

## The Coach-Athlete Relationship and Self-Determination: Assessing an Athlete Centered Scale in Sport

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**Abstract.** One purpose of the present study was to develop and test the factor structure of a multidimensional and hierarchical instrument for measuring athlete-centered coaching called the Athlete-Centered Coaching Scale (ACS). Another purpose of the study was to validate the ACS through an inspection of the relation with the three psychological needs proposed by self-determination theory (SDT). The ACS was measured by a 16-item scale and was developed to capture important relational elements based on the theoretical framework developed by Carl Rogers. Need satisfaction was measured by a modified version of the Basic Psychological Need Satisfaction at Work Scale (BPNSWS) that we named the Reduced Need Satisfaction Scale (RNSS). Participants in the study were 382 junior athletes in different sports such as cross country skiing, nordic combined, ski jumping, volleyball, handball, track and field, ice hockey, biathlon, cycling and orienteering. Both the ACS and the SDT were investigated by means of confirmatory factor analyses (CFA) before a structural model was tested. The confirmatory factor analyses supported both a first and second order model of the ACS constituting the four dimensions of the ACS; (1) Congruence, 2) Empathy, 3) Positive regard, and 4) Commonness. The structural model had acceptable fit to data and revealed that the ACS was positively related to SDT. The present study extends the literature on athlete-centered coaching and its relation to other concepts. The results of the study are discussed together with limitations and suggestions for further research.

**Keywords:** athlete-centered; coaching; self-determination; sport

### **Introduction**

Questions concerning what coaching behaviours that are favourable in order to develop effective coach-athlete relationships in sport has occupied researchers and practitioners for several decades (Blom, Watson II, & Spadaro, 2010; Chelladurai, 2007; Côté & Gilbert, 2009; Horn, 2002; Jowett & Cockerill, 2003). Research claims that the coach has an essential role in developing the athlete in sport (Jowett & Cockerill, 2002; Lyle, 1999, 2002; Mageau & Vallerand, 2003).

Also, instructions and prescriptions from the coach have traditionally been found to dominate the interactions between coaches and their athletes (Cushion & Jones, 2006; Potrac, Jones & Cushion, 2007). Consequently, athletes have been found to play a passive and docile role in the coaching process (Cushion & Jones, 2012). Recently, a number of elite coaches have highlighted the use of seemingly “athlete-centered” approaches within their coaching practices (Jones, Armour & Potrac, 2004). Thus, athlete-centered coaching has gained increased popularity in the field of coaching science in sport (Nelson, Cushion, Potrac & Groom, 2012). However, the field of coaching lacks an in-depth examination of the practical and theoretical implications of such an approach (Jones, 2006).

Discussions regarding athlete-centered coaching and empowerment are starting to occupy the field of coaching (Kidman, 2001, 2005). An empowered athlete is actively encouraged to engage in directing and shaping their sporting life, including tactical strategizing and the content and delivery of training sessions (Cassidy Jones & Potrac, 2009). Thus, athlete-centered coaching shares important similarities with self-determinate behaviour and self-determination theory (Deci & Ryan, 2002). The importance of being the origin of actions and strategies (autonomy), being able to utilize and display own capacity (competence), and being attached to other people (relatedness) are highlighted as important in order to influence intrinsic motivation in self-determination theory (Deci & Ryan, 2002).

The first purpose of this study was to test the factor structure of a newly developed multidimensional and hierarchical Athlete-Centered Scale (ACS), to meet the claim for empirical studies that investigate the coach-athlete relationship and athlete centered coaching. The scale is intended to measure athletes’ perceptions of a coach’s approach in the coach-athlete relationship. A second purpose was to validate the ACS through an inspection of its relation to the three psychological needs proposed by self-determination theory.

### **Theoretical framework**

The coach-athlete relationship is found to be particularly crucial in terms of creating a positive outcome or not for the athlete (Jowett & Cockerill, 2002; Lyle, 1999). Therefore, questions concerning how to facilitate effective coach-athlete relationships have received increasing attention within research (Cassidy et al., 2009; Jones, et al., 2011). The discussions in sport include the teaching of pre-defined knowledge and skills versus facilitating learning to meet the needs of the individual athlete (Penney & Chandler, 2000; Penney, 2006). In coaching, this question is brought into stark relief with the introduction and advocacy of athlete-centered coaching as an alternative to the “traditional” practices, which are highly directive, autocratic and prescriptive (Kidman, 2001, 2005; Potrac & Cassidy, 2006).

The athlete centered approach has its origin in humanistic psychology, which emphasizes a positive attitude towards the learner as a pedagogical framework in order to achieve growth and development (Hill, 2001). The athlete-centered approach has largely been detached from the work of Carl Rogers (1969). Rogers

was primarily focused on the development of human potential and developed his theoretical foundation mainly within the framework of therapy. However, Rogers also claimed that his theories had implications in other domains who aimed to promote human potential, such as the field of education. Thus, Rogers's contributions in the field of education are underpinned by his broader theoretical framework from therapy (Nelson et al., 2012).

The basic elements of Carl Rogers's theoretical framework were to have a more personal relationship with the learner, to help him or her to reach a state of realization so that they could help themselves (1959). Thus, Rogers was primarily focused on understanding the fundamental characteristics of effective communication and how communication affected the development of human potential (Hill, 2001). Rogers (1969) work provides an opportunity for domains within education, such as coaching in sport, to clearly focus on certain qualities that exist in the relationship between the coach and the athlete. Rogers (1959) especially emphasizes the importance of the relationship between the educator and the learner. The basic elements in the relationship are as follows; a) congruence (genuineness), b) empathy, and c) unconditional positive regard towards a learner. Perhaps the most fundamental element in Rogers's theoretical framework is what Rogers referred to as congruence (1959). This means that the educator allows the learner to experience them as they really are and that the educator does not have a façade. Empathy is the ability to understand what the learner is feeling. This refers to the educator's ability to understand sensitively and accurately the learner's experience and feelings in the communication process. Research has indicated that speakers feel a need for clear responses from listeners and it is important to follow precisely what the learner is feeling and to communicate to them that the educator understands what they are feeling (Hargie & Dickson, 2004).

The importance of empathetic understanding is identified as the ability to "*stand in their learner's shoes*" and "*view the world through their eyes*" in an attempt to be sensitive to how the process appears to them. The third important element in Rogers's theoretical framework is that the educator is careful to always maintain a positive attitude towards the learner, even when he or she might be disgusted by the learner's actions. Unconditional positive regard towards a learner refers to the educator's deep and genuine caring for the learner. It might be so that some of the learners' actions are not approved by the educator, but the educator does approve of the learner. The educator therefore needs an attitude of "*I'll accept you as you are*". Based on these basic elements the educator creates a supportive, non-judgmental environment, where the educator and the learner establish a common understanding about the focused case, in which the learners are encouraged to reach their fully potential. The presence of these attitudinal qualities in the interpersonal relationship between the educator and learner is likely to induce a much more productive learning environment. These basic elements are important in order to achieve changes in all areas according to Rogers (1959). Thus, it should be of great interest to examine if domains within education, such as coaching in sport, benefits from these relational conditions.

Interestingly, in coaching in sport, athlete-centered coaching has been largely uncritically advocated as the “best” and often the “only” way to do it in recent years (Jones & Standage, 2006). Indeed, understanding has rarely gone beyond assuming a functional link between nurturing, supportive, “nice” and inclusive behavior’s and positive sporting and developmental outcomes (Jones & Standage, 2006; Cassidy et al., 2009; Potrac & Marshall, 2010). That is, whilst generic statements about the benefits of a more athlete-centered approach to sports coaching have been made, an in-depth examination of the theoretical implications of such an approach remains elusive (Jones, 2001). While the relationship between learner-centered approaches and humanistic psychology is not new, in contrast, discussions in coaching “*about the application of principles taken from humanistic psychology remain limited and largely superficial*” (Nelson et al., 2010, p. 468). This shift should not be underestimated. Indeed, it represents a step change whereby ‘the role of the coach (sic coach educator)’ is ‘on the cusp of a fundamental re-think’ (Jones & Standage, 2006, p. 65), and, as such, presents a significant moment for critical consideration and debate. Many coaches are also found to actually only present “*an illusion of empowerment*”, so that the athletes “*buy into*” their coaches’ agenda (Potrac & Jones, 2009).

Central to Rogers’s writing is the notion that learners actively engage in the process of learning and that education should be relevant to their needs and desires. Therefore, Rogers’s educational philosophy was underpinned by an unshakable belief in the tendency towards self-actualization. Interestingly, self-determination is both an educational ideal as well as a natural end point of psychological development according to Rogers (Brookfield, 2009).

### **Self-determination theory**

Deci and Ryan (1985, p. 8) define intrinsic motivation as the life force or energy for the activity and for the inward pursuit to feel competent, self-determining and to enjoy the activity. Deci and Ryan (2002) argue for the existence of basic psychological needs which must be satisfied in the individual’s environment in order to achieve personally growth and development (Deci & Ryan, 2002). These psychological needs are: (a) the need for competence, (b) the need for autonomy and (c) the need for relatedness. *The need for competence* refers to the general feeling of functioning effectively in one’s social and achievement environment, it highlights the importance of experiences, or the lack of experiences, where the individual has the opportunity to optimally utilize and display their strengths and capacity (Deci, 1975; Harter, 1983; White, 1959). *The need for self-determination*, or autonomy, refers to the individual’s perception or understanding of being the source to, or origin of the achievement behaviour (de Charms, 1968; Deci & Ryan, 1985; Ryan & Connell, 1989). Self-determination implies that actions originate from one’s own interests and values and emanate from personal initiative. *The need for relatedness* highlights the feeling of connectedness and attachment to other people. It carries a dual view that the individual is taking care of others and that others are caring for the individual (Baumeister & Leary, 1995; Bowlby, 1979; Ryan, 1995). Thus, in order for individuals to proactively engage in their own learning and development,

intrinsic motivation is a requisite and desirable component of achievement pursuits.

Advocates argue that sharing decision-making with the athletes result in the development of athletes that take greater responsibility and ownership of their performances. This is believed to aid athletes' retention of tactical and technical aspects of performance and commitment to ongoing learning and development (Cassidy et al., 2009). Empowering learners in this way through athlete-centered coaching undeniably resonates with Rogers's underlying beliefs.

It is important for the field of sport coaching to address the fact that the athlete-centered approach has received increased attention both by practitioners and researchers, to ensure that the relationships between practical coaching and underpinning principles and ideas is more clearly articulated and critically considered. Otherwise, coaching will do little more than blindly undertake convenient educational concepts and ideas from humanistic psychology (Jones et al., 2011). The consequence of such activity is the development of a "loose patchwork of assumed related notions" on this topic, where theory serves no purpose beyond decoration (Turner, 2000; Everett, 2002). In this respect, a-theoretical or superficial approaches to coaching do little to deepen its conceptual underpinnings or support recommendations for practice.

### **The present study**

One purpose of this study was to develop a scale for measuring the important elements in an athlete-centered approach to coaching and validate the instrument, so that it can be used in future studies on athlete-centered coaching. Because of the self-determinate nature of athlete-centered coaching we expect that the ACS will relate to need satisfaction. A relation between these concepts may contribute to the validation of the ACS.

### **Method**

**Participants and procedure.** Four hundred and eighty three junior athletes from seven different Norwegian high schools for elite sports were invited to voluntarily participate in an online questionnaire measuring elements of the coach-athlete relationship and need satisfaction. The athletes were participants in different sports such as cross country skiing, biathlon, Nordic combined, shooting, ice-hockey, ski jumping, alpine skiing, cycling, track and field, football, orienteering, handball and volleyball. From these 483 participants, 382 (216 males and 166 females) completed the data collection, which gives a response rate of 79%. The sample had a mean age of 18 ½ years, ranging from 17 to 20 years.

**The general variables.** The variables examined here include items and inventories such as age, gender, type of sport, performance level, type of school, need-satisfaction and degree of athlete-centered coaching. All measurements

used in this study were based on previously developed scales proven to hold both satisfactory validity and reliability. The measurements were originally in English. The measurements were translated into Norwegian and slightly adjusted for the purpose of this study by the authors.

**The Athlete-centred Coaching Scale (ACS).** Based on the theoretical review of the theoretical framework of Carl Rogers and the needed skills to develop an athlete-centred relation (Rogers, 1959), we developed the Athlete-centred Coaching Scale (ACS). The ACS consists of four dimensions with different numbers of items on each subscale. The dimensions are: (1) Congruence, (2) Empathy, (3) Positive regard, and 4) Commonness. It is important to note that the instrument was designed to measure the athlete's perception of the coach based on his or her experiences from a coaching relationship. Responses were given on a 7-point scale ranging from "Not at all" (1) to "Absolutely" (7).

Congruence consisted of four items with a Cronbach's alpha of .92. An example of an item is: *"My coach expresses a real and genuine interest in me"*. The second dimension focused on a coach's emphatic skills. This dimension consisted of four items with a Cronbach's alpha of .91. An example of item is: *"My coach seems to understand me well when we speak together"*. Positive regards consisted of four items. An example of item is: *"My coach normally expresses an unconditional positive attitude in me as a person"*. The Cronbach's alpha for this dimension was .90. The last dimension is the most obvious element in an athlete-centred approach, the importance of establishing a common and mutual understanding with an athlete. An example of item is: *"My coach normally approaches me with dialogue, so that we understand each other"*. The Cronbach's alpha for this dimension was .93.

**Self-determination.** Since the concept of the basic psychological needs is central to self-determination theory, we developed an instrument based on the most often implemented tool used for this study, namely the Basic Psychological Need Satisfaction at Work Scale (BPNSWS) (Baard, Deci, & Ryan, 2004). The instrument is originally a 21 item questionnaire measuring three need satisfaction dimensions. The authors translated the instrument, but reduced it into a 12 item questionnaire, consisting of autonomy (4 items), competence (3 items) and relatedness (4 items). For the sake of clarity, we named it the Reduced Need Satisfaction Scale (RNSS). The participants were asked to consider their feelings about their situation as athletes in their training environment in their sports during the last year, and to indicate how true the 12 statements were on a seven point scale. Examples of items are: *"I feel like I can make a lot of input in deciding how my training gets done"* (autonomy), *"People in my training environment tell me I am good at what I do"* (competence) and *"I really like the people in my training environment"* (relatedness). The reliability for each dimension were .61, .73 and .85 respectively.

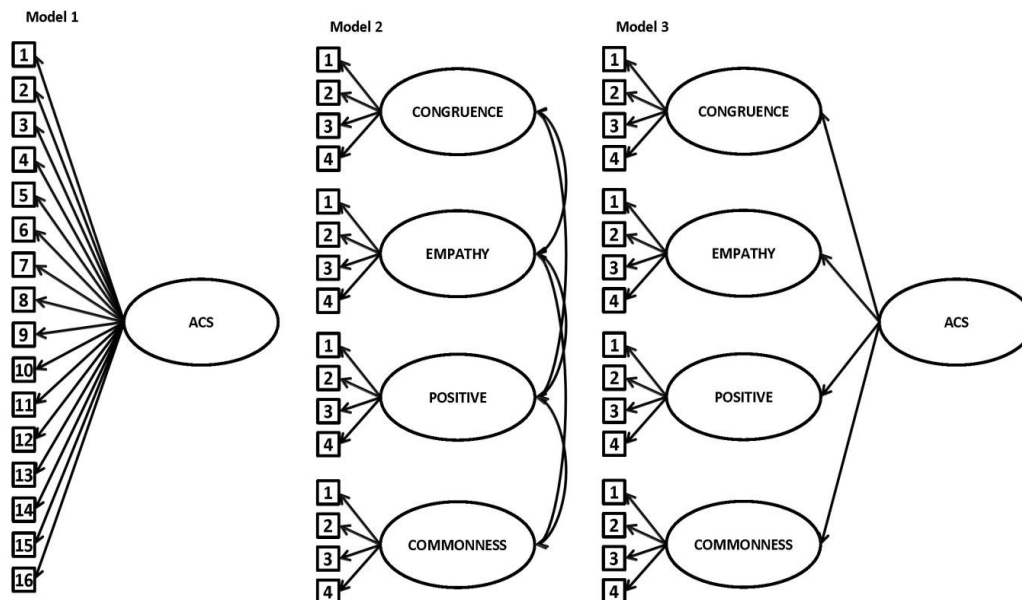
**Data analysis.** The data was analyzed by means of confirmatory factor analysis (CFA) and structural equation modelling (SEM) using the AMOS 21 software. SEM is a statistical methodology that takes a confirmatory approach to the analysis (Byrne, 2001). In this approach, a hypothesized model of the relations

between the constructs is tested statistically to determine the extent to which it is consistent with the data, which is referred to as the goodness of fit. If the goodness of fit is adequate, the plausibility of the proposed relations among the constructs is supported. To assess the model fit, we used well-established indices, such as CFI, IFI, TLI, and RMSEA, as well as the chi-square test. For the CFI, IFI, and TLI indices, values greater than .90 are typically considered acceptable, and values greater than .95 indicate a good fit of the data (Byrne, 2010; Hu & Bentler, 1999). For well-specified models, an RMSEA of .06 or less reflects a good fit (Hu & Bentler, 1999; Tabachnick & Fidell, 2007).

In the present study we first conducted confirmatory factor analyses to investigate the measurement models of the SDT and the ACS, respectively. We then used structural equation modelling to investigate a theoretical model of the relation between the concepts.

## Results

**Measurement model ACS.** Three theoretical models of the ACS were tested. Model 1 defined ACS as a single, first order factor with loading on the 16 observed items. This model was tested to ascertain whether the scale could be treated as a one-dimensional construct. Model 2 defined four correlated primary factors corresponding to the four theoretical dimensions. Model 3 defined four primary factors and one second order factor underlying the primary factors. The three theoretical models are presented in Figure 1.



**Figure 1: Three theoretical models of the ACS.**

Model 1 did fit the data ( $\chi^2(104, N = 382) = 414.960, p < .001, CMIN/DF = 3.990, RMSEA = 0.089, IFI = 0.959, TLI = 0.949$  and  $CFI = 0.956$ ). Model 2 and 3 had also good fit to data with goodness of fit indices of respectively ( $\chi^2(98, N = 382) = 394.675, p < .001, CMIN/DF = 4.027, RMSEA = 0.089, IFI = 0.958, TLI = 0.949$ ,

and CFI = 0.958) for Model 2 and ( $\chi^2$  (100, N = 382) 399.920,  $p < .001$ , CMIN/DF = 3.999, RMSEA = 0.089, IFI = 0.958, TLI = 0.949, and CFI = 0.958) for Model 3. None of the error variances was allowed to be correlated. All regression weights in the models were significant at  $p < .001$ . The correlations between the primary factors in Model 2 are presented in Table 1.

Table 1  
Correlations between the latent variables in Model 2 (ACS)

Variable	1	2	3
1. Congruence	-		
2. Empathy	.997***	-	
3. Positive	.991***	.997***	-
4. Commonness	.972***	.999***	.988***

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Results from the confirmatory factor analyses partly support that ACS is a multidimensional construct. In the present study, ACS consisted of four highly correlated primary factors with 16 corresponding items. The correlations are strong. Based on these strong correlations the ACS should be regarded as a one-dimensional construct constituted by four highly correlated dimensions of communication.

**Measurement model SDT.** Three theoretical models of the SDT were tested. Model 1 defined SDT as a single, first order factor with loading on the 12 observed items. Model 2 defined three correlated primary factors corresponding to the three theoretical dimensions. Model 3 defined three primary factors and one second order factor underlying the primary factors. The three theoretical models are presented in Figure 2.

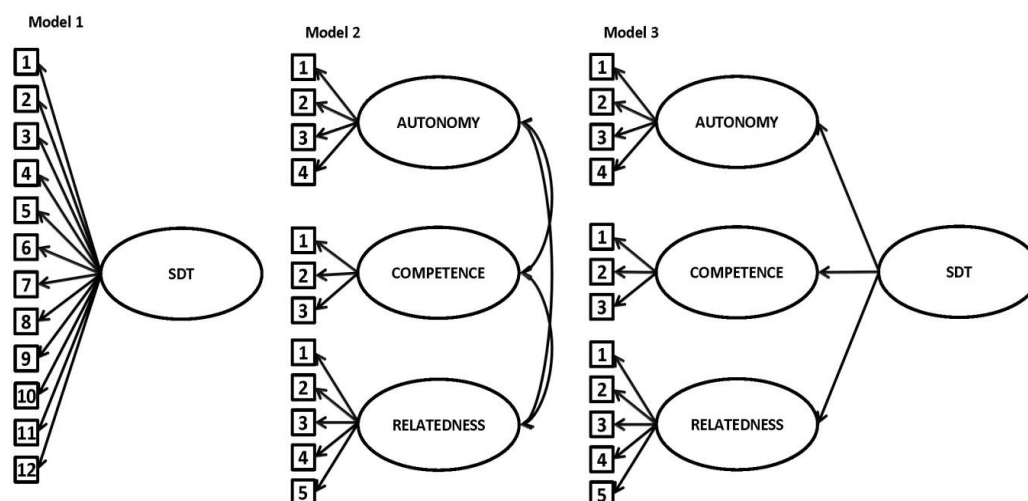


Figure 2: Three theoretical models of the SDT.

Model 1 did not fit the data ( $\chi^2$  (54, N = 382) = 290.592,  $p < .001$ , CMIN/DF = 5.381, RMSEA = 0.107, IFI = 0.898, TLI = 0.874, and CFI = 0.897). Model 2 and 3 had acceptable fit to the data with goodness of fit indices of respectively ( $\chi^2$  (51,



$N = 382$ ) 208.473,  $p < .001$ ,  $CMIN/DF = 4.088$ ,  $RMSEA = 0.090$ ,  $IFI = 0.932$ ,  $TLI = 0.911$ , and  $CFI = 0.932$ ) for Model 2 and ( $\chi^2 (51, N = 382) 208.473$ ,  $p < .001$ ,  $CMIN/DF = 4.088$ ,  $RMSEA = 0.090$ ,  $IFI = 0.932$ ,  $TLI = 0.911$ , and  $CFI = 0.932$ ) for Model 3. None of the error variances was allowed to be correlated. All regression weights in Model 2 and 3 were significant at  $p < .001$ . The correlations between the primary factors in Model 2 are presented in Table 2.

Table 2  
*Correlations between the latent variables in Model 2 (SDT)*

Variable	1	2	3
1. Autonomy	-		
2. Competence	.868***	-	
3. Relatedness	.778***	.894***	-

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Results from the confirmatory factor analyses support that SDT is a multidimensional construct. In the present study, SDT consisted of three correlated primary factors with 12 corresponding items. The correlations are strong. SDT can be regarded as both domain-specific and multidimensional, and the second order analysis also indicates that the concept may be experienced as a more general experience SDT.

**Structural model.** A second purpose of the present study was to validate the ACS through an inspection of its relation to SDT. We therefore tested a theoretical model by means of SEM. Based on the results from the CFA and for validation purposes the theoretical model specifies the SDT as second order model. In the model we let the ACS predict SDT. The theoretical model is shown in Figure 3.

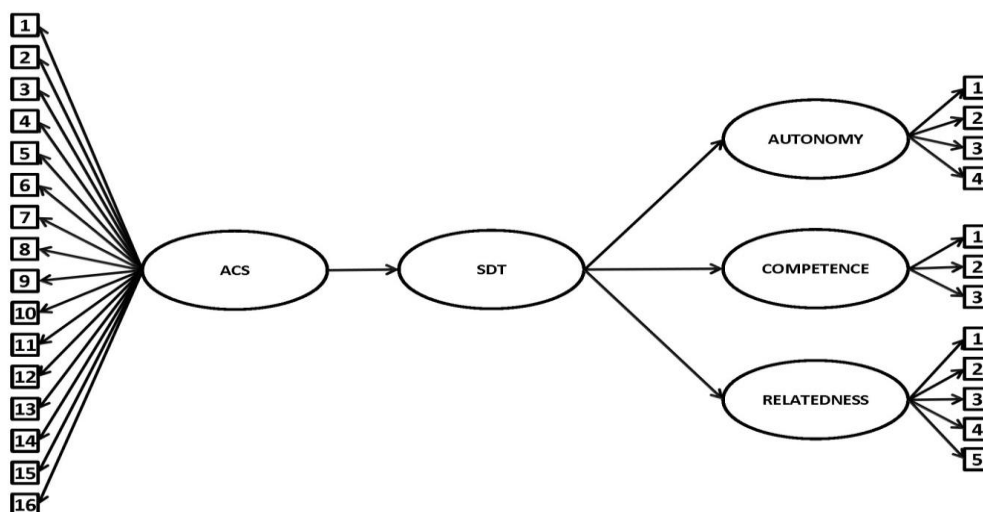


Figure 3: Theoretical model of the relation between ACS and SDT.

The model had acceptable fit to data ( $\chi^2 (347, N = 382) = 932.207$ ,  $p < .001$ ,  $CMIN/DF = 2.686$ ,  $RMSEA = 0.067$ ,  $IFI = 0.939$ ,  $TLI = 0.933$ , and  $CFI = 0.939$ ).

None of the error variances was allowed to be correlated. All regression weights in the model were significant at  $p < .001$ . In this model the ACS predicted the SDT with a standardized regression weight of  $\beta = .50$   $p < .001$  explaining 25% of the variance of SDT.

## Discussion

Athlete-centered coaching is lately claimed to be largely uncritically advocated as the “best” and often the “only” way in sport coaching (Jones & Standage, 2006). In spite of such a claim little attention has been given to address this issue by measuring coaches’ competencies based on athlete-centered values and related variables that are relevant to discuss the effectiveness of such coach behaviour. The first purpose of the present study was therefore to develop and test the factor structure of a multidimensional and hierarchical Athlete-Centered Scale (ACS) in coaching. A second purpose was to validate the ACS through an inspection of its relation to need satisfaction.

The ACS was developed by the authors based on the core elements in learner-centered approaches within humanistic psychology and the theoretical framework developed by Carl Rogers (1969). We first investigated a CFA model defining ACS as single primary factor to ascertain whether the ACS could be treated as a one-dimensional construct (Figure 1, Model 1). This model had acceptable fit to data. However, a model defining four primary factors, and a model defining four primary factors and one second order factor underlying the primary factors, had also good fit to data (Figure 1, Model 2 and 3). This analysis supports that the conceptualization of the ACS can be regarded as a one-dimensional construct constituted by four highly correlated dimensions of coach values.

The finding in this study makes the instrument particularly useful for research purposes analyzing athlete-centered coach values as a latent trait (Figure 1, Model 3). The analyses support that athlete-centered coach values can be regarded as a general domain-specific experience of athlete-centered coach values, but that the construct also can be regarded as a second order factor underlying the four primary factors; *congruence, empathy, positive regard* and *commonness*. These findings make the instrument suitable to examine how a second order factor relates to other concepts, but it can also be used to explore whether or not the separate dimensions relate differently to other constructs.

Need satisfaction (SDT) was measured by the Reduced Need Satisfaction Scale (RNSS) consisting of 12 items constituting three dimensions, autonomy, competence and relatedness respectively. We initially tested a single primary factor to ascertain whether the RNSS could be treated as a one-dimensional construct (Figure 2, Model 1). This model did not fit the data. However, we found strong support for both a model consisting of three correlated primary factors and a second order model underlying the three dimensions (Figure 2, Model 2 & 3). The analyses clearly support that need satisfaction should be regarded as multidimensional and hierarchical as in accordance with self-determination theory (Deci & Ryan, 2002; Moen & Federici, 2011).

One theoretical model was tested by means of structural equation modelling to investigate the relation between the ACS and the SDT (Figure 3). In the model we let the one-dimensional ACS factor predict the second order SDT factor. The result from this analysis revealed a positive relation between perceptions of athlete-centered coach values and need satisfaction. In the model ACS predicted SDT with a standardized estimate of .50 explaining 25% of the variance of SDT. This estimate can be interpreted as a medium to strong relation. Thus, these results indicate a satisfactory validation of the ACS.

Our theoretical model showed a medium to strong relation between ACS and SDT. This should be an important finding in order to validate the ACS and use it as a measurement to investigate athlete-centered coaching in future research. The true nature of athlete-centered coaching is based on the empowerment of the athlete, so that he or she can make important decisions for him or herself without being directly influenced by others. Thus, the coach is stimulating the athlete to be responsible in his or her learning in athlete-centered coaching. This should stimulate the need for autonomy positively. Research that has investigated learner-oriented approaches, such as coaching interventions in business, has shown that coaching has a positive significant effect on autonomy (Moen & Skaalvik, 2009). Another important principle in athlete-centered coaching is the coach's facilitation of athlete generated strategies and solutions regarding the coaching issue(s). This should stimulate the need for competence, since it is the athlete's competence which is the origin for the decided solutions and strategies. The same study discussed above showed a positive effect from coaching on the need competence as well. Another study shows that business coaching had positive significant effect on competence (Moen & Skaalvik, 2008). The conversation is central in the athlete-centered coaching process and the establishment of trust and mutuality through the active use of attending skills is in focus (Jones et al., 2004). Thus, the athlete is given attention from the coach throughout the conversation which should stimulate the need for relatedness. Interestingly, the effect from coaching has been found to be very large and significant on relatedness (Moen & Skaalvik, 2009). Our finding confirms the relationship between the needs that are central in self-determination theory and athlete-centered coaching values.

It seems that researchers, practicing coaches and athletes are lacking a well-established, reliable and valid instrument for measuring athletes' perceptions of their coaches' athlete-centered values. The development of the ACS may contribute to this field. Also, the ACS could easily be adjusted to measure the coaches' own perceived athlete-centered values as well, which could be an important contribution with regards to measure the effect from coaching educational programs or potential coherence between athletes' and coaches' perceptions of coaches values as an example. The CFA and SEM analyses conducted in the present study contribute to the validity of the ACS and the instrument has several advantages. First of all, the instrument allows SEM analyses both of the one-dimensional factor and of the second order factor underlying the four primary factors. Analysis of primary factors allows the

examination of how the different dimensions of athlete-centered coach competencies may be related to other relevant concepts such as for example self-efficacy and attribution. Analysis of a second order factor is particularly useful in more complex models where several concepts are included.

The results from the present study should be an important contribution to the field of sport coaching. However, this study has several limitations and further studies need to be conducted before clear conclusions are made. One limitation is the probability that sample size has influenced the results. Both the factor structure of the ACS and SDT should be verified with larger samples. Another limitation is that the principles from the work of Carl Rogers have not been tested extensively in the educational domain, and in sport coaching especially. More studies are needed before clear conclusions can be made. A third limitation is that the ACS is yet not tested in other cultures than Norwegian. Also, the ACS should be considered as a preliminary scale measuring coaching competence. We consider that the four dimensions constituting the ACS may apply to all coaches but other possible dimensions of coach competencies should also be explored in future research.

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