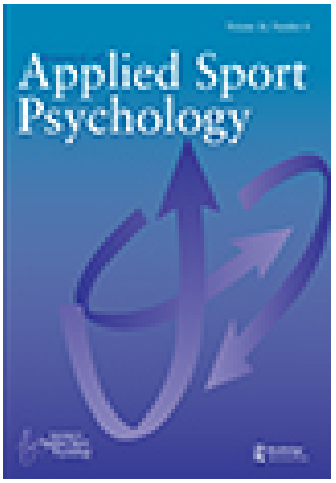

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Nichola Callow [a], Matthew J. Smith [b], Lew Hardy [a], Calum A. Arthur [a] & James Hardy [a]

[a] Institute for the Psychology of Elite Performance, Bangor University, UK

[b] University of Chichester, UK

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Measurement of Transformational Leadership and its Relationship with Team Cohesion and Performance Level

NICHOLA CALLOW

Institute for the Psychology of Elite Performance, Bangor University, UK

MATTHEW J. SMITH

University of Chichester, UK

LEW HARDY, CALUM A. ARTHUR, AND JAMES HARDY

Institute for the Psychology of Elite Performance, Bangor University, UK

The present study explored the construct validity of a Differentiated Transformational Leadership Inventory and its relationship with team cohesion and performance level. Three hundred and nine club standard ultimate Frisbee players in the United Kingdom (mean age = 24.30 years, SD = 3.90) completed an adapted version of Hardy, Arthur, Jones, Shariff, Munnoch, Isaacs, and Allsopp et al.'s (in press) Differentiated Transformational Leadership Inventory and the Group Environment Questionnaire (Carron, Widmeyer, & Brawley, 1985). Confirmatory factor analysis revealed evidence for the factorial and discriminant validity of the leadership inventory. Furthermore, results demonstrated that the leadership behaviors of fostering acceptance of group goals and promoting team work, high performance expectations, and individual consideration significantly predicted task cohesion; and fostering acceptance of group goals and promoting teamwork significantly predicted social cohesion. Performance level moderated these relationships. These results are discussed with reference to the conceptualization and measurement of transformational leadership, and how coaches' leadership behaviors may influence cohesion depending on the level of athletes' performance.

Coaches' leadership behaviors play an important role in successful sporting performance (e.g., Gould, Greenleaf, Chung, & Guinan, 2002). Nevertheless, within the sport context, the conceptual and theoretical examination of these leadership behaviors is somewhat limited, especially in relation to transactional and transformational leadership theory (Rowold, 2006). This lack of research is surprising given the predominance of this theory in other contexts such as the military and business (e.g., Bass, Avolio, Jung, & Berson, 2003; Burns 1978; Rafferty & Griffin, 2004).

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Address correspondence to Nichola Callow, Institute for the Psychology of Elite Performance, School of Sport, Health and Exercise Sciences, Bangor University, George Building, Holyhead Road, Bangor, Gwynedd, United Kingdom LL57 2PZ. E-mail: n.callow@bangor.ac.uk

Burns' (1978) theory states that transactional leadership involves exchange processes between leaders and followers, with followers receiving direct rewards (and punishments) for their work. In contrast, transformational leadership involves the building of relationships with followers based on personal, emotional, and inspirational exchanges, with the goal of developing followers to their fullest potential. Transformational leadership behaviors result in higher levels of individual, group, and organizational performance beyond that accounted for by transactional behaviors (Bass et al., 2003).

More recently, Burns' (1978) theory has been further developed into a full range leadership theory (FRLT; Avolio & Yammarino, 2002). The FRLT defines five transformational factors, three transactional leadership factors, and one non-leadership factor and is measured by the Multifactor Leadership Questionnaire (MLQ-5X; Bass & Avolio, 2000). Researchers using the MLQ-5X have found transformational leadership to positively influence individual and group outcomes in business (e.g., Purvanova, Bono, & Dzieweczynski, 2006), the military (e.g., Dvir, Eden, Avolio, Bass, & Shamir, 2002), and education (Barnett & McCormick, 2004). Furthermore, in sport, Zacharatos, Barling, and Kelloway (2000) found peers and coaches perceived leaders who used transformational behaviors as effective, satisfying, and effort-evoking; Charbonneau, Barling, and Kelloway (2001) demonstrated that intrinsic motivation mediated the transformational leadership/performance relationship in university athletes; and Rowold (2006) found transformational leadership behaviors to predict performers' perceptions of the effectiveness of their coaches' behaviors, satisfaction with their coach, and extra effort over and above transactional leadership.

Although the MLQ5-X is the most popular tool for measuring transformational leadership (Avolio & Yammarino, 2002), it is not without its critics. Empirically, there have been problems with its factorial (see Rafferty & Griffin, 2004 for a review) and discriminant validity (e.g., Careless, 1998). Indeed, although Rowold (2006) contended his results support the nine-factor structure of the MLQ-5X in sport, when the fit statistics are examined in relation to the contemporary criteria for fit statistics (e.g., Hu & Bentler, 1999), the adequacy of fit and support for the nine-factor structure is brought into question. These types of issues have led some researchers to use global measures of transformational and transactional leadership (e.g., Jung, Chow, & Wu, 2003), and some a reduced set of factors (e.g., Beauchamp, Welch, & Hulley, 2007). Whereas other authors, such as Podsakoff, MacKenzie, Moorman, and Fetter (1990) and Hardy et al., (in press) have developed their own more differentiated models and measures of transformational leadership.

Based on items from Podsakoff et al.'s (1990) Transformational Leadership Inventory (TLI) and items from the MLQ5-X, Hardy et al. (in press) developed a Differentiated Transformational Leadership Inventory (DTLI) for the military setting. This inventory includes six transformational behaviors: *individual consideration*, where leaders show their respect for followers and concern for their personal feelings and needs; *inspirational motivation*, where leaders develop, articulate, and inspire others with their vision for the future; *intellectual stimulation*, where leaders challenge followers to re-examine their assumptions about their work, and re-think how it can be performed; *fostering acceptance of group goals*, where leaders promote cooperation among followers and get them to work together towards a common goal; *high performance expectations*, where leaders express expectations for excellence, quality, and/or high performance on the part of followers; *appropriate role modelling*, where leaders set examples for followers to emulate that are consistent with values that the leaders espouse; and a transactional behavior, *contingent reward*, where leaders provide positive reinforcement in return for appropriate follower behavior and performance. In line with Hu and Bentler's (1999) statistical criteria, confirmatory factor analysis (CFA) of the inventory generated supportive evidence for its factorial validity. Furthermore, all leadership behaviors, with the exception of

high expectations and intellectual stimulation, significantly discriminated between pass and failure of military recruit training, thus evidence for the discriminant validity of the inventory was demonstrated.

In addition to developing the inventory, Hardy et al. (in press) also explored the effect of a transformational leadership intervention on self-report recruit outcomes. Results revealed that the leadership behaviors of individual consideration, fostering acceptance of group goals and teamwork, and contingent reward were significantly higher for the intervention as opposed to the control group, as were the psychological outcomes of self-confidence, resilience, and satisfaction with training. The differential results for the leadership behaviors support the predictive validity of the inventory, and highlight the importance of using a differentiated rather than global model of leadership. Specifically, adopting the differentiated model allowed for specific leadership behaviors to be targeted (cf. Antonakis, Avolio, & Sivasubramaniam, 2003), and differential effects to be revealed (Podsakoff et al., 1990). These differential effects would not have been revealed if a global model had been used. Given the positive results and potential of the inventory to inform interventions for leadership development and successful performance, the first purpose of the present study was to examine the factorial and discriminant validity of an adapted version of the inventory in a sport setting.

Research on transformational leadership has identified variables that have mediated the relationship between transformational leadership behaviors and follower behaviors. These variables include trust in the leaders (Barling, Weber, & Kelloway, 1996), intrinsic motivation (Charbonneau et al., 2001), and team cohesion (Bass et al., 2003). Although transformational leadership is theorized to have its most important effects on team processes and outcomes (e.g., Dvir et al., 2002), little research has been conducted in this area. Indeed, in sport, although coach leadership has been shown to predict task and social cohesion (Jowett & Chaundy, 2004), research investigating transformational leadership has yet to take group dynamic variables such as cohesion into account. Consequently, the second purpose of the present study was to examine the relationship between transformational leadership and cohesion.

With reference to cohesion, Hardy, Shariff, Munnoch, and Allsopp (2004) found fostering acceptance of group goals to be the only leadership behavior to predict task and social cohesion in a military context. Interestingly, Brawley, Carron, and Widmeyer (1993) found that athlete participation in team goal setting led to high task and social cohesion. Perhaps the process of being involved in the setting of team goals facilitates acceptance of those goals. Based on these results, and the notion that cohesion would develop in performers who were encouraged by leaders to work towards common goals, it was hypothesized that in the present study fostering acceptance of group goals and promoting team work would have a positive relationship with both task and social cohesion. Related to encouragement by leaders, research has explored the possible transference of expectations from leader to follower through the Galatea effect (Eden & Ravid, 1982). With this effect, follower expectations and subsequently performance can be raised as an unintentional consequence of the Pygmalion effect (i.e., through subconscious high expectations of the followers by the leader) or as a result of deliberate high expectancy communicated by a leader to the followers (see White & Locke, 2000 for review). Indeed, within the sport literature coach expectations predicted their team's performance (Chase, Lirgg, & Feltz, 1997). Thus, given that leaders who exhibit high performance expectations would perhaps also communicate high expectations related to task aspects of cohesion, it was hypothesized that high performance expectations would have a positive relationship with task cohesion.

A further hypothesis can be drawn from previous research that has used the Leadership Scale for Sports (LSS; Chelladurai & Saleh, 1978). This research has indicated that coaches perceived to be high in social support develop teams with greater levels of task cohesion

(Gardner, Shields, Bredemeier, & Bostrom, 1996). The social support construct of the LSS can be conceptually linked with the individual consideration dimension from Bass and Avolio's (2000) MLQ-5X, because both refer to a leader's concern for followers' feelings and needs. Moreover, Yukelson (1997) proposed that leaders who are aware of and accommodate individual differences within a team are able to blend the talents of individuals into a smooth, cohesive, working unit. In view of this reasoning, and the results from the research using the LSS, it was hypothesized that individual consideration would have a positive relationship with task cohesion.

Linked to smooth working units, although team conflict has been shown to have a negative effect on cohesion and performance (Carron, Colman, Wheeler, & Stevens, 2002), research indicates that constructive conflict and constructive conflict management are associated with higher cohesion and performance (Sullivan & Feltz, 2001). Given that conflict management relates to individual problem-solving, and the leadership behavior of intellectual stimulation challenges performers to re-examine their assumptions about their performance and create solutions to problems, this leadership behavior could be used to encourage constructive conflict management. Consequently, it was hypothesized that intellectual stimulation will have a positive relationship with both task and social cohesion.

Within transformational leadership research, the influence of contextual and situational variables on the relationship between leadership and various outcomes has been highlighted as important (Antonakis et al., 2003). Indeed, Hardy and Arthur (2006) found that leadership behaviors were differentially important across recruits from three divisional companies of the British Infantry who had the same operational goals in war, but different non-operational duties. Specifically, provision of inspirational motivation was important for parachute recruits and to a lesser extent for line recruits, but did not appear to be important for guard recruits. Conversely, providing an appropriate role model appeared important for guard recruits, but rather less so for parachute or line recruits. This contextual and situational influence is also evident in the sport setting. For example, using the LSS, research has shown experienced elite athletes prefer autocratic behavior from their coach (Chelladurai & Carron, 1983). Further, with time and experience athletes come to expect their coach to make the majority of the decisions (Carron & Hausenblas, 1998) and have a preference for social support (Chelladurai & Carron, 1983). Thus, it is clear that the performance level of the performer may moderate the relationship between leader behaviors and cohesion. Consequently, the final purpose of the present study was to explore the relationship between transformational leadership behaviors and cohesion at two levels of performance.

In summary, the present study had three purposes: (a) to examine the factorial and discriminant validity of an adapted version of Hardy et al.'s DTLI in a sport setting; (b) to examine the relationship between leadership behaviors and cohesion; and (c) to explore the relationship between transformational leadership behaviors and cohesion at two performance levels.

METHOD

Participants

A sample of 309 ultimate Frisbee players (male $n = 204$, female $n = 105$) with a mean age of 24.30 ($SD = 3.90$) years gave informed consent to participate in the study. Ultimate Frisbee was sampled because it is an interactive team sport (Carron & Chelladurai, 1981) with which the present authors had data collection opportunities. Participants were recruited only from teams who were competing in UK national tour events or university national finals. Further, within the context of UK ultimate Frisbee, the captain is normally the leader/coach of the

team. For teams to be recruited, captains had to achieve a number of criteria that distinguished them as the true leaders of the teams (i.e., having specific responsibilities for leading training, strategy, team selection, and coaching). Participants had played ultimate Frisbee for an average of 1.10 ($SD = 1.30$) years under their current captains.

Explanation of the Game of and Organizational Structure of Ultimate Frisbee in the UK

Ultimate Frisbee is played with a disc (approximately 27 cm in diameter and 175 g) and 7 players on each team. The outdoor pitch measures 64 m by 37 m and with an 18 m deep 'endzone' at each end of the pitch. Players cannot run when in possession of the disc, instead the disc is moved up field by throwing it from player to player. A point is scored by a player catching the disc in the endzone that they are attacking. Squad sizes are not fixed, with unlimited substitutions and players able to interchange in the break in play after a point is scored. The game is unique in that it is self-refereeing, with players having to make and agree on decisions regarding rule infringements (e.g., contact fouls) between themselves. In the UK, there are open competitions for male, female, and mixed gender teams, with teams based mainly on geographical location. The outdoor season is based around the "tour", a series of three qualifying events, and then a national final, to which the top 32 teams in the country are invited to compete. The most successful teams on the tour are invited to represent the UK in European and World club competitions.

Measures

As part of a larger data collection, participants completed a total of three measures. For the purposes of the present study, the following two measures were relevant.

Transformational Leadership

To determine perceptions of transformational leadership behaviors an adapted version of Hardy et al.'s (in press) DTLI was administered. The DTLI has 26-items, with items from the MLQ-5X (Bass & Avolio, 2000) and TLI (Podsakoff et al., 1990) measuring individual consideration (MLQ-5X), inspirational motivation (MLQ-5X), intellectual stimulation (TLI), fostering acceptance of group goals (TLI), high performance expectations (TLI), appropriate role-modelling (TLI), and contingent reward (TLI) in a military context. Hardy and colleagues' research supports the factorial, discriminant, and predictive validity of the inventory. In the present study the stem "my section corporal" was changed to "my team leader/captain". Further, the fostering acceptance of group goals and teamwork title was changed to fostering acceptance of group goals and promoting teamwork, because the latter title reflects the nature of the items more accurately. Also, 4 items not related to sport were deleted (e.g., believes each individual is crucial to the success of the section) and 9 items added (e.g., praises athletes when they show improvement). Consequently, a 31-item inventory specific to sport, measured on a 5-point Likert scale anchored by 1 (*not at all*) to 5 (*all of the time*) was developed. See Table 1 for all 31 items.

Cohesion

The Group Environment Questionnaire (GEQ; Carron et al., 1985) was used to assess the players' perceptions of team cohesion. The GEQ contains 18 items that measure the following four dimensions of task and social cohesion: attraction to group-task (e.g., "I do not like the style of play on this team"), group integration-task (e.g., "We all take responsibility for any loss or poor performance by our team"), attraction to group-social (e.g., "Some of my best friends are on this team"), and group integration-social (e.g., "Our team would like to spend

Table 1
Completely Standardized Factor Loadings and Fit Statistics for Single Factor Models Prior to Item Deletion

Item	Factor Loading	S-Bχ^2 (df)	RMSEA	SRMR	NNFI	CFI
Individual Consideration (IC)		2.45	.03	.02	1.00	1.00
1 Recognizes that different athletes have different needs	.67	(2)				
2a Treats each team member as an individual	.55					
3a Considers that I have different strengths and abilities from others	.62					
4a Helps team members to develop their strengths	59					
Inspirational Motivation (IM)		4.85	.07	.03	.98	.99
1 Talks in a way that makes me believe I can succeed	.64	(2)				
2b Talks optimistically. . .	.69					
3b Talks enthusiastically. . .	.76					
4b Expresses confidence. . .	.55					
Intellectual Stimulation (IS)		.72	.00	.01	1.00	1.00
1 Gets me to re-think the way I do things	.71	(2)				
2 Challenges me to think about problems in new ways	.83					
3 Shows performers how to look at difficulties from a new angle	.78					
4 Tries to help us work out how to solve problems	.59					
Fostering Acceptance of Group Goals and Promoting Team Work (AGG)		5.17	.07	.06	.98	.99
1 Encourages athletes to be team players	.65	(2)				
2 Gets the team to work together for the same goal	.79					
3 Develops a strong team attitude and spirit among athletes	.61					
High Performance Expectations (HPE) c		17.72	.09	.04	.98	.99
1 Insists on only the best performance	.69(d)	(5)				
2 Will not settle for second best	.75					
3 Expects us to achieve high standards	.86					
4 Expects a lot from us	.85					
5 Always expects us to do our best	.69					
Appropriate Role Model (ARM) c		27.44	.12	.05	.94	.97
1 Leads from the front whenever he/she can	.66	(5)				
2 Is a good role model for me to follow	.65					
3 Leads by example	.93					
4 Always sets a good example	.65(d)					
5 Leads by "doing" rather than simply "telling"	.64					
Contingent Reward (CR) c		47.76	.12	.05	.96	.98
1 Praises athletes when they show improvement	.66	(9)				
2 Personally praises me when I do outstanding work	.87(d)					
3 Always recognizes our achievements	.64					
4 Gives me positive feedback when I perform well	.92(d)					
5 Gives us praise when we do good work	.75					
6 Gives me special recognition when I do very good work	.82					

a. These three items have been modified from original MLQ-5X items.
b. These three items are word indicators only, of complete MLQ-5X items. All six items were reproduced by special permission of the Publisher, MIND GARDEN, Inc., www.mindgarden.com, from the "Multifactor Leadership Questionnaire for Research" by Bernard M. Bass and Bruce J. Avolio. Copyright 1995, 2000 by Bernard M. Bass and Bruce J. Avolio. All rights reserved. Further reproduction is prohibited without the publisher's written consent.
c. Reveals inadequate fit using Hu and Bentler's (1999) cut off point recommendations
d. Items deleted after first single factor confirmatory factor analyses (CFAs).

time together in the off season"). Each item is measured on a 9-point scale anchored by 1 (*strongly disagree*) to 9 (*strongly agree*). For the purpose of the present study, the two task dimensions and the two social dimensions were summed to provide a task-cohesion and a social-cohesion scale (Carron et al., 1985).

Although questions have been raised about the internal consistency of the GEQ scales (e.g., Eys, Carron, Bray, & Brawley, 2007); studies have supported the validity of the GEQ across a variety of groups and situations (see Carron, Brawley, & Widmeyer, 1998 for a review). Importantly, in the present study the internal consistency of the task and social cohesion scales were $\alpha = .83$ and $\alpha = .82$ respectively, that is above the .70 criteria for acceptable internal consistency (Nunnally & Bernstein, 1994).

Performance Level

Participants were divided into two performance groups. The "high performance" group were participants from teams who had qualified for the European Ultimate Club Championships ($n = 118$) and the "low performance" group were participants who had not qualified for the European Ultimate Club Championships ($n = 191$).

Procedure

Following school research ethics board approval, 48 team captains were approached (at random) during three ultimate Frisbee events (tour 1, student outdoor finals, and tour 2) to gain permission for their teams to participate in the study. It was established verbally that the captains were the true leaders of the sides (i.e., they led training, devised tactics and strategies, and were the main communicators to the teams). In return for their participation, captains were offered feedback from the results of the inventories. More specifically, if requested, captains were provided with information concerning their own leadership behaviors, and information on how these scores compared to captains of other teams. Confidentiality of individual responses and team identification was maintained in all cases.

All captains gave permission for his/her team to participate in the study, at this point the nature of the study was then explained to the players during a break in their competition schedule. Players who volunteered signed an informed consent form and provided their postal or e-mail address. After the competition weekend, inventories were sent out individually to participants by e-mail or by post, with a request to return them to the researcher on completion as soon as possible. A total of 454 ultimate Frisbee players (282 men, 172 women) were approached to participate in the study. Out of the 441 participants who requested their questionnaire be sent by e-mail, 301 were returned (68%). Whereas, out of the 13 participants who requested their questionnaire be sent by post, 8 were returned (62%). Thus, a total of 309 questionnaires (68% response rate) were returned to the researcher.

Data Analysis

Descriptive analyses were conducted on demographic variables (e.g., years with the leader) and for all of the scales measured in the study. The factorial validity of the DTLI was examined via analysis of covariance structures using LISREL 8.12 (Joreskog & Sorbom, 2003) with maximum likelihood estimation. A sequential approach to model testing, advocated by Biddle, Markland, Gilbourne, Chatzisarantis, and Sparkes (2001) was utilized. This approach first tested separate single factor models for each scale to assess the convergent validity of the items making up that scale. The procedure examined a number of "fit indices" to ascertain the structural integrity of each scale (see below for further detail on the fit indices). If a scale was judged as unacceptable, items were considered for removal based on two criteria. First, if

items displayed low factor loadings and/or highly positive or negative standardized residuals. Low factor loadings demonstrate items that are poor indicators of their underlying factor, and problem residuals can mean that the model is either under or over parameterized. Second, when problem items were identified, they were then scrutinized to see if there was an appropriate theoretical rationale for their removal. For example, the high performance expectation (HPE) item "...insists on only the best performance" (HPE1) had a large positive standardized residual with HPE2 "...will not settle for second best." Scrutiny of the items lead to the conclusion that implicit within the HPE1 is a demand for the best performance. Theoretically, this demand is contrary to the underlying premise of transformational leadership, which is based on the building of relationships through personal, emotional, and inspirational exchanges. Indeed, within this theoretical context, exchanges should occur in terms of expectations, beliefs, and hopes rather than demands. Consequently, taking the statistical results and theoretical rationale together, HPE1 was deleted. Once problem items had been removed, the goodness of fit of each pair of scales was then examined. In addition to examining factor loadings and standardized residuals, modification indices were explored to identify problem items. Finally, using the same criteria, the whole model was tested.

To assess model fit for both the single factor analyses and the whole model, the following fit indices were employed; the Satorra-Bentler chi-square statistic (Satorra & Bentler, 1994), the root mean square error of the approximation (RMSEA; Steiger & Lind, 1980), the comparative fit index (CFI; Bentler, 1990), the non-normed fit index (NNFI; Tucker & Lewis, 1973), and the standardized root mean square residual (SRMR; Bentler, 1995). The Satorra-Bentler chi-square was used to correct for non-normality where the data showed departure from multivariate normality (indicated by large Mardia coefficients).

The criteria set for a good model fit included a non-significant Satorra-Bentler chi-square ($p > .05$). Nevertheless, it has been recommended that the chi-square be used subjectively as an index of fit rather than a test statistic, with large chi-square values relative to degrees of freedom indicating a poor fit, and small values indicating a good fit (Jöreskog & Sorbom, 2003). For assessing the fit indices, Hu and Bentler's (1999) relatively conservative criteria were also used (Markland, 2007). Specifically, a RMSEA close to .06 was taken to indicate a good fit, close to .08 a reasonable fit, and greater the 1.0 as a poor fit. The probability that the RMSEA was larger than .06 was examined with the alpha level set at $p > .05$. Further, CFIs and NNFIs of greater than .95, and SRMRs of less than .06 were all taken to indicate a good fit (Hu & Bentler, 1999).

It has recently been argued (Hayduk & Glaser, 2000) that the only criterion to adequately test model fit is the chi-square test statistic, and that incremental fit indices should not be used at all (Barrett, 2007). However, this issue is the subject of much discussion within the literature (e.g., Barrett, 2007; Markland, 2007). Consequently, a combination of Hu and Bentler's (1999) criteria, with recognition that these are not "golden rules," along with an examination of the chi-square relative to its degrees of freedom was employed to provide a balanced approach to testing model fit.

To assess the discriminant validity of the separate leadership scales, competing models were compared. Specifically, the unconstrained model (seven leadership factors) was compared to a series of models where the correlation between pairs of factors was constrained to 1.00. The criteria for discriminate validity to be evident was set where the unconstrained model's χ^2 value had to be significantly less than the constrained models' (Anderson & Gerbing, 1988).

To further examine the discriminant validity of the inventory and to explore the research purpose related to performance level, a discriminant function analysis was employed to explore which (if any) leadership behaviors differentiated between high and low performance levels. Multiple linear regression analyses were then used to examine the relationship between

leadership behaviors, cohesion, and performance level. For all regression analyses the respective tests of assumptions were met.

RESULTS

Descriptive Analyses

Means, standard deviations, zero order correlations, and alpha coefficients for all of the scales measured are displayed in Table 2. In addition, the zero-order correlation between experience and performance level, and, years with the leader and performance level are also displayed. Inspection of the zero order correlations reveals that all leadership behaviors were significantly correlated with both task and social cohesion. The magnitude of the relationships, however, differed. For example, the relationship between acceptance of group goals and promoting teamwork and task cohesion was $r = .51$, whereas the relationship between intellectual stimulation and task cohesion was $r = .33$. The zero order correlations also revealed that certain leadership behaviors (e.g., high performance expectation) were significantly correlated with performance level, whereas other behaviors were not (e.g., individual consideration). Further, of note are the significant correlations between years with the leader and performance level ($r = .25$), and, experience and performance ($r = .53$). These specific correlations will be explored further in the discriminant function analysis section.

Confirmatory Factor Analyses

Data screening of the leadership inventory revealed that four participants had missing data points (less than 1% of the total number of data points). When missing points are 5% or less than the total number of data points, exclusion of participants is an appropriate strategy (Tabachnick & Fidell, 2001). Consequently, the data from the four participants were removed and the analyses performed on the data from the remaining 305 participants.

Single Factor Models

First, the factor loadings and fit statistics for each of the leadership factors were examined. This process revealed that four of the factors, individual consideration (IC), inspirational motivation (IM), intellectual stimulation (IS), and fostering acceptance of group goals and promoting teamwork (AGG), had acceptable factor loadings and fits. However, for three leadership factors the fit was not ideal (see Table 1 for factor loadings and fit statistics).

In considering the single factor model for high performance expectation (HPE), HPE1 ("...insists on only the best performance") was identified as a problem item, and was removed. The subsequent fit for the model was greatly improved, with lower values for $\chi^2(2) = 0.19$, RMSEA = 0.00, and higher values for CFI = 1.00, and NNFI = 1.00. Similarly, for the single factor model for appropriate role model (ARM), one item ARM4 ('...always sets a good example') was identified as a problem item and was removed. When the fit was re-assessed an improved fit resulted, with lower values for $\chi^2(2) = 4.84$, RMSEA = 0.07, SRMR = 0.03, and higher values for CFI = .99, and NNFI = .98. With contingent reward (CR) two items were identified as problematic. Specifically, CR2 ('...personally praises me when I do outstanding work') and CR4 ('...gives me positive feedback when I perform well') were deleted and the fit for the model was greatly improved, with lower values for $\chi^2(2) = 3.17$, RMSEA = 0.04, and SRMR = 0.02, and higher values for CFI = 1.00, and NNFI = 0.99.

Table 2
Means, Standard Deviations, Zero Order Correlations between Study Variables (After Item Deletion). Alpha Coefficients are Displayed in Bold

Scale	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Individual Consideration	3.81	.70	**.66**											
2. Inspirational Motivation	4.17	.62	.51**	**.75**										
3. Intellectual Stimulation	3.34	.76	.54**	.48**	**.82**									
4. Fostering Acceptance of Group Goals and Teamwork	4.22	.71	.60**	.64**	.56**	**.73**								
5. High Performance Expectations	3.99	.82	.31**	.43**	.45**	.38**	**.86**							
6. Appropriate Role Model	4.13	.74	.54**	.64**	.57**	.62**	.46**	**.81**						
7. Contingent Reward	4.04	.73	.60**	.56**	.47**	.53**	.24**	.44**	**.82**					
8. Task cohesion	6.93	1.23	.41**	.44**	.33**	.52**	.42**	.43**	.39**	**.83**				
9. Social cohesion	6.77	1.30	.14*	.21**	.20**	.28**	.15**	.19**	.19**	.42**	**.82**			
10. Experience	4.30	3.30	−.06	.00	−.06*	−.06	.20**	−.03	−.12	−.03	−.15	—		
11. Years with leader	1.10	1.32	.06	.06	.13*	.06	.19**	.10	.02	.02	.02	.38**	—	
12. Performance	—	—	.09	.25	.15	.15	.42	.20**	.06	.21**	.05	−.53**	−.25**	—

$N = 305$, $^{**}P < .001$ $^{*}P < .05$.

Pairwise Combinations

After the separate single factor models for each subscale had been examined, and following the removal of the identified problem items (HPE1, ARM4, CR2, and CR4), the goodness of fit of each pair of subscales was subsequently assessed to identify any ambiguity among items. Of the 21 possible pairwise models, 13 met or exceeded the specified criteria for goodness of fit. The remaining eight models revealed high RMSEA scores or low NNFI scores. Out of the eight problem pairings, four models were combinations associated with individual consideration. The IC items were scrutinized and Item IC2 ('. . .treats each team member as an individual'), although this item would seem to tap IC well, it had high modification indices cross-loading onto other subscales with a focus on the individual, for example, with ARM 2 ('. . .Is a good role model for me to follow'). Perhaps IC2 identifies the individual but does not distinguish enough with regard to differences in individual needs, which is inherent in individual consideration. Thus, IC2 was removed and the subsequent fit of the pairwise models was found to be improved, with only one model (IC and IM) still having an inadequate fit. Of the other four problem models (all including inspirational motivation), no theoretical rationale could be identified for the deletion of problem items. Consequently, with 17 out of 21 pairs fitting well the full model was run.[1]

Full Model

With the items HPE1, IC2, ARM4, CR2, and CR4 removed, the fit of the full model was assessed and revealed a very good fit, with factor loadings ranging from .53 to .86 and $\chi^2(278) = 499.1$, RMSEA $= 0.05$, SRMR $= 0.06$, NNFI $= 0.98$ and CFI $= 0.98$. When the discriminant validity of the separate leadership scales was assessed, all 21 of the resulting unconstrained models had a lower χ^2 than the constrained models, with only the individual consideration / fostering acceptance of group goals and promoting teamwork model not being significantly lower. Nevertheless, given that these two behaviors had discriminant validity with other leadership behaviors, we decided to retain all the separate factors to further explore the individual relationships that they possessed with performance and cohesion.

Discriminant Function Analysis

Prior to conducting the discriminant function analysis to examine which if any leadership behaviors discriminated performance level, it was necessary to conduct a multivariate analysis of covariance (MANCOVA) with performance level as the independent variable, the leadership behaviors as the dependent variables, and experience as a covariate. This analysis was necessary because the significant zero-order correlation between experience and performance level was $r = .53$, that is it was above $r = .30$ which indicates that experience has the potential to act as an interacting or confounding variable in the leadership/performance level relationship (Pedhazur, 1982). Because the zero-order correlation between time with the leader and performance was below .30, time with the leader was not included as a covariate. However, the test of homogeneity of regression slopes assumption was violated. This violation could have occurred because the performance groups had unequal samples (Tabachnick & Fidell, 2001). Specifically, the high performance group had 118 participants in contrast to 191 in the lower performance group. Thus, 118 participants were randomly selected from the larger performance group, and a second MANCOVA conducted with experience as a covariate. The test of homogeneity of regression slopes was satisfied and the analysis revealed that experience was not a significant covariate ($p > .22$). Consequently, a discriminant function analysis was conducted without experience as an independent variable. This analysis revealed that the leadership behaviors discriminated between high and low performance ($\chi^2(7) = 56.21$,

$p < .01$). The standardized structure coefficients suggested that this discrimination was largely due to high performance expectation (.88) and inspirational motivation (.49). The other leadership behaviors did not make a significant contribution to the discriminant function ($r <$ .40).

Regression Analyses

All 305 participants whose data were used in the CFA analyses fully completed the GEQ (Carron et al., 1985). Consequently, the raw data from 305 participants were used in the regression analyses. (See Table 2 for descriptives and zero-order correlations with leadership behaviors.)

Task and Social Cohesion Analyses

It was proposed that fostering acceptance of group goals and promoting teamwork, high performance expectation, individual consideration, and intellectual stimulation would predict task cohesion, while fostering acceptance of group goals and promoting teamwork and intellectual stimulation would predict social cohesion. The first forced entry regression demonstrated that the hypothesized leadership behaviors did predict a significant proportion of the variance in task cohesion, ($R^2 = 0.34$, $F_{4,300} = 38.01$, $p < .01$). Inspection of the standardized beta coefficients indicated that this effect was largely accounted for by fostering acceptance of group goals and promoting teamwork ($\beta = .37$, $p < .001$) followed by high performance expectation ($\beta = .27$, $p < .001$) and individual consideration ($\beta = .14$, $p < .001$). The standardized beta coefficient for intellectual stimulation was non-significant. The second forced entry regression analysis demonstrated that fostering acceptance of group goals and promoting teamwork and intellectual stimulation predicted a significant proportion of the variance in social cohesion ($R^2 = 0.07$, $F_{2,304} = 12.76$, $p < .001$). However, inspection of the standardized beta coefficients revealed that this effect was accounted for by fostering acceptance of group goals and promoting teamwork ($\beta = .23$, $p < .001$) and not intellectual stimulation.

Performance Level: Task and Social Cohesion Analyses

For the higher level performance group, forced regression analysis revealed that fostering acceptance of group goals and promoting teamwork, high performance expectation, individual consideration, and intellectual stimulation predicted a significant proportion of the variance in task cohesion ($R^2 = 0.40$, $F_{4,113} = 18.73$, $p < .01$). However, high performance expectations and individual consideration were the only leadership behaviors to significantly contribute with the respective standardized beta coefficient of $\beta = .37$ $p < .01$; $\beta = 0.26$, $p < .01$. For the lower level performance sample, the four leadership behaviors predicted a significant proportion of the variance in task cohesion ($R^2 = 0.29$, $F_{4,182} = 18.96$, $p < .01$). However, fostering acceptance of group goals and promoting teamwork and high performance expectation were the only leadership behaviors to predict a significant amount of variance with the respective standardized beta coefficients of $\beta = 0.45$, $p < .01$; $\beta = .21$, $p < .05$.

In relation to social cohesion, for both the high and low performance groups, fostering acceptance of group goals and promoting teamwork, and, intellectual stimulation significantly predicted social cohesion. However, a significant standardized beta coefficient was only revealed for fostering acceptance of group goals and promoting teamwork in the lower performance group ($R^2 = 0.07$, $F_{2,115} = 4.00$, $p < .01$, $\beta = .17$, $p > .1$; $R^2 = 0.10$, $F_{2,184} = 10.42$, $p < .01$, $\beta = 0.29$, $p < .01$ respectively).

DISCUSSION

The present study had three purposes: (a) to examine the factorial and discriminant validity of an adapted version of Hardy et al.'s (in press) DTLI in a sport setting; (b) to examine the relationship between leadership behaviors and team cohesion; and (c) to explore the relationship between transformational leadership behaviors and cohesion at two performance levels.

Generally, the results support the factorial validity of the inventory in an interactive sport setting (such as ultimate Frisbee), with the structural integrity of the full seven-factor model being confirmed by CFA. Additionally, the transformational leadership behaviors significantly discriminated between each other with the exception of individual consideration and fostering acceptance of group goals and promoting team work. However, these two factors did show significant discriminant validity with other leadership behaviors. Further, high performance expectations, inspirational motivation, and appropriate role model significantly discriminated between the high and low performance groups whereas the other leadership behaviors did not. Consequently, taking these results together, preliminary support for the discriminant validity of the DTLI in an interactive sport setting is provided.

It is interesting to note that, in the present study, high performance expectation significantly discriminated between high and low performance but contingent reward did not. Whereas, in Hardy et al. (in press), high performance expectation did not significantly discriminate between pass and fail, but contingent reward did. Hardy et al. proposed that the lack of discrimination by high performance expectation was probably due to a ceiling effect with a mean high performance expectation of 4.48 on a 5 point scale. In the present study this ceiling effect was not evident (the mean of high performance expectation was 3.99). Conversely, in Hardy et al., the mean of contingent reward was only 3.23, whereas in the present study it was 4.44. Taken together, these results support the notion that different leadership behaviors are not only used differentially, but their relative influence might vary in different contexts, and, as such, the results provide justification that future research needs to examine the effect of contextual influences on both transformational and transactional leadership.

With regard to team cohesion, as hypothesized fostering acceptance of group goals and promoting teamwork, high performance expectation, and individual consideration predicted task cohesion. In addition, fostering acceptance of group goals and promoting teamwork predicted social cohesion. The significant relationships related to fostering acceptance of group goals and promoting teamwork is important from a measurement perspective. Specifically, given that the MLQ-5X (Bass & Avolio, 2000) does not fully capture this leadership behavior, and the majority of transformational leadership research uses the MLQ or one of its variants, the complete influence of fostering acceptance of group goals and promoting teamwork may previously have been undetected.

The lack of relationship between intellectual stimulation and cohesion was not expected. To recap, it was hypothesized that intellectual stimulation could be used to encourage constructive conflict management by challenging performers to re-examine their assumptions about their performance and create solutions to problems, which would result in cohesive behaviors and a consequent relationship between intellectual stimulation and task and social cohesion. However, it could be that the level of conflict was not to the extent that required explicit intervention via intellectual stimulation, thus reducing the possibility of a significant relationship between the two constructs. Clearly, this explanation is speculative in nature and future research is warranted.

Of particular relevance is the result that when performance level was taken into account there was no relationship between fostering acceptance of group goals and promoting teamwork and

cohesion in the high performance group but there was with the low performance group. One possible reason for this difference could be due to fostering acceptance of group goals and promoting teamwork being more important at the early stage of a team's development when cohesion might be developing or when the team is not achieving the performance level to which they aspire, than, at a more advanced stage in a group's development, when cohesion is more fully developed and the team is achieving the performance level they desire (Holt & Sparkes, 2001).

Similarly, when performance level was taken into account individual consideration predicted task cohesion in the high performance group, but not in the low performance group. This result is not surprising given that as athletes become more experienced they prefer and require more social support (e.g., Chelladurai & Carron, 1983; Gould, Dieffenbach, & Moffett, 2002). Furthermore, the results support previous intervention research demonstrating that a focus on the individual is important for high team cohesion (Holt & Dunn, 2006). Future research should explore the development of a mechanism to help leaders provide a focus on the individual in a manner that influences task cohesion.

From an applied perspective, the performance results lead to the suggestion that the level of performance should be considered when deciding on what specific leadership behaviors to employ if trying to foster team cohesion. Nevertheless, the fact that high performance expectation predicted task cohesion irrespective of performance level leads to the suggestion that this specific leadership behavior could be encouraged irrespective of performance level.

Another applied implication that is linked to a measurement issue can be highlighted. Specifically, although the present study is correlational in nature and causality can not be implied, the fact that high performance expectations, inspirational motivation, and appropriate role model significantly discriminated between the high and low performance groups whereas the other leadership behaviors did not demonstrates the unique contribution that these specific leadership behaviors could make to performance. Thus, using a differentiated rather than global measure of transformational leadership (Podsakoff et al., 1990) allows for an examination of the behaviors in which a leader is low, and which behaviors should be targeted given the specific applied context. With reference to this point, future research should conduct longitudinal studies to establish the direct effect of specific leadership behaviors not only on performance but other important group dynamic variables such as collective efficacy (Bandura, 1997) and team roles (Eys, Beauchamp, & Bray, 2006). Further to this, from both a measurement and applied perspective, other contextual factors should be taken into account. For example, gender is known to determine the factor structure of the MLQ-5X (Antonakis et al., 2003), and to moderate the cohesion/performance relationship (Carron et al., 2002). Thus, future research should possibly explore the validity of the present study's inventory, and relevant dependent variables, in relation to gender.

There are a number of limitations related to the present study and one methodological issue worthy of discussion. In terms of limitations, the magnitude of common method variance effects was not measured (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Nevertheless, in an attempt to reduce possible effects, different response formats for the criterion and predictor variables were used and the study was confidential and voluntary. To reduce the likelihood further, future research should create a larger physical barrier between the collection of the criteria and predictor variables perhaps by posting/e-mailing the criterion related questionnaire at a later stage. In addition, a marker variable could be employed. This method involves a relevant, but theoretically unrelated variable to a study's variables, also being measured. Any observed relationships are partialed out, thus controlling for the possible confound of common method variance. A second limitation relates to the issue that a single sport setting was employed. Future research should examine different types of sports to test the generalizability of our results.

The methodological issue relates to the majority of the data collection being via e-mail rather than by paper and pencil with postal return. The use of on-line data collection methods, such as e-mail, is somewhat unusual for sport psychology research. In research areas that do use this method, there is conflicting evidence on the method's effectiveness in relation to response rates and anonymity (e.g., Donovan, Mader, & Shinsky, 2006), potential sampling bias (Welker, 2007), and possible non-equivalence between on-line and paper and pencil inventories (Buchanan et al., 2005). Nevertheless, given athletes' dislike of paperwork (Beckmann & Kellmann, 2003) and that there was a high response rate in the present study (Pedrana, Hellard, & Giles, 2008), e-mail might be a suitable data collection method for sport psychology research. Clearly, future sport psychology research should examine the issues surrounding the use of this method in more detail.

To summarize, the results of the present study offer supportive evidence for the factorial and discriminant validity of the DTLI (Hardy et al., in press) in an interactive sport setting, and demonstrate the relationship between specific transformational leadership behaviors and both cohesion and level of performance. Further, the differentiated results support previous calls to utilize more fully differentiated models of transformational leadership and highlight the utility of examining leadership behaviors through intervention studies. This is a fruitful area of research that has the potential to influence positively on many aspects of team functioning and performance.

FOOTNOTE

1. The complete set of fit statistics for all 21 pairwise models including the pairwise models involving IC before and after the deletion of IC2 can be obtained from the lead author.

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