Journal of Sports Sciences
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713721847

Achievement goals in sport: The development and validation of the Perception of Success Questionnaire

Glyn C. Roberts [a]; Darren C. Treasure [b];Gloria Balague [c]
[a] The Norwegian University of Sport Science, Oslo, Norway [b] University of Southern Illinois at Edwardsville, Chicago, IL, USA [c] University of Illinois, Chicago, IL, USA

To cite this Article Roberts, Glyn C. , Treasure, Darren C. andBalague, Gloria(1998) 'Achievement goals in sport: The development and validation of the Perception of Success Questionnaire', Journal of Sports Sciences, 16: 4, 337 — 347
To link to this Article: DOI: 10.1080/02640419808559362
URL: http://dx.doi.org/10.1080/02640419808559362

Journal of Sports Sciences, 1998, **16**, 337–347

Achievement goals in sport: The development and validation of the Perception of Success Questionnaire

GLYN C. ROBERTS,[1]* DARREN C. TREASURE[2] and GLORIA BALAGUE[3]

[1]*The Norwegian University of Sport Science, Oslo, Norway,* [2]*University of Southern Illinois at Edwardsville and* [3]*University of Illinois, Chicago, IL, USA*

Accepted 8 June 1997

Recent research into motivation and achievement behaviour in sport has focused on achievement goal theory. This theory states that two goal orientations manifest themselves in achievement contexts and impact on the motivation process. These two goals have been defined as 'task' and 'ego' goal orientations. This paper traces the development of the Perception of Success Questionnaire as a measure of achievement goals developed specifically for the sport context. The early development of the questionnaire is documented, in which the scale was shortened from the initial 29 to the current 12 question format. We demonstrate that task and ego goals are orthogonal, internal reliabilities for the orientations are high, with strong construct and concurrent validity. We conclude by reporting results from two recent confirmatory factor analyses that were conducted on the Children's and Adult versions of the questionnaire; these results show the Perception of Success Questionnaire to be a reliable and valid instrument to measure achievement goal orientations in sport.

Keywords: achievement goals, motivation, Perception of Success Questionnaire.

Introduction

Recent research into motivation and achievement behaviour has focused on a social cognitive theoretical perspective. One important social cognitive perspective is the achievement goal analysis derived from independent and collaborative classroom-based research (Nicholls, 1980, 1984, 1989; Dweck and Elliott, 1983; Maehr, 1984; Dweck, 1986; Maehr and Braskamp, 1986; Ames, 1987, 1992; Ames and Archer, 1987). Although theorists may have a preferred nomenclature, issues of emphasis and conceptual nuances, each stresses the role of achievement goals in the motivational equation (Duda, 1992; Roberts, 1992). This framework is built on the assumption that the individual is an intentional, goal-directed person who operates in a rational manner, and that achievement goals guide subsequent decision making and behaviour in achievement contexts.

The goal of action in achievement goal theory is assumed to be the demonstration of competence, and thus the perception of ability becomes a central variable. It is argued, however, that there is more than one concept of ability (Nicholls, 1984) and these different concepts of ability determine one's affective and cognitive responses to achievement striving. Based on developmental work with children, Nicholls (1984) concluded that the development of the concept of ability is a process of differentiating the concepts of luck, task difficulty and effort from ability. Following a series of experiments, Nicholls (1978; Nicholls and Miller, 1984) concluded that, by the age of 12 years, most children are able to differentiate effort from ability. Two recent studies have demonstrated that the same developmental process occurs in the physical activity context (Walling, 1994; Whitehead and Smith, 1996). Nicholls (1980, 1984, 1989) contended that two concepts of ability manifest themselves in achievement contexts for individuals aged 12 years and older; namely, an undifferentiated concept of ability, where ability and effort are not differentiated by the individual, and a differentiated concept of ability, where ability and effort are differentiated (Nicholls, 1984, 1989).

Reaching this developmental stage, however, does not necessarily dictate that a differentiated concept of ability will be automatically invoked. Rather, individuals will approach a task with certain goals reflecting

* Address all correspondence to Glyn C. Roberts, Norges Idrettshogskole, Postbox 4014, Ullevaal Hageby, 0806 Oslo, Norway.

0264–0414/98

their personal perceptions and beliefs about the particular achievement activity in which they are engaged (Dennett, 1978; Nicholls, 1980, 1984, 1989; McArthur and Baron, 1983). The concept of ability they use, and the ways they interpret their performance, can be understood in terms of these perceptions and beliefs. These perceptions and beliefs form a personal theory for achievement in the activity (Nicholls, 1989). The adopted personal theory of achievement includes one's beliefs about how to be successful in the activity. Therefore, people will differ in which of the concepts of ability they use and how they use them based on their personal theory of what is necessary to be successful.

The two concepts of ability are assumed to be embedded within two orthogonal achievement goal orientations and become the source of the criteria by which individuals assess success in achievement contexts. The two goal orientations act as dispositional tendencies to view success according to one concept of ability or the other. Thus, the goal of the individual is to meet the criteria by which success is evaluated. In this paper, and in our current research, the two orientations are termed 'task' and 'ego' (Nicholls, 1980, 1984, 1989), even though in the past we have used the labels 'mastery' and 'competitiveness' to refer to the manifestation of the goals in sport contexts (e.g. Roberts and Balague, 1989, 1991).

Nicholls (1980, 1984, 1989) used the terms 'task' and 'ego' involvement to refer to the different states of involvement individuals experience in achievement contexts. The terms 'task' and 'ego' orientation refer to one's tendency to use the undifferentiated or differentiated concepts of ability respectively, thus being in a state of goal involvement. Whether one is in a state of task or ego involvement in achievement contexts in physical activity is dependent on the circumstances or the dispositional orientation of the individual. Individual differences in disposition to be ego- or task-oriented may be the result of socialization through ego- or task-involving motivational climates in the home or in the classroom, or as a result of the previous physical activity experiences of the individual (Ames, 1984, 1992; Nicholls, 1984, 1989, 1992; Roberts, 1984, 1992; Duda, 1992, 1993). An individual is assumed to be predisposed to be task or ego goal involved and to exhibit the behaviours associated with each achievement goal. One of the assumptions of Nicholls' (1980, 1984, 1989) approach to achievement goal theory is that goal orientations are orthogonal; thus one can be high or low in either or both. This has been theorized to be the case in physical activity contexts too (e.g. Roberts, 1984) and there is empirical evidence to support this (e.g. Roberts *et al.*, 1996).

An individual who is task-oriented uses an undifferentiated concept of ability to assess demonstrated competence and the person's actions are aimed at achieving mastery, learning or perfecting a task. The individual evaluates personal performance to determine whether effort is expended and mastery achieved; thus, the demonstration of ability is self-referenced and success is realized when mastery is demonstrated. Task goal orientation, then, is the predisposition to evaluate success in terms of achieving mastery. In contrast, an individual who is ego-oriented uses a differentiated concept of ability to assess competence and the person's actions are aimed at exceeding the performance of others. The individual evaluates personal performance with reference to the performance of others; thus, the demonstration of ability is other-referenced and success is realized when the performance of others is exceeded, especially if little effort is expended. Ego goal orientation, then, is the predisposition to evaluate success in terms of demonstrating better ability to others (Nicholls, 1980, 1984, 1989; Dweck and Elliott, 1983; Maehr and Braskamp, 1986).

There are considerable data to show that the two achievement goal orientations exist and are relevant to the achievement behaviour of individuals in sport (see reviews by Roberts, 1984, 1992, 1993; Duda, 1992, 1993; Roberts and Treasure, 1995; Roberts *et al.*, 1997). If the goal orientation of the person is task-involving, then the concept of ability is undifferentiated and perceived ability is not relevant, as the individual is trying to demonstrate mastery at the task rather than normative ability (Nicholls, 1989). As the individual is trying to demonstrate mastery, the achievement behaviours will be adaptive, in that the individual will persist in the face of failure, will exert effort, select challenging tasks and be interested in the task (Nicholls, 1984, 1989; Dweck, 1986; Roberts, 1992). On the other hand, if the goal orientation of the individual is ego-involving, then the conception of ability is differentiated and perceived ability is relevant, as the individual is trying to demonstrate normative ability; how he or she fares in comparison with others in sport becomes important (Nicholls, 1984, 1989; Roberts, 1992). If the individual is ego-oriented and perceives himself or herself as being high in ability, then that person is likely to engage in adaptive achievement behaviours (Nicholls, 1989; Roberts, 1992). Demonstrating high normative ability in this context is likely, and therefore the individual is motivated to persist and demonstrate that competence to pertinent others. If one can demonstrate ability with little effort, however, this is evidence of even higher ability. Thus, an ego-oriented individual is inclined to use the least amount of effort to realize his or her goal (Nicholls, 1984, 1992; Roberts, 1992). On the other hand, if the perception of ability is low, then the individual will realize that ability is not likely to be demonstrated and will manifest maladaptive

achievement behaviours (Nicholls, 1989). Maladaptive behaviours include avoiding realistic challenge, reducing persistence in the face of difficulty, not exerting effort and, in sport, dropping out if achievement of desired goals appears difficult (Nicholls, 1984, 1989; Roberts, 1984, 1992). While these behaviours may be viewed as adaptive by the participant, because a lack of ability is disguised by these behaviours, they are considered maladaptive in striving for long-term achievement in sport contexts.

Measures of goal orientations in sport

To study goal orientations in sport, one must have reliable and valid means of measuring them. To measure the goal orientations, researchers have typically constructed questionnaires that are assumed to assess ego and task goal orientations (e.g. Nicholls *et al.*, 1985). Although Dweck and Leggett (1988) conceptualized, and measured, the achievement goals as being dichotomous, it has been more usual for researchers to assume that the two goals are conceptually orthogonal, and measure them accordingly (Nicholls, 1984, 1989). Several attempts to create scales to assess these concepts in sport have been made. Gill and Deeter (1988) developed a scale to measure what appear to be similar constructs; however, their Sport Orientation Questionnaire was not designed with achievement goal theory in mind, and the constructs do not conform to achievement goal constructs (Marsh, 1994).

Nicholls (1989) argued that, to assess the achievement goals of individuals, they should be asked about the criteria that make them feel successful in a given context. In line with this suggestion, Duda (1989), Duda and Nicholls (1992) and Roberts and his colleagues (Roberts and Balague, 1989, 1991; Treasure and Roberts, 1994b) have developed scales to measure tasks and ego goal orientations in sport that incorporate questions pertaining to the criteria individuals use to determine whether success has been achieved. Duda and her colleagues converted the questionnaire developed by Nicholls *et al.* (1985) for the academic context to the sport context by changing the wording so that it was sport-specific. The Task and Ego Orientation in Sport Questionnaire (Duda, 1989; Duda and Nicholls, 1992) has demonstrated acceptable validity and reliability and has been used successfully in the sport context (e.g. Duda, 1989, 1992, 1993; Chi and Duda, 1995). Roberts and Balague (1989, 1991) have also developed a questionnaire to measure goal orientations in sport contexts. However, they used extensive scale development procedures to develop the Perception of Success Questionnaire. It is the aim of this paper to document the development and report the psychometric properties of the Perception of Success Questionnaire.

The early development of the Perception of Success Questionnaire

Recognizing that the sport context was potentially very different from the academic context, Roberts and Balague (1989) argued that a questionnaire specifically designed for the sport context was needed. Therefore, they used scale development procedures, as recommended by the American Psychological Association (1974), to construct a scale sensitive to the sport context.

Following the suggestion of Nicholls *et al.* (1985) and Nicholls (1989) that individuals need to be asked their perceptions of success to measure task and ego goal orientations, Roberts and Balague (1989) initially created a pool of 48 questions drawn from the extant literature that addressed perceptions of success in sport. The stem of the question was: 'In sport, I feel successful when . . .'. Such phrases as 'I win' and 'I work hard' were used to reflect ego and task orientations respectively. Important sources of the questions were the early attempts to measure goal orientations (e.g. Ewing, 1981; Whitehead, 1987). These questionnaires were designed to demonstrate the use of achievement goals in sport, but were not designed to measure ego and task goal orientations specifically. Therefore, we used the questions that most closely reflected task and ego orientations within these questionnaires. Other important sources were two questionnaires specifically designed to measure task and ego goal orientations, one in an academic context (Nicholls *et al.*, 1985) and the other in a sport context (Jackson, 1988; see Jackson and Roberts, 1992). All of the questions from these two questionnaires were included in the original list of questions. Roberts and Balague then used a panel of experts (motivation researchers in education as well as sport psychology, who were well versed in achievement goal theory) to narrow down the list to questions that best met the specified task and ego goal orientation in sport criteria. The experts were given the descriptions of ego- and task-oriented individuals in sport as articulated above, and were asked their opinion, as well as their evaluative response on a 5-point Likert scale, whether the question captured the essence of the respective goal orientation. This process produced a final pool of 29 questions that was then used to determine their efficacy in assessing goal orientations.

The next step involved administering the scale to a sample ($n = 147$) of sport participants (66 females, 71 males) drawn from an undergraduate population of

students at a large American Mid-west University. Only students who were currently involved in competitive sport, or who had been involved in competitive sport at high school level, were recruited for this study. Following principal components factor analysis procedures with varimax rotation, a two-factor solution emerged with 26 and 22% of the variance explained by the ego and task orientation factors respectively (Roberts and Balague, 1989). After elimination of items that loaded on both factors, or which decreased alpha coefficients, a 26-item questionnaire was derived that formed the initial scale of the Perception of Success Questionnaire. The alpha coefficients were strong, at 0.92 for task (item coefficients ranged from 0.63 to 0.80) and 0.90 for ego (item coefficients ranged from 0.56 to 0.76) orientations.

Subsequent administrations of the scale have shortened it to include those items that consistently load on one factor or the other. For example, Roberts *et al.* (1995) gave the 26-item questionnaire to 338 volunteer participants (143 females, 194 males, 1 missing code) enrolled in physical activity classes at a large university in the American Mid-west. The participants (mean $\pm$ *s*: age 20.6 ± 2.1 years) were asked to indicate which sports they participated in most frequently. Originally, 375 participants volunteered, but 48 individuals who selected non-competitive activities, such as aerobic dance, or who had participated in the sport for less than 1 year, were eliminated from the study. The remaining participants indicated they had been participating in their designated sport for 8.8 ± 4.3 years, and 66% were currently actively competing at the sport they designated. A principal component factor analysis (followed by both oblique and orthogonal rotations) was conducted and revealed two factors reflecting a task goal and an ego goal. Consistent with Roberts and Balague (1989), a minimum factor weight of 0.4 was required for an item to be assumed to load on a factor. Because the intercorrelation between the two factors was low ($r = 0.17$), the orthogonal solution was accepted. Importantly, the items loaded identically to the previous study on both the task and ego goal orientation. The Cronbach alphas for the task and ego scales were 0.89 and 0.91 respectively. Thus, in separate studies, the robustness of the items to load consistently on the appropriate subscale and the internal reliability of the subscales were demonstrated.

To produce a more parsimonious scale, we selected the eight items that consistently loaded the highest on each scale in the previous studies. This procedure produced a 16-item scale (8 items for each goal orientation). This questionnaire was administered to 243 participants (141 males and 102 females; age 20.8 ± 2.4 years) active in sport at a large American Mid-west University (Roberts and Balague, 1991). We also included the Task and Ego Orientation in Sport Questionnaire (Duda, 1989; Duda and Nicholls, 1992) to investigate the concurrent validity of the Perception of Success Questionnaire, and administered the latter questionnaire to the same participants 1 week later to determine test–retest reliability. We then selected the 12 items (6 for each scale) that best measured task and ego goal orientation on the first administration, to determine the efficacy of the 6-item subscales to measure task and ego goal orientations. As shown in Table 1, the factor loadings were strong. The correlations of the selected 12-item Perception of Success Questionnaire to the longer form were 0.98 for task and 0.97 for ego goal orientations, demonstrating the efficacy of the shorter form to measure the goal orientations. The intercorrelation of the goal orientations on the short form was 0.08. The internal consistency coefficient alphas of the short form were 0.82 for task and 0.87 for ego goal orientation. Test–retest (1 week)

Table 1 Factor loadings of task and ego goal orientations of the Perception of Success Questionnaire (Roberts and Balague, 1991)

Task orientation			Ego orientation		
Questions	Test 1	Test 2	Questions	Test 1	Test 2
I reach personal goals*	0.793	0.844	I show other people I am the best*	0.815	0.860
I show clear personal improvement*	0.793	0.799	I am the best*	0.811	0.842
I perform to the best of my ability*	0.787	0.781	I am clearly superior*	0.789	0.883
I overcome difficulties*	0.756	0.843	I outperform my opponents*	0.760	0.802
I reach a goal*	0.712	0.807	I beat other people*	0.741	0.819
I work hard*	0.654	0.786	I win*	0.710	0.804
I do my best	0.629	0.671	I accomplish something others cannot do	0.709	0.703
I master something I could not do before	0.601	0.762	I can do something few others can	0.708	0.612

* Questions used for the 12-item Perception of Success Questionnaire.

reliabilities were 0.80 and 0.78 for task and ego goal orientations respectively. To confirm the concurrent validity of the short form of the Perception of Success Questionnaire, we correlated it with the Task and Ego Orientation in Sport Questionnaire. The ego orientation correlated 0.80 and the task orientation correlated 0.71 to the ego and task orientations of the Task and Ego Orientation in Sport Questionnaire respectively. Thus, the psychometric properties of the short form of the Perception of Success Questionnaire were strong, and this form became the standard in subsequent research.

The above studies were all conducted with adult participants. We also wished to confirm the use of the Perception of Success Questionnaire with a younger, adolescent population. The pertinence of this questionnaire for a younger population was confirmed in a cross-sectional study with 330 children attending a comprehensive school in a large city in the UK (Treasure and Roberts, 1994a). However, in a pilot study, it was found that the wording of the questionnaire was a little difficult for the younger participants. Therefore, we simplified the language on some questions, and we used additional items to try to make this version of the questionnaire more pertinent to younger participants (see Appendix 1). In brief, two items were changed from the adult version: we substituted 'I accomplish something others cannot do' for 'I win', and we substituted 'I succeed at something I could not do before' for 'I reach personal goals'. We have subsequently demonstrated the adequacy of the Children's version of the Perception of Success Questionnaire (Treasure and Roberts, 1994b).

We have chosen to use the title 'Children's' version for the Perception of Success Questionnaire used with younger participants for clarity and consistency. However, mindful of Nicholls' (1984, 1989; Nicholls and Miller, 1984) developmental work in academic contexts, and supported in sport by the results of Walling (1994) and Whitehead and Smith (1996), children cannot be truly ego-oriented until they are able to differentiate effort from ability. The Perception of Success Questionnaire, therefore, should not be used with children under the age of 11 years, as they are unlikely to be able to clearly differentiate the concepts of effort and ability.

Treasure and Roberts (1994a) administered the modified questionnaire to all participants in their study. The participants included 48 girls and 48 boys in the first year of the secondary school (age 11.3 ± 0.47 years), 78 girls and 78 boys in the third year of the school (age 13.4 ± 0.49 years), and 44 girls and 34 boys in the fifth year of the school (age 15.3 ± 0.48 years). The study investigated the relationship of goal orientations to beliefs about the purpose of sport, causes of success and satisfaction in sport (Treasure and Roberts, 1994a).

Following a principal axis factor analysis with both orthogonal and oblique rotations, two factors were extracted reflecting a task and an ego orientation for each age group. The intercorrelation between the two factors was 0.07, 0.12 and −0.27 for the first-, third- and fifth-year groups respectively. This confirmed the proposed orthogonality of task and ego goal orientations (Nicholls, 1989). The internal consistency of the subscales of the Children's version of the Perception of Success Questionnaire ranged from 0.85 to 0.90 for the task subscale and from 0.82 to 0.89 for the ego subscale. Thus, the questionnaire demonstrated acceptable internal consistency and a stable factor structure for the three age groups used in the study. Consistent with research with populations of older adults (e.g. Roberts *et al.*, 1994) and elite athletes (e.g. Roberts and Ommundsen, 1996), the robustness of the Perception of Success Questionnaire to measure the goal orientations was confirmed.

Construct validity

Construct validity is the most important psychometric property to be demonstrated in the development of any instrument; it involves testing the adequacy of theoretically derived relationships. To this end, research on achievement goal theory in sport has focused on very specific relationships derived from the work of Nicholls (1989). Specifically, in addition to reflecting personal criteria for success, Nicholls (1989) contended that an individual's personal goals are linked to their world views in a conceptually coherent fashion. In general, our research on achievement goals in sport has focused on three sets of personal beliefs – namely, purposes of sport, beliefs about the causes of success and sources of satisfaction – and has established evidence that responses generated from the Perception of Success Questionnaire associated with different beliefs about sport in a conceptually coherent fashion. For the purpose of construct validity, we have typically used canonical correlation analysis with task and ego orientations as the criterion variables and the hypothesized association with beliefs about the sport achievement context as the predictor variables. High canonical correlations are considered indicative of a very significant relationship, and we used the redundancy index measure of the amount of variance in one set of variables that is predicted or explained by the other set. All redundancy values that were over 10% were considered significant and meaningful; a canonical correlation loading of 0.30 was considered to contribute significantly to any function (Tabachnick and Fidell, 1996).

Purposes of sport

We have found consistently that task and ego goal orientations are associated with different beliefs about the wider purposes of sport. A task orientation has been found to be significantly associated with the belief that the purpose of sport is to develop lifetime skills and social responsibility. In contrast, an ego orientation has been found to be predominantly related to the belief that sport is a means to an end, namely enhanced social status (Treasure and Roberts, 1994a; Roberts *et al.*, 1995; Roberts and Ommundsen, 1996).

Causes of success

One of the fundamental tenets of achievement goal theory is that the perceived causes of success vary depending on an individual's goal orientation. Specifically, it is hypothesized that the more ego-oriented an individual, the more that person should see better athletic ability and the attempts to beat others as causes of success in sport. By the same logic, the more task-oriented an individual, the more that person should think that success in sport depends on effort and attempts to master new skills. The results of Treasure and Roberts (1994a) demonstrated that ego and task orientations, as derived from responses to the Perception of Success Questionnaire, are indeed related to different beliefs about the causes of success. Across the three age groups in this cross-sectional study, canonical correlational analysis revealed a consistent pattern of results. A task orientation was related to the belief that motivation or effort resulted in success, while an ego orientation was related to the belief that external factors and ability resulted in success in sport.

Sources of satisfaction

Consistent with the above pattern of relationships, we hypothesized that the determinants of an individual's satisfaction in sport would also vary depending on the achievement goal adopted. The results of two studies support the construct validity of the Perception of Success Questionnaire. With the exception of the youngest group, for whom social approval was the only source of satisfaction for ego- and task-oriented participants, Treasure and Roberts (1994a) found that an ego orientation was reliably related to satisfaction derived from normative success, whereas a task orientation was associated with satisfaction derived from mastery experiences. Consistent with the results of the older adolescents in the study of Treasure and Roberts (1994a), Roberts and Ommundsen (1996), using a population of elite adult athletes, found that a task orientation was related to mastery experiences and that an ego orientation was associated with the demonstration of normative ability as sources of satisfaction.

The research reported above supports the construct validity of the Perception of Success Questionnaire in that the hypothesized relationships derived from achievement goal theory were confirmed. When the participants were ego-oriented, as determined by the questionnaire, they generally endorsed the enhancement of status as a purpose of sport, ability and external factors as causes of success, and normative success as a source of satisfaction. In contrast, when the participants were task-oriented, they generally endorsed personal development and lifetime skills as purposes of sport, motivation or effort as the cause of success, and mastery experiences as sources of satisfaction.

Current development of the Perception of Success Questionnaire

The research discussed so far supports the existence of a two-factor structure for the Perception of Success Questionnaire. The structure was found to be stable across populations of adolescents (e.g. Marsh, 1994; Treasure and Roberts, 1994a,b), young adults (e.g. Roberts and Balague, 1989, 1991; Roberts *et al.*, 1995), older adults (e.g. Roberts *et al.*, 1994) and elite athletes (Roberts and Ommundsen, 1996). Although exploratory factor analysis in earlier studies has supported the existence of the two-factor structure the questionnaire is purported to represent, it is also necessary to test whether the two-factor structure exists (Marsh, 1994). Therefore, in two recent studies, we used confirmatory factor analysis to test the *a priori* factor structure underlying the task and ego orientation responses on the Perception of Success Questionnaire. Confirmatory factor analysis allows the researcher to posit an *a priori* structure and to test the ability of the solution based on this structure to fit the data, by demonstrating that the solution is well defined, that the parameter estimates are consistent with predictions and theory, and that the subjective indices of fit are reasonable (Marsh, 1994).

In the first study, 274 female athletes (age 14.01 ± 1.82 years, range 10–18 years) attending a 7-day residential summer basketball camp at a large American Mid-west University, completed the Children's version of the Perception of Success Questionnaire. We then examined the stability of the hypothesized factor structure of the questionnaire with confirmatory factor analysis using the Windows LISREL 8.12 program (Joreskog and Sorbom, 1993). This method was used to verify a hypothesized factor structure of 12 observed variables (items) loading on two latent constructs (dimensions). The standardized maximum likelihood factor loadings for the observed variables on their

Table 2 Standardized maximum likelihood loadings and *t*-values of items comprising the Children's version of the Perception of Success Questionnaire.

Question[a]	Loading	*t*-value
1. I beat other people	0.59	12.8
2. I am the best	0.72	19.6
3. I do better than others	0.75	21.9
4. I show other people I am the best	0.77	23.7
5. I accomplish something others cannot do	0.65	15.5
6. I am clearly better	0.61	13.8
7. I try hard	0.61	14.1
8. I really improve	0.74	22.9
9. I overcome difficulties	0.69	18.4
10. I succeed at something I couldn't do before	0.73	21.5
11. I perform to the best of my ability	0.73	22.0
12. I reach a target I set for myself	0.83	33.1

Note: All *t*-values >1.96 are significant. [a] Ego items 1–6; task items 7–12.

proposed dimensions are shown in Table 2. As this table shows, all of the items have statistically significant factor loadings, as indicated by *t*-values greater than 1.96, suggesting a meaningful association between the items and their proposed dimensions.

Although a number of different assessments of fit of the observed data to the specified model are available, to date there are no universally accepted guidelines. To assess the fit of the data to the proposed factor structure, the chi-square statistic, the chi-square to degrees of freedom ratio, and root mean square residual were used. In addition, the Tucker-Lewis index (Tucker and Lewis, 1973) was generated, as it has been shown to be the goodness-of-fit index least affected by sample size (Marsh *et al.*, 1988).

The chi-square statistic is a function of the difference between the observed covariance matrix and predicted matrix of the respective model. A non-significant chi-square indicates the model fits the data. The chi-square was significant in this case ($\chi^2_{54} = 138$, $P < 0.005$), suggesting that the data were an inadequate fit of the model. However, Joreskog (1969) suggested that the ratio of chi-square to the degrees of freedom is a better assessment of overall goodness of fit. In general, ratios below 2.0 indicate that the model fits the data well; ratios between 2.0 and 3.0 are considered acceptable (Bryne, 1984). The ratio of 2.5 for the present data suggests an acceptable fit.

The root mean square residual is a measure of comparison between the observed and the reproduced correlational matrices; the closer the value is to zero, the better the fit of the model. Values below 0.05 indicate a good fit, and values between 0.05 and 0.10 are considered acceptable (Rupp and Segal, 1989). The value for the present data was 0.07, demonstrating an acceptable fit.

Although the above goodness-of-fit indices are commonly used in the literature, Marsh *et al.* (1988) have shown that they are all subject to inflation because of sample size. Of the 30 goodness-of-fit indices considered by Marsh *et al.* (1988), the Tucker-Lewis index was the only one found to be relatively independent of sample size. Consequently, we used this as the final goodness-of-fit index; our value of 0.90 suggests an adequate fit, as values less than 0.90 usually mean that the model can be improved substantially (Tucker and Lewis, 1973).

From the above, we concluded that the solution was well defined and the parameters were consistent with the theory and predictions. The subjective goodness-of-fit indices indicated a reasonable fit, which supports the two-factor structure underlying the motivation responses to the questions of the Perception of Success Questionnaire. Furthermore, the internal consistency of the subscales was determined by Cronbach alpha and were found to be 0.84 for ego orientation and 0.87 for task orientation. The above findings demonstrate internal consistency and confirm the findings of previous research.

Similar goodness-of-fit assessments have been shown using the Adult version of the Perception of Success Questionnaire (see Appendix 2). In a recent study (Kavussanu, 1996), the responses to the questionnaire of 191 elite American college male ($n = 56$) and female ($n = 135$) basketball players (age 19.49 ± 1.83 years, range 17–25 years), participating in Divisions I, II and III of the National Collegiate Athletic Association, were subjected to a confirmatory factor analysis using the Windows LISREL 8.12 program (Joreskog and Sorbom, 1993). Congruent with the results of the Children's version, the standardized maximum likelihood factor loadings for all of the questions were statistically significant, as indicated by *t*-values greater than 1.96, suggesting a meaningful association between the questions and their proposed dimensions (see Table 3). To assess the fit of the data to the proposed factor structure, we again used the chi-square statistic, the chi-square to degrees of freedom ratio, the root mean square residual and the Tucker-Lewis index. Although the chi-square statistic was again significant ($\chi^2_{54} = 156$, $P < 0.01$), suggesting that the data were an inadequate fit of the model, the remaining goodness-of-fit indices were reasonable. Specifically, a ratio of chi-square to degrees of freedom of 2.8 emerged, while the root mean square was 0.09. Most importantly, a Tucker-Lewis index of 0.09 was again adequate. In addition, Cronbach alpha coefficients of 0.88 for both the task

Table 3 Standardized maximum likelihood loadings and *t*-values of items comprising the Adult version of the Perception of Success Questionnaire.

Question[a]	Loading	*t*-value
1. I beat other people	0.66	9.96
2. I am clearly superior	0.89	15.18
3. I am the best	0.89	15.18
4. I show other people I am the best	0.72	11.04
5. I outperform my opponents	0.62	9.10
6. I win	0.50	7.06
7. I work hard	0.70	10.60
8. I show clear personal improvement	0.72	10.99
9. I reach a goal	0.86	14.15
10. I overcome difficulties	0.75	11.64
11. I reach personal goals	0.75	11.68
12. I perform to the best of my ability	0.62	9.10

Note: All *t*-values >1.96 are significant. [a] Ego items 1–6; task items 7–12.

and ego goal orientations indicated high internal consistency. Consistent with the Children's version of the Perception of Success Questionnaire, therefore, the results of the confirmatory factor analysis support the two-factor structure of the Adult version of the questionnaire.

The use of linear structure relationships to investigate the efficacy of factor structures in sport psychology is uncommon. The procedure derives indices of fit that confirm the adequacy of a proposed factor structure underlying a construct. The results of the two confirmatory factor analyses reported above confirm the existence of a stable two-factor structure and the indices of fit for the Perception of Success Questionnaire were acceptable. This supports the general findings of Marsh (1994), who also found that the two-factor solution for the questionnaire was confirmed when confirmatory factor analysis was used to compare responses to different instruments independently designed to measure the same, or strongly related, constructs. Clearly, the two-dimensional achievement goal structure appears to exist; we may conclude, therefore, that the Perception of Success Questionnaire is a reliable and valid measure of task and ego goal orientations in sport.

Discussion

The aims of this study were to trace the development of the Perception of Success Questionnaire, to present psychometric data to support the validity and reliability of the questionnaire, and to present further evidence of the factorial validity of the Children's version and the Adult version of the scale by conducting confirmatory factor analyses. The Perception of Success Questionnaire has been developed over the past 10 years and has been fine-tuned to the present 12-item measure for both adults and children. The findings here support the two-factor structure of the questionnaire and reveal that it has strong psychometric properties. In addition, the data that emerged from this analysis compare very favourably with those of other published studies that have reported confirmatory factor analysis with sport-specific questionnaires (e.g. Gill and Deeter, 1988; McAuley *et al.*, 1989; Walling *et al.*, 1993; Marsh, 1994; Chi and Duda, 1995).

However, no scale is perfect. If we are to avoid the 'jingle, jangle' fallacy (Marsh, 1994), then we need to continue to subject our questionnaires to rigorous tests, thus ensuring that we are measuring what we purport to measure. This is certainly the case with the Perception of Success Questionnaire. However, the use of the questionnaire so far has demonstrated that it is a valid and reliable instrument to measure task and ego motivational orientations in sport. Current and future research should focus on determining the validity and reliability of the questionnaire to measure the motivational orientations which, many have argued, are important to understand achievement behaviour in sport (e.g. Roberts, 1984, 1992, 1993; Duda, 1989, 1992, 1993; Treasure and Roberts, 1994a,b; Roberts and Treasure, 1995; Roberts *et al.*, 1997). We are also determining the cross-cultural validity of achievement goals. The Perception of Success Questionnaire has been successfully translated into French (Durand *et al.*, 1996), Finnish (J. Liukkonnen, unpublished manuscript), Korean (Yoo and Park, 1994), Spanish (Escarti *et al.*, in press) and Norwegian (Roberts and Ommundsen, 1996). The robustness of the achievement goal approach to understanding motivation in sport contexts is now well documented, and the evidence to support the robustness, reliability and validity of the Perception of Success Questionnaire to measure achievement goal orientations in sport is now considerable.

References

American Psychological Association (1974). *Standards for Educational and Psychological Tests and Manuals*. Washington, DC: American Psychological Association.

Ames, C. (1984). Competitive, co-operative, and individualistic goal structures: A motivational analysis. In *Research on Motivation in Education*, Vol. 1 (edited by R. Ames and C. Ames), pp. 177–207. New York: Academic Press.

Ames, C. (1987). The enhancement of student motivation. In *Advances in Motivation and Achievement*, Vol. 5 (edited by D.A. Kleiber and M.L. Maehr), pp. 123–148. Greenwich, CT: JAI Press.

Ames, C. (1992). Achievement goals, motivational climate, and motivational processes. In *Motivation in Sport and Exercise* (edited by G.C. Roberts), pp. 161–176. Champaign, IL: Human Kinetics.

Ames, C. and Archer, J. (1987). Mothers' beliefs about the role of ability and effort in school learning. *Journal of Educational Psychology*, **18**, 409–414.

Bryne, B. (1984). The general/academic self-concept nomological network: A review of construct validation research. *Journal of Education Research*, **54**, 427–456.

Chi, L. and Duda, J.L. (1995). Multi-sample confirmatory factor analysis of the task and ego orientation in sport questionnaire. *Research Quarterly for Exercise and Sport*, **66**, 91–98.

Dennett, D.C. (1978). *Brainstorms: Philosophical Essays on Mind and Psychology*. Montgomery, VT: Bradford.

Duda, J.L. (1989). The relationship between task and ego orientation and the perceived purpose of sport among male and female high school athletes. *Journal of Sport and Exercise Psychology*, **11**, 318–335.

Duda, J.L. (1992). Motivation in sport settings: A goal perspective approach. In *Motivation in Sport and Exercise* (edited by G.C. Roberts), pp. 57–92. Champaign, IL: Human Kinetics.

Duda, J.L. (1993). Goals: A social cognitive approach to the study of achievement motivation in sport. In *Handbook of Research in Sport Psychology* (edited by R.N. Singer, M. Murphey and L.K. Tennant), pp. 421–436. New York: Macmillan.

Duda, J.L. and Nicholls, J.G. (1992). Dimensions of achievement motivation in schoolwork and sport. *Journal of Educational Psychology*, **84**, 1–10.

Durand, M., Famose, J.P., Cury, F. and Sarrazin, P. (1996). Une version francaise des questionnaires de buts de motivation scholaires et sportifs. *International Journal of Sport Psychology*, **27**, 251–268.

Dweck, C.S. (1986). Motivational processes affecting learning. *American Psychologist*, **41**, 1040–1048.

Dweck, C.S. and Elliott, E. (1983). Achievement motivation. In *Handbook of Child Psychology. Vol. 4: Socialisation, Personality, and Social Development* (edited by M. Hetherington), pp. 643–691. New York: John Wiley.

Dweck, C.S. and Leggett, E.L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, **95**, 265–273.

Escarti, A., Cervello, E. and Guzman, J.F. (1996). La orientacion de metas de adolescentes deportistas de competicion y la percepcion de los criterios de exito deportivo de los otros significativos. *Revista de Psicologia Social Aplicada*, **6**, 27–42.

Ewing, M.E. (1981). Achievement orientations and sport behaviour of males and females. Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign.

Gill, D.L. and Deeter, T.E. (1988). Development of the sport orientation questionnaire. *Research Quarterly for Exercise and Sport*, **59**, 191–202.

Jackson, S.A. (1988). Positive performance states of athletes: Toward a conceptual understanding of peak performance. Unpublished Master's thesis, University of Illinois, Champaign, IL.

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

Joreskog, K.G. (1969). A general approach to confirmatory maximum likelihood factor analysis. *Psychometrika*, **34**, 183–202.

Joreskog, K.G. and Sorbom, D. (1993). *Windows LISREL 8.12*. Chicago, IL: Scientific Software International, Inc.

Kavussanu, M. (1996). Moral development and behaviour in sport: An achievement goal perspective. Unpublished doctoral thesis, University of Illinois, Champaign, IL.

Maehr, M.L. (1984). Meaning and motivation: Toward a theory of personal investment. In *Research on Motivation in Education*, Vol. 1 (edited by R. Ames and C. Ames), pp. 115–144. New York: Academic Press.

Maehr, M.L. and Braskamp, L. (1986). *The Motivation Factor: A Theory of Personal Investment*. Lexington, MA: Lexington Books.

Marsh, H. (1994). Sport motivation orientations: Beware of jingle-jangle fallacies. *Journal of Sport and Exercise Psychology*, **16**, 365–380.

Marsh, H.W., Balla, J.R. and McDonald, R.P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin*, **103**, 391–410.

McArthur, L.Z. and Baron, R.M. (1983). Toward an ecological theory of social perception. *Psychological Review*, **90**, 215–238.

McAuley, E., Duncan, T.E. and Tammen, V.V. (1989). Psychometric properties of the intrinsic motivation inventory in a competitive sport setting: A confirmatory factor analysis. *Research Quarterly for Exercise and Sport*, **60**, 48–58.

Nicholls, J.G. (1978). The development of the concepts of effort and ability, perception of attainment, and the understanding that difficult tasks take more ability. *Child Development*, **49**, 800–814.

Nicholls, J.G. (1980). An intentional theory of achievement motivation. Communication to the *Symposium on Attributional Approaches to Human Behaviour*, Centre for Interdisciplinary Studies, University of Bielefeld, Germany, August.

Nicholls, J.G. (1984). Conceptions of ability and achievement motivation. In *Research on Motivation in Education*, Vol. 1 (edited by R. Ames and C. Ames), pp. 39–73. New York: Academic Press.

Nicholls, J. (1989). *The Competitive Ethos and Democratic Education*. Cambridge, MA: Harvard University Press.

Nicholls, J. (1992). The general and the specific in the development and expression of achievement motivation. In *Motivation in Sport and Exercise* (edited by G.C. Roberts), pp. 31–57. Champaign, IL: Human Kinetics.

Nicholls, J.G. and Miller, A.T. (1984). Development and its discontents: The differentiation of the concept of ability. In *The Development of Achievement Motivation* (edited by J.G. Nicholls), pp. 185–218. Greenwich, CT: JAI Press.

Nicholls, J., Patashnik, M. and Nolen S. (1985). Adolescent theories of education. *Journal of Educational Psychology*, 77, 683–692.

Roberts, G.C. (1984). Achievement motivation in children's

sport. In *The Development of Achievement Motivation* (edited by J. Nicholls), pp. 251–281. Greenwich, CT: JAI Press.

Roberts, G.C. (1992). Motivation in sport and exercise: Conceptual constraints and convergence. In *Motivation in Sport and Exercise* (edited by G.C. Roberts), pp. 3–30. Champaign, IL: Human Kinetics.

Roberts, G.C. (1993). Motivation in sport: Understanding and enhancing the motivation and achievement of children. In *Handbook of Research in Sport Psychology* (edited by R.N. Singer, M. Murphey and L.K. Tennant), pp. 405–420. New York: Macmillan.

Roberts, G.C. and Balague, G. (1989). The development of a social-cognitive scale of motivation. Communication to the *Seventh World Congress of Sport Psychology*, Singapore, July.

Roberts, G.C. and Balague, G. (1991). The development and validation of the Perception of Success Questionnaire. Communication to the *8th European (FEPSAC) Congress*, Cologne, Germany, July.

Roberts, G.C. and Ommundsen, Y. (1996). Effect of goal orientations on achievement beliefs, cognitions and strategies in team sport. *Scandinavian Journal of Medicine and Science in Sports*, **6**, 46–56.

Roberts, G.C. and Treasure, D.C. (1995). Achievement goals, motivational climate, and achievement strategies and behaviours in sport. *International Journal of Sport Psychology*, **26**, 64–80.

Roberts, G.C., Treasure, D.C. and Hall, H.K. (1994). Parental goal orientations and beliefs about the competitive sport experience of their child. *Journal of Applied Social Psychology*, **24**, 631–645.

Roberts, G.C., Hall, H.K., Jackson, S.A., Kimiecik, J.C. and Tonymon, P. (1995). Implicit theories of achievement and the sport experience: Effect of goal orientations on achievement strategies and perspectives. *Perceptual and Motor Skills*, **81**, 219–224.

Roberts, G.C., Treasure, D.C. and Kavussanu, M. (1996). The orthogonality of achievement goals: Beliefs about success and satisfaction in sport. *The Sport Psychologist*, **10**, 398–408.

Roberts, G.C., Treasure, D.C. and Kavussanu, M. (1997). Motivation in physical activity contexts: An achievement goal perspective. *Advances in Motivation and Achievement*, Vol. 10 (edited by M. Maehr and P. Pintrich), pp. 413–447. Greenwich, CT: JAI Press.

Rupp, M.T. and Segal, R. (1989). Confirmatory factor analysis of a professional scale in pharmacy. *Journal of Social and Administrative Pharmacy*, **6**, 31–38.

Tabachnick, B.G. and Fidell, L.S. (1996). *Using Multivariate Statistics*. Northridge, CA: Harper Collins.

Treasure, D.C. and Roberts, G.C. (1994a). Cognitive and affective concomitants of task and ego goal orientations during the middle-school years. *Journal of Sport and Exercise Psychology*, **16**, 15–28.

Treasure, D.C. and Roberts, G.C. (1994b). Perception of success questionnaire: Preliminary validation in an adolescent population. *Perceptual and Motor Skills*, **79**, 607–610.

Tucker, L.R. and Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, **38**, 1–10.

Walling, M.D. (1994). Children's conceptions of effort and ability in the physical and academic domains. Unpublished doctoral thesis, Purdue University, West Lafayette, IN.

Walling, M.D., Duda, J.L. and Chi, L. (1993). The perceived motivational climate in sport questionnaire: Construct and predictive validity. *Journal of Sport and Exercise Psychology*, **15**, 172–183.

Whitehead, J. (1987). *A Study of Adolescent Drop-out and Persistence in Sport in Relation to Subjective Achievement Goals: Phase II*. Report to the National Coaching Foundation, Leeds, UK.

Whitehead, J. and Smith, A.G. (1996). Issues in development of a protocol to evaluate children's reasoning about ability and effort in sport. *Perceptual and Motor Skills*, **83**, 355–364.

Yoo, J. and Park, S.J. (1994). A field test of the achievement goal perspective in sport. *Korean Journal of Physical Education*, **33**, 14–28.

Appendix 1: Perception of Success Questionnaire (Children's Version)

What does success in sport mean to you? There are no right or wrong answers. We ask you to circle the letter that best indicates how you feel.

WHEN PLAYING SPORT, I FEEL MOST SUCCESSFUL WHEN:

	Strongly agree		Neutral		Strongly disagree
I beat other people	A	B	C	D	E
I am clearly better	A	B	C	D	E
I am the best	A	B	C	D	E
I try hard	A	B	C	D	E
I really improve	A	B	C	D	E
I do better than others	A	B	C	D	E
I reach a target I set for myself	A	B	C	D	E
I overcome difficulties	A	B	C	D	E
I succeed at something I could not do before	A	B	C	D	E
I accomplish something others cannot do	A	B	C	D	E
I show other people I am the best	A	B	C	D	E
I perform to the best of my ability	A	B	C	D	E

Appendix 2: Perception of Success Questionnaire (Adult Version)

What does success in sport mean to you? There are no right or wrong answers. We ask you to circle the letter that best indicates how you feel.

WHEN PLAYING SPORT, I FEEL MOST SUCCESSFUL WHEN:

	Strongly agree		Neutral		Strongly disagree
I beat other people	A	B	C	D	E
I am clearly superior	A	B	C	D	E
I am the best	A	B	C	D	E
I work hard	A	B	C	D	E
I show clear personal improvement	A	B	C	D	E
I outperform my opponents	A	B	C	D	E
I reach a goal	A	B	C	D	E
I overcome difficulties	A	B	C	D	E
I reach personal goals	A	B	C	D	E
I win	A	B	C	D	E
I show other people I am the best	A	B	C	D	E
I perform to the best of my ability	A	B	C	D	E