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Chapter

THE MEASUREMENT OF ACHIEVEMENT MOTIVATION IN SPORT

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ABSTRACT

In competitive sports, where the achievement of success is the very purpose of participation, it is vital that researchers and practitioners can access valid and reliable measures of achievement motivation. A range of self-report scales designed to measure motivation in sport have been developed from different theoretical perspectives. The present review aims to examine the definition and measurement of achievement motivation in sport. A systematic search of the literature was undertaken to identify relevant self-report scales. The search resulted in nine scales. The scales are reviewed following a discussion of the development of the field of achievement motivation in sport. Each scale is critiqued by describing its general properties, factor structure, evidence of reliability and validity, and potential application. The review concludes with recommendations for the measurement of achievement motivation in sport and suggestions for future development in this area.

Keywords: Achievement motivation, achievement goals, assessment, sport

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INTRODUCTION

The behavioural effects of motivation are important for achievement-oriented tasks across a range of human endeavours. Indeed, in the sporting domain, where achievements are the very purpose of participation, the study of achievement motivation is vital to explain and enhance sport performance. Research efforts are largely reliant on self-report measures developed from specific theoretical perspectives when attempting to map the underlying motivational aspects of sport performance. Indeed, self-report scales of achievement motivation range from attempts to map the underlying drives of motivation (Atkinson 1957, Elbe and Wenhold 2005), to measuring the motivation to achieve itself (Gill and Deeter 1988), and to categorising the various outcomes athletes regard as reflecting success (Roberts, Treasure, and Balague 1998). As a result, the current literature contains a wide variety of measures and theoretical approaches. The present chapter aims to review self-report measures of achievement motivation that are relevant to the sporting domain.

It is important for a critical appraisal of current approaches to the measurement of achievement motivation in sport. The present review adds to past reviews that have examined a select number of measures (Clancy, Herring, and Campbell 2017, Lonsdale et al. 2014), measures focused on a single theoretical framework (Hulleman et al. 2010), or measures no longer used in contemporary research (Duda and Whitehead 1998, Mayer, Faber, and Xu 2007, Vallerand and Fortier 1998). The present review recognises the diversity of measurement approaches and seeks to classify them according to the theoretical domains and target constructs. In doing so, it may serve to simplify the process of selecting a measure that fits the theoretical basis for a research project or practical application.

The chapter begins by defining constructs relevant to achievement motivation and discusses their conceptualisation and application within the sporting domain. It next situates the current review in relation to previous work in the area. The methods used to identify self-report measures for review are described. The identified measures are then presented according to recency of validation and an outline is given of the format and psychometric properties of each measure. Recommendations are also provided for the appropriateness of the measure for various applications. The review concludes with recommendations for the measurement of achievement motivation in sport and suggestions for future development in this area.

ACHIEVEMENT MOTIVATION

The drive for performance is fundamental to human nature. Over the past decades, several relevant constructs have been introduced to account for competence-striving behaviour in sport contexts. Accordingly, there are now over three decades worth of measures relevant to achievement motivation in sport.

Classical theories of achievement motivation argued that behaviour in achievement contexts was driven by two achievement related motives; the motive to attain success and the motive to avoid failure, also referred to as approach/avoidance (Atkinson 1958, Atkinson 1957). However, this dichotomy was since abandoned in favour of a solitary focus on defining achievement motivation in relation to the motive of success (e.g., Duda 1989, Vealey 1986). Gill, Dzewaltowski, and Deeter (1988) applied this definition and conceptualised achievement motivation as the desire to enter and strive for success in sport achievement situations. Accordingly, the concept of competitiveness in sport, defined as a disposition to strive for success against a standard of excellence when in the presence of others (Martens 1976) featured heavily in earlier measures of sport achievement motivation (e.g., Smither and Houston 1992, Houston et al. 2002, Vealey 1986)

Nevertheless, success is not necessarily defined solely by winning or losing. Indeed, in a match against a stronger team the effective use of a strategy may be considered a success despite the game ending in a loss. Similarly, an athlete finishing last in a race but still improving their personal record may consider their performance a success. Thus, there can be a difference between what an individual athlete judges to be success and the outcome of competition, in other words, the purpose of task-engagement (Maehr 1989).

Using a socio-cognitive approach, achievement goal theory was developed to account for the sought outcomes resulting from the primary driving force of desire for success (Nicholls 1984, Nicholls et al. 1989). The central tenet of achievement goal theory is that an individual's primary motivation in achievement contexts is to demonstrate competence through successful performance (Nicholls 1984). Further, within everyone there exists an implicit orientation, or goal, that guides what is defined as success or failure. Achievement goals are thought to create a framework for how athletes interpret, experience, and act in their search for sport achievement (Dweck 1986, Elliot and Church 1997, Nicholls et al. 1989). The dichotomy of goal orientations which have received the bulk of attention in the literature have

interchangeably been labelled as task-and ego-involvement goals (Nicholls 1984), learning and performance goals (Elliott and Dweck 1988, Dweck 1986), and mastery and performance goals (Ames and Archer 1988, 1987). Within the following chapter the mastery and performance label will be adopted in general discussion (see Ames 1992 for an overview of construct labels).

When a performance orientation is internalised, the perception of competence is based in a normative approach which is dependent on surpassing others, or alternatively performing equally well with less effort than that of others. Conversely, when someone is mastery oriented, their primary goal is improvement as judged in relation to performance of the task itself. Thus, judgement is made in a self-referenced manner, such as internal comparisons with one's past attainment, and success is defined in accordance with how performance relates to capacity.

Thus, within achievement motivation the constructs of achievement motives and achievement goals are intrinsically linked, with achievement motives construed as the underlying motivational drive and achievement goals supplying the definition of what constitutes the purpose of achievement behaviour. Within earlier sport achievement literature, an attempt to incorporate a measure of both the drive for success as well as the criteria on which an athlete would gauge their success was often made (e.g., Gill and Deeter 1988). However, a pure focus on achievement goals was more common (e.g., Duda 1989). Nevertheless, the approaches were similar in that they abandoned the potential impact of avoidance of failure.

In more recent literature, the motive of avoiding failure has been re-introduced within achievement goal theory. The introduction started with a separation of performance goals into performance avoidance goals and performance approach goals (Elliot and Church 1997, Elliot and Harackiewicz 1996). The result was a trichotomy where mastery was considered a separate goal alongside the two goals of performing better than others (performance approach), and not performing worse than others (performance avoidance). In a later revision, the same separation was applied to mastery goals to create the two goals of displaying competence in relation to the task or self (mastery approach), or the goal of avoiding incompetence in relation to the task or self (mastery avoidance; Conroy, Elliot, and Hofer 2003, Elliot and McGregor 2001). In the most recent extension, the use of the task or self as a standard of reference for mastery goals was separated to result in a trichotomy of standards used for evaluation (self, task, other). With the bifurcation of the approach avoidance dichotomy the result was six separate goals in a 3×2 theoretical model (Elliot, Murayama, and Pekrun 2011).

In sum, within the broader context of achievement goal theory both performance and mastery orientations are important for achievement behaviours (Biddle et al. 2003, Ntoumanis, Biddle, and Haddock 1999, Duda and Nicholls 1992) and for the psychological functioning in athletes. Mastery orientation is generally connected to a more adaptive type of psychological and behavioural functioning in athletes (Biddle et al. 2003). However, athletes internalising either orientations may demonstrate high levels of performance. Thus, the measurement of an athlete's achievement orientation can provide an insight into the motivations that drives performance, even though it may not be necessarily predictive of the quality of that performance.

Past reviews of achievement motivation measures in sport

Several reviews of measures of sport achievement motivation have been undertaken in the past. To our knowledge, none of the available reviews represent a comprehensive and up-to-date discussion on the variety of measures targeting constructs relevant to the underlying achievement motives and subsequent desired achievement goals present in competitive sport.

Duda and Whitehead (1998) and Mayer, Faber, and Xu (2007) provided a comprehensive review of goal orientation measures and constructs. However, both reviews are now more than a decade old and more contemporary measures have emerged since which have not yet been reviewed. Conversely, Gill et al. (1991) compared various measures but focused on those oriented towards measuring competitiveness. Lonsdale et al. (2014) provided a comparison of the psychometric properties of goal orientation measures but focused only on two specific measures. Most recently, Clancy, Herring, and Campbell (2017) performed a critical review and bibliometric analysis of motivation measures used in sport. The review focused only on the most commonly used measures. Newer measures which have not yet been widely used may have been excluded from this review. As result, the present review aimed to provide a broader search of measures available in the sport achievement motivation domain. The quality of the measures included in the review was ensured by applying minimal psychometric evaluation criteria.

Literature search methodology and review criteria

To identify appropriate measures for review an extensive search of SportDiscus, PsycInfo, Google Scholar, and Web of Science was conducted. The search was complimented by manual inspection of relevant manuscripts (see Figure 1 for search process).

Scales were included or excluded based on several criteria. First, to be eligible for inclusion, the scales must be described in an electronically-accessible English language original publication and the scales must be available in English. Second, to ensure an adequate evaluation of scale quality at least three psychometric parameters must have been examined from the following: validity (construct, convergent, divergent), test-retest reliability, internal consistency, and factor structure. Third, the scale must be appropriate for use in a competitive sporting environment. Fourth, the scale must provide a comprehensive measure of at least one key construct in the achievement motivation field, such as achievement motive or goal orientation.

Scales were excluded if they were explicitly limited to physical activity and not competitive sporting situations, did not provide evidence of use in a competitive population, or were created for a specific clinical sub-population. For scales where several versions exist, only the most recent was included.

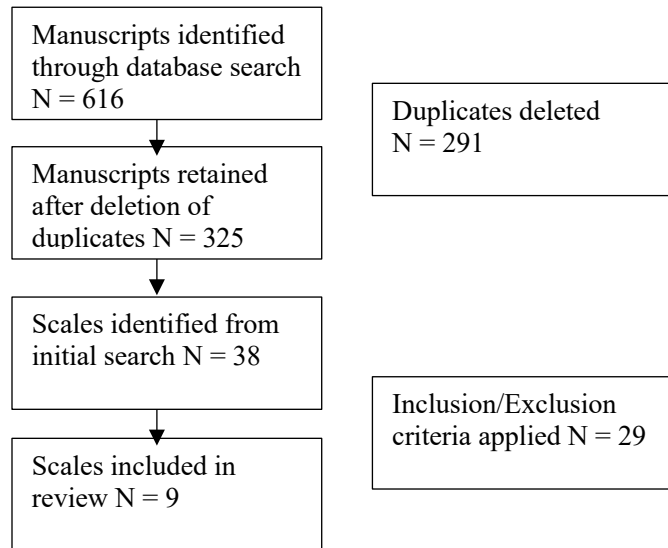


Figure 1. Flow diagram of the process of scale inclusion and exclusion

Review outline

A brief description of each measure will be followed by information regarding the samples used in the validation process, conclusions reached during factor

analytical work, and psychometrics established. When available, validity will be described in terms of construct, convergent, and divergent. Reliability will be described in terms of internal consistency (Cronbach's alpha), and test-retest coefficients when available. Internal consistency will be assessed as satisfactory when the alpha is $\geq .70$ (Cortina 1993). Each measure section will finish with a short discussion of the measure and suggestions of appropriate uses in research.

Measures reviewed

1. Sport Specific Motives Scale (SMSS; Willis 1982).
2. Competitive Orientation Index (COI; Vealey 1986).
3. Sport Orientation Questionnaire (SOQ; Gill and Deeter 1988).
4. Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda and Nicholls 1992).
5. Perceptions of Success Questionnaire (POSQ; Roberts, Treasure, and Balague 1998).
6. Achievement Goals Questionnaire – Sport (AGQ-S; Conroy, Elliot, and Hofer 2003).
7. Achievement Motives Scale – Sport (AMSS; Elbe and Wenhold 2005).
8. Achievement Goal Scale for Youth Sports (AGSYS; Cumming et al. 2008).
9. 3×2 Achievement Goals Questionnaire – Sport (3 × 2 AGQ-S; Mascaret, Elliot, and Cury 2015).

SPORT SPECIFIC MOTIVES SCALE

The sport specific motives scale (SMSS; Willis 1982) is a 40-item measure where the dichotomy of motive to approach success (MAS) and motive to avoid failure (MAF) was supplemented with a third motive, the need for power. The need for power refers to the desire to establish and maintain power through an impact or control over others. The motive was included as its combination with need for success had previously been explored in technical and economical activities (Varga 1975), and had also been suggested as a promising avenue for achievement related research in sport (Donnelly and Birrell 1978). Additionally, Winter (1973) found supportive evidence of a link between the power motive and participation in certain competitive sports.

Items consists of statements (e.g., "I try very hard to be the best") which are responded to using a 5-point scale ranging from 1 (never) to 5 (always). Item scores

are summed across the three subscales with a higher score indicating a greater adherence to the specific motive.

Sample

Preliminary testing was completed on a sample of 256 high school athletes. Subsequent testing was conducted using a sample of 996 athletes (75% male) from organised sport teams.

VALIDITY

Factor structure

Items went through two stages of factors analysis. At stage one, items were selected from a pool of 140 items based on factor loadings greater than .30. Retained items were categorised and subjected to the second stage of testing. The pool of 80 items were culled into 40 items using a criterion of .25 or better corrected item-total correlation. In the final scale, inter-correlations between MAS and Power was significant ($r = .51$) as was the correlation between MAS and MAF ($r = .22$). There was no significant correlation between MAF and Power.

Convergent validity

Power and MAS was expected to be positively correlated to competitiveness whilst a negative correlation was expected between competitiveness and MAF. In support of convergent validity, coaches' ratings of athlete competitiveness showed a significant (although low) correlation to power ($r = .37$) and MAS ($r = .19$). The correlation between Power and MAF was not significant ($r = -.12$).

Content validity

In support of content validity, the MAF showed a significant correlation ($r = .65$) with a sport anxiety measure, the MAS showed a significant correlation ($r = .23$) with a general measure of achievement tendency, and Power showed a significant correlation ($r = .22$) with a general Dominance Scale.

RELIABILITY

Internal consistency

Internal consistency was acceptable with Cronbach's alpha of .76 for power, .78 for MAS, and .76 for MAF.

Test-retest

Eight-week test-retest reliability was marginally acceptable with coefficients of .75 for power, .69 for MAS, and .71 for MAF.

DISCUSSION

The SMSS provides a unique addition to the measurement of achievement motivation in sport with the addition of the Power scale. The lack of continued validation and limited use of the full scale in research restricts its applicability. Additionally, the low correlation interpreted as support for the MAS and Power content validity should be interpreted with caution as they are comparing a sport measure to a non-sport measure. Interestingly, the scale was able to separate between athletes in highly successful teams and less successful teams, with the latter scoring significantly lower on the MAF scale.

COMPETITIVENESS ORIENTATION INDEX

The Competitive orientation index (COI; Vealey 1986) is a dichotomous measure of goal orientations. Participants are provided with a 4×4 matrix representing various competitive situations with the two goal orientations of performance and winning (outcome) represented on two spectrums. The matrix thus consists of 16 different scenarios. Example scenarios include a very good performance that results in a close loss and an above average performance that resulted in a close win. The matrix was introduced to provide athletes with a response scale not requiring a choice between being competitive and performing, but instead allowing for consideration of both goals simultaneously.

Responses for each of the scenarios in the matrix are made using a response scale ranging from 0 (very dissatisfied in this situation) to 10 (Very satisfied in this situation). The scoring procedure devised for the COI is a variance analysis approach based on the columns-by-rows design of the matrix. The orientation scores are computed by dividing the column (winning) or row (performance) sum of squares by the total sum of squares. Scores range from 0 (low) to 1 (high) representing how much the athletes' feelings of satisfaction vary based on outcome of performance, and quality of performance.

Sample

The scale was validated using two samples of young adults active in sport ($N = 419$).

VALIDITY**Factor structure**

To examine item separation, each cell within the measure was considered as an item and examined for adequate variability. Between cell variability was deemed adequate (range .84 to 9.53) as was within cell variability (all standard deviations above 1).

Concurrent validity

In support of concurrent validity, the COI was found to correlate with trait sport confidence and locus of control in expected directions. Specifically, a performance orientation was positively related to state sport-confidence ($r = .29$) and negatively related to external locus of control ($r = -.29$). Conversely, an outcome orientation was negatively related to state sport confidence ($r = -.27$) positively related to external locus of control ($r = .26$).

Construct validity

Construct validity was supported by a lower rating of perceived external locus of control by those high in performance orientation as compared to those high in outcome orientation. Further, performance-oriented athletes were found to be more satisfied with their past performance and give a higher rating to their self-perceived performance as compared to outcome-oriented athletes.

RELIABILITY**Internal consistency**

Since the COI is not additive, any measure of internal consistency was considered pointless during validation. Reliability was instead measured through test-retest procedures.

Test-retest

Test-retest correlations were at: 1 day ($r = .69$), 1 week ($r = .69$), and 1 month ($r = .63$). Across times and samples, both performance ($r = .69$) and outcome orientation ($r = .67$) remained similar.

DISCUSSION

The COI is appropriate for use in research focusing on the relationship between a focus on winning or performing as the strongest driver of competitive athlete's achievement behaviour. Importantly, in the COI it is acknowledged that athletes may strive for both performance and winning and that one goal may be held as more important than the other. Thus, the scale allows for a more fluid assessment of orientations. However, the relatively complicated procedure for scoring the OCI limits its use for quick assessments in, for instance, the sport psychology industry or in applied psychology research involving competitive situations (e.g., Neumann & Honke, 2018). This limitation could be overcome using computer-based scoring and calculation algorithms.

SPORT ORIENTATION QUESTIONNAIRE

The sport orientation questionnaire (SOQ; Gill and Deeter 1988) is a 25-item scale aimed at measuring achievement orientations and competitiveness. The result is a three factor self-report scale consisting of a 13-item competitiveness scale and two 6-item goal orientation scales.

To complete the questionnaire, athletes read and respond to statements regarding how they usually feel about sports and competition. An example item is "My goal is to be the best athlete possible". Statements are responded to using a 5-point Likert type response scale ranging 1 (Strongly disagree) to 5 (Strongly agree). Each item is scored, and a total is accumulated for each scale. A high score on the competitiveness scale indicates a high level of desire to enter sport achievement situations, to strive for success and meet competitive demands. A high score on the win subscale indicates a strong desire to win in interpersonal competition in sport, and a high score on the goal subscale indicates a strong desire to reach personal goals in sport. The scales are not exclusive, and it is possible for a person to be high in all scales simultaneously.

Sample

The original construction and validation of the SOQ was conducted using three mixed gender samples, two undergraduate and one high-school. All participants from the undergraduate samples were involved in some form of sporting context ($N = 455$). Sample three were competitive athletes or non-participants ($N = 266$).

VALIDITY

Factor structure

The factor structure of a preliminary 32 item SOQ was examined using exploratory factor analyses (EFA). Initial examination of several psychometric criteria all indicated a trend favouring a three-factor solution. Out of the original 32 items, 25 had relatively strong loadings on one of the three factors (competitiveness, win, goal), and were retained in the final model. In sample two and three Confirmatory factor analysis was used for replication. Although significant chi-square values indicated a potential departure from the three-factor model, high coefficients of determination and supportive goodness of fit indices supported the three-factor model and indicated that the significant chi-square values may have been a product of the large sample. Indeed, all loadings on sample one and two were over .50, ranging from .57 to .89 for the university sample, and from .66 to .91 for the high school sample, indicating appropriately grouped items as per the three factors.

Construct validity

To establish construct validity multivariate analyses were used to compare the ability of the SOQ and a non-sport achievement motivation scale (WOFO) to distinguish between competitors and non-competitors. The competitiveness scale was able to separate between competitors and non-competitors, as well as competitors and non-participants. Additionally, both competitiveness and win orientation were significantly higher for competitors than non-competitors. The more general measure of achievement motivation was not able to discriminate between competitors and non-competitors.

Convergent validity

In support of convergent validity, the goal orientations scale of the SOQ shared a lower correlation with another competitiveness scale as compared to that of the SOQ competitiveness and win orientation scales. Similarly, the goal scale had a higher correlation with the WOFO work and mastery scale.

RELIABILITY

Internal consistency

Internal consistency was found to range from good to excellent (alpha .79-.95).

Test re-test reliability

Test-retest reliability was examined for a 4 week period. Correlations ranged from $r = .73$ to $.89$. Individual item test-retest correlations ranged from $r = .39$ to $.76$.

DISCUSSION

The SOQ includes both a specific measure aimed at competitiveness as well as subscales targeting participant's achievement orientation. The inclusion of items questioning the presence of a motivation to enter sporting situations and strive for success, as well as inclusion of items querying participant's definition of success makes the SOQ appropriate for use within competitive sporting populations as well as within athletic populations. Gender differences were found in the original validation of the measure and should be considered when used in gender diverse samples. Specifically, in the validation process men were found to on average score higher on the win orientation, and women on average scored higher on the goal orientation. Importantly, although similar to the goal orientation dichotomy proposed by Nicholls (1984), evidence has been provided that the SOQ constructs do not conform to the goal orientation framework (Marsh 1994).

**TASK AND EGO ORIENTATION IN SPORT
QUESTIONNAIRE**

The task and ego orientation in sport questionnaire (TEOSQ; Duda and Nicholls 1992) is a 13-item measure of goal orientations as per the task- ego-dichotomy. When completing the measure respondents are asked to think about their most successful experience in sport, and what aids successful performance, and then respond to a series of statements using the stem: "I feel really successful when...". Respondents answer on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) the degree to which they agree with each item. Item scores are summed for each subscale with higher scores indicating a greater tendency towards that goal orientation.

Sample

The measure was originally tested in a sample of 207 high-school students where the larger portion of participants were current or previous participants in sport teams. The scale was subsequently validated in a sample of 878 college students who engaged in physical activity skills classes (Li et al. 1998).

VALIDITY**Factor structure**

The factor structure of the TEOSQ was explored using a principal-components method, which indicated two separate factors (task and ego) with alphas of .86 and .89 respectively. However, a later assessment using CFA indicated an unsatisfactory fit of the measurement model to the theoretical two factor structure (Chi and Duda 1995). To confirm the two-factor structure and substantiate evidence of its validity Li et al. (1998) conducted additional analyses using SEM procedures. Model estimation was done via CFA and the original two-factor structure was supported by goodness-of-fit indices. Additionally, factors loadings and a supportive tau-equivalence model supported the relationship between the items of the TEOSQ and the underlying constructs they purported to measure.

Convergent

In support of convergent validity, a high ego orientation has been found to predict views on sport as connected to extrinsic benefits and personal gain, as well as beliefs of ability as a determinant of success (Duda and Whitehead 1998, Van-Yperen and Duda 1999). Similarly, high task orientation has been found to predict greater effort, higher self-esteem, and increased focus on co-operation, as well as a belief in effort as a determinant of success (Duda 1989, Van-Yperen and Duda 1999). The convergent validity of the subscales has been supported across both men and women (Li, Harmer, and Acock 1996).

Criterion

Criterion validity was supported through predictions of intrinsic motivation in expected directions. Specifically, the predicted positive relationship between task orientation and intrinsic motivation and the predicted negative link between ego orientation and intrinsic motivation was tested and supported via fit index results (CFI = .96, NNFI = .96, RMSEA = .06) and highly significant positive and negative

relationships as per predictions. These results were consistent with those previously found by Duda et al. (1995).

RELIABILITY

Internal consistency

Satisfactory to good internal consistency has been found across numerous studies with the task subscale resulting in Cronbach alphas ranging from .76 to .88, and the ego subscale from .81 to .89. (e.g., Williams 1994, Lochbaum and Roberts 1993, Duda 1989, Williams and Gill 1995, Van-Yperen and Duda 1999, Ntoumanis 2001, Lameiras, Almeida, and Garcia-Mas 2014, Allen et al. 2015).

Test-retest

Test re-test reliability was examined across the interval of a full soccer season resulting in test-retest correlations for the task of .58 and ego subscale of .67 (Van-Yperen and Duda 1999).

DISCUSSION

The TEOSQ represents one of the most well-established measures in the field of sport achievement goals. Indeed, in a meta-analysis of goal orientation studies by Biddle et al. (2003) the TEOSQ had been used in 80.6% of studies reviewed. Due to its focus on the task and ego dichotomy, and brief nature, the measure is appropriate quick examination of achievement goals driven by the desire for success. The low level of test-retest reliability over a full soccer season found in Van-Yperen and Duda (1999) should be considered if the TEOSQ is used in longitudinal research or to examine the efficacy of achievement motivation interventions.

PERCEPTION OF SUCCESS QUESTIONNAIRE

The perceptions of success questionnaire (POSQ; Roberts, Treasure, and Balague 1998, Roberts and Balagué 1991) is a 12-item measure of task and ego goal orientations based in achievement goal theory (Nicholls 1984). Unlike the TEOSQ, the POSQ was specifically developed for sport using a rigorous scale development procedure, rather than adapted from education contexts.

In the scale, respondents are asked to think about what success in sports means to them and then respond to items using the stem “When playing sport I feel most

successful when...”. Responses to items (e.g., “I work hard”) are recorded using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Items are summed across subscales with higher scores indicating a greater tendency towards that goal orientation. An adult and children’s version of the scale are available (Liukkonen and Leskinen 1999).

Sample

The development and validation of the POSQ was a long term process starting with scale structure development in a sample of 147 mixed gender undergraduate sport participants (Roberts and Balagué 1989). A more parsimonious version was later tested in a sample of 243 mixed gender university students active in sport (Roberts and Balagué 1991). The child version of the scale was assessed in a sample of 330 mixed gender children and adolescents (Treasure and Roberts 1994).

VALIDITY

Factor structure

Initial testing resulted in the original 48 items being reduced to 26 (Roberts, 1995). Further pursuit of a more parsimonious scale resulted in a 16-item version, which was subsequently reduced to 12 during the validation process (Roberts, Treasure, and Balague 1998). To confirm the proposed two-factor structure a CFA was conducted. Results were supportive of the 12 items fitting to the proposed two factor structure with fit-indices indicating adequate model fit (RMSR = .09, Tucker-Lewis index = .90).

Construct validity

The construct validity of the POSQ has been assessed through tests of theoretically derived relationships as per Nicholls (1984) original framework. In support, task orientation has been found to be associated with the belief that the purpose of sport is to develop lifetime skills and social responsibility, and that motivation or effort results in sport success. Conversely, ego orientation has been linked to the belief that sports is a means to enhanced social status, and that external factors and ability are responsible for sport success (Treasure and Roberts 1994, Roberts et al. 1995, Roberts and Ommundsen 1996).

Convergent validity

In support of the convergent validity of the POSQ, the task and ego subscales have shown significant correlations with the corresponding scales of the TEOSQ (task $r = .71$, ego $r = .80$) (Roberts, Treasure, and Balague 1998).

RELIABILITY**Internal consistency**

The internal consistency of the two scales has ranged from acceptable to good in American, Norwegian, British, and Finnish athletes with the task sub-scale resulting in a Cronbach's alpha between .75 to .87 and the ego subscale between .79 to .91 (Roberts, Treasure, and Balague 1998, Ommundsen, Roberts, and Kavussanu 1998, Lemyre, Roberts, and Ommundsen 2002, Pensgaard and Roberts 2000, Harwood, Cumming, and Fletcher 2004, Rottensteiner et al. 2015).

Test-retest

The test-retest reliability of the POSQ has been measured at 1 week and found satisfactory with a correlation of $r = .80$ for the task scale and $r = .78$ for the ego scale (Roberts, Treasure, and Balague 1998).

DISCUSSION

The POSQ represents a brief measure of task and ego goal orientation with a long history of use in sport. The availability of a child version makes the POSQ appropriate for research across different age groups. The 1-week test-retest interval also indicates that the measure may be appropriate shorter longitudinal studies.

**ACHIEVEMENT GOALS QUESTIONNAIRE –
SPORT**

The Achievement Goals Questionnaire – Sport (AGQ-S; Conroy, Elliot, and Hofer 2003) is a 12-item measure of achievement goals. Emerging research from other achievement motivation domains indicated that the utility of the achievement goal construct was enhanced when the underlying motivational drive dichotomy of approach-avoidance was included (Elliot and McGregor 2001). Thus, mastery and performance goals were bifurcated with the approach (desire for success) – avoidance (fear of failure) dichotomy, resulting in four separate achievement goals

(Elliot and McGregor 2001). These four goals were defined as Performance approach (PAp), Performance avoidance (PAv), Mastery approach (MAp), and Mastery avoidance (MAv). PAp represents the desire and striving to do better than others, whilst PAv represents striving to avoid doing worse than others. MAp is reflective of the desire to master a task for itself, whilst MAv represents a desire to not do worse than one has done previously. Within these four orientations, the full content of achievement goals in competence settings was assumed to be covered (Elliot and McGregor 2001).

Participants respond to items which concern different ways in which individuals can strive for competence, (or avoid incompetence) and are asked to consider their thoughts and feelings regarding the activity before responding. An example item is “I worry that I may not perform as well as I possibly can”. Respondents rate how consistent each way of evaluating competence is with their own achievement goals on a scale ranging from 1 (not at all like me) to 7 (completely like me). Scores are summed for each subscale with higher scores representing a greater inclination towards a specific orientation.

Sample

The AGQ-S was validated using a sample of 356 mixed gender recreational athletes from a university population. Data was collected from the sample in four waves (Day 1, 3, 7, and 21).

VALIDITY

Factor structure

Confirmatory factor analysis was used to examine the fit of the theoretical 2×2 model against other rival models. Results indicated that the hypothesised model with all factors correlated displayed an acceptable fit to the data and the fit was superior to that of the other models tested (NFI = .92, NNFI = .92, CFI = .94, RMSEA = .08).

External Validity

To assess external validity, the scales of the AGQ-S were correlated to the Performance Failure Appraisal Inventory (PFAI-S), a validated measure of fear of failure in motor performance. MAv ($r = .31$ to $.46$), PAv ($r = .28$ to $.34$), and PAp ($r = .1$ to $.23$) goals were all significantly correlated with fear of failure scores. Only MAp was not significantly correlated ($r = -.05$ to $.03$). In support of validity, MAv, and PAv goals exhibited stronger and more consistent positive associations with

fear of failure score than PAp across all four waves of data collection. However, PAp scores showed a positive and significant correlation with fear of failure scores at three time points.

RELIABILITY

Internal consistency

The average internal consistency of the MAp, MAV, PAp, and PAV scales over the four waves of data collection were .70, .82, .88, and .87, respectively.

Test-retest reliability

Test-retest reliability was compared across all waves, resulting in six time intervals (2, 5, 7, 14, 19, and 21 days). Depending on time between measurement points, coefficients ranged from .48 to .65 for the MAp, from .45 to .70 for the MAV, from .63 to .77 for the PAp, and from .65 to .80 for the PAV. Reliability was generally higher for shorter than longer time comparisons.

DISCUSSION

The AGQ-S represents a measure of achievement goals with added additional depth through the re-introduction of achievement motives. Although only preliminary support for construct validity has been provided, use of the scale appears a feasible option if the valence underlying the result sought by athletes is a construct of interest. The wide spread of test-retest coefficients should be considered when considering the measure for use in intervention studies. Additionally, the positive correlation between fear of failure and PAp scores indicates less support for the bifurcation used in the performance orientation.

ACHIEVEMENT MOTIVES SCALE-SPORT

The achievement motives scale-sport (AMSS; Elbe and Wenhold 2005) is a 30 item scale originally validated in German (Elbe 2002). The scale is based in, and measures, the original achievement motive dichotomy of hope to achieve success (HS) and fear of failure (FF). Each construct is measured with 15 items.

Each of the 30 items consists of a statement which participants respond to using a scale ranging from 1 (not true for me at all) to 4 (exactly true for me). An example item is "I am attracted to athletic activities which allow me to test my abilities". Scores on the two sub-scales are totalled and subtracted from each other to produce a net hope score (HS - FF). If the net-hope value is positive it indicates that the

athlete is more driven by the hope for success. Conversely, if the net-hope value is negative it indicates that the athlete is primarily driven by fear of failure.

Sample

The English version of the scale went through validation using three samples. Sample 1 consisted of 165 German university students, sample 2 of 82 Scottish sport science students, and sample 3 of 60 young elite German athletes.

VALIDITY

Construct validity

In support of construct validity, competitive athletes were found to score significantly higher on the HS as compared to non-competitive participants. No difference was found for FF.

External validity

External validity was assessed through behavioural observation of a hand-ball game where those high in HS were expected to choose a closer distance to throw a ball than those high in FF. Results were supportive with a significant negative correlation ($r = -.49$) between net hope and chosen distance, such that those with higher net hope chose a closer distance (increased probability of success).

Convergent validity

The AMS-S was correlated with the TEOSQ (sample 1) and the SOQ (sample 1, 2, and 3). In support of convergent validity, a significant positive correlation was found between the HS scale and all scales of the TEOSQ and SOQ. However, the expected correlations between the FF scale and the TEOSQ and SOQ was not significant. Specifically, an expected negative correlation between the FF scale and the competition and win orientation scale, and a positive correlation with the ego subscale of TEOSQ failed to appear. The only supportive correlation was a significant negative correlation between FF and the SOQ competition scale in sample 2. Thus, the validity of the hope for success scale was supported, but for the fear of failure scale the convergent validity requires further confirmation.

RELIABILITY

Internal consistency

Internal consistency was good during the validation process, with Cronbach's alpha ranging from .92 to .95 for the hope for success scale, and from .93 to .94 for the fear of failure scale.

Test-retest reliability

Test retest reliability over 6 weeks was tested on the German version of the scale in the first sample and resulted in a coefficient of $r = .71$ for the HS scale and $r = .69$ for the FF scale.

DISCUSSION

The AMS-S is appropriate for use in any research looking to examine specifically achievement motives. The scale is also appropriate for use when attempting to predict future performance as an earlier study found support for the HS scale correlating with both current performance and future performance (Elbe 2002). It should be noted that the English version of the scale has not been as thoroughly validated as the German version. This includes predictive validity and test-retest validity. As such, more research is needed using larger English-speaking samples of competitive athletes. Additionally, no gender differences were found for the HS scale, but in the Scottish sample women scored significantly higher on FF than did men. However, this finding was not replicated in the other samples.

ACHIEVEMENT GOALS SCALE – YOUTH SPORT

The Achievement Goals Scale – Youth Sport (AGSYS; Cumming et al. 2008) is a 10-item measure of goal orientation created for use with a youth and child population (9-14 years). The original aim was to develop a scale for children which corresponded to the 2×2 framework put forth by Elliot and McGregor (2001). However, the authors were unable to develop avoidance scales which were not highly correlated, raising questions regarding the applicability of this construct to a younger demographic. The subsequently developed scale is therefore based on the mastery and ego achievement goal framework.

The scale uses the stem: “We want to know what your goals are in sport” (Cummings, et al., 2008; pp 701), and participants respond to a series of 10 goal related statements using a 5-point scale ranging from 1 (not at all true) to 5 (very true). Each item corresponds to either mastery or ego orientation. To score the scale, item scores for each orientation is totalled with a higher score on either ego or mastery indicating a greater orientation towards that specific goal.

Sample

The scale was validated and normed over four studies using samples of 1675 young athletes aged between 9 to 14 years. Sample 1 consisted of 13 young athletes who took part in a focus group assessing initial items. Sample 2 consisted of 477, 9–14-year-old athletes competing in youth basketball and swimming programs. Sample 3 consisted of 1162 athletes aged between 9 to 14-year. Samples 2 and 3 were combined to provide age- and sex-related normative data based on a subsample of 1422 for which sex was reported. Sample 4 consisted of 11 male and 12 female competitive figure skaters between the ages of 9 and 14 years who provided test–retest reliability data.

VALIDITY

Age appropriate item development

Each potential item was subjected to a Flesch-Kincaid reading level analysis (Harrison 1980) and was only retained if the item received a score (4.0) indicating it to be appropriate for a youths.

Factor structure

Items were first evaluated using EFA and later with CFA using the 477 participants in sample 2. The items loaded onto clear mastery and ego goal orientation factors with eigenvalues of 3.91 and 3.18, respectively, and accounted for 60% of the item response variance. As EFA revealed factor validity, the degree of fit to the hypothesised 2 factor model was tested using CFA in a sample of 1162 athletes (sample 3). Again, a very good fit was demonstrated for the full sample, as well as over age-groups (CFI = .95, RMSEA = .056, SRMR = .056).

Convergent Validity

Convergent validity was supported by comparisons to the children’s version of the POSQ, where significant correlations were only found between corresponding

scales. Further, a higher mastery orientation and lower ego orientation was found in females as compared to males. Such sex differences are consistent with goal orientation theory, and with what is commonly found in tests of the TEOSQ and POSQ (Duda and Whitehead 1998).

Discriminant validity

Discriminant validity was assessed through comparison to a children's social desirability scale (Children's Social Desirability questionnaire). The AGSYS appeared to not be significantly influenced by a social desirability response set (task $r = .14$, ego $r = -.17$).

RELIABILITY

Test-retest reliability

Test-retest reliability was assessed at a 1 week interval using 23 athletes (sample 4). Results indicated stability over the short time period with test-retest coefficients of $r = .95$ for the ego scale, and $r = .92$ for the task scale.

DISCUSSION

The AGSYS is specifically developed for children and youths, rather than adapted from an adult version. During validation, the AGSYS demonstrated good psychometric qualities and would be a useful tool in research focussed on a younger population. Additionally, the measure displayed sensitivity to changes in achievement goal orientations over a short time and may thus be a useful outcome measure in intervention studies targeting children or youth. Interestingly, the exploration of goal-orientation using CFA and EFA provided some preliminary evidence of an earlier emergence of mastery and ego-oriented goal orientations (9-10 years old) than what was previously thought (Cumming et al. 2008, Nicholls 1978).

THE 3 × 2 ACHIEVEMENT GOAL QUESTIONNAIRE FOR SPORT

The 3 × 2 Achievement Goal Questionnaire for Sport (3 × 2 AGQ-S; Mascaret, Elliot, and Cury 2015) is an 18-item measure of achievement goals and the individuals underlying achievement motive. The 3 × 2 model provided a further

development 2×2 AGQ-S (Conroy, Elliot, and Hofer 2003) by introducing a separation of mastery based goals into task-based and self-based categories.

The result is a six factor 3×2 model where participants respond to a series of statements preceded by the stem “In sport, my goal is...”. Responses are provided on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The six factors of the scale are: task-approach, task-avoidance, self-approach, self-avoidance, other-approach, and other-avoidance goals. Performance goals have simply been re-termed ‘other’ to clarify the standard by which competence is gaged. The scale has previously been used in the education domain (Elliot, Murayama, and Pekrun 2011) and through the 3×2 AGQ-S was extended into the sporting domain.

Sample

Item development, factor analyses, and validation of the 3×2 AGQ-S took place across two studies using samples of undergraduate sport education students who were also active competitors in some sport. The first study used a mixed gender sample of 679 students, and study 2 used a mixed gender sample of 302 students (Mascret, Elliot, and Cury 2015).

VALIDITY

Factor structure

The factor structure of the 3×2 AGQ-S was investigated over two studies using CFA to test the covariance matrix of the hypothesised six-factor structure using maximum likelihood estimation. The results across both studies supported the hypothesized structure with strong standardized factor loadings (ranging from .70 to .92), and fit statistics which met the criteria for a good fitting model. The fit of the hypothesised model was also compared to 10 alternative models, which resulted in further support for the six-factor structure as providing the best fit.

Convergent validity

Convergent validity was examined through comparison of the 3×2 AGQ-S to measures of constructs known to be associated with constructs the 3×2 purports to measure (perceived competence, implicit theories of ability, and intrinsic interest). These measures are central to achievement goal concepts and linked to the underlying structure of the 3×2 AGQ-S. In support of convergent validity, a significant positive correlation was found between entity theory and approach goals as well as other avoidance goals. Further, a significant positive correlation was found between incremental theory and task and self-approach goals. Last, a

significant positive correlation was found between perceived competence and task and self-approach goals.

RELIABILITY

Internal consistency

The internal consistency for each achievement goal ranged from satisfactory to good with Cronbach alpha's varying from .80 to .93 in study 1, and from .87 to .94 in study 2.

DISCUSSION

The 3 × 2 AGQ-S provides a comprehensive and current measure of achievement goal orientation and achievement motive with no gender differences apparent in outcomes. Further, through its incorporation of the concept that a person can focus on mastery of a task separately from personal improvement the scale provides a further depth of understanding than prior goal orientation measures. Thus, the scale is appropriate for research seeking an in depth understanding of respondents underlying drives and goals resulting in achievement behaviour. Of note, the recency of the scale means that it has yet to be used extensively across various competitive populations, and its utility with, for instance, professional athletes remain to be tested. Additionally, due to its single instance of validation in sport, limited information exists regarding indices of validity and reliability.

GENERAL DISCUSSION

The current chapter aimed to provide an up to date review of self-report achievement motivation scales. The review included all scales that measured either the motivational drive of achievement behaviour, the purpose of achievement behaviour, or both. Additional psychometric criteria were also applied. Thus, measures were not chosen simply based on frequency of use, or recency of development. The result was an exclusion of scales focusing exclusively on less current topics such as competitiveness, and the inclusion of measures based on more recent theoretical developments.

As is apparent in the review, several measures targeting a variety of combinations of constructs from the achievement motive and achievement goal literature exist. Researchers and practitioners thus have a range of choices. The psychometric properties of scales were found to be overall satisfactory with sound factor structure, validity and reliability.

For those measures in which test-retest reliability was available, coefficients differed widely (.48 to .95). Partially, this may be explained by the various

timeframes utilised in repeated testing in that a longer period between initial test and subsequent retest generally resulted in lower reliability coefficients. Regardless, the stability of a measure over time is an important factor to consider when choosing a measure to be reapplied within a specific timeframe, such as when the effects of an intervention is to be examined through a comparison between a pre-intervention baseline and a post-intervention assessment. Stability over time is also important for longitudinal studies, such as those that examine changes over childhood or adolescence or those that examine variations in a sample over a competitive season.

Samples used during validation were of adequate size and from suitable populations (i.e., athletes). However, it should be noted that most samples primarily consisted of students involved in sports to varying degree, rather than samples that primarily identified as elite/professional athletes. Indeed, with the exception of the AMSS (Elbe and Wenhold 2005), no other scale reviewed had been validated using elite athletes. Thus, the appropriateness for use in such a highly specialised population may be questioned.

Notably, theoretical achievement motivation models have in the past two decades undergone several evolutions through, first, the re-introduction of avoidance of failure as a motive, and subsequent division of mastery goals based on the evaluative standard used to gauge performance (self and task). Importantly, research in other areas indicates that the utility of the achievement goal construct is enhanced when the full approach-avoidance dichotomy is included (Elliot and Harackiewicz 1996, Elliot and McGregor 2001, Rawsthorne and Elliot 1999, Elliot 1999). Therefore, continued use of these constructs appear beneficial in the pursuit of additional information surrounding achievement motivation and behaviour. Indeed, considering the already established importance of dichotomous achievement goals for psychological functioning (Biddle et al. 2003), further division may lead to insights of benefit to athlete performance and functioning. Such information is of value to coaches, sport psychologists, athletes and researchers alike. For instance, coaches and psychologists may be able to construct more individualised interventions when more in depth information is gained regarding the athlete's current motivational landscape. However, with the continued use of dichotomous measures, it remains to be seen if scales adhering to these more recent developments will be as wholly embraced as, for instance, the POSQ and TEOSQ continue to be.

Future directions

The current chapter focused on self-report measures as this makes up the bulk of measures available to date. However, one of the main reasons for investigating achievement motivation is to predict achievement behaviour. Indeed, a basic

assumption of achievement motivation theory is that an individual's motivation towards a given task can be determined by the choice of task, and the persistence and effort applied to the task (Weiner 1996). When using self-report measures, investigations of this inherent link are limited to objective outcome measures of performance such as podium placements. As numerous extraneous factors outside of motivation can impact on such outcomes, any conclusions reached using these measures should be interpreted with care. One way by which to tackle this issue is to utilise other avenues to gain behavioural information

One such avenue is the application of systematic observation of behaviour to deduce achievement motivation. In other words, to assess motivation based on observed behaviour rather than assess motivation and linking it to performance measures. Shafizadeh and Gray (2011) applied this practice when developing an achievement motivation measure for application to football/soccer (BASAM-SG). Here, assessors observe video recordings of an athlete and make conclusions regarding their achievement motivation based on the frequency and duration of certain behaviours. Thus, there is an assumption that achievement motivation should be reflected by specific behaviour exhibited during performance. For instance, a player who is highly active in pursuing the ball after losing it would be considered more achievement motivated than a less active one. Further development of such measures is one important area for research in achievement motivation. In particular, the extent to which behaviours can be linked to specific motivations (e.g., mastery-and performance-involvement goals) requires further examination.

Similarly, psychophysiological measurements have been suggested to provide a future avenue to assess psychological states (Neumann, 2008). A series of studies in our laboratory has shown that psychophysiological measures such as heart rate, respiration, and electromyographic activity to be sensitive to attentional states (e.g., Neumann & Brown, 2013; Neumann & Heng, 2011; Neumann & Moffitt, 2018; Neuman & Piercy, 2013; Neumann & Thomas, 2009, 2011). However, psychophysiological measurements often lack specificity with regards to the specific type of psychological state. For instance, it may be expected that cues associated with achievement would elicit a heightened physiological state in the athlete (e.g., a phasic change in autonomic arousal). Such changes could be interpreted as being positively associated with achievement motivation. However, its specific type (e.g., mastery or performance achievement goals) would not be able to be interpreted from the physiological signal on its own. While such

interpretations may be possible by examining the specific nature of the cue, future research is required to examine this possibility.

An additional direction that future research and development may take is to examine the generality of the achievement motivation measures reviewed in this chapter. The use of the scales in applied sport contexts, such as training and competition, has already been discussed. In such applications, the use of simple and brief measures are preferred. Short forms of the scales are required to meet these demands. However, care is required in this work because briefer versions of scales often result in poorer reliability and validity. The applicability of achievement motivation measures in novel sport contexts also requires further examination. Virtual reality represents one such novel application (see reviews by Neumann, 2016, Neumann et al., 2018). According to the model proposed by Neumann et al. (2018) environmental factors, task factors, and the presence of others can influence motivational states (for examples see Murry, Neumann, Moffitt, & Thomas, 2016; Parton & Neumann, in press). While it would be expected that achievement motivation measures would be applicable to virtual contexts, research is required to substantiate this claim.

Conclusion

In conclusion, within the field of achievement motivation in sport there are numerous validated measures available, providing researchers with a choice to best fit on the research questions they wish to answer. The same applies for sport psychologists who wish to assess or intervene on achievement motivation in their clients. Recent years has also seen development of the more classical theoretical models. These new developments should produce additional insights and targets for research aimed at achievement motivation. To supplement such developments, continued exploration of alternative ways of assessing achievement motivation less prone to response bias and dependency on self-insight is also necessary.

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