument was extracted from a modified version of a 5-stage system that includes 1-obserever training, 2-revising current criteria, 3-face validity, 4-reliability, and 5-objectivity (Brewer & Jones, 2002). As there was a lack of existing instruments pertinent to the behavioural assessment of achievement motivation, the second stage of the systematic method (Brewer & Jones, 2002) changed into establishing observable criteria and was used at the first stage. The other stages followed through the systematic method.

1 - Establishing observable criteria

The aim of this stage was to build comprehensive behavioural definitions covering more or less all motivational behaviours within the game, thus ensuring the content validity of the checklist.

Content validity, or logical validity, of the BASAM-SG was determined according to existing literature within the areas of motivation in exercise and sport. The key themes that emerged from previous investigations were used to develop the checklist of motivational behaviours in soccer (see table 1). The Maehr and Braskamp (as cited in Biddle & Mutrie, 2005) definition of motivation was very useful for the present study because they proposed an operational definition of motivation. They stated that motivation is defined into five behavioural patterns including direction, persistence, continuing motivation, intensity, and performance. According to Maehr and Braskamp (as cited in Biddle & Mutrie, 2005), direction refers to decision-making and behavioural goals.

Persistence refers to the degree of sustained concentration on the task and, in this study; it refers to "assertive behaviours" and "success continuing". Continuing motivation refers to the commitment to the intended activity and exercise maintenance. Scanlan, et al (1993) proposed a sport commitment model for motivation and define sport commitment as the desire and resolve to continue in sport activity with personal investment and social constraints (as cited in Gill, 1999). The commitment subscale in the present study refers to "corrective attempts" and "consciousness". Intensity refers to how much the person has invested in an activity and to the amount of effort exerted during the activity. Nicholls (1989) defined achievement motivation into task and ego orientation. Task oriented behaviours emphasizes mastering the skills and is associated with effort, persistence, and cooperation. In the present study it refers to "arousal or drive" and "physical exertion".

After the definitions of motivation criteria were established, the next step was to assign motivational criteria to specific behaviours and movements in the game of soccer for each player.

"Assertive behaviours" (item 1) refers to the relative frequency of successful one-on-one contests between two opposing players for possession of the ball.

"Success continuing" (item 2) refers to the mean relative frequency of all successful movements in the field to total active zone. Active zone is determined through counting the number of zones that are occupied by the player during the game.

"Corrective attempts" (item 3) refers to the relative frequency of attempts that were performed after losing possession of the ball to total frequency of losing possession of the ball.

"Consciousness" (item 4) refers to the relative frequency of all successful movements to total movements.

"Arousal and drive" (item 5) refers to the relative frequency of all movements to total time of play.

"Physical exertion" (item 6) refers to the relative frequency of active zone to total zone of soccer pitch.

2 - Observer Training

The main goal of this stage was to ensure familiarity with the concept of systematic observation, therefore reducing the likelihood of scoring error and enhancing reliability and objectivity (Brewer & Jones, 2002). Firstly, the observers became familiar with each behavioural classification, and then they used it to practise coding and to review digital video clips.

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Table 1: The item, subscales, and motivational behaviour criteria of BASAM-SG

Item	Subscale	Criterion
1- The degree of seriousness and challenges in his/her movements	Persistence	Assertive behaviours
2- The degree of corrective movements repetition in the similar situations	Persistence	Success continuing
3- The degree of efforts for correcting or preventing from his/her faults	Commitment	Corrective attempts
4- The degree of concentration on game events	Commitment	Consciousness
5- The degree of motivated and energetic demonstration during entire game	Intensity	Arousal and drive
6- The degree of physical activity during the entire game	Intensity	Physical exertion

3 – Validity

Face validity is claimed when the measure obviously involves the behaviours being measured (Thomas & Nelson, 2005). Face validity was established by a panel of specialists who agreed on the motivational behaviours checklist within the defined categories. Face validity was computed through agreement coefficient between specialists.

4 – Reliability

Reliability refers to the degree to which a measure would produce the same result from one occasion to another. Intra-rater reliability is the amount of consistency in classifying the same behaviour on two occasions (Clark-Carter, 1999). In the current study, the same observer analysed the motivational behaviours of the selected soccer players of the Iranian national team in a 90 min match between Iran vs. the Korean Republic on two occasions with two weeks interval.

5 – Objectivity

Objectivity or inter-rater reliability ensures the similarity of scoring by different observers while watching the same behaviours. Consequently, two skilled observers analysed the motivational behaviours of the selected soccer players of the Iranian national team in the 90 min of the match between Iran vs. the Korean Republic.

Data analysis

The percentages of all the specified behaviours were analyzed using descriptive statistics and included the mean, standard deviation, and frequency distribution. Face validity for confirming the agreement between specialists was computed by intra-class correlation coefficient. Canonical and Pearson correlations were administered for ensuring the intra-rater reliability and inter-rater reliability of the BASAM-SG through computed from the same behaviours on two occasions and two observers, respectively.

Repeated measures analysis of variance (ANOVA) was used for determining the role of the achievement motivation behaviours in predicting performance outcome. This was attained though the comparison of the BASAM-SG subscales among 3 matches of the Iranian national soccer team at the Asian qualification games. These matches included Iran vs. Singapore (6-0), Iran vs. Thailand (0-0), and Iran vs. the Korean Republic (1-1). The level of confidence was determined at 95%.

Results

Validity of BASAM-SG

The result of the intra-class correlation coefficient demonstrated an acceptable face validity ($R=.78$, $F_{6,24}= 5.65$, $p<.01$) for the BASAM-SG. Thus, the new instrument had good agreement between specialists for measuring the relevant criteria.

Reliability of BASAM-SG

The result of test-retest reliability of the BASAM-SG was executed through the canonical correlation coefficient. There was high stability ($R_c = .88$) between the two occasions. Thus, the new instrument has good reliability for measuring the achievement motivation behaviours.

Objectivity of BASAM-SG

The result of inter-rater reliability of BASAM-SG was executed through the Pearson correlation coefficient. There was high objectivity ($r= .99$) between the two observers. Thus, the new instrument has good objectivity for measuring the achievement motivation behaviours for different analysts.

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Association between motivational behaviours with performance

The results of the repeated measures ANOVA demonstrated significant differences between three matches on total score ($F_{2, 12} = 10.96$, $p<.01$), direction ($F_{2, 12} = 11.22$, $p<.01$), persistence ($F_{2, 12} = 4.24$, $p<.05$), commitment ($F_{2, 12} = 5.51$, $p<.05$), and intensity ($F_{2, 12} = 3.95$, $p<.05$) subscales of the BASAM-SG.

The least significant results demonstrated that the achievement motivation behaviours of Iran's players against Singapore (6-0) was significantly higher than the two other matches ($p<.05$). In addition, the players' persistence against the Korean Republic was significantly higher than against Thailand ($p<.05$), but the other subscales were not different.

Discussion

The purposes of the present study were two fold: the development and psychometric analysis of the BASAM-SG, and the applicability of this new instrument for distinguishing the achievement behaviours in soccer according to different performance outcomes.

We found acceptable validity and reliability of the instrument for measuring achievement motivation behaviours during match play. According to our experts, the BASAM-SG had good face validity for measuring achievement motivation behaviours. In addition, its power for assessing achievement motivation behaviours during match play on different occasions (intra-rater reliability) and between different observers (inter-rater reliability) was high. Thus, the BASAM-SG has the potential to assess the achievement motivation behaviours of players during a soccer match by observing behaviours related to their willing for success, persistence, and commitment.

Previous investigators have developed valid and reliable behavioural instruments for assessing psychological characteristics such as coaches' behaviours (Brewer & Jones, 2002; Smith et al., cited by Morrow et al., 2000), motivation in a teaching setting (Morgan et al. 2005), and aggression (Gee & Sullivan, 2006; Shafizadeh, 2008). Since such observational instruments require psychometric analysis for their application, the current research applied a 5-stage model for establishing the validity, reliability and objectivity of BASAM-SG (Brewer & Jones, 2002). Validity results revealed that the determined criteria for motivational behaviours support many of the theoretical models of achievement motivation (Biddle & Mutrie, 2005; Gill, 1999; Williams, 2001). Reliability results were important because they determined the stability of the new instrument for assessing the intended behaviours. One of the weaknesses of using observational tools to evaluate and discriminate between behaviours is that there

may be differences in scores between observations and between observers (Thomas & Nelson, 2005). The results of inter-rater and intra-rater reliabilities have demonstrated that the BASAM-SG is a suitable instrument for the behavioural assessment of achievement motivation during or after sport matches and for different analysts. In summary, the new instrument for the behavioural assessment of achievement motivation during sport matches is a valid and reliable tool and is helpful for evaluating players' motivational behaviours during a soccer match.

The second purpose of the present study was to examine the association between achievement motivation behaviours and performance as indicated by the match result. Validity is confirmed when the new instrument can distinguish between different performance outcomes (match result), not only revealing the effectiveness of the BASAM-SG for performance prediction, but also confirming its predictive validity. According to achievement theory (Nicholls, 1989) task-oriented athletes define success according to effort, persistence and commitment to their goals. Previous studies also have demonstrated the positive relationships between achievement motivation and successful performance (Gill, 1999). Supporting these findings, the current study demonstrated that there was a positive correlation between the amount of achievement motivation behaviours and successful performance. Thus, the BASAM-SG has predictive validity and applicability for analyzing the motivational behaviours of soccer players for the likelihood of a successful performance or probability of winning. Coaches, therefore, can use this tool to ensure future success according to the players' motivational behaviours along with their technical and tactical actions. In other words, coaches can use this tool to determine the motivation of players for competing against opponents and use this information to make decisions relevant to substitutions or team tactics.

It is recommended that other investigators study the applicability of the current instrument for evaluating the motivational behaviours of players during different matches. For example it could be applied to investigate the differences in motivational behaviours between winning and losing teams. Future research could also assess the applicability of the new instrument in other sport settings (e.g. educational classes, sports) and other levels of participants (amateur level players in soccer). For example, physical education teachers could use the BASAM-SG to evaluate performance changes following an educational intervention to enhance motivation in team games.

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