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Abstract

The study investigated the association between coach–athlete relationship interdependence and satisfaction level as a function of competition level, relationship length, and gender composition. A series of multilevel modelling analyses found that the associations between relationship interdependence and sport-related satisfaction were weaker for lower-level competitors than they were for higher-level competitors, as well as for short-term relationships compared to long-term relationships. We also found that all female dyads were more satisfied with training and instruction than other gender combinations. Moreover, the associations between relationship interdependence and sport-related satisfaction were weaker for female coach–male athlete dyads than they were for other gender combination dyads. The findings and their implications for theory and practice are discussed.

Keywords

3Cs model, coach–athlete dyads, competition level, gender, interdependence theory, relationship length

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Although researchers from several disciplines have paid considerable attention to personal and social relationships over the last three decades, special or context-dependent relationships have not received much attention (Wood & Duck, 1995). One such context consists of the unique relationships within athletic communities, and of the various types of relationships that exist within athletic communities, the coach–athlete dyad is probably the most important (e.g., Côté & Gilbert, 2009; Lyle, 2002). Similar to school, music, and dance teachers, coaches are expected to provide quality practice sessions and prepare members for evaluation and competition (Short & Short, 2005). Thus, during teaching, learning, and evaluation processes, coaches and athletes can develop relationships through which they express needs (e.g., autonomy, competence) and satisfy goals (e.g., skill development, performance success). Nevertheless, our understanding of the coach–athlete relationship has been hindered by a lack of a comprehensive framework (Wylleman, 2000), and in this paper we provide at least part of such a framework by examining coach–athlete relationships within the context of Interdependence Theory.

Interdependence theory and the coach–athlete relationship

Interdependence Theory (IT) is an important framework for understanding personal and social relationships (Kelley et al., 2003) as it concerns how relational partners influence each other's outcomes (Kelley & Thibaut, 1978; Thibaut & Kelley, 2007). Outcomes are typically defined as a combination of rewards and costs. Rewards are positive consequences (e.g., happiness, gratification and pleasure) and costs are negative consequences (e.g., anxiety, conflict, and antagonism). Interdependence is a fundamental structural property of relationships and represents 'the "foundation" ... the "interpersonal reality" within which specific motives are activated, toward which cognition is oriented, and around which interaction unfolds' (Rusbult, Kumashiro, Coolsen, & Kirchner, 2004, p. 138).

In sports, a coach and an athlete are in a relationship in which the coach is expected to lead, instruct, and provide support, and the athlete is expected to execute, learn, and receive support. Typically, athletes form relationships with coaches to learn skills, techniques, and tactics, to feel competent and successful, and to gain satisfaction from their sport. In contrast, coaches form relationships with athletes to share knowledge and experience, to support the athlete in reaching his/her potential, and to achieve personal success and satisfaction. As such, coach–athlete relationships contain the elements of interdependence as described by Rusbult et al. (2004).

IT posits that partners' evaluations of their relationships are influenced by two standards: comparison level (CL) and comparison level for alternatives (CL-alt). CL is 'the standard against which the member evaluates the 'attractiveness' of the relationship or how satisfactory it is', whereas CL-alt is 'the standard the member uses in deciding to remain in or to leave the relationship' (Thibaut & Kelley, 2007, p. 21). Within IT, satisfaction with a relationship per se is a function of comparing the rewards and costs of that relationship with some type of internal standard (CL). In contrast, deciding whether to stay in a relationship is a function of comparing the rewards and costs of that relationship with the rewards and costs of other relationships that are available (CL-alt). For example,

someone may remain in a unsatisfactory relationship (below his or her CL) because the satisfaction available in other relationships (CL-alt) is less. Or, someone may leave a satisfactory relationship (above his or her CL) because the satisfaction available in other relationships (CL-alt) is greater.

From an IT point of view, relationship members are likely to be both attracted to a relationship and satisfied with it as the rewards associated with the relationship increase and costs decrease. In terms of interdependence per se, more interdependent and close relationships may be more satisfying because they fulfil basic human needs (Baumeister & Leary, 1995, Deci & Ryan, 2000), heighten positive affect (Fredrickson, 2001), and enhance self (Aron & Aron, 1996; Hinde, Finkenauer, & Auhagen, 2001).

Although much of the research on IT has concerned romantic relationships (e.g., Drigotas, Rusbult, & Verette, 1999; Kilpatrick, Bissonnette, & Rusbult, 2002), research has recently applied the theory to examining professional relationships such as the coach–athlete relationship (e.g., Jackson, Grove, & Beauchamp, 2010; Jowett, 2008). The present study used an extension of IT known as the 3Cs model (Jowett, 2007) to examine coaches' and athletes' interdependence and satisfaction with their sport.

Interdependence and the 3Cs model of the coach–athlete relationship

The 3Cs model describes the interdependent nature of the coach–athlete relationship and provides a framework for studying such relationships. In the 3Cs model, coach–athlete relationships are defined by three constructs: closeness, commitment, and complementarity. *Closeness* refers to the affective ties between coaches and athletes, and includes partners' mutual trust, respect, appreciation, and interpersonal attraction. *Commitment* refers to how motivated partners are to maintaining their relationship over time, and includes partners' thoughts of attachment and long-term orientation. *Complementarity* refers to the co-operative interactive acts between the coach and the athlete and includes responsiveness and readiness. Within the model, interdependence of relational partners is presumed to increase as each of the 3Cs increases.

Coach–athlete interdependence and satisfaction

Research on the links between interdependence and satisfaction has found that coach's and athlete's interdependence as measured by the 3Cs are positively related to satisfaction with training and instruction and performance accomplishments, and to dedication to sport and social support. For example, Jowett and Don Carolis (2003) found that the interdependence of athletes' relationships with their coaches was positively related to satisfaction with individual performance, training, instruction, and to treatment by the coach. Correspondingly, coaches' interdependence with their athletes was positively related to their satisfaction with the quality of instruction and performance (Lorimer, 2009). In another study, athletes' perceived levels of relationship interdependence was positively associated with athletes' satisfaction with the relationship (Jowett & Ntoumanis, 2004).

Qualitative studies have found similar relationships between coach–athlete interdependence and outcomes. For example, Jowett and Cockerill (2003), in a study of 12 Olympic-level athletes, examined how relational qualities were associated with affective outcomes (e.g., pleasure and displeasure). In their study, one interviewee stated ‘I felt that he [coach] could not provide me with what I needed, as a result, I started to feel frustrated and angry to the point that I could no longer perform well’, whereas another stated ‘My coach was a father figure. My respect for him was uppermost . . . We remained close after I ended my career with swimming until he died’ (Jowett & Cockerill, p. 325 and p. 320 respectively). Collectively, the findings of these studies indicate that the degree to which coaches and athletes depend on each other for obtaining valued outcomes is related to the degree to which they evaluate the relationship as favourable and believe that the other relationship member satisfies important needs.

Purpose and research hypotheses

The present study aims to identify moderators of the relationships between coach–athlete interdependence and satisfaction. Riemer and Chelladurai (1998) uncovered 15 satisfaction facets in sport, including individual and team performance, team task contribution, dedication, medical personnel, academic support services, and external agents. This study measured three facets of satisfaction: (i) satisfaction with the training and instruction that coaches provided to athletes; (ii) satisfaction with one’s own task performance; and (iii) satisfaction with the behaviours exhibited by the coach that directly affect individuals, yet indirectly affect the entire team. Dyad-level moderators included contextual (i.e., competition level), relational (i.e., relationship length), and individual (i.e., gender) variables.

It has been suggested that ‘athletes and coaches who operate at the highest level of competitive sports may be more motivated to establish interdependent relationships because the risks are higher than for those participating at lower levels’ (Jowett, Paull, & Pensgaard, 2005, p. 160). For example, at higher levels of sport, coaches and athletes may need closer and more interdependent relationships because at that level of performance the risks are much greater (e.g., intensive training that can lead to injury and burnout, de-selection that can lead to contract termination). Thus, top-level coaches and athletes may be motivated to develop close and supportive relationships to protect themselves against such risks. Moreover, higher levels of competition may present coaches and athletes with reduced choices and alternatives, and fewer alternatives mean that coach–athlete relationships that are dissatisfying are maintained (low CL, but even lower CL-alt). Whereas a dissatisfied novice athlete may decide to change coaches, team, and teammates by moving to another locality or registering with another club, top-level athletes are unlikely to have such alternatives. Therefore, we pose our first hypothesis:

H1: Competition level will moderate the association between interdependence and satisfaction as these variables will be more strongly related for dyads at higher levels (e.g., national and international) than lower levels (e.g., club) of competition.

The second moderator we examined was the length that the coach–athlete relationship had existed. For example, Jowett and Gale’s (2002) study with track and field athletes suggested that coach–athlete interdependence was greater in longer (four years or more) than shorter relationships (up to three years) (Jowett & Gale, 2002). Based on the available evidence, albeit somewhat limited, we hypothesized:

H2: Relationship length will moderate the association between interdependence and satisfaction. A stronger correlation will exist for dyads with longer, compared to shorter, relationship length.

Recent research on gender in coach–athlete relationships generated interesting results. For example, female athletes assumed greater similarity between their own and their coaches’ commitment perceptions than did males (Jowett & Clark-Carter, 2006). Female athletes may assume greater similarity to affirm self-mental representations and promote self-concept (Jowett & Clark-Carter, 2006). Jowett and Don Carolis (2003) found that females perceived their relationships with their coaches to be more interdependent in terms of the 3Cs (higher levels of closeness, commitment, and complementarity) than their male counterparts did.

This study focused on coach–athlete gender combinations. Same gender coach–athlete dyads may allow themselves greater interdependence and feel more satisfied with important outcomes (e.g., training and performance). The similarity-attraction hypothesis (Byrne, Clore, & Smeaton, 1986) posits that people validate their self from similar others. In organizations, gender similarity in subordinate-supervisor dyads is positively related to both relationship quality and satisfaction with job performance (e.g., Green, Anderson, & Shivers, 1996; Mayer, Davis, & Schoorman, 1995). Whilst such actual similarity has been evidenced over the years, Montoya, Norton, and Kirchner (2008) have recently explained that it is perceived similarity that is more likely to be important to longer-term relationships than actual similarity. Nonetheless, actual similarity such as gender may promote perceived similarity (e.g., the thought that we enjoy and like the same things). For example, research on friends has revealed that female-female dyads tend to enjoy and like disclosing information and expressing feelings, while male-male friends tend to enjoy and like doing activities together such as playing or watching sports (Wright, 1982). Therefore, we hypothesized:

H3: Gender composition will moderate associations between interdependence and satisfaction such that associations between the two measures will be stronger for same-gender dyads than for mixed-gender dyads.

Method

Participants

British athletes and coaches ($N = 276$; 186 males and 90 females) representing 138 coach–athlete dyads participated. Participants’ age was measured dichotomously. For

Table 1. Descriptive statistics of measures of relationship interdependence and satisfaction for the athlete and the coach samples

Athletes (N = 138)	M	SD	α	1	2	3
1. Relationship interdependence	5.97	0.68	.88			
2. Satisfaction with training and instruction	5.83	0.93	.82	.67		
3. Satisfaction with performance	5.43	0.98	.73	.34	.36	
4. Satisfaction with personal treatment	5.98	0.93	.92	.82	.72	.32
Coaches (N = 138)	M	SD	α	1	2	3
1. Relationship interdependence	6.13	0.55	.89			
2. Satisfaction with training and instruction	5.84	0.83	.75	.46		
3. Satisfaction with performance	5.61	0.95	.75	.45	.62	
4. Satisfaction with personal treatment	6.22	0.62	.74	.75	.50	.39

Note. Correlations are significant at the $p < 0.01$ level

coaches, 60% were junior coaches (18–39 years) and 40% senior coaches (40+ years). For athletes, 61% were junior athletes (18–23 years) and 39% senior athletes (24–40 years). One quarter of coaches (27%) reported being a coach for 0–4 years, 41% reported 5–15 years, and 33% reported 16 years of experience or more. For athletes, 28% reported being in their sport for 0–4 years, 30% for 5–10 years, and 41% for 11 years or more. Using categories proposed by Aune, Buller, and Aune (1996), 35% of coach–athlete dyads were short term, 45% medium term, and 20% long term. For level of sport performance, 30% performed at club level, 19% at regional level, 26% at national level, and 25% at international level. Participants performed in individual sports such as swimming, track and field, cycling, golf, and racket sports. For gender composition, 46% were male-male and 12% were female-female, 36% were male coach-female athlete, and 6% female coach-male athlete.

Procedure

Coaches and athletes were contacted via email, letter, telephone, or personal meetings to briefly provide information about the study's purpose and participation criteria (i.e., adults with at least a three-month coach–athlete relationship). The confidential and voluntary nature of the data was assured. The questionnaires were administered simultaneously (but separately) to the coach and athlete at the sports ground either before or after practice. Questionnaires took approximately 15 minutes to complete.

Measures

Relationship interdependence. The direct perspective of the 11-item Coach–athlete Relationship Questionnaire (CART-Q; Jowett & Ntoumanis, 2004) assessed coach–athlete interdependence. The CART-Q contains four closeness items (e.g., 'I like my coach/athlete'), three commitment items (e.g., 'I am committed to my coach/athlete'), and four complementarity items (e.g., 'I am responsive to my athlete/coach's efforts'). Item

responses ranged from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). Summary statistics are presented in Table 1.

Satisfaction. The Athlete Satisfaction Questionnaire (ASQ; Riemer & Chelladurai, 1998) assessed three facets of athletes' satisfaction: satisfaction with training and instruction, satisfaction with individual performance, and satisfaction with personal treatment. The training and instruction subscale contained three items (e.g., 'I am satisfied with the instruction I have received from the coach this season'). The individual performance subscale contained three items (e.g., 'I am satisfied with the degree to which I have reached my performance goals during the season'). Finally, the personal treatment subscale contained five items (e.g., 'I am satisfied with the recognition I receive from my coach').

Parallel items measured coaches' satisfaction. Coaches' satisfaction with training and instruction included three items (e.g., 'I am satisfied with the instruction I have provided my athlete this season'); performance also included three items (e.g., 'I am satisfied with the degree to which my athlete has reached his/her performance goals during the season'); and personal treatment involved five items reflecting coaches' satisfaction with his/her coaching behaviours (e.g., 'I am satisfied with the recognition I give to my athlete'). Response scales ranged from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). Summary statistics for these responses are presented in Table 1.

Data analysis and results

This study's primary focus concerned how relationship-level variables (e.g., length of coach–athlete relationship) would moderate individual-level relationships between interdependence and satisfaction. Therefore, given a nested data structure (with athletes and coaches nested within dyads), analyses were performed with a series of multilevel models (Multi-level modelling [MLM]; Kenny, Kashy, & Cook, 2006; Nezelek, 2008) using HLM6 (Raudenbush, Bryk, Cheong, & Congdon, 2004).

The first step in multilevel analysis is usually referred to as a totally unconditional or null model in which there are no predictors at any level of analysis. Such models provide separate variance estimates for levels 1 and 2 (within- and between—dyad) respectively. In the model presented below, i individuals across j dyads are measured on variable y , and their responses are modelled as a function of the intercept for each dyad (β_{0j} , the mean of y) and error (r_{ij}), and the variance of r_{ij} is the level 1 variance. At level 2, the mean of y for each of j dyads (β_{0j}) is modelled as a function of only the grand mean (γ_{00}) and error (u_{0j}), and the variance of u_{0j} is the level 2 variance.

$$\text{Level 1: } y_{ij} = \beta_{0j} + r_{ij}$$

$$\text{Level 2: } \beta_{0j} = \gamma_{00} + u_{0j}$$

For the four primary individual-level variables (interdependence, and three satisfaction measures), most of the variance was at the dyad level (see Table 2), indicating that the dyad is a meaningful unit of analysis. Dyad means differed from one another more than dyad members differed from each other, although within-dyad variability was meaningful.

Table 2. Multilevel descriptive statistics for primary variables of interest

	M	Variance	
		Level 1	Level 2
1. Relationship interdependence	6.05	.14	.25
2. Satisfaction with training and instruction	5.83	.05	.73
3. Satisfaction with performance	5.52	.10	.54
4. Satisfaction with personal treatment	6.11	.29	.65

Within-dyad analyses

The next set of analyses examined relationships between interdependence and the separate measures of satisfaction. The critical coefficient in these analyses is the γ_{10} coefficient, or the functional equivalent to the mean within-dyad relationship. The coefficient tests the hypothesis that the relationship between interdependence and a measure of satisfaction differs from 0. Interdependence was entered group mean-centred and as a random effect and was modelled as a fixed effect when necessary (Nezlek, 2008).

$$\text{Level 1: } y_{ij} = \beta_{0j} + \beta_{1j} (\text{Interdependence}) + r_{ij}$$

$$\text{Level 2: } \beta_{0j} = \gamma_{00} + u_{0j}$$

$$\text{Level 2: } \beta_{1j} = \gamma_{10}$$

As expected, the relationship between interdependence and satisfaction was significant and positive for all three satisfaction measures: training, $\gamma_{10} = .94$, $t = 5.12$, $p < .001$; treatment, $\gamma_{10} = 1.01$, $t = 7.84$, $p < .001$; and performance, $\gamma_{10} = .45$, $t = 3.42$, $p < .001$. Similar to unstandardized regression coefficients, these coefficients represent how much a dependent variable changes for every one unit change in an independent variable.

Differences due to dyad type

Coach–athlete dyads varied in terms of relationship length (short, medium or long), competition level (club, regional, national, international), and gender composition (four combinations). These variables provided the basis for ‘no-intercept’ or ‘zero-intercept’ level 2 models where mutually exclusive categories are represented by sets of dummy-coded variables, one dummy variable per category. The level 2 intercept is dropped from the model, and the predictors are entered uncentered. Thus, level 2 coefficients become estimates of the mean level 1 coefficient for category. For example, differences in means as a function of relationship length were examined with the following model:

$$\text{Level 1: } y_{ij} = \beta_{0j} + r_{ij}$$

$$\text{Level 2: } \beta_{0j} = \gamma_{10} (\text{Short}) + \gamma_{20} (\text{Medium}) + \gamma_{30} (\text{Long}) + u_{0j}$$

In this model, *Short* was coded 1 for short relationships and 0 otherwise, and so forth for *Medium* and *Long*. Differences across competition level and gender composition both involved four dummy-coded variables. The coefficients (means) estimated by such a model can then be compared through ‘tests of fixed effects’ (Raudenbush & Bryk,

2002), which represent model constraints. Such constraints can involve a pair of means (e.g., short versus long relationships) or combinations of means. For example, to test a hypothesis that same- and mixed-sex dyads differ, constraints of -1, -1, +1, +1 could be applied to gender composition (FF + MM versus FCMA + MCFA) (Nezlek, 2003).

Analyses of mean satisfaction reflect few differences. For example, all female dyads were more satisfied with training than the other gender combinations considered together, 6.03 versus 5.80, $\chi^2(1) = 3.76, p < .05$. Given the large number of analyses and the lack of complementary results, this result should be interpreted cautiously.

The same technique examined differences in slopes (relationships) between satisfaction and interdependence. Sometimes called 'slopes as outcomes' analyses, a slope (i.e., a level 1 coefficient representing a relationship between two level 1 measures) becomes the dependent measure at level 2. These level 2 equations were structurally equivalent to those examining means differences, except the dependent measure was a slope (β_{1j}). For example, differences in the satisfaction-interdependence slope as a function of relationship length were examined using the model below. Differences among dyads were tested using the constraints discussed above.

$$\text{Level 1: } y_{ij} = \beta_{0j} + \beta_{1j} (\text{Satisfaction}) + r_{ij}$$

$$\text{Level 2: } \beta_{0j} = \gamma_{10} (\text{Short}) + \gamma_{20} (\text{Medium}) + \gamma_{30} (\text{Long}) + u_{0j}$$

$$\text{Level 2: } \beta_{1j} = \gamma_{11} (\text{Short}) + \gamma_{21} (\text{Medium}) + \gamma_{31} (\text{Long}) + u_{1j}$$

Results of analyses of the satisfaction-interdependence slopes produced some consistent differences. For competition level, slopes between interdependence and both satisfaction with training and satisfaction with treatment were weaker at the club level than for regional, national, and international competitors considered together (training: .34 versus 1.23, $\chi^2(1) = 16.2, p < .001$; treatment: .63 versus 1.19, $\chi^2(1) = 11.6, p < .001$). Slopes for club competitors differed significantly from 0, but were simply weaker than slopes for other competition levels. The same pattern occurred for the relationship between satisfaction with performance and interdependence (.26 versus .54) but was not significant.

Analyses examining differences in interdependence-satisfaction slopes by relationship length also produced clear results. Slopes between interdependence and all satisfaction measures were weaker for short-duration dyads than for medium- and long-duration dyads considered together (training: .34 versus 1.24, $\chi^2(1) = 10.90, p < .001$; treatment: .70 versus 1.20, $\chi^2(1) = 7.39, p < .01$; performance: .02 versus .74, $\chi^2(1) = 5.98, p = .01$). Slopes for training and treatment satisfaction for short-duration dyads differed significantly from 0, but were weaker than those for other duration levels. The slope for performance among short-duration dyads did not differ significantly from 0, whereas slopes for medium- and long-duration dyads were ($ps \leq .01$).

The final analyses examined how gender composition influenced the satisfaction-interdependence slopes. Slopes between training and treatment satisfaction and interdependence were weaker for female coach/male athlete dyads than for other gender combination dyads (training: .40 versus 1.17, $\chi^2(1) = 6.22, p = .01$; treatment: .54 versus 1.11, $\chi^2(1) = 11.62, p < .001$). Training and treatment satisfaction slopes for female coach/male athlete dyads differed significantly from 0, but were weaker than other gender combinations' slopes. There were no significant differences in the satisfaction with performance and interdependence slopes as a function of gender composition of the dyad.

Given that competition level and relationship length produced similar results moderating satisfaction-interdependence slopes (i.e., one category, club and short, stood out), the question arises whether these effects are independent. Given our sample size and dyad type distributions, we could not examine a combination of level and length using multilevel models. Dyad-level analyses, however, suggested that these effects were independent. We found no relation between competition level and dyad duration ($\chi^2(6) = 7.82, p > .25$). Club competitors did not differ from competitors at other levels in having short-duration relationships with coaches. If the club and short-duration effects reflected the same root cause, the underlying distributions of dyads would overlap. They did not. Similar analyses were performed on the overlap between gender composition and either level or length. The overlap was not significant (level: $\chi^2(9) = 7.96, p > .50$; length: $\chi^2(6) = 6.24, p = .40$), indicating that the gender composition effects were independent of level and length effects.

Discussion

The study examined variations in the association between coach–athlete relationship interdependence and sport-related satisfaction as a function of three moderators: competition level, relationship length, and gender composition of dyads. Coaches and athletes were satisfied with training, performance, and personal treatment, but more important, greater interdependence was associated with more satisfaction for both coaches and athletes. Such associations replicate previous research that found that coach–athlete interdependence was positively associated with sport satisfaction (Jowett & Don Carolis, 2003; Jowett & Ntoumanis, 2004; Lorimer, 2009).

Consistent with our first hypothesis, associations between interdependence and satisfaction with training, instruction, and personal treatment were weaker for lower-level (i.e., club) competitors than for higher-level (i.e., regional, national, and international) competitors. Relationships in the higher-end competition may provide important support during intense, stressful, and extreme events (e.g., injury, burnout, performance slumps) (Pierce, Sarason, & Sarason, 1996). Moreover, close relationships not only have the capacity to help individuals cope with stressful events, but ‘also enable individuals to prevent stressful events’ (Pierce et al., 1996, p. 441). For example, advice from a trusted and respected coach about appropriate strength training may reduce the probability that an athlete injures him/herself. This is consistent with Chelladurai and Carron (1983) who found that higher-end (e.g., collegiate) athletes preferred more social support or ‘relationship-oriented behaviors’ (p. 375) than lower-end participants (e.g., high school sport). Thus, to be satisfied, coaches and athletes may have to establish interdependence to act as a buffer against actual or potential stress, particularly in high-level competition.

Consistent with our second hypothesis, associations between satisfaction and interdependence were stronger for longer relationships. This is consistent with studies indicating that time affects coach–athlete interdependence (Jowett & Gale, 2002), interpersonal perceptions (Jowett & Clark-Carter, 2006), and athletes’ perceptions of the physical self (Jowett, 2008). Relationship length has been thought to be an indicator of relationship development, like closeness, intimacy, and satisfaction (Aune et al., 1996). In fact, Aune et al. argued that relationship length is a superior indicator of relationship

development because long-term partners (compared with short-term partners) are likely to have survived more dynamic relationship events such as security, isolation, intimacy, and conflict.

Our findings reveal that the association between satisfaction and interdependence may vary as a function of relationship duration for the following reasons. It would appear that interdependence is more important for lengthier relationships than it is for shorter ones, at least insofar as satisfaction of its members is concerned, supporting previous findings (Jowett & Gale, 2002). There may be a number of reasons for how and why time moderates the association between coach–athlete interdependence and their members' satisfaction. For example, interdependence may be more important to dyads with lengthier relationships because of the resources invested (e.g., time and energy) by relationship members (Rusbult & Buunk, 1993). On the one hand, coaches invest their knowledge, skills, and expertise and on the other hand athletes invest their raw talent, long and hard hours of training, as well as their passion, determination, and motivation to achieve. It is possible that duration and investments go hand in hand, in that the lengthier the relationship the more the investments. Jowett and Clark-Carter (2006) have explained that 'in such [long-term] relationships the stakes are higher and investments are greater' (p. 632). Kelley and colleagues (2003) acknowledged the interrelation between investments and relationship length by explaining investments are building blocks for the future and thus both partners contribute at each time period to eventually achieve greater rewards and increased levels of positive emotions including satisfaction.

Finally, we hypothesized (H3) that interdependence and sport-related satisfaction would be more strongly related in same-gender dyads (all male and all female dyads) than other-gender dyads (female coach-male athlete/ and male coach-female athlete). This hypothesis was partially supported. All-female dyads were more satisfied with training and instruction than the other gender combinations considered together. This finding may highlight, at least in part, the importance of similarity in two-person relationships (Byrne et al., 1986; Wright, 1982). Same gender, in this case all females, may imply that a combination of actual similarity (in gender) and perceived similarity (in attitudes and perceptions due to the same gender) regulate the strength of the association between relationship interdependence and relationship satisfaction (Montoya et al., 2008).

Moreover, associations between interdependence and the three sport-related satisfaction variables were weaker for the female coach-male athlete dyad than for the other gender combinations. We acknowledge that the small number of female coach-male athlete dyads we had (eight dyads) limits the generalizability of our findings, so some discussion of these results seems warranted. Historically, coaches of both male and female athletes have been predominantly male (Weinberg, Reveles, & Jackson, 1984). Moreover, Weinberg and colleagues have explained that over the years of modern competitive sport, male coaches have been thought to have a greater capacity to lead and instruct, as well as the ability to impart competitiveness and toughness to their athletes. Our findings support this deep-rooted tradition and persisting attitudes. From a sex-role socialization perspective, it is plausible that male athletes' attitudes have not changed sufficiently to view a female coach in the same way they view a male coach. In the eyes of male athletes, female coaches may not have achieved enough success to act as role

models (Weinberg et al., 1984). Subsequently, male athletes may view this cross-gender partnership as less workable and effective.

Future research in gender differences in athletics relationships could examine the association between coach–athlete interdependence and satisfaction level in sports that are predominantly male (e.g., U.S. football, ice hockey) versus predominantly female sports (e.g., netball, synchronized swimming). In addition, it would be interesting to determine whether team sports (e.g., football, hockey) versus individuals sports (e.g., tennis, swimming) or sport types (e.g., martial arts versus sailing) moderate associations between interdependence and satisfaction. Different sports, for example, may cultivate distinct norms or codes of relating, communicating, and interacting. Norms are rule-based inclinations established to coordinate interaction in interdependence situations (Thibaut & Kelley, 2007). Subsequently, a rigid, militaristic, and highly (inter-)dependent context may be the norm in martial arts to a greater extent than in sailing. Thus, although greater interdependence may be expected in martial sports than in sailing, athletes in both sports may be equally satisfied. Finally, it would be important to consider the specific ‘alternatives’ (e.g., other coaches/athletes) and also ‘investments’ (e.g., moral, ethical) available to athletes and coaches. These considerations would provide a fuller picture of the facets of interdependence theory in coach–athlete relationships.

The present findings have both theoretical and practical significance. From a theoretical perspective, they extend the association between interdependence and satisfaction to coach–athlete relationships (Thibaut & Kelley, 2007; see also Jowett, 2007). From a practical point of view, our findings are useful because they highlight possible mechanisms or dimensions that influence the association between relationship interdependence and satisfaction. With a view to the next Olympic Games in London in 2012, it would be interesting to investigate the role of coach–athlete interdependence and satisfaction levels in determining group processes (e.g., team cohesion and collective efficacy) and objective and subjective performance-related outcomes (e.g., win-loss record, personal bests, Olympic medals, skill or technique acquisition, competence). The role of relationship interdependence and satisfaction in athletes’ and coaches’ well-being (e.g., depression, life satisfaction, and conflict) would have implications for intervention development aimed to foster effective and successful coach–athlete relationships.

The current study advances an important line of inquiry on the association of interdependence and satisfaction level by providing evidence for, and supplying possible explanations of, how and why this association changes in the coach–athlete relationship. Although this study addressed questions about relationship interdependence and satisfaction level grounded on interdependence theory, the study has its limitations. One limitation is that the data are cross-sectional; therefore, claims about causal associations cannot be made. It remains unclear whether relationship interdependence leads to satisfaction or relationship satisfaction leads to interdependence or indeed whether they are cyclically related and together are caused by such factors as individual difference characteristics (e.g., personality) and sociocultural variables (e.g., culture), as well as other factors (e.g., similarity, empathy). Longitudinal and experimental research could uncover these potential multi-layered associations. Future research should extend these findings in both sport and other contexts (e.g., music teachers and musicians, dance

teachers and dancers, school teachers and pupils, doctors and patients, leaders and employees) to better understand associations between interdependence and satisfaction.

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