

DISSERTATION FROM THE
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Bård Erlend Solstad

Towards a Better Understanding of the Dynamics of Sports Coaching at the Youth Level: The Coach's Perspective

A Study of the Youth Football Coaches Participating
in the Norwegian Arm of the Promoting Adolescent
Physical Activity (PAPA) Project

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“Sometimes life hits you in the head with a brick. Don’t lose faith! I’m convinced that the only thing that kept me going was that I loved what I did. You’ve got to find what you love, and that is as true for your work as it is for your lovers. Your work is going to fill a large part of your life, and the only way to be truly satisfied is to do what you believe is great work. And the only way to do great work is to love what you do. If you haven’t found it yet, keep looking and don’t settle! As with all matters of the heart, you’ll know when you find it. And, like any great relationship, it just gets better and better as the years roll on.

So keep looking! Don’t settle!”

(Steve Jobs, June 12, 2005)

In Memory of...

Halvor Solstad (1912-1987)

Mary Solstad (1918-2007)

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Some people have played an important role in my life, without me being fully aware of it. First, in 2003, I attended the entrance exam at the Norwegian School of Sport Sciences. Before the last exercise (i.e., the 1,500-m running time-trial), I knew I had to run faster than six minutes. Therefore, I would like to express my gratitude to Ingeborg Storaas Saltbones for pushing me to finish well ahead of demand (05:57). Second, a special thanks to Åse Linn Vålandsmyr who has played a significant role in my academic development. Thank you for your belief in me during some important years of development! Third, I have been blessed to be surrounded by caring and loving friends: Kim Boel Pedersen and Karl Johan Kjøde. Thank you for being there when it was important! Finally, I would like to acknowledge four colleagues and friends who have been *very important* to me during the last decade: Marte Bentzen, for many things, but most of all for making the last four years memorable; Gro Jordalen and Mats Melvold Hordvik, who have contributed significantly to my psychological well-being the last couple of years; and finally, Klaudia Karina Jonskås, who has been one of my dearest and closest friends during my time at the Norwegian School of Sport Sciences.

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Further, the French-Swedish author and journalist, Jan Guillou, wrote in one of his many books: "But if the two executives had told him that they would continue to Hallingskeid on the same day, he had followed along without protesting, and possibly died along the road, fainted at least. But rather choosing those alternatives than complaining" (The Bridge Builders, 2011, p. 142). This quote reflects my attitude the last four years! To be more specific, when you are among those who are privileged to be enrolled in a sport psychology doctoral program, and additionally, are supervised by two awesome professors, then you have to be willing to walk some extra miles. Hence, I consider myself *extremely fortunate* to have worked with two *amazing supervisors* during my PhD-project: Professor Yngvar Ommundsen and Professor Lars Tore Ronglan.

First, John Dewey (1938) argued, "Every experience is a moving force. Its value can be judged only on the ground of what it moves toward and into" (p. 38). In my opinion, one of

Yngvar's best qualities as a supervisor is that he understands that *every experience* is a valuable experience! Hence, the way he listens to you, talks to you, encourages you, helps you, critiques you, argues with you, and motivates you, are all educative (i.e., they all lead to adaptive growth) in one way or another. Moreover, as a token of my gratitude, I have tried to outline Yngvar's style of academic supervision: (structure + the principle of continuity of experience + task involvement + the zone of proximal development + general involvement + autonomy-supportive supervision)³. Finally, I just want to say thank you!

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Last, but certainly most important (!!), I want to take this opportunity to thank my mom for her ongoing unconditional love and support. Thank you for always being there for me, for your belief in me, for always encouraging me, and for loving me with all your heart!

Oslo, October 2016

Bård Erlend Solstad

List of Articles

Article I

Solstad, B. E., Van Hoyer, A., & Ommundsen, Y. (2015). Social-Contextual and Intrapersonal Antecedents of Coaches' Basic Need Satisfaction: The Intervening Variable Effect of Providing Autonomy-Supportive Coaching. *Psychology of Sport and Exercise*, 20, 84-93. doi:10.1016/j.psychsport.2015.05.001

Article II

Solstad, B. E., Ivarsson, A., Haug, E. M., & Ommundsen, Y. (Submitted). Providing Empowering and Disempowering Behaviors to Young Athletes: Effects on Coaches' Late-Season Well-Being. *International Sport Coaching Journal*.

Article III

Solstad, B. E., Larsen, T., Holsen, I., Ivarsson, A., Ronglan, L. T., & Ommundsen, Y. (Re-Submitted). Pre- to Post-Season Differences in Empowering and Disempowering Behaviors among Youth Football Coaches: A Sequential Mixed Methods Study. *Sports Coaching Review*.

Article IV

Solstad, B. E., Stenling, A., Wold, B., Heuzé, J. P., Sarrazin, P., & Ommundsen, Y. (Submitted). A Bayesian Approach to the Validation of the Empowering and Disempowering Motivational Climate Questionnaire-Coach (EDMCQ-C). *Measurement in Physical Education and Exercise Science*.

Article V

Solstad, B. E., Solberg, P. A., Wold, B., Samdal, O., Ronglan, L. T., Ivarsson, A., & Ommundsen, Y. (Manuscript in Preparation). The Effects of the Norwegian Arm of the Empowering Coaching™ Training Program on Coaches' Self-Reported Behaviors – A Bayesian Approach.

Summary

Background: This doctoral thesis was based on the Promoting Adolescent Physical Activity (PAPA) project (Duda et al., 2013). Specifically, this doctoral thesis focused on the Norwegian arm, thereby aiming to acquire detailed information about volunteer youth football coaches who provide sports coaching to young athletes. Guided by Self-Determination Theory (SDT; Deci & Ryan, 2012) and Achievement Goal Theory (AGT; Nicholls, 1989), the doctoral thesis set out to investigate important aspects related to the role of volunteer youth sport coaches, suggesting that previous research has overlooked key factors in terms of theory and methodology, with potential implications for improved understanding of the dynamics operating within the coach-athlete relationship.

Objectives: The purpose of this doctoral thesis was four-fold: (a) to investigate the potential psychological costs and benefits of providing different styles of coaching to young athletes for coaches themselves, (b) to gain insights into what coaches considered to be the merits of participating in the Norwegian arm of the Empowering Coaching™ training program (ECTP; Duda et al., 2013), (c) to validate a questionnaire that measures coaches' self-report of their own empowering and disempowering behaviors, and (d) to investigate the effectiveness of the ECTP on coaches' self-reported empowering and disempowering behaviors.

Design: Articles I and IV were cross-sectional studies. Article II was a prospective study. In Article III, a sequential mixed-methods design was used. Finally, Article V utilized a cluster randomized controlled trial design.

Method: The total sample consisted of 280 youth football coaches (257 males; 23 females), assigned to either the intervention ($n = 193$; $M = 41.99$ years, $SD = 6.32$; males $n = 174$, females $n = 19$) or the control group ($n = 87$; $M = 43.19$ years, $SD = 5.15$; males $n = 83$; females $n = 4$) of the Norwegian arm of the PAPA project (Duda et al., 2013).

Results: In Article I, results indicated that the provision of autonomy-supportive behaviors to young athletes was related to coaches' basic needs satisfaction. Following up longitudinally on these findings, results from Article II showed that an empowering provision profile (i.e., high levels of empowering and low levels of disempowering coach behaviors) was positively associated with coaches' psychological well-being. Whereas a more disempowering provision profile (i.e., moderate levels of empowering and disempowering coach behaviors) was positively related to impairment in coaches' psychological well-being. In Article III, we examined whether coaches' self-reported empowering and disempowering behaviors differed from pre- to post-season after attending the ECTP, and what coaches considered to be the value of taking part in the ECTP, as well as the value of the ECTP's content. Findings showed that there was no difference in the coach behavior assessments from pre-to-post. However, results from semi-structured interviews among a subsample of the coaches indicated that participation in the ECTP led coaches to reflect on their own coaching practices, facilitating an increased focus on enabling autonomy and involvement for the athletes and providing more attention to the athletes' feelings of mastery. Next, given the shortage of validated measures of coaches' perceptions of their own behaviors (Horn, 2008), Article IV used Bayesian statistics to validate the Norwegian version of the Empowering and Disempowering Motivational Climate Questionnaire-Coach (EDMCQ-C; Appleton, Ntoumanis, Quested, Viladrich, & Duda, 2016) in which a cross-validation, using responses from a sample of French youth football coaches, was included. Contrary to recent suggestions by Appleton and colleagues (2016), findings showed that a reduced two-factor model (i.e., 27 out of 34 original items) displayed an adequate data-model fit in both samples. Findings also supported approximate measurement invariance across the two groups. Finally, Article V used the validated Norwegian version of the EDMCQ-C to investigate the effectiveness of the Norwegian arm of the ECTP. The Bayesian analysis

revealed no credible differences in the bivariate latent change scores between the intervention and the control group, neither in empowering nor in disempowering coach behaviors.

Conclusions: The overall findings and recommendations of this doctoral thesis are that the perspectives of youth sports coaches need to be included in future research. Specifically, given the reciprocal nature of the coach-athlete relationship (Smith & Smoll, 2007), future studies should investigate the interaction between multiple perspectives in the youth sport context. This is because results indicate that the provision of constructive and non-constructive styles of coaching to athletes is related to psychological costs and benefits for coaches themselves, which in turn, may have both positive and negative implications on athletes' psychosocial development. As such, the perspectives of youth sport coaches are equally important in future coach education research. A first suggestion for future research is therefore to examine the importance of providing and receiving constructive and non-constructive styles of coaching within coach-athlete relationships; hence, acknowledging the need for researchers to study the reciprocal causal relations existing within the coach-athlete relationship. A second suggestion is to continue the use of sequential mixed-methods research, thereby providing more complete and insightful answers to the field of youth sport coaching education. The final suggestion is to continue the use of Bayesian statistics in future work (Stenling, Ivarsson, Johnson, & Lindwall, 2015; Van de Schoot et al., 2014). Indeed, Bayesian analysis is beneficial with regard to its ability to represent substantive theory (see Muthén & Asparouhov, 2012 for details).

Sammendrag

Bakgrunn: Tidligere forskning innen barne- og ungdomsidrett har vært sentrert omkring trenerens betydning for de unges idrettsopplevelser og psykologiske utbytte av å delta i organisert idrett. Denne forskningen har derfor basert seg på et utøverperspektiv. Det overordnede formålet med denne doktorgradsavhandlingen har imidlertid vært å videreutvikle forskningsbasert kunnskap på dette feltet ved å undersøke ulike aspekter ved trenerrollen slik trenerne selv ser det. Ett hovedspor i avhandlingen har vært å undersøke betydningen av ulike typer treneratferd for trenernes eget psykologiske velvære. Et sentralt forskningsspørsmål har også vært hvorvidt deltakelse på kurset *Motiverende Lederskap* har hatt positive effekter på treneres egenrapporterte myndiggjørende og umyndiggjørende treneratferd, og hvorvidt trenerne anså kurset som positivt for sin egen trenergjerning i barne- og ungdomsidretten. Tidligere forskning har i tillegg benyttet seg av svært ulike spørreskjema for å måle treneratferd. Det har også vært benyttet en rekke ulike statistiske analyser. Dette har begrenset muligheten for å sammenligne resultater på tvers av studier. Et viktig metodologisk anliggende for denne doktorgradsavhandlingen har derfor vært å benytte en integrert og teoretisk fundert tilnærming til måling av treneratferd – *Motiverende Lederskap* – og teste denne ut ved hjelp av nyere statistiske tilnærminger. Målgruppen i avhandlingen har vært fotballtrenere fra Sør-Norge med ansvar for lag med spillere i alderen 11-14 år.

Mål: Avhandlingen har hatt fire delmål: Det første målet var å undersøke hvorvidt ulike treneratferd oppleves å gi ulike psykologiske konsekvenser for trenerne selv for deres eget velvære som trener. Det andre målet var å følge en gruppe trenere over en sesong, som var deltakere på kurset *Motiverende Lederskap*, med sikte på å fange opp ulike sider ved deres utbytte av å delta på kurset. Det tredje målet var å validere et spørreskjema som måler treneres egenrapporterte myndiggjørende og umyndiggjørende treneratferd. Det siste og fjerde målet var å undersøke effekten av kurset *Motiverende Lederskap* på slik treneratferd.

Design: Artikkel I og IV er basert på tverrsnittdesign, mens artikkel II er basert på et prospektivt design. I artikkel III inngår en sekvensiell metodetriangulering med hovedfokus på en kvantitativ tilnærming (spørreskjema) og fulgt opp av kvalitativ metodikk (semistrukturerte intervjuer). Tanken var å supplere og utdype de kvantitative resultatene. Artikkel V er en intervensjonseffektstudie basert på et klynge-randomisert kontrollert design.

Metode: Det totale utvalget bestod av 280 fotballtrenere i norsk barne- og ungdomsfotball (257 menn; 23 kvinner) som enten deltok i intervensjonsgruppen ($n = 193$; $M = 41.99$ år; $SD = 6.32$; menn $n = 174$, kvinner $n = 19$), eller i kontrollgruppen ($n = 87$; $M = 43.19$ år; $SD = 5.15$; menn $n = 83$; kvinner $n = 4$) i den norske delen av PAPA-prosjektet (Duda m. fl., 2013).

Resultat: Artikkel I var basert på et nyere teoretisk rasjonale om betydningen for trenerne selv av å være autonomi-støttende overfor utøvere. Resultatene viste at en trenerrapportert autonomi-støttende treneratferd korrelerte med ivaretagelse av trenernes egne psykologiske behov for henholdsvis autonomi, kompetanse og sosial tilhørighet. Artikkel II fulgte opp resultatene fra artikkel I ved å bruke et prospektivt design, en person-sentrert analyse og et utvidet empirisk mål på psykologisk velvære. Resultatene viste at en profil preget av en myndiggjørende treneratferd på begynnelsen av sesongen (T1) korrelerte med trenernes psykologiske velvære på slutten av sesongen (T2). Resultatene viste også at en profil preget av en umyndiggjørende treneratferd på T1 korrelerte med et redusert psykologisk velvære blant trenerne på T2. Artikkel III undersøkte om trenerne som deltok på kurset *Motiverende Lederskap*, endret egenrapportert treneratferd fra T1 til T2. Resultatene viste at det var ingen forskjeller i egenrapportert treneratferd. Supplerende kvalitative resultater viste imidlertid at deltakelse på kurset *Motiverende Lederskap* førte til økt selvrefleksjon, og i sin tur til et økt fokus fra trenernes side på å involvere utøverne i fotball-relaterte avgjørelser og utøvernes mestringsopplevelser. Artikkel IV benyttet seg av Bayesiansk statistikk for å validere den norske versjonen av spørreskjemaet: *Empowering and Disempowering Motivational Climate*

Questionnaire-Coach (EDMCQ-C; Appleton, Ntoumanis, Quested, Viladrich, & Duda, 2016).

Hensikten med valideringen av dette spørreskjemaet var todelt: For det første finnes det kun et fåtall validerte spørreskjema som måler ulike dimensjoner ved positiv og negativ treneratferd basert på et stringent teoretisk rasjonale. For det andre ble det mulig å utvide tidligere forskning ved å undersøke effekten av kurset *Motiverende Lederskap* på trenernes egenrapporterte myndiggjørende og umyndiggjørende treneratferd med bruk av den Bayesianske tilnærmingen (Artikkel V). Resultatene fra artikkel V viste imidlertid at det ikke var noen påvisbar effekt av kurset *Motiverende Lederskap* på endringsskårene til trenernes egenrapporterte treneratferd.

Konklusjon: Resultatene underbygger verdien av forskning som ikke bare fokuserer på utøveres motivasjon og velvære i organisert barne- og ungdomsidrett, men også setter fokus på betingelser for at trenere selv skal oppleve god motivasjonskvalitet og velvære i rollen som trener. Slikt sett kan studier av treneres perspektiv i organisert barne- og ungdomsidrett anses som like verdifulle som de studiene som fokuserer på utøveres perspektiv. Det er rimelig å anta at økt bevissthet blant trenere om hva som gir påfyll for deres eget psykologiske ve og vel, også vil være til fordel for deres egne utøveres psykologiske utbytte av å delta i organisert barne- og ungdomsidrett. Andre resultater gir støtte til å fortsette bruken av metodetriangulering. Denne metoden har en viktig plass i forskning med fokus på treneratferd og psykologisk utbytte av tiltak med tanke på å påvirke treneratferd i en positiv retning. Resultatene fra artikkel III viste at en slik triangulering gir en mer nyansert forståelse av tiltak for en bedre trenerpraksis. Funn fra artikkel IV og V viste at anvendelse av Bayesiansk statistikk også bør ha en viktig plass i fremtidig forskning. En slik statistisk tilnærming er fordelaktig med tanke på å presentere innholdet i komplekse psykologiske teorier (f.eks. Muthén & Asparouhov, 2012).

Abbreviations

AGT	Achievement Goal Theory
ASC	Autonomy-Supportive Coaching
BSEM	Bayesian Structural Equation Modeling
CDP	Coach Development Program
CET	Coach Effectiveness Training
CFA	Confirmatory Factor Analysis
ECTP	Empowering Coaching™ training program
EDMCQ-C	Empowering Disempowering Motivational Climate Questionnaire-Coach
EFA	Exploratory Factor Analysis
FIML	Full Information Maximum Likelihood
IOC	International Olympic Committee
MAC	Mastery Approach to Coaching
MI	Measurement Invariance
MMR	Mixed Methods Research
NCS	Norwegian Confederation of Sports
PAPA	Promoting Adolescents Physical Activity
SDT	Self-Determination Theory
SEM	Structural Equation Modeling

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Appendix I

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Appendix III

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Appendix IV

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Appendix V

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Appendix VI

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Appendix VII

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Introduction

There is general agreement among sport psychology researchers that a coach's interpersonal behavior constitutes an important determinant of differences in young athletes' perceptions of a large number of key psychological and motivational variables (see Balish, McLaren, Rainham, & Blanchard, 2014; Harwood, Keegan, Smith, & Raine 2015 for reviews). Less, however, is known about coaches' own outcomes (Horn, 2008). Until recently, sport psychology researchers predominantly investigated aspects of coaches' interpersonal behaviors that were pertinent to athletes' performance and well-being in youth sport (e.g., Ntoumanis, 2012; Roberts, 2012; Weiss, Amorose, & Kipp, 2012). More recently, research has begun to focus on potential aspects of sports coaching, such as various antecedents of coaches' interpersonal behaviors (e.g., coaches' perceptions of the coaching environment, motivation towards coaching, and psychological well-being; Rocchi, Pelletier, & Couture, 2013; Solstad, Van Hoye, & Ommundsen, 2015; Stebbings, Taylor, Spray, & Ntoumanis, 2012). Lacking, however, is a greater focus on the psychological costs and benefits of providing different types of interpersonal coach behaviors to athletes for coaches themselves.

Recent publications have shown that people who engage in benevolent acts (e.g., giving something to others) are likely to experience enhanced psychological well-being because their own basic psychological needs (i.e., autonomy, competence, and relatedness) are satisfied (e.g., Martela & Ryan, 2015, 2016; Weinstein & Ryan, 2010). In contrast, recent publications have shown that people who go along with behaviors that hurt others are likely to experience thwarting of their psychological needs (Legate, DeHaan, & Ryan, 2015; Legate, DeHaan, Weinstein, & Ryan, 2013). Thus, it may be of interest to investigate whether the provision of a constructive style of coaching (e.g., autonomy-supportive coaching) to athletes is related to coaches' psychological needs satisfaction. Another important line of future research would be

to determine whether the provision of various types of coaching behavior, considered both constructive and non-constructive to athletes, is related to coaches' psychological well-being.

Moreover, previous interpersonal coach development programs (CDPs) have been designed to improve coaches' understanding of their own interpersonal behaviors, with the goal of positively influencing athletes' behavior, affect, and cognitions (e.g., Evans, McGuckin, Gainforth, Bruner, & Côté, 2015; Langan, Blake, & Lonsdale, 2013; Lauer & Dieffenbach, 2013). However, no CDP has reassured that coaches' self-reported interpersonal behaviors have changed as part of participating in a CDP before extending the evaluation of the effectiveness of the CDP to include athletes' perceptions of their coaches' interpersonal behaviors (Evans et al., 2015; Langan et al., 2013). Moreover, no CDP has collected data on athletes' perceptions of both pre- and post-training coach behaviors. Thus, a recent study reviewing the effectiveness of CDPs on athletes' outcomes argued that "it is possible that the results obtained were due to pre-existing differences between the groups of coaches and not the intervention per se" (Langan et al., 2013, p. 46). In addition, the challenge of assessing coaches' self-reported interpersonal behaviors has previously been related to the lack of validated questionnaires (Chelladurai & Riemer, 1998). To date, only one measure (i.e., the Coach Dominant Behavior Scale; CDB-S) has been validated; however, this measure was designed to assess coaches' dominant behaviors rather than their interpersonal behaviors creating the psychosocial learning environment (see Yang & Jowett, 2013 for details).

The research presented in the current doctoral thesis was prompted by the desire to better understand the volunteer youth football (i.e., European soccer, hereafter referred to as football) coaches who participated in the Norwegian arm of the Promoting Adolescent Physical Activity (PAPA) project (Duda et al., 2013). Football is considered the most popular sport among youth within a global and Norwegian context (e.g., Larsen et al., 2015; Tjomsland et al., 2015). Membership numbers retrieved from the Norwegian Confederation of Sports (NCS) confirm

that more than a quarter-million youngsters in the 6-19 years age group play football on a regular basis in Norway (Statistics Norway, 2015). The high levels of participation in organized youth sport has led to a correspondingly high degree of adult involvement (Stefansen, Smette, & Strandbu, 2016), which has been shown to relate to a wealth of challenging aspects related to sports coaching at the youth level (Langan et al., 2013; Lauer & Dieffenbach, 2013). Among these challenges, the issue of motivation has great importance with regard to both coaches and athletes (e.g., Roberts, 2012; Ryan & Deci, 2007; Weiss et al., 2012). Consequently, the current doctoral thesis resides in its use of two contemporary theories of motivation. Langan and colleagues (2013) argued, “a major stumbling block in the advancement of coach education literature is the lack of a theoretical basis for many interventions” (p. 47); hence, this doctoral thesis used both Self-Determination Theory (SDT) and Achievement Goal Theory (AGT) as conceptual frameworks. These two frameworks are used for understanding selected underlying mechanisms of sports coaching at the youth level (e.g., Deci & Ryan, 2000, 2012; Ryan & Deci, 2000a, 2002; Nicholls, 1984a, 1989).

In addition, this doctoral thesis aspired to contribute to the current paucity of empirical data on sports coaching at the youth level putting the coaches themselves at the center (Evans et al., 2015; Langan et al., 2013). We specifically aimed to use the aforementioned motivational conceptual frameworks to expand upon previous research taking athletes’ perspectives, focusing on the comprehensive role of volunteer youth sport coaches for producing positive outcomes in athletes (e.g., Evans et al., 2015; Langan et al., 2013). As a result, the current doctoral thesis deals with three main issues relevant to the advancement of the sports coaching and sport psychology literature through the coach’s perspective: (a) the psychological effects of providing specific interpersonal coach behaviors to young athletes for coaches themselves; (b) coaches’ experiences of a theory-based CDP (i.e., the Empowering Coaching™ training program [ECTP]; Duda et al., 2013); and (c) the effectiveness of the ECTP on coaches’ self-

report of their own interpersonal behaviors. To achieve this, we also needed to address conceptual, methodological, and statistical issues related to the measurement of self-reported interpersonal coach behaviors. Thus, the five articles included in this doctoral thesis used both quantitative (e.g., Structural Equation Modeling [SEM] and Bayesian Structural Equation Modeling [BSEM]) and qualitative (e.g., semi-structured interviews) methods in order to answer research questions of varying nature (Gigerenzer & Marewski, 2015; Hathcoat & Meixner, 2015; Ivankova, 2014; Little, 2013; Muthén & Asparouhov, 2012).

We begin by drawing attention to the theoretical frame of reference. We then present the used material and methods. Next, we give a summary of the results from the five articles included in this doctoral thesis. Building on the summary of results, we then discuss our research questions. We close this doctoral thesis with a discussion of the theoretical and practical implications of our findings followed by the limitations, conclusions, and perspectives.

The Theoretical Frame of Reference

The chapter starts out with a brief overview of the Norwegian youth sport context, including the fact that many volunteer coaches who are engaged in youth sport rarely have any formal training in creating healthy psychosocial learning environments for their athletes (Smith & Smoll, 2005, 2011). We then elaborate on the difference between organismic and social-cognitive theories of motivation, before continuing to elaborate on the contemporary motivational framework consisting of SDT (Deci & Ryan, 2000, 2012) and AGT (Nicholls, 1984a, 1989). After providing a detailed overview of the motivational conceptual frameworks, we continue by presenting the conceptual foundation of the Empowering Coaching™ framework (Duda, 2013), including an explanation of whether the concepts of empowerment and disempowerment are akin with the concepts referred to in the SDT and AGT literature. We then present some additional thoughts regarding the implementation of an empowering sports coaching philosophy at the youth level. Next, given that previous CDPs have neglected to consider the psychological effects of providing different types of coaching behavior to young athletes for coaches themselves, we give an overview of recent studies that have focused on the psychological costs and benefits of engaging in different types of behavior. We continue by highlighting the need to explicitly consider coaches' perceptions of participating in CDPs as well as the need to both develop and validate measures assessing coaches' self-report of their own interpersonal behaviors. We conclude by highlighting the purpose of this doctoral thesis and listing the research questions.

Organized Youth Sport in Norway

Over the past 50 years, organized youth sport has evolved in Norway and is a firmly established part of the Norwegian society. Specifically, the NCS experienced a substantial increase in membership numbers between the mid 1960's and 1980's, which has continued to

increase until the early 2000's (Green, Thurston, Vaage, & Roberts, 2015). This increase was partially due to changes in lower recruitment age, higher participation of female youth, and the introduction of several new types of sport (Ingebrigtsen & Aspvik, 2010). Although the membership numbers in Norwegian youth sports are currently high among children 6 to 12 years of age, with approximately 500,000 participants currently participating, the proportion of adolescents between 16 to 19 years of age who participate in sport has declined (Statistics Norway, 2015). One reason for this attrition has to do with the high degree of adult involvement in organized youth sport (Smoll & Smith, 2002). Indeed, several studies have shown that coach and parental behaviors are predictive of young athletes' well-being in sport and in their continued sport involvement (see Balish et al., 2014; Harwood et al., 2015 for reviews).

The Volunteer Nature of Youth Sports Coaching

At the youth level, adults (e.g., parents) are typically responsible for coaching and mentoring young athletes (e.g., Graham, Dixon, & Hazen-Swann, 2016; Smith & Smoll, 2005, 2011; Vargas-Tonsing, 2007; Wiersma & Sherman, 2005). Parents in Norway commonly regard involvement in organized youth sport as a normal part of their everyday life, and additionally, as a way to connect with their children (see Stefansen et al., 2016 for details). However, the 'deep involvement' practice of parenthood, involving engagement in one-to-one coaching, post-competition debriefing, and individual tutoring strategies for further development, often lead to undesirable psychosocial outcomes (e.g., Duda & Balaguer, 2007; Smith & Smoll, 2007, 2011; Smoll & Smith, 2002). Moreover, it is worth noting that few of the parents who take on the responsibility of coaching young athletes have received formal training in creating healthy psychosocial learning environments for their athletes (Smith & Smoll, 2005, 2011; Smoll & Smith, 2002). Thus, the voluntary nature of youth sports coaching has important implications for young athletes and often raises an area of concern. Specifically,

many controversies surrounding youth sport revolve around the relationship between coaches and their athletes (e.g., Horn, 2008; Mageau & Vallerand, 2003; Smith & Smoll, 2007, 2011). This is because coaches are likely to influence athletes' attitudes, and outcomes from one's participation, by engaging in both desirable and undesirable interpersonal behaviors, transmitting their personal values and beliefs both verbally and through being an example in the sport setting, and by prioritizing some objectives over others (Smith, Smoll, & Cumming, 2007; Smoll & Smith, 2002). Because of this, coaches who are unskilled may cause more harm to their athletes because of their inability to recognize their own level of incompetence (Dunlosky & Rawson, 2012; Ehrlinger, Mitchum, & Dweck, 2016; Kim, Chiu, & Bregant, 2015; Kruger & Dunning, 1999). In an attempt to address these challenges in youth sport, the International Olympic Committee (IOC) has proposed a set of guiding principles in order to develop "healthy, resilient, and capable youth athletes, while providing opportunities for all levels of sport participation and success" (Bergeron et al., 2015, p. 843). One of these principles is concerned with the role of coach education and effectiveness. Indeed, it is argued that "coach education and mentoring to develop coach competencies should be a priority of sport organizations" (Bergeron et al., 2015, p. 848). Thus, it is worth mentioning that recent reviews of the sports coaching education literature have highlighted the need for psychosocial training interventions to have a theoretical basis (see Langan et al., 2013 for details). A combination of the organismic and the social-cognitive approach to human motivation may be a viable alternative, enabling researchers to study a range of psychological processes within a world-renowned conceptual framework.

Organismic and Social-Cognitive Theories of Motivation

Theories of human motivation are based on various assumptions concerning the nature and dynamics of motivation (e.g., Baumeister, 2016; Reeve, 2016; Ryan, 2012). For example,

the organismic dialectic starts off by postulating that all humans are proactive, growth-oriented, and naturally inclined toward integration, involving such concepts as autonomy and homonomy (Deci & Ryan, 2000, 2012; Ryan & Deci, 2002). Autonomy refers to the tendency of integrating psychological elements into an elaborated, coherent, and unified sense of self, whereas homonomy refers to people's ability to integrate themselves with others. Ryan and Deci (2002) have outlined that both of these tendencies are essential for healthy human development. The aforementioned organismic activities require innate psychological nutrients: autonomy, competence, and relatedness. To the extent that people have sufficient inner resources, they are able to take part in a specific number of natural processes, involving intrinsic motivation, integration of extrinsic regulations, and movement towards greater well-being (Deci & Ryan, 2000). However, given that people are vulnerable to both internal and external forces, there also exists a possibility that the environment inhibits the organismic processes. The degree to which environments are controlling, over-challenging, or rejecting is likely to influence people in such a manner that they may compartmentalize their psychological structures, withdraw concern for others, and engage in antisocial activities (see Deci & Ryan, 2000 for details).

Conversely, the social-cognitive approach to human motivation highlights that human behavior should be seen in the context of triadic reciprocity (Schunk & Usher, 2012). This outlines that there are reciprocal interactions among a number of influences, involving social or environmental, personal (e.g., cognitions, beliefs, skills, and affects), and behavioral factors (Schunk & Usher, 2012). The contrasting feature of the social-cognitive approach is its focus on subjective interpretation of behavior (Roberts, 2012). The social-cognitive approach to human motivation views individuals as proactively engaged in their own actions and accomplishments, meaning that the function and subjective meaning of people's behavior must be considered in understanding their motivation (Nicholls, 1989; Roberts, 2012). It is argued that "what we do and the concepts we employ depend on our purposes – on what we want to

accomplish or on what question we want to ask” (Nicholls, 1989, p. 81). In sum, the main difference between these two contemporary perspectives is whether psychological needs (as organismic necessities) or cognition take center stage in explaining the psychological processes that serve the quality of motivation, which in turn, leads to achievement behavior (Deci & Ryan, 2012; Roberts, 2012).

Self-Determination Theory

Self-determination theory is based on two meta-theoretical assumptions, which are both concerned with the nature of human beings (Deci & Ryan, 2012). First, it is assumed that people are inherently active, thereby initiating engagement with their social environments. Second, it is assumed that people have a natural and developmental tendency towards integrating external regulations into a unified sense of self (see Deci & Ryan, 1985, 2000 for details). In the sections below, we will present the main tenants of SDT.

Basic Psychological Needs

To begin, SDT purports that people’s personalities and cognitive structures depend on a set of innate psychological nutrients in terms of experiencing personal growth, integration, and well-being (Deci & Ryan, 1985, 2000, 2012; Ryan & Deci, 2000a, 2000b, 2002). These nutrients are typically referred to as basic psychological needs, which indicate that all people have the need to experience autonomy, competence, and relatedness regardless of culture and one’s developmental period (Ryan & Deci, 2002). Even though satisfaction of these psychological needs is considered a requirement for well-being, effective functioning, and psychological health, people may not be explicitly conscious of these psychological needs as goal objects (Ryan & Deci, 2002). Despite this, it is argued that the healthy human psyche will strive to attain these three needs, including being drawn towards situations that increase the

likelihood of satisfying these innate requirements (Ryan & Deci, 2002). Thus, the specifications of SDT encourage people to feel autonomous, as they perceive to be the origin or source of their own behavior, competent as they exercise their own capacities, and related as they are cared for and care for others in close relationships (Ryan & Deci, 2002). The degree to which the three basic psychological needs are satisfied or thwarted will have positive or negative impacts on a range of outcomes, including the quality of people's motivation (Deci & Ryan, 1985, 2000, 2012).

Autonomous and Controlled Motivation

As mentioned, the natural organismic activities involve a proactive engagement with the environment and an increased tendency towards integration of external regulations (Deci & Ryan, 2000, 2012). In the process of internalization, external regulations are transformed into personally endorsed self-regulations (Deci & Ryan, 2000). It becomes evident that a key aspect of SDT is the differentiation between various types of motivation (see Deci & Ryan, 2000, 2012 for details). Importantly, this differentiation makes it easier to understand and predict the quality of people's experience and their behavior (Spence & Deci, 2016). The differentiation between types of motivation is related to the "relative autonomy of a person's actions" (Deci & Ryan, 2012, p. 89); thus, motivation is typically classified as being either autonomous or controlled. Controlled motivation consists of two subtypes of extrinsic motivation: external and introjected forms. Autonomous motivation is comprised of three subtypes of motivation: identified and integrated, which are forms of extrinsic motivation, and intrinsic motivation (Deci & Ryan, 2012). The distinguishing characteristic between the four forms of extrinsic motivation is that the regulation of behavior moves from being controlled by external contingencies to being a part of the other aspects of the integrated sense of self (Deci & Ryan, 2000, 2012). Intrinsic motivation, however, refers to "the inherently satisfying internal conditions that occur when

doing an intrinsically motivated behavior” (Deci & Ryan, 2012, p. 88). In other words, an inherent satisfaction primarily occurs due to experiences of autonomy, competence, and, in some cases, relatedness (Deci & Ryan, 2012). Autonomously motivated people are likely to report enhanced well-being, perform more effectively, and behave in a healthier manner. People who have controlled motivation are likely to report the opposite outcomes because their need for autonomy is thwarted within social contexts (Deci & Ryan, 2012).

Supporting or Thwarting Basic Psychological Needs Satisfaction

From the SDT perspective, the quality of social environments (e.g., the athletic environment) is captured in the concepts of autonomy-supportive and controlling climates (Deci & Ryan, 2012; Ntoumanis, 2012). When coaches (i.e., an authority figure) provide athletes with choices and a rationale for task engagement, acknowledge athletes’ perspectives, and provide athletes with opportunities to take initiative, the results are likely to foster an autonomy-supportive climate (Carpentier & Mageau, 2013; Deci & Ryan, 1985, 2012; Mageau & Vallerand, 2003). However, when coaches use a controlling communication style, focus on ego-involvement, and use external contingencies to shape athletes’ behavior, a controlling climate is likely to be generated (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010; Deci & Ryan, 1985, 2012; Mageau & Vallerand, 2003). Basic psychological needs are satisfied through coaches providing experiences of autonomy, competence, and relatedness, which naturally create a motivating autonomy-supportive climate (Deci & Ryan, 2012). More specifically, when athletes perceive autonomy-support from their coach, they are likely to feel genuinely connected to the coach and included by the other team members. Athletes’ perspectives are involved when coaches’ provide support for autonomy, thus athletes are likely to feel competent because the coach is mindful of potential obstacles that can hinder their athletic progression. The last aspect of perceiving autonomy-support concerns athletes’ feelings

of autonomy. Indeed, when athletes are given choices or a rationale for task engagement within the sport-specific environment, they are likely to personally endorse or identify with the activity. Consequently, they are likely to act with a sense of volition and, thus, do what it takes to satisfy their other psychological needs (see Deci & Ryan, 2012 for details).

Controlling climates are defined as “those that are experienced as pressure to think, feel, or behave in specified ways” (Deci & Ryan, 1985, p. 95). A critical issue arising when experiencing pressure is that an external locus of causality is facilitated. The athletes experience an external source (e.g., the coach) as the initiator of behavior (Deci & Ryan, 1985). Thus, a controlling coach structures the environment in a way that makes the activities instrumental; the coach is in control of the desired outcomes. This may, in turn, cause a reorientation in athletes’ engagement with the sporting activity (Deci & Ryan, 1985). Indeed, athletes may start to wonder whether they are trying to do well on achievement tasks for the coach or for themselves. According to SDT, these feelings represent impaired or thwarted psychological needs, particularly the need for autonomy (e.g., Deci & Ryan, 1985, 2012). Another conceptual framework, yet equally influential as SDT in the sport psychology literature, is AGT (see Roberts, 2012 for details).

Achievement Goal Theory

The achievement goal approach to human motivation represents several distinct lines of thinking about the achievement goal constructs, including the work of John G. Nicholls, Carol S. Dweck, Carol Ames, and Andrew J. Elliot (see Murayama, Elliot, & Friedman, 2012 for details). This thesis, however, is grounded in Nicholls’s theoretical framework of achievement motivation (e.g., Nicholls, 1984a, 1989). One of Nicholls’s main arguments in constructing the theory was to “understand inequality of motivation for intellectual development and for deciding what might best be done to foster optimum motivation in students of all levels of

ability” (Nicholls, 1989, p. 83). The following sections outline the two keys to Nicholls’s conceptualization of the achievement goal construct and review the main elements of his theory.

The Intentional Approach and Different Conceptions of Ability

The intentional approach is important to the achievement goal approach because, by merely trying to predict the behavior of others, it becomes evident that people’s actions may only be regarded as rational or irrational when they are viewed in the light of the different goals that are pursued (Nicholls, 1984b, 1989). Hence, having the ability to predict various types of achievement behavior requires extensive knowledge about what behavior will maximize desirable outcomes and, thus, minimize undesirable outcomes. According to AGT, achievement behavior is defined as “behavior in which the goal is to develop or demonstrate – to self or to others – high ability, or to avoid demonstrating low ability” (Nicholls, 1984a, p. 328). Therefore, the intentional approach involves the ability to predict when people are likely to seek being competent, as opposed to incompetent. From this, Nicholls (1984a, 1984b, 1989) has argued that ability is a relative concept, which can be judged in different ways.

One of Nicholls’s contributions to the achievement goal literature was to recognize that ability could be construed in more than one way (Nicholls, 1984a, 1984b, 1989). According to Nicholls (1984a, 1984b), the development of the concept of ability should be viewed as a process of differentiation. This process implies that young children will start by relying on a relatively undifferentiated conception of ability, and will then acquire a more differentiated conception of ability roughly by the age of 12 (Nicholls, 1984a, 1984b). Thus, if young children apply the undifferentiated conception to themselves, then they essentially do not recognize the difference between their own ability and effort (Nicholls, 1984b). This means that the individual equates success with optimal effort. Hence, the subjective experience with the use of the undifferentiated conception of ability involves that high ability is inferred from improved

performances, or from success on achievement tasks in which young children have some doubt about their own success (Nicholls, 1984b). Conversely, if more mature children apply the differentiated conception to themselves, they are then likely to define ability with reference to the performance of a normative reference group. A valid ability-inference, however, may only be inferred by acknowledging the role of both effort and performance. This is because optimal effort will eventually disclose individuals' ability, thereby revealing their current capacity or performance level (Nicholls, 1984b). Consequently, high ability is only implied by outperforming others while exerting equal amount of effort, or by achieving the same performance as others while exerting less effort (Nicholls, 1984a, 1984b). It then becomes evident that the two conceptions of ability have significance for individuals who strive to develop competence in various achievement settings, including organized youth sport.

States of Involvement, Goal Orientations, and Motivational Climate

The achievement situation will tend to influence individuals' thoughts on how to best develop or demonstrate high ability (i.e., in reference to oneself or others), thereby producing different motivational states of involvement (Nicholls, 1984a, 1984b, 1989). Accordingly, the motivational state of task involvement is characterized by an attitude with respect to seeking skill improvements through practice or acquiring new skills and, thus, mastering these skills even though the consequence may be failing (Nicholls, 1984b). The motivational state of ego involvement is characterized by the attitude to demonstrate superior capacity relative to those of others (Nicholls, 1984b). It is worth noting that a motivational state is a reflection of certain properties of the achievement situation as well as individual differences in proneness to the two motivational states of involvement (Nicholls, 1989). Consequently, from an AGT perspective, individuals are expected to differ in terms of their differences in task orientation and ego orientation, respectively, and their different perceptions of the achievement situation (Ames,

1992; Nicholls, 1989). An individual's predisposition to act in either a task- or ego-involved manner refers to their personal criteria of success and failure (i.e., I feel most successful if I do my best vs. outperform others), while the situational determinants refer to an individual's perception or opinion about what significant others (e.g., the coach) believe are important criteria of success and failure. Researchers have proposed that combining an individual's predispositions and his/her perceptions of the different achievement cues within a particular sport context may provide a better understanding of the motivation process in youth sport (see Roberts, 2012 for details). Until recently, researchers have mostly used either SDT or AGT as conceptual frameworks in their research. Duda (2013), however, proposed a reconceptualization of the coach-created motivational climate, uniting the two conceptual frameworks.

The Empowering Coaching™ Framework

The reconceptualization of the coach-created motivational climate united coaching behaviors holding motivational significance in the underlying dimensions of 'empowering' and 'disempowering' coach behavior (see Duda, 2013 for details). In doing so, the SDT and AGT frameworks were combined in such a way that the what (i.e., the goal content), why (i.e., goal motives), and how (i.e., the coach's influence on his/her athletes) of coaches' behaviors were addressed. If coaches are empowering, they will largely be autonomy-supportive, task-involving, and socially-supportive; however, if coaches are disempowering, they will largely use ego-involving and controlling coaching behaviors. As a consequence, coaches who are empowering wish to promote self-referenced perception of competence and psychological needs satisfaction among their athletes, whereas disempowering coaches are more apt to emphasize achievement tasks in which athletes are evaluated in terms of their performance in comparison to a normative reference group. Thus, the coach who is disempowering is less

concerned about whether his/her athletes' psychological needs are satisfied (Duda, 2013). Moreover, because Duda (2013) did not discuss whether the concepts of empowerment and disempowerment are akin with the concepts referred to in the SDT and AGT literature, we will now embark upon this discussion.

The Concepts of Empowerment and Disempowerment

The concept of psychological empowerment evolved originally from Paulo Freire's published work in the early 1970's (see Freire, 1972 for details), which provides explanations for inequalities among different groups of people living in the society (Stephens, 2008). Moreover, its underlying philosophy is concerned with the fact that participation is of no real benefit to individuals unless it includes helping them gain control of the activities they are involved in (Stephens, 2008; Zimmerman, 1995).

Building upon this, Nicholls (1979) argued that all children should have equal opportunities for attaining their intellectual potential by outlining: "Fulfillment of potential is taken to mean that everybody should achieve the best that is possible for them. Therefore, equality is conceived so that it implies maximum quality" (p. 1071). Task involvement is a type of coach behavior that aims to enhance athletes' sense of certainty in accomplishing achievement tasks that they feel competently uncertain, thereby also increasing their faith in their own athletic abilities and perceived competence (Nicholls, 1989). The concept of psychological empowerment and empowering coach behavior also fits within SDT (Deci & Ryan, 2012). As mentioned, SDT emphasizes that in order for people to remain autonomous in their life activities, they ought to find themselves in situations characterized by an autonomy-supportive interaction style. The reason for this is that people are acknowledged in this type of situation, which in turn, means that they are given some choice and are encouraged to contribute

with their own opinion (Carpentier & Mageau, 2013; Deci & Ryan, 2012; Mageau & Vallerand, 2003).

In contrast, disempowerment involves depriving individuals of authority, personal control, and influence (Zimmerman, 1995). Hence, the process of experiencing disempowering coach behavior is likely to make athletes feel ineffectual, less in control, and unimportant, thereby adversely affecting the quality of their participation in sport. As mentioned, ego-involving coach behaviors revolve around whether athletes' ability is judged as either high or low on the basis of the ability of athletes in a normative reference group (Nicholls, 1984a). This type of coach behavior focuses on athletes' ability relative to that of other team members. More specifically, although ego-involving coaches acknowledge that task mastery is improved by effort (Nicholls, 1984a), it is still those athletes achieving task mastery with minimum effort who are given the most attention by the coach (i.e., the most talented athletes). Hence, ego-involving coach behaviors pay little attention to task difficulty, the pace of instruction, and the fact that each athlete learns at a different pace (Ames, 1992; Treasure, 2001). Athletes finishing at a slower pace, and particularly those who are judged low in ability, may therefore develop an ambivalent view regarding effort and performance (Nicholls, 1984a). Although acknowledging that effort is needed to develop athletic skills and that practicing with high levels of effort is a requirement to accomplish personally-valued and personally-challenging achievement tasks, athletes may indeed experience this requirement as challenging. First, learning is an insufficient basis of perceived competence in an ego-involving climate. Second, optimum effort will eventually reveal athletes' current level of performance (Nicholls, 1989). Consequently, ego-involving coaches may limit the chances of a large proportion of athletes demonstrating their athletic ability, and ultimately of fulfilling their athletic potential. This, in turn, implies that athletes' proactive behaviors, including the continuation of sport-specific practice outside of the training grounds (e.g., Baker & Young, 2014), are likely to decrease over

time. Ego-involving coach behaviors additionally stand in contrast to the importance of optimum motivation in the development of youth athletic potential. Indeed, in alignment with the concept of empowerment, Nicholls (1979) argued, “If we observe that all children are optimally motivated, we are on the way to the goals of quality and equality. When any children are not optimally motivated we are making less than desirable progress toward these goals” (p. 1072).

Complementing the preceding arguments concerning empowerment, SDT maintains, “in healthy individual development, people move in the direction of greater autonomy” (Deci & Ryan, 2012, p. 85). This stands in contrast to controlling coaching contexts, which are focused on imposing specific and preconceived ways of thinking, feeling, and behaving upon others (Bartholomew et al., 2010). Controlling coach behaviors are likely to induce a change in athletes’ values and behavioral regulations from internal to external regulation of athletes’ achievement behaviors (Deci & Ryan, 2012); thus, disempowering the athletes. Moreover, SDT typically refers to controlled extrinsic motivation when people enter situations in which they enact behaviors that represent a form of reward or punishment, or in this case, a contingency that is controlled by the coach. This, in turn, means that the process involving young athletes esteeming themselves to the degree that they perform well in sport may lead to achievement behaviors that are motivationally unstable in the long-term (Deci & Ryan, 2012). The underlying mechanism is that the behavioral and psychosocial outcomes are contingent on the perceived approval by the coach; hence, the coercive force from the coaching context reduces the autonomy of athletes’ achievement behaviors (Deci & Ryan, 2012).

Taken together, the concepts of empowering and disempowering coach behavior can be used to unite the conceptual distinctions between the SDT and AGT literature in relation to the coach-created motivational climate. From a sociological perspective, however, it is worth noting that the rhetoric of the current coaching education literature, mainly based on SDT and

AGT literature, has been criticized for not taking the disciplinary power embedded in youth sport contexts into account (see Denison, Mills, & Konoval, 2015 for details).

Implementation of an Empowering Sports Coaching Philosophy

Even though it may be obvious that empowerment, as a motivational approach, is a comprehensive and, at times, very demanding coaching style, researchers hardly mention the number of difficult aspects related to the implementation of this style of sports coaching (e.g., Denison et al., 2015; Jones, 2001; Nelson, Cushion, Potrac, & Groom, 2014). As mentioned, the main goal of an empowerment approach to sports coaching is to enhance sport coaches' ability to understand the role of satisfaction of the three psychological needs, along with the demonstration of self-referenced ability, thereby enhancing young athletes' learning experiences, well-being, and athletic performances (Deci & Ryan, 2012; Duda, 2013; Kidman, 2001; Nicholls, 1989). Indeed, developing an athlete-centered approach to coaching (e.g., empowering athletes) might seem contradictory, or at least difficult, in a context in which unbalanced coach-athlete power relations is normalized (Denison et al., 2015). Nevertheless, working towards greater empowerment for athletes is educationally worthwhile because the coach then is concerned with supporting athletes to become involved in decision-making processes and to raise their self-awareness and self-sufficiency (Kidman, 2001). Hence, athletes who perceive an empowering style of sports coaching are likely to make informed decisions, helping them to become more self-regulated and to further develop as athletes (Duda, 2013; Kidman, 2001).

A real hurdle to overcome, however, is that an empowering style of sports coaching “does not succeed on its own” (Kidman, 2001, p. 147). Indeed, the empowering approach to sports coaching requires the coach to work on a range of tasks: developing and practicing the empowering strategies; gaining the support of athletes, parents, other coaches, and

administrators; and enabling athletes to understand the benefits of going along with the empowering principles (Kidman, 2001). Additionally, based on the extremely complex social system embedded in youth sport settings (Denison, et.al., 2015; Smith, 2014; Smoll & Smith, 2002), coaches must self-reflect on their own coaching practices in order to further develop and improve. The self-reflection process may provide the coach with an opportunity to “cope with ambiguity in the coaching context” (Jones & Wallace, 2005, p. 119), and accept the variety of challenges associated with his/her role as a coach. As such, inviting coaches to processes of self-reflection and raising of consciousness should be regarded as an essential aspect of any psychosocial training intervention (Jones & Wallace, 2005; Kidman, 2001; Smith, 2014; Smith & Smoll, 2005, 2011). Consequently, to drive the fields of sports coaching and sport psychology forward, it would seem important to acquire additional knowledge about experiences and lessons learned from coaches who participate in CDPs.

Previous CDPs have solely focused on coaches’ interpersonal behaviors in relation to athletes’ psychosocial outcomes (e.g., Evans et al., 2015; Langan et al., 2013; Lauer & Dieffenbach, 2013). As such, they have neglected to consider the psychological costs and benefits of providing different types of coaching behavior to athletes for coaches themselves. From a social psychological perspective, studies have begun to illuminate the psychological effects of providing autonomy-supportive behaviors to others (Deci, La Guardia, Moller, Scheiner, & Ryan, 2006; Patrick, Knee Canevello, & Lonsbary, 2007), complying with behaviors that hurt others (Legate et al., 2013, 2015), and engaging in prosocial behavior (Martela & Ryan, 2015, 2016; Weinstein & Ryan, 2010).

Psychological Effects of Providing Different Behaviors to Athletes

Self-determination theory outlines that just as receiving autonomy-support in the social environment is a necessary condition for need satisfaction to the receiver, providing autonomy-

support to others is an equally important condition for the need satisfaction of the provider (e.g., Deci et al., 2006; Deci & Ryan, 2012; La Guardia & Patrick, 2008). A few studies have examined this assumption outside of the sport setting. For example, Deci and colleagues (2006) used a dyadic design to examine the psychological effects of providing and receiving autonomy-support in close relationships. Findings showed that receiving and providing autonomy-support were both significant predictors of psychological needs satisfaction. After controlling for autonomy support received, findings still showed that the provision of autonomy-support was a significant contributor to individuals' self-report of relationship quality. Provision of autonomy-support also explained significant variance in the general well-being composite. In another study, Patrick and colleagues (2007) looked at the extent to which individuals in romantic relationships provided need-supportive behaviors to each other. Findings showed that the more aware each romantic partner was of the other's psychological needs, by providing support for the need for autonomy, competence, and relatedness, the better relational functioning and well-being were reported by both partners. Finally, in the school domain, a recent publication has shown that physical education (PE) teachers who provided autonomy support to their students over the course of a semester reported greater teaching motivation, teaching skill, and teaching well-being (Cheon, Reeve, Yu, & Jang, 2014). Drawing on these findings, we assume that if a coach were considering his or her athletes' perspectives, encouraging them to initiate certain behaviors, supporting their choices, and being responsive to their thoughts and questions, the coach would be able to satisfy his or her three psychological needs. This example first highlights that the coach is engaging in these behaviors on his or her own volition (i.e., autonomy). Second, the coach is in a position where he or she is likely to help athletes develop their athletic abilities (i.e., competence). Finally, repeated events where coaches are responsive to athletes' initiatives have a chance to create positive social interaction

patterns, and thereby develop a sense of connectedness between the coach and his or her athletes (i.e., relatedness).

Considering the scope of AGT in physical activity settings (see Roberts, 2012 for details), previous research has not sought to determine whether providing task-involving behaviors to athletes relates to coaches' psychological functioning. However, when task-involved, coaches are likely to achieve a sense of personal competence and control by helping athletes maximize their potential (Nicholls, 1989). Hence, the provision of task-involving behaviors to athletes would be expected to relate positively to coaches' own psychological well-being. Building upon this insight, and based on prior AGT- and SDT-based research (e.g., Cheon et al., 2014; Deci et al., 2006; Treasure & Roberts, 1995), it is suggested that coaches who provide task-involving behaviors to their athletes are more likely to promote their own sense of autonomy, in addition to experiencing a sense of competency when teaching athletes new skills. This is because the coaches freely choose to involve their athletes in various learning situations, thereby changing the locus of responsibility in the sport setting. Another key aspect of providing task-involving behaviors to athletes include giving recognition to others and emphasizing that everyone has an important role on the team. Hence, it is reasonable to expect that coaches would experience an increased sense of relatedness given that such coach behaviors are likely to elicit increased task cohesion among athletes (Heuzé, Sarrazin, Masiero, Raimbault, & Thomas, 2006). Lastly, social support is a behavior with potential implications for coaches' psychological well-being (e.g., subjective vitality, positive affect; Ryan & Solky, 1996), as social support involves loving, valuing, and having a deep regard for others (Pierce, Sarason, & Sarason, 1992). Thus, guided by SDT (Ryan & Solky, 1996), we suggest that providing social support to athletes would satisfy the need for relatedness among coaches. Conversely, recent research has shown that engagement in harmful interpersonal behaviors is psychologically costly (Legate et al., 2013, 2015).

Engaging in Behaviors that Hurt Others

In recent publications guided by SDT, Legate and colleagues (2013, 2015) used several experiments to determine whether compliance with behaviors aimed at hurting others carried psychological costs. Findings indicated that compliance both worsened mood and increased negative affect, supporting the working hypothesis that compliance with behaviors involving ignorance or exclusion of others is related to thwarted psychological needs. Additionally, it became evident that compliant individuals suffered because they felt pressure to do so, thereby thwarting their experiences of autonomy and relatedness. Informed by the foregoing findings, we suggest that providing controlling behaviors to athletes, similar to perceiving controlling behaviors from the coach, would be detrimental to the sense of psychological well-being reported by coaches themselves, because these acts would thwart their psychological needs. By providing controlling behaviors to athletes, coaches would likely experience a diminished sense of autonomy because they expose themselves to a greater risk of experiencing interpersonal conflicts with their own athletes. This implies that coaches may perceive the sport setting as a pervasive condition of threat, leading to more coercive or defensive behaviors, and thus thwarting their need for autonomy. When coaches provide controlling behaviors to their athletes, they are also more likely to experience a diminished sense of competence by having contributed to the thwarting of athletes' psychological needs, which in turn, could be linked to a reduction in athletes' inherent drive and interest. Accordingly, coaches are likely to perceive inferior long-term performances and functioning among their athletes, in which case their need for competence could be thwarted. Finally, the involved athletes would likely experience a diminished sense of relatedness because controlling coaching relates to behaviors focused on imposing a specific and preconceived way of behaving while participating in the sporting activity. As such, controlling coaching behaviors fully contradict autonomy-supportive

behaviors in which direct expressions of caring, involving oneself in the life of others, and taking another's perspective are in forefront (Deci & Ryan, 2012).

Ego involvement, by comparison, is a concept commonly referred to in both the AGT- and SDT-based literature (Deci & Ryan, 1985; Nicholls, 1989; Ryan, 1982). According to AGT, the state of ego involvement refers to “the desire to enhance the self by establishing one's superiority relative to others, even when one might not be directly competing with or even imagining any specific others” (Nicholls, 1989, p. 87). Whereas SDT assumes that ego-involved individuals “become invested in, and pressure themselves toward, particular outcomes. They evaluate themselves in terms of the outcomes they attain” (Deci & Ryan, 1985, p. 108). In other words, when ego-involved, individuals become involved with the activity at hand because they want to prove their normative competence, as their goal is to preserve their self-esteem (Deci & Ryan, 1985). This state of involvement involves an external perceived locus of causality and extrinsic motivation, thus creating an internally controlling motivational orientation (Ryan, 1982). Therefore, it appears intuitive that the provision of ego-involving behaviors to athletes, in any athletic event in which the coach and athlete struggle for supremacy, will be associated with various indices of psychological ill-being (e.g., negative affect, distress, shame, and guilt). This is because coaches are likely to feel pressure either from their internal states (e.g., self-evaluation) or from the environment (e.g., other club coaches and/or parents) to engage in behaviors that will increase the likelihood of emerging victorious (i.e., providing ego-involving behaviors to athletes). In addition, when ego-involved, individuals are likely to “be in a controlling mode vis-à-vis themselves” (Deci & Ryan, 1985, p. 109). Hence, coaches who display such behaviors are in danger of undermining their own intrinsic motivation towards sports coaching (Deci & Ryan, 1985). The foregoing information demonstrates that prior SDT- and AGT-based research has neglected the psychological effects of providing interpersonal coach behaviors to athletes for coaches themselves. Previous youth sport coaching education

research has also neglected the psychological effects; neither considered nor examined coaches' perceptions of attending various CDPs (see Evans et al., 2015; Langan et al., 2013 for details).

Coach Development Programs

Although much effort has been put into developing psychosocial training interventions in youth sport (e.g., Evans et al., 2015; Lauer & Dieffenbach, 2013), Langan and colleagues (2013) argued, "it is difficult to draw firm conclusions concerning the effect of non-formal coach education interventions on coaches' interpersonal effectiveness" (p.46). One reason for this is due to the methodological quality of former studies (Langan et al., 2013). For example, in three studies, which received a strong overall rating by a recent review (Langan et al., 2013), Smith, Smoll, and their colleagues evaluated the effect of interventions based on Coach Effectiveness Training (CET) and Mastery Approach to Coaching (MAC; e.g., Smith et al., 2007; Smith, Smoll, & Curtis, 1979; Smoll, Smith, & Cumming, 2007). A methodological weakness in these studies was that the CET and the MAC were designed to produce changes in a number of athlete relevant outcomes, suggesting an exclusive focus on athletes' perceptions of their coaches' behaviors (Langan et al., 2013). However, given the reciprocal causal relations existing in sport contexts (Smith & Smoll, 2007), it can be argued that future research ought to place equal emphasis on coaches' outcomes.

As noted above, relying on only athletes' perceptions of their coaches' behaviors has shortcomings, mainly due to the network of reciprocal causal relations operating within the coach-athlete relationship (Smith & Smoll, 2007). As Campbell (1977) highlighted nearly four decades ago: "I submit that when both the independent and dependent variables are based on self-reports by the same person, we have learned absolutely nothing about leadership, no matter what the results turn out to be" (p. 229). Drawing on these arguments with the understanding that sport is within a naturalistic setting, constituting a complex social system with a range of

social-psychological processes (Smoll & Smith, 1989, 2002), it seems fair to argue that future studies need to expand the scope of investigation. For example, to include either an objective assessment of the coach-created motivational climate (Smith, Smoll, & Hunt, 1977; Smith et al., 2015) or coaches' perceptions of their own interpersonal behavior, in combination with athletes' perceptions of their coaches' behaviors, could advance research focusing on the dynamics of sports coaching at the youth level. A recent publication has characterized coach education research as "an approach that is still in such early stages of development" (Langan et al., 2013, p. 47); therefore, acquiring greater knowledge concerning coaches' perceptions of their own interpersonal behaviors could contribute to improved psychosocial outcomes among athletes in all age groups.

Further, only two measures have addressed the topic of coaches' perceptions of their own interpersonal behaviors: (a) the Coaching Behavior Assessment System (CBAS; Smith et al., 1977); and (b) the Coach Dominant Behavior Scale (CDB-S; Yang & Jowett, 2013). First, the CBAS (Smith et al., 1977) is a measure that asks coaches to indicate the extent to which they engage in the 12 CBAS categories. However, as argued by Chelladurai and Riemer (1998):

"No published evidence has been provided for this scale's reliability or validity although, as was the case for the player perceptions measure, one might argue that this particular measure is intuitively face valid because it would seem that each item is a direct measure of its corresponding leadership behavior." (p. 233)

Second, the CDB-S is a newly developed measure assessing coaches' perceptions of their dominant behavior (e.g., the coach's capacity and intention to direct and lead his/her athletes) in the sport setting (Yang & Jowett, 2013). Findings indicated that the scale was a psychometrically sound self-report measure, supporting the premise of satisfactory model fit, factor loadings, and composite reliability score (see Yang & Jowett, 2013 for details). However,

it should be noted that this validation study was carried out on an elite sample of coaches, who were predominantly coaching at the international level.

Finally, given that CDPs cannot address all aspects related to sports coaching at the youth level, coaches have been encouraged to become aware, register, and reflect upon their own coaching practices during the season. In fact, particular emphasis has been placed on the ability of coaches to become aware of interpersonal behaviors reducing the quality of athletes' motivation and how interpersonal behaviors likely to be considered non-constructive (i.e., ego-involving and controlling coaching behaviors) might be changed in accordance with guidelines related to various CDPs. To further assist coaches in the process of becoming more aware of their own interpersonal behaviors, coaches have been given brief coaching manuals in written format. The main aim of these coaching manuals have been to reinforce the messages dealt with during the CDP and, thus, to assist coaches in enhancing self-awareness and involving themselves in processes of self-reflection throughout the season (Smith & Smoll, 2005, 2011). To our knowledge, no studies have examined the perceived usefulness of these coaching manuals on coaches' self-reported interpersonal behaviors. Thus, future studies should investigate the relative contribution of specific coaching manuals on coaches' post-season interpersonal behaviors.

Guided by SDT and AGT (Deci & Ryan, 2000, 2012; Nicholls, 1984a, 1989), we therefore set out to investigate important aspects related to the role of volunteer sport coaches at the youth football level, suggesting that previous coach education research has overlooked key factors having potential positive and negative implications for both coaches and athletes.

Purpose of the Doctoral Thesis and the Listing of Research Questions

The purpose of this doctoral thesis was four-fold: (a) to investigate the potential psychological costs and benefits of providing different styles of coaching to young athletes for

coaches themselves; (b) to gain insights into what coaches considered to be the merits of participating in the Norwegian arm of the ECTP; (c) to validate a questionnaire that measures coaches' self-report of their own empowering and disempowering behaviors; and (d) to investigate the effectiveness of the ECTP on coaches' self-reported empowering and disempowering behaviors. Specific research questions were formulated surrounding these four purposes in each of the five articles:

❖ **Article I: Research Questions**

- Do coaches' provision of autonomy-support to their athletes relate positively to their own self-report of psychological needs satisfaction?
- Do coaches' provision of autonomy-support to their athletes mediate the relations between social-contextual and intrapersonal variables and coaches' self-report of psychological needs satisfaction?

❖ **Article II: Research Question**

- Do coaches' levels of empowering behaviors and disempowering behaviors at the beginning of the sport season predict their levels of psychological well-being at the end of the sport season?

❖ **Article III: Research Questions**

- Do coaches participating in the Norwegian arm of the ECTP differ in self-report of empowering and disempowering behaviors across the sport season?
- Does the perceived usefulness of the Empowering Coaching™ manual relate positively to coaches' post-season empowering behaviors, and relate negatively to coaches' post-season disempowering behaviors?

- What do coaches consider the merits of participating in the Norwegian arm of the ECTP?

❖ **Article IV: Research Questions**

- The hypothesized multidimensional factor structure of the EDMCQ-C: Can the multidimensional factor structure be confirmed using coaches' self-report of their own empowering and disempowering behaviors?
- Can the hypothesized multidimensional factor structure of the EDMCQ-C be validated across two country-specific samples of coaches, using coaches' self-report of their own empowering and disempowering behaviors?

❖ **Article V: Research Question**

- Does the Norwegian arm of the ECTP have an impact on coaches' self-report of empowering and disempowering behaviors from pre- to post-seasons?

Methods

Participants

The total sample consisted of 280 youth football coaches (257 males; 23 females)¹, assigned to either the intervention ($n = 193$; $M = 41.99$ years, $SD = 6.32$; 174 males, 19 females) or the control group ($n = 87$; $M = 43.19$ years, $SD = 5.15$; males $n = 83$; females $n = 4$) of the Norwegian arm of the PAPA project (Duda et al., 2013).² The majority of the sample were Norwegian ($n = 269$) and a few had other nationalities ($n = 11$). Of the 280 coaches, 222 (79.3%) completed the pre-season measures (T1), whereas 203 (72.5%) completed the post-season measures (T2).

In terms of prior coach education, few coaches in the control group reported coaching knowledge equivalent to the Union of European Football Associations (UEFA) ‘C’ coaching license ($n = 22$). In contrast, a larger proportion of the coaches in the intervention group reported coaching knowledge equivalent to the UEFA ‘C’ coaching license ($n = 68$). A few coaches in the intervention group also reported having completed the UEFA B coaching license ($n = 10$). With regard to prior coach experience, coaches in the intervention group reported a mean experience of 7.1 years ($SD = 5.3$), while coaches in the control group reported an experience of 5.9 years ($SD = 3.3$).

Procedure

After the Norwegian arm of the PAPA project received approval from the Norwegian Centre for Research Data (NSD), a sample of football clubs in the southern part of Norway was contacted by e-mail and informed about the purpose of the study. Contact information was then

¹ In terms of measuring intervention effects, note that 51 coaches in the intervention condition did not participate in the ECTP. The results, however, remained similar when these coaches were excluded from the Bayesian analyses. Therefore, analyses were conducted for the full sample of coaches ($N = 280$).

² Coaches who participated in the Norwegian intervention arm received the six-hour ECTP at the beginning of the sport season. Moreover, coaches’ self-report of their own empowering and disempowering behavior were assessed before they attended the ECTP. It went approximately 5-months between the pre- and post-test assessments.

obtained from those football clubs willing to participate. Moreover, the football club management was given written information, which was relayed to the coaches, about the voluntary aspect of participating in the study and the research team's plan to ensure data confidentiality. Information was also given to the football club management, telling coaches about their opportunities, at any time, to withdraw from the study. Lastly, members of the research team distributed paper copies of the questionnaire (paper-and-pencil version) to the head and assistant coaches, who filled it out before or after a training session, requiring the average coach to spend 25 minutes filling out the questionnaire.

The Norwegian Arm of the PAPA Project

The Norwegian arm of the ECTP was tested using a cluster randomized controlled trial, meaning that football clubs were randomized to participate in either the intervention or the control group (Duda et al., 2013). The reason for using clubs rather than individuals, was to avoid the possibility that coaches in the intervention group interacted with coaches in the control group and, possibly, sharing the content of the ECTP with them. The recruitment of coaches was organized in collaboration with the Norwegian Football Association and its local football clubs in the southern part of Norway. Coaches were recruited from 46 different football clubs that had 109 registered boys' and girls' teams (boys' $n = 66$; girls' $n = 43$). Of these teams, 33 clubs and 80 teams were randomized to the intervention group. Coaches who were allocated to the intervention group were invited to participate in the 360 min ECTP workshop ahead of the season during the spring of 2011. The workshop was led by trained coach educators (CEs) who were recruited and trained by the members of a Norwegian research group (Søvik, Larsen, Tjomsland, & Samdal, 2016; Van Hove et al., 2015). The main focus of this workshop was on how coaches could enhance the qualitative aspects of athletes' motivation. The workshop content and learning activities were also intended to support coaches in their efforts to

understand and implement the strategies outlined by the ECTP framework in such a way that their athletic environments would become more empowering and, therefore, less disempowering (Duda et al., 2013).

Measures

Article I

Perceived Parental Pressure

Due to the lack of existing measures in the literature that assess the relevant external pressure factors within the youth sport context, the Norwegian PAPA research team compiled a 9-item scale specifically for use in the Norwegian arm of the PAPA project. The three items used in this study which reflected parental pressure in the sport context, [i.e., parents are: (a) interfering with your decisions as coach, (b) insisting that you should increase the focus on sport performance, and (c) concerned with the issue that the best athletes should get the most playing time], were rated by coaches on a 7-point scale, ranging from 1 (*never problematic*) to 7 (*often problematic*). Raykov's (2009) coefficient *rho* was .80 (95% CI = [.75-.86]), with a standard error (S.E.) of .03, and the validity coefficient (VC) was higher than the recommended value of .80 (VC = .92; see Brown, 2006).

Perceived Social Unity

The Norwegian PAPA research team compiled a new 6-item scale to examine how coaches perceived the social unity among their athletes. The scale was developed specifically for use in the Norwegian arm of the PAPA project, and followed a review of the sport and social psychology literatures (e.g., Cameron, 2004; Carron & Brawley, 2008; Fiske, 2004; Paskevich, Estabrooks, Brawley, & Carron, 2001). Thus, coaches completed a questionnaire that assessed their perceptions of social unity on their team (e.g., athletes are socially united). Each item was

responded to on a 5-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). In addition, the coefficient ρ of the scale was .79 (95% CI = [.73-.85]), in combination with a S.E. of .03. The VC was higher than .80 (VC = .90; Brown, 2006).

Self-Determined Motivation

Coaches completed a Norwegian version of the Coach Motivation Questionnaire (CMQ; McLean, Mallett, & Newcombe, 2012) to assess their self-determined motivation towards coaching. This is a 23-item self-report questionnaire designed to assess six forms of motivational regulation: intrinsic motivation (5 items, coefficient ρ = .78; 95% CI = [.70-.86]; S.E. = .04; e.g., because I find it stimulating), integrated regulation (3 items, coefficient ρ = .67; 95% CI = [.59-.76]; S.E. = .04; e.g., because coaching is fundamental to who I am), identified regulation (3 items, coefficient ρ = .75; 95% CI = [.67-.83]; S.E. = .04; e.g., because it contributes to my development as a person), introjected regulation (4 items, coefficient ρ = .51; 95% CI = [.41-.64]; S.E. = .06; e.g., because I don't want to let my athletes down), external regulation (4 items, coefficient ρ = .82; 95% CI = [.77-.86]; S.E. = .02; e.g., to be respected by others), and amotivation (4 items, coefficient ρ = .75; 95% CI = [.69-.81]; S.E. = .03; e.g., I often think my coaching efforts are a waste of time). The items were adapted to the youth sport context, asking coaches to indicate their reasons for coaching athletes on a 5-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Additionally, a Self-Determination Index (SDI; Blanchard, Amiot, Perreault, Vallerand, & Provencher, 2009) was modeled by using the DEFINE command in *Mplus*. Specifically, the SDI is a latent construct that incorporates information from the six aforementioned motivational subscales, thus representing one score of self-determined motivation. Each SDI index is computed by using the individual items from the six motivational subscales. The individual items, however, are weighted differently based on their respective placement on the self-

determination continuum (Blanchard et al., 2009). In line with previous research, the following formula was used to compute each of the three SDI indicators: [(intrinsic motivation*3) + (integrated motivation*2) + (identified motivation*1)] – [(introjected motivation*1) + (external motivation*2) + (amotivation*3)].

Provision of Autonomy-Supportive Coaching

Coaches completed an adapted Norwegian version of the Health Care Climate Questionnaire (HCCQ; Williams, Grow, Freedman, Ryan, & Deci, 1996). More specifically, five items (coefficient $\rho = .61$; 95% CI = [.52-.71]; S.E. = .05; e.g., athletes are given choices and options) from the HCCQ were used to assess the degree to which coaches perceived themselves to provide autonomy-support to their athletes. In this study, the four items reflecting provision of autonomy-supportive coaching were: (a) it is important that athletes experience a sense of self-determination with regard to their own participation in football, (b) the coach answers athletes' questions thoroughly and properly, (c) the coach provides athletes with a rationale for the various tasks that he/she proposes, and (d) the coach emphasizes that athletes should play football because they enjoy it. Coaches gave their responses on a 5-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Basic Psychological Needs Satisfaction

Coaches completed an adapted and extended Norwegian version of the Basic Needs Satisfaction at Work Scale (BNSAW; Deci et al., 2001) to assess their basic needs satisfaction in coaching: need for autonomy (6 items, coefficient $\rho = .66$; 95% CI = [.58-.75]; S.E. = .05; e.g., decide how to coach), need for competence (6 items, coefficient $\rho = .67$; 95% CI = [.58-.75]; S.E. = .04; e.g., people say I am a good coach), need for relatedness with athletes (8 items, coefficient $\rho = .71$; 95% CI = [.65-.79]; S.E. = .04; e.g., get along with athletes), and need for

relatedness with people in the football club (9 items, coefficient $\rho = .75$; 95% CI = [.70-.82]; S.E. = .03; e.g., get along with club). The scale consisted of 29 items that asked coaches to indicate their level of needs satisfaction on a 5-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). As the focus of Article I was on provision of autonomy-support to athletes, one of the relatedness subscales (i.e., need for relatedness with athletes) was used. In addition, evidence to support the reliability of this scale has been provided in the sporting domain (e.g., Stebbings et al., 2011, 2012).

Articles II, III, IV, and V

Empowering and Disempowering Motivational Climates

Coaches' self-report of their empowering and disempowering behaviors were assessed using the Empowering and Disempowering Motivational Climate Questionnaire-Coach (EDMCQ-C; Appleton, Ntoumanis, Quested, Viladrich, & Duda, 2016; Article IV). The EDMCQ-C comprises short form versions of the four following sub-scales: the HCCQ (Williams et al., 1996), the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton, Duda, & Yin, 2000), the Social Support Questionnaire (SSQ; Sarason, Sarason, Shearin, & Pierce, 1987), and the Controlling Coach Behaviors Scale (CCBS; Bartholomew et al., 2010). It is important to note that the scale originally included 34 items and was measured on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). However, due to poor model fit of the Norwegian version of the original scale in a sample of coaches, different composition of samples, and the use of a parceling strategy (Appleton et al., 2016; Little, Rhemtulla, Gibson, & Schoemann, 2013), different compositions of the EDMCQ-C were used in Articles II and III. In Article IV, Bayesian statistics were used to validate a reduced, Norwegian coach version of the EDMCQ-C (i.e., 27 out of 34 items). This reduced version of the EDMCQ-C was also used in Article V.

Article II

Empowering and Disempowering Coaching Behaviors

The empowering dimension of coaches' self-reported behaviors consisted of autonomy-supportive behaviors (4 items; coefficient $\rho = .64$; 95% CI = [.54-.73]; S.E. = .05; VC = .81; e.g., athletes are given choices and options), task-involving behaviors (6 items; coefficient $\rho = .80$; 95% CI = [.74-.86]; S.E. = .03; VC = .90; e.g., the coach is encouraging players to try new skills), and socially-supportive behaviors (3 items; coefficient $\rho = .64$; 95% CI = [.52-.75]; S.E. = .06; VC = .81; e.g., athletes can count on the coach, no matter what happens). Conversely, the disempowering dimension of coaches' self-reported behaviors consisted of controlling behaviors (5 items; coefficient $\rho = .76$; 95% CI = [.69-.83]; S.E. = .04; VC = .89; e.g., the coach is less supportive towards athletes when they are not performing well on practices and in competitions) and ego-involving behaviors (5 items; coefficient $\rho = .69$; 95% CI = [.62-.76]; S.E. = .04; VC = .86; e.g., the coach devotes most of his/her attention to the best athletes).

Basic Psychological Needs Satisfaction

Coaches completed 10 items from the sport-specific, Norwegian version of the BNSAW (Deci et al., 2001). As such, coaches' experience of needs satisfaction consisted of need for competence (4 items; coefficient $\rho = .56$; 95% CI = [.45-.67]; S.E. = .06; VC = .80; e.g., I do well as a coach), need for autonomy (3 items; coefficient $\rho = .64$; 95% CI = [.52-.77]; S.E. = .06; VC = .84; e.g., I decide how to coach), and need for relatedness (3 items; coefficient $\rho = .67$; 95% CI = [.56-.78]; S.E. = .06; VC = .88; e.g., I get along with athletes). Coaches' responded to these questions on a 5-point Likert-type scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Psychological Well-Being

The 9-item Norwegian version of the Positive Affect Negative Affect Scale (PANAS; Crocker, 1997) assessed coaches' positive affect (5 items; coefficient $\rho = .83$; 95% CI = [.77-.90]; S.E. = .03; VC = .92; e.g., pleased, thrilled, joyful, enthusiastic, and proud) and negative affect (4 items; coefficient $\rho = .77$; 95% CI = [.62-.92]; S.E. = .08; VC = .89; e.g., unhappy, angry, frustrated, and depressed). Items were responded to on a 7-point Likert-type scale, ranging from 1 (*not very often*) to 7 (*all the time*). Additionally, four items from the Norwegian version of the Trait Subjective Vitality Scale (TSVS; Ryan & Frederick, 1997) were used which assessed coaches' experience of feeling energized and really alive in their everyday life (4 items; coefficient $\rho = .88$; 95% CI = [.85-.92]; S.E. = .02; VC = .96; e.g., full of vitality, looking forward to, alert and awake, and lots of energy). Coaches responded to these questions on a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Evidence for the reliability of these scales has also been garnered by prior research (e.g., Stebbings et al., 2011, 2012).

Article III

Empowering and Disempowering Coaching Behaviors

The empowering dimension of the questionnaire consisted of task-involving behaviors (8 items, coefficient $\rho = .84$; 95% CI = [.79-.88]; S.E. = .02; e.g., the coach is encouraging athletes to try new skills), autonomy-supportive behaviors (4 items, coefficient $\rho = .59$; 95% CI = [.47-.70]; S.E. = .06; e.g., athletes are given choices and options), and socially-supportive behaviors (3 items, coefficient $\rho = .64$; 95% CI = [.52-.75]; S.E. = .06; e.g., athletes can count on the coach, no matter what happens). Conversely, the disempowering dimension of the questionnaire consisted of ego-involving behaviors (7 items, coefficient $\rho = .79$; 95% CI = [.73-.84]; S.E. = .03; e.g., the coach devotes most of his/her attention to the best athletes) and

controlling behaviors (6 items, coefficient $\rho = .77$; 95% CI = [.70-.83]; S.E. = .03; e.g., the coach is less supportive towards athletes when they are not performing well on practices and in football matches).

The Perceived Usefulness of the Empowering Coaching™ Manual

The questionnaire consisted of 5 items (coefficient $\rho = .90$; 95% CI = [.86-.94]; S.E. = .02; e.g., the workbook has served as a good tool for self-reflection). The questions were developed for use solely in the Norwegian context for the purposes of evaluating the ECTP workshop at the end of the sport season, and coaches responded to each question on a five-point Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The stem for all questions was “I feel that.”

Article IV

Empowering and Disempowering Coaching Behaviors

The empowering dimension consisted of task-involving behaviors (7 items; the coefficient Omega (e.g., Widaman, Little, Preacher, & Sawalani, 2011), $\omega = .81$; VC = .90; 95% CI = [.77-.84]; S.E. = .02; e.g., the coach is encouraging athletes to try new skills) and autonomy-supportive behaviors (4 items; $\omega = .60$; VC = .78; 95% CI = [.49-.69]; S.E. = .05; e.g., athletes are given choices and options). However, the latent variable representing coaches' socially-supportive behaviors consisted of two items, thus it was under-identified and could not be evaluated in terms of using goodness-of-fit (GOF) indices (Brown, 2006). Conversely, the disempowering dimension consisted of controlling behaviors (7 items; $\omega = .58$; VC = .87; 95% CI = [.46-.66]; S.E. = .07; e.g., the coach is less supportive towards athletes when they are not performing well on practices and in football matches), and ego-involving behaviors (7 items; ω

= .74; VC = .90; 95% CI = [.68-.78]; S.E. = .02; e.g., the coach devotes most of his/her attention to the best athletes).

Article V

Empowering and Disempowering Coaching Behaviors

The empowering dimension of the scale consisted of task-involving coach behaviors (7 items; $\omega = .81$; VC = .90; 95% CI = [.76-.85]; S.E. = .02; e.g., the coach is encouraging athletes to try new skills) and autonomy-supportive coach behaviors (4 items; $\omega = .60$; VC = .79; 95% CI = [.49-.68]; S.E. = .05; e.g., athletes are given choices and options). As mentioned, the latent variable that represented coaches' socially-supportive behaviors was under-identified (Brown, 2006). Conversely, the disempowering dimension of the scale consisted of controlling coach behaviors (7 items; $\omega = .72$; VC = .87; 95% CI = [.65-.77]; S.E. = .03; e.g., the coach is less supportive towards athletes when they are not performing well on practices and in football matches) and ego-involving coach behaviors (7 items; $\omega = .78$; VC = .93; 95% CI = [.72-.82]; S.E. = .03; e.g., the coach devotes most of his/her attention to the best athletes). Before elaborating on the use of SEM, a brief overview of the initial development of the EDMCQ-C will be presented (see Appleton et al., 2016 for details).

The Use of Short-Forms in the Development of the EDMCQ-C

To obtain manageable scales and to best preserve the content of the five climate dimensions (i.e., task-involvement, ego-involvement, autonomy support, controlling coaching behaviors, and social support) that make up the EDMCQ-C, the original pool of 67 items reflecting these dimensions was reduced to 34 items using a sample of 378 British male and female athletes (Appleton et al., 2016). According to Widaman and colleagues (2011), this approach for constructing a short form measure has certain limitations. The main reason for this

is that the item selection is based on a single data set, thereby capitalizing the results on chance. Indeed, the results of this particular SEM model only apply to a single data set of British athletes. If researchers, however, want to rely entirely on short forms of original scales, a justifiable approach for developing these forms would rather be to locate a subset of items, which maintain the factorial integrity of the respective theoretical constructs. Widaman and colleagues (2011) argued that a preferred procedure in which the first model should involve the original scales and some other carefully chosen constructs. Then, in the second model, the aim should be to replicate all aspects (e.g., mean, variance, and associations between the constructs) of the first model with a subset of items. Finally, the second model should be repeated several times until the researchers identify an optimal subset of items that represents the original scales in a conceptually coherent manner.

Data Analysis

Structural Equation Modeling

Structural equation modeling is often used to model a number of different constructs in sport psychology research (e.g., Marsh, 2007; Ntoumanis & Myers, 2016). These constructs represent attributes of people that are theorized to affect each other, which in turn, constitute sets of causal relations accounting for achievement behavior (Bollen & Hoyle, 2015). Examples from the SDT and AGT literature include autonomous and controlled motivation, basic psychological needs, contextual factors, goal orientations, intrinsic and extrinsic aspirations, perceived ability, and well-being indices (Deci & Ryan, 2012; Roberts, 2012). However, it is worth noting that the unobserved nature of these constructs necessitates the use of strategies involving “the representation of unobserved constructs as latent variables” (Bollen & Hoyle, 2015, p. 56). A well-known form of latent variable is the common factor. Common factors, or just factors, represent latent sources of commonality among a number of observed variables

(Bollen & Hoyle, 2015). Note also that other widely used terms for observed variables are manifest variables and indicators (Kline, 2011; Little, 2013). Furthermore, variance in each observed variable is assumed to be attributed to those latent variables affecting it. Importantly, though, one can separate variance as to whether it is common to all of the observed variables, specific to each observed variable, or simply random measurement error (Bollen & Hoyle, 2015). Taking this into consideration, a latent variable may therefore be defined as “the unobservable ‘thing’ or ‘entity’ that gives rise to the observed measurements represented by the manifest indicators” (Little, 2013, p. 103).

Before specifying a path model using a SEM computer tool (e.g., *Mplus*), a confirmatory factor analysis (CFA) must be conducted in order to examine the factor structure of the respective scales. More specifically, a goodness-of-fit (GOF) evaluation is typically used to determine whether each of the CFA’s are able to reproduce the observed relationships among the observed variables in the sample data (Brown & Moore, 2012). Hence, a number of global GOF indices are used to evaluate the acceptability of each CFA model: the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). In addition, recognizing that GOF evaluation is a highly debated topic among methodologists, it is usual to consider the fit to be acceptable when the following criteria are met: $CFI \geq .90$, $RMSEA \leq .08$, and $SRMR \leq .08$ (Brown & Moore, 2012; Little, 2013). Further, the specification of an indirect effect is widely discussed in the statistical literature (e.g., Jose, 2016; MacKinnon, Kisbu-Sakarya, & Gottschall, 2013; Preacher, 2015). Thus, we will continue by drawing attention to the testing of mediation.

Testing Indirect Effects

In line with the statistical literature (e.g., Hayes & Scharkow, 2013; Jose, 2016; MacKinnon et al., 2013), the bias-corrected bootstrap CI was used to make inferences about

standardized indirect effects in the first article. Specifically, it is argued that the bias-corrected bootstrap CI is the most trustworthy test when researchers are concerned about the power of statistical tests (Hayes & Scharkow, 2013). Bootstrapping is also a statistical method that is recommended when researchers are dealing with small-to-moderate sample sizes, and additionally, is powerful because of its ability to detect the indirect effect in sample distributions that are skewed away from zero (Shrout & Bolger, 2002). Further, the modern approach when testing the intervening variable effect is to quantify the indirect effect, rather than inferring the existence of this effect based on a set of tests (Hayes, 2009). Previous research has taken for granted that a predictor variable and an outcome variable need to be related in order for an intervening variable to be a mediator (see Hayes, 2009 for details); however, Hayes (2009) has outlined that:

“X can exert an indirect effect on Y through M in the absence of an association between X and Y becomes explicable once you consider that a total effect is the sum of many different paths of influence, direct and indirect, not all of which may be a part of the formal model.” (p. 414)

In addition, when performing analyses on single-occasion data sets, it is important to recognize that one’s structural equation model may have a number of equivalent versions, which will yield the same fit to the data (Kline, 2011, 2015).

Equivalent Models in Structural Equation Modeling

Based on the nature of cross-sectional data and the susceptibility of confirmation bias (Kline, 2011, 2015; MacCallum & Austin, 2000), it is important to test alternative versions to the original model (i.e., models with different substantive implications). This is because the tested model “is probably one of perhaps many equivalent versions, each of which would fit the same data equally well” (Kline, 2015, p. 124). This phenomenon, however, is typically

known as equivalent models (Breckler, 1990; Kline, 2011, 2015; MacCallum, Wegener, Uchino, & Fabrigar, 1993). Indeed, it is argued, “equivalent models yield the same predicted correlations or covariances but with a different configuration of paths among the same observed variables” (Kline, 2015, p. 225). Therefore, it is worth noting that researchers have been urged to “generate and evaluate the substantive meaningfulness of equivalent models in empirical studies” (MacCallum & Austin, 2000, p. 213). Moreover, given that coaches who participated in the Norwegian arm of the PAPA project filled out questionnaires at two time points during the sport season, the following section will elaborate on some aspects related to the modeling of longitudinal data.

Longitudinal Structural Equation Modeling

Before modeling a longitudinal change process, all latent variables must be factorially invariant, meaning that all loadings and intercepts of each observed variable need to be proportionally equal over time and/or across groups (e.g., Little, 2013; McArdle & Nesselroade, 2014; Millsap & Olivera-Aguilar, 2015; Sass, 2011). This prerequisite is crucial in order to use latent variables in repeated-measures studies of change processes (Little, 2013). However, given the choice of statistical paradigm (i.e., frequentist vs. Bayesian), a researcher may choose between either measurement invariance (MI) or approximate MI (Muthén & Asparouhov, 2013; Van de Schoot et al., 2013). The main difference between these two approaches is that approximate MI replaces exact zero constraints with approximate zero constraints (Muthén & Asparouhov, 2013; Van de Schoot et al., 2013). Within this doctoral thesis, both MI and approximate MI are used.

Once factorial invariance has been established, researchers may rightfully investigate whether latent variables (i.e., constructs of interest) change over time (e.g., McArdle & Nesselroade, 2014; Ployhart & Vandenberg, 2010). The concept of change, however, involves

different sets of terminology (see McArdle & Nesselroade, 2014 for details). For example, if researchers make comparisons across individuals, then they are studying interindividual (i.e., between-person) differences. Conversely, researchers need longitudinal information when comparing different patterns of intraindividual (i.e., within-person) change. It is also worth noting that intraindividual change is only detected by conducting repeated-measures in which the same individual is measured at least twice (McArdle & Nesselroade, 2014).

The primary constructs of interest in this doctoral thesis are empowering and disempowering coach behaviors. As such, one of the objectives of the current doctoral thesis was to examine interindividual differences in these constructs from pre- to post-season among coaches within the Norwegian intervention arm of the PAPA project (Article III). Because of this, Article III took on a mixed-methods approach to assess interindividual differences of the intervention group from pre- to post-season. This was supported qualitatively through the use of semi-structured interviews from a subsample of the coaches within the Norwegian intervention arm of the PAPA project. Conversely, Article V aimed to explore intervention effects, thus using the whole sample of Norwegian coaches (the intervention and control groups) to compare patterns of interindividual differences in intraindividual change in self-reported empowering and disempowering coach behaviors. With regard to the latter, the approach taken was to create latent change scores (LCSs; Geiser, 2013; McArdle & Nesselroade, 2014). In the statistical literature, LCSs are defined as “interindividual differences in true intraindividual change over time – that is, change scores corrected for random measurement error” (Geiser, 2013, p. 145). The value of applying this type of modeling technique is that LCSs represent the absolute change (at the latent variable error-free level) in the constructs of interest measured over time (Geiser, 2013).

From a longitudinal modeling standpoint, it is worth noting that the number of published studies in sport psychology relying on variable-centered analyses has been considerably greater

than studies using a person-centered approach (see Stenling, Ivarsson, & Lindwall, 2017 for details). Variable-centered analyses represent an average estimate of observed relationships, whereas person-centered analyses systematically consider whether there are meaningful relationships in subgroups of individuals (Morin et al., 2016; Morin, Morizot, Boudrias, & Madore, 2011). In recent years, however, many studies in the field of sport psychology have begun to use person-centered analyses (e.g., Bentzen, Lemyre, & Kenttä, 2016; Gustafsson, Hill, Stenling, & Wagnsson, 2015; Ivarsson, Stenling, Fallby, Johnson, Borg, & Johansson, 2015). This could be seen as an attempt to address the fact that people may be better identified as belonging to certain clusters, which again relate differently to outcomes under study (Morin et al., 2011, 2016). Thus, in Article II, a person-centered approach was used to examine whether different clusters of youth football coaches (providing different levels of empowering and disempowering coach behaviors to young athletes) related differently to coaches' psychological well-being from pre- to post-season. During the last decade, it has also become more common in sport psychology research to explore how synergistic combinations of both quantitative and qualitative methods may offer a more nuanced understanding of a given phenomenon (e.g., Partington & Cushion, 2013). Thus, an overview of mixed-methods research is given in the following section (MMR; see Hesse-Biber & Johnson, 2015).

Mixed-Methods Research

The mixing of quantitative and qualitative methods is referred to as MMR (Johnson, Onwuegbuzie, & Turner, 2007). It has been argued that researchers should “strategically combine qualitative and quantitative methods, approaches, and concepts in a way that produces complementary strengths and nonoverlapping weaknesses” (Johnson et al., 2007, p. 127). A recurring, yet often overlooked topic in the context of MMR is the influence of different philosophical perspectives (i.e., the underlying assumptions; see Hathcoat & Meixner, 2015).

For example, researchers may identify with a postpositivist claim when modeling latent variables in SEM, whereas they may adopt the position of a social constructionist when interpreting qualitative interviews (Hathcoat & Meixner, 2015; Hesse-Biber & Leavy, 2010). The shift between methods, however, is in alignment with pragmatism, which is the most frequently used philosophical position in MMR (Hathcoat & Meixner, 2015; Johnson et al., 2007). In brief, because pragmatism negates a distinction between the philosophical positions, it represents a pragmatic, or ‘whatever-works’, maxim serving as an exacerbating factor with regard to the issue of incompatibility (Hathcoat & Meixner, 2015). More specifically, the conditional incompatibility thesis argues that the mixing of quantitative and qualitative methods is inconsistent and, thus, inappropriate (Hathcoat & Meixner, 2015). Among methodological purists, it is argued, “since qualitative and quantitative inquiry is informed by contradictory ontological and epistemological assumptions it is inappropriate to integrate these techniques within a single study” (Hathcoat & Meixner, 2015, p. 4). Therefore, knowing that incompatibility may occur under certain conditions (e.g., researchers may choose particular techniques, methods, and/or decisions rather than others), researchers are encouraged to be mindful and transparent regarding the influence of philosophical perspectives in their mixed methods studies (see Hathcoat & Meixner, 2015 for details).

In addition, researchers are required to address the meta-inferences resulting from their entire study when conducting sequential MMR. Meta-inferences refer to conclusions based on inferences from both the quantitative and qualitative parts of a mixed methods study (Ivankova, 2014). Specifically, it has been highlighted, “integration of the inferences derived deductively and inductively is a critical stage in a mixed methods study process and researchers should adhere to rigorous standards for assessing inference quality to ensure their credibility and validity” (Ivankova, 2014, p. 26). To accommodate this requirement, a three-step procedure was used in Article III to ensure the quality of the meta-inferences that are generated in

sequential mixed methods designs. The three-step procedure involved: (a) selecting a purposefully subset of the questionnaire respondents; (b) using the results from the post-season interviews to elaborate on the quantitative results; and (c) observing interaction between the quantitative and qualitative findings (see Ivankova, 2014 for details). Similar to the development within the field of MMR, there has been a resurgence in the discussions between frequentists and Bayesians the last decade (e.g., McGrayne, 2011; Muthén & Asparouhov, 2012; Van de Schoot et al., 2014). Consequently, the sections below try to simply explain the main differences between frequentist and Bayesian statistics.

Frequentist vs. Bayesian Statistics

Frequentist statistics involve testing first- and second-order CFA by relying on the overly restrictive independent cluster model (ICM) using the maximum likelihood (ML) estimator. The statistical challenges related to ICM-CFA models, however, involve that they comprise zero cross-loadings and residual covariances (Asparouhov, Muthén, & Morin, 2015; Marsh et al., 2009). This, in turn, often leads to poor fit between the data and the model because items derived from multidimensional measures will seldom load merely on one construct without having systematic associations with other non-intended constructs (Perry, Nicholls, Clough, & Crust, 2015). Moreover, the misspecifications mentioned above, will most likely lead to distorted factors in combination with overestimated factor correlations, and thus distorted structural relations (Asparouhov & Muthén, 2009; Marsh et al., 2009). As part of solving these challenges, researchers may use model modification indices. However, a stepwise relaxation of parameters may actually cause researchers to abandon their theoretical hypotheses, thereby increasing the risk of capitalization on chance (MacCallum, Roznowski, & Necowitz, 1992) and, thus, selecting the wrong model (Asparouhov et al., 2015). Other solutions include freeing all cross-loadings and residual covariances from their default settings. Although the

former leads researchers to apply the traditional form of exploratory factor analysis (EFA) with rotations, the latter results in models that are not identified because all the degrees of freedom are being used (see Asparouhov et al., 2015 for details).

Further, the advantages of using Bayesian statistics, as opposed to frequentist statistics, for data analysis can easily be outlined by describing the three following issues: (a) probability; (b) estimation; and (c) inferences. First, in the context of science, researchers are generally concerned with the issue of ascribing probabilities to certain hypotheses, or theories, by using scientific evidence (Chalmers, 1999). As such, it is worth noting that statistical analyses, which are often used when addressing various quantitative research questions, are based on different theories of probability (Van de Schoot et al., 2014; Zyphur & Oswald, 2015). These theories, however, exist within various paradigms; namely, the frequentist paradigm and the subjective probability paradigm (Van de Schoot et al., 2014). Thus, it is important to understand the difference between the frequentist and the Bayesian view of probability. The frequentist view of probability is concerned with the relative frequency of a certain event during an infinite number of times (e.g., how often an event occurs within the frequency range of infinite observations), yet the Bayesian view of probability is related to degrees of knowledge or degrees of belief (Zyphur & Oswald, 2015). Specifically, it is argued that frequentist probability constitutes a hindrance in the context of science because “it creates confusion when making inferences with p values and confidence intervals, it inhibits small-sample research, and it makes estimating many statistical models difficult or impossible” (Zyphur & Oswald, 2015, p. 391).

Second, the main difference between the two aforementioned paradigms (frequentist vs. Bayesian statistical inferences) manifests itself in terms of the nature of unknown parameters in any statistical model (Van de Schoot et al., 2014). Unlike the Bayesian paradigm, frequentist statistics assume that the parameter of interest is fixed, meaning that there is only one true

parameter in the population, and assuming that the observed data are random (Van de Schoot et al., 2014; Zyphur & Oswald, 2015). Conversely, Bayesian statistics assume that the parameter of interest is a random or uncertain variable, which therefore is best described by using a probability distribution (Enders, 2010; Van de Schoot et al., 2014). As such, the uncertainty associated with the parameter is quantified by estimating its probability across a full range of values, which in turn, allows researchers to make probability statements about the parameter given the observed data (Zyphur & Oswald, 2015).

Third, in frequentist statistics, it is normal practice to use the null hypothesis significance testing procedure (NHSTP) to draw conclusions. This technique comprises testing the hypothesis of no effect, thereby using a conventional value (e.g., $p < .05$) to either retain or reject the hypothesis. However, it has previously been indicated that the NHSTP is related to a number of flaws (e.g., Gigerenzer et al., 2004; Ivarsson et al., 2015; Wasserstein & Lazar, 2016). For example, the NHSTP makes it difficult to interpret the practical significance of the results presented in various sport psychology journals, thus indicating that researchers should rather provide information of what their results actually mean in the real world. Conversely, Bayesian analysis involves three parts, which together constitute the Bayes theorem (Kaplan, 2014; Muthén & Asparouhov, 2012). The first part involves specifying a prior distribution for the parameters included in the analysis. This distribution gives an impression of researchers' knowledge, or subjective beliefs, concerning the relative probability of different parameter values before they observe the data. The second part involves collecting the data and then using the likelihood function to estimate the different parameter values. The final part encompasses the generation of the posterior distribution, which outlines that an updated set of relative probabilities is created because the prior distribution is multiplied with the likelihood function (Enders, 2010). Hence, by using Bayesian analysis, as utilized in Articles IV and V, researchers are allowed to make intuitive inferences because the probability of a given hypothesis is

ascribed directly to the observed data (Van de Schoot et al., 2014; Zyphur & Oswald, 2015). Regardless of statistical paradigm, the problem of missing data is present in most empirical studies using questionnaires containing multi-item measures (e.g., Donders, van der Heijden, Stijnen, & Moons, 2006; Eekhout, de Boer, Twisk, de Vet, & Heymans, 2012), especially in those studies involving longitudinal data (see Enders, 2010, 2011 for details). The following section will therefore give a brief overview of the modern statistical literature on missing data.

Missing Data Analysis

Although recent publications have indicated that missing data may produce biased inferences (e.g., Peeters, Zondervan-Zwijnenburg, Vink, & Van de Schoot, 2015), and knowing that advanced techniques are available to handle missing data (e.g., multiple imputation and FIML), recent reviews still indicate that many studies seldom choose to apply these methods (e.g., Eekhout et al., 2012). In fact, recent research has indicated that the regression model estimates are most accurate when multiple imputation is applied to item scores containing high percentage (>25%) of missing data (Eekhout et al., 2014). However, it is worth noting that both multiple imputation and FIML are likely to produce biased parameter estimates when the data are missing not at random (MNAR), which in turn, mean that multiple imputation and FIML will only accommodate systematic missingness when data is MAR (see Enders, 2010, 2011 for details). Therefore, researchers have to examine whether their parameter estimates depart from an MAR mechanism, meaning that there is no systematic relationship between the ‘would-be values’ and the likelihood of dropout (Enders, 2011).

Results

Article I Social-Contextual and Intrapersonal Antecedents of Coaches' Basic Need Satisfaction: The Intervening Variable Effect of Providing Autonomy-Supportive Coaching

Solstad, B. E., Van Hove, A., & Ommundsen, Y. (2015).

Objectives: Grounded in SDT, the purpose of this study was to test a new intervening variable model, involving antecedents associated with coaches' psychological needs satisfaction. Specifically, the researchers examined the relations of coaches' perceptions of the sport context and their self-determined motivation for coaching to coaches' psychological needs satisfaction via coaches' provision of autonomy-support to athletes.

Design: A cross-sectional study.

Method: Participants were a sample consisting of 222 ($M_{\text{age}} = 42.3$; $SD = 6.1$) youth football coaches enrolled in the Norwegian intervention and control arms of the PAPA project.

Results: Little's MCAR test ($p = .76$) showed that the missing data was completely random (ranging from .00 to 1.80%). Further, the structural regression model using 95% bias-corrected bootstrap CI derived from 10,000 resamples demonstrated an acceptable fit to the data: $\chi^2(217) = 296.38$, $p < .001$, SRMR = .05, RMSEA = .04, (90% CI RMSEA = .03 to .05), CFI = .95. The hypothesized structural model was supported in which coaches' perceptions of a socially united group of athletes and their self-determined motivation towards coaching related positively to coaches' psychological needs satisfaction via coaches' provision of autonomy-support to athletes. Conversely, coaches' perceptions of parental pressure in the sport context was unrelated to coaches' psychological needs satisfaction via coaches' provision of autonomy-support to athletes. Given the cross-sectional design in this study, the phenomenon of equivalent

models in SEM was tested (e.g., Breckler, 1990; MacCallum et al., 1993). Thus, the alternative models that were tested yielded the same fit to the data as the original model: $\chi^2(217) = 296.38$, $p < .001$, SRMR = .05, RMSEA = .04, (90% CI RMSEA = .03 to .05), CFI = .95. The first model showed that coaches' perceptions of social unity among their athletes was positively related to coaches' psychological needs satisfaction through coaches' provision of autonomy-support to athletes. The second model showed that coaches' perceptions of social unity among their athletes was positively related to coaches' provision of autonomy-support to athletes through coaches' psychological needs satisfaction. Taken together, the data indicated that coaches' psychological needs satisfaction can be modeled both as a predictor and as an outcome in relation to coaches' provision of autonomy-support to athletes. However, it should be noted that only two alternative versions of the original model were considered, both of which offered substantive explanations of the relationships among the latent variables. As such, the researchers are not in a position to claim that the original model is the most plausible representation of the data. Thus, based on the fact that "a well-fitting model is one plausible representation of the underlying structure from a larger pool of plausible models" (Tomarken & Waller, 2003, p. 580), future research is encouraged to use a longitudinal design in order to examine the psychological benefits related to providing autonomy-support to athletes during a sport season.

Limitations: Limitations include the cross-sectional design of this study, as well as concerns surrounding the possibility of common method biases in the data set.

Conclusions: Findings support previous research by demonstrating the psychological benefits of providing autonomy-support to others. Nevertheless, two plausible alternative models from the SDT perspective were also tested, both of which yielded identical measures of fit compared to the original model. Thus, it cannot be argued that the original model provides a more superior explanation of the data.

**Article II Providing Empowering and Disempowering Behaviors to Young Athletes:
Effects on Coaches' Late-Season Well-Being**

Solstad, B. E., Ivarsson, A., Haug, E. M., & Ommundsen, Y. (Submitted).

Objectives: The purpose of this study was to investigate the relationships between coaches' provision of empowering and disempowering behaviors to young athletes at the beginning of the sport season and their perceptions of psychological well-being at the end of the sport season.

Design: A prospective study.

Method: Participants were a sample consisting of 169 ($M_{\text{age}} = 41.99$; $SD = 6.32$) youth football coaches who participated in the Norwegian intervention arm of the ECTP.

Results: The missing data analysis showed that 47 coaches (27.8%) withdrew from the study over the course of the sport season. The results, using both independent t tests and Little's MCAR test, showed that the data did not satisfy the MCAR mechanism.³ For this reason, FIML was used to handle the missing data (Enders, 2010). Moreover, because this study was interested in examining heterogeneous groups of coaches showing variability in their provision of empowering and disempowering behaviors to their athletes, a person-centered approach was used. The latent profile analysis showed three distinct profiles. The relationship between these profiles and coaches' psychological well-being was in line with the hypotheses. Statistical significant differences between the three latent profiles were obtained for basic psychological needs satisfaction ($\chi^2(2) = 23.14, p < .001$), positive affect ($\chi^2(2) = 16.40, p < .001$), and negative affect ($\chi^2(2) = 11.91, p = .003$). There was, however, no significant difference between the three latent profiles in subjective vitality at T2 ($\chi^2(2) = 1.95, p = .378$). In other words,

³ Little's MCAR test was significant ($\chi^2 = 169.08$; $df = 89$; $p < .001$). Moreover, two of the four t tests (Bootstrap) revealed that dropouts reported lower levels of need satisfaction ($t = -4.02$; $df = 81$; $p < .001$; BC 95% CI[-.37 - -.12]; Cohen's d effect size = .70) and positive affect ($t = -2.77$; $df = 69$; $p < .01$; BC 95% CI[-.76 - -.12]; Cohen's d effect size = .52) at T1. Dropouts, however, were not significantly different from those coaches who completed both assessments on subjective vitality ($t = -1.86$; $df = 76$; $p = .067$; BC 95% CI[-.48 - .01]; Cohen's d effect size = .32) and negative affect ($t = 1.46$; $df = 79$; $p = .149$; BC 95% CI[-.06 - .49]; Cohen's d effect size = .25).

coaches in the most empowering profile differed from coaches in the two other profiles in terms of reporting higher levels of psychological needs satisfaction and positive affect, and lower levels of negative affect, at the end of the sport season. Due to the increased tendency of method bias in cross-sectional studies (Podsakoff et al., 2012), it was also decided to report the relationship between the predictor and the criterion variables at T1. The findings indicated that there were statistically significant differences between the three latent profiles in basic psychological needs satisfaction ($\chi^2(2) = 53.13, p < .001$), subjective vitality ($\chi^2(2) = 8.81, p = .012$), positive affect ($\chi^2(2) = 69.80, p < .001$), as well as negative affect ($\chi^2(2) = 18.98, p < .001$). It is also worth noting that effect sizes were estimated in this study. Specifically, the strengths of the results (i.e., effect sizes) varied throughout the sport season. In almost all cases (i.e., differences between the three profiles), the effect sizes were significantly reduced from T1 to T2. Consequently, without accounting for the issue of method bias in this study, the risk for committing a Type I error would have been increased (Podsakoff et al., 2012).

Limitations: The first limitation concerns the group sizes in the three latent profiles. Although the profiles differed with regard to levels of self-reported empowering and disempowering coach behaviors, the total number of coaches, particularly in the least empowering profile, was very low. Thus, it is important not to generalize these findings to other samples of youth sport coaches. The second limitation concerns the fact that those coaches who completed both assessments differed from those coaches who dropped out of the study. This issue, however, was handled by using the current state of missing data practice (i.e., FIML).

Conclusions: Findings indicated that an intrinsic value exists as to why coaches should provide empowering behaviors, as opposed to disempowering behaviors, to their athletes. Such actions may be advantageous in terms of improving coaches' perceptions of psychological well-being. In practical terms, future coach education may take advantage of these findings by rationalizing the importance for coaches to coach in an empowering manner.

Article III Pre- to Post-Season Differences in Empowering and Disempowering Behaviors among Youth Football Coaches: A Sequential Mixed Methods Study

Solstad, B. E., Larsen, T., Holsen, I., Ivarsson, A., Ronglan, L. T., & Ommundsen, Y. (Re-Submitted).

Objectives: The overall aim of this study was to investigate pre- to post-season differences in self-reported coach behaviors among coaches who participated in the Norwegian intervention arm of the ECTP, and their evaluative reactions to participation in the ECTP. Hence, the purpose of this study was threefold. First, to examine whether coaches who participated in the ECTP differed in their self-reported empowering and disempowering coach behaviors from pre- to post-season. Second, to determine the association between coaches' perceived usefulness of the ECTP manual and their post-season empowering and disempowering behaviors. Third, to gain insights into what coaches considered to be the utility value of participating in the ECTP.

Design: A sequential mixed methods study.

Method: Participants comprised 193 ($M_{\text{age}} = 41.99$; $SD = 6.32$) youth football coaches who attended the Norwegian intervention arm of the ECTP. Also, 12 of these coaches (10 males; 2 females; $M_{\text{age}} = 41.67$; $SD = 5.68$) were interviewed at T2 using semi-structured interviews.

Quantitative results: Differences were detected in self-reported empowering and disempowering behaviors at T1 between dropouts and those coaches who responded on both of the repeated measures.⁴ Therefore, ad hoc sensitivity analyses were performed to test the MAR-

⁴ We performed independent samples *t*-tests to determine whether or not there were differences between dropouts and those coaches who responded on both assessments across the season. Bootstrap results, which was based on 10,000 resamples, revealed that dropouts reported higher levels of disempowering behaviors ($t = -3.03$; $df = 164$; $p < .05$; BC 95% CI[-.33 - -.07]; $d = .55$) and lower levels of empowering behaviors at T1 ($t = 3.21$; $df = 164$; $p < .05$; BC 95% CI[.11 - .45]; $d = .53$). Thus, the preliminary analyses indicated that the missing data could be MNAR (Enders, 2010).

based estimates (see Enders, 2010 for details). Findings showed that the multiple imputation parameter estimates did not depart from an MAR mechanism. It is, however, worth noting that the Wald z test estimates were higher for empowering behaviors and lower for disempowering behaviors when the constants were not added to the imputed values. Further, the longitudinal measurement model, with strong factorial invariance constraints in place, yielded a good fit to the data: $\chi^2(134) = 192.07, p < .001, SRMR = .08, RMSEA = .05, (90\% \text{ CI } RMSEA = .03 \text{ to } .06), CFI = .96$. The model constraint command in *Mplus* 7.31 was used to compute and test new parameters (i.e., the difference between T1 and T2 scores for each latent variable and Cohen's effect size d). Findings showed that the difference in self-reported empowering coach behaviors was nearly zero ($\Delta = .01; d = .03$), as was the difference in self-reported disempowering behaviors ($\Delta = .01; d = .03$). Additionally, the longitudinal structural model that investigated the relationships between the perceived usefulness of the ECTP manual and coaches' post-season empowering and disempowering behaviors, yielded a good fit to the data: $\chi^2(227) = 306.62, p < .001, SRMR = .07, RMSEA = .04, (90\% \text{ CI } RMSEA = .03 \text{ to } .05), CFI = .96$. The standardized association between the manual and coaches' post-season empowering behaviors was non-significant ($\beta = .04; p = .66$), as was the standardized association between the manual and coaches' post-season disempowering behaviors ($\beta = -.03; p = .70$). Nevertheless, the ECTP manual was positively related to empowering behaviors ($r = .19; p = .04$) and negatively related to disempowering behaviors ($r = -.18; p = .06$) at T1.

Qualitative results: Three themes that were explicitly related to the ECTP emerged from the interview transcripts were: (a) the value of the training program and its content; (b) the importance of autonomy, involving the athletes, and the feeling of mastery; and (c) change in coaching practice. First, several coaches highlighted that the focus on creating a conducive motivational climate and addressing the psychosocial dynamics of coaching in youth sport was a relatively new focus in relation to previous coaching workshops; such workshops often had a

technical and football-specific content. In correspondence to the value of the content, the coaches also asked for more training in these matters, as the ECTP was limited to a 1-day workshop. Second, two themes were highlighted with regard to coaches' learning outcomes. The first theme was the importance of involving the athletes in decisions related to both training and competition, thus keeping them motivated. The second theme was how important the feeling of mastery was for the quality of athletes' motivation. Third, coaches mentioned some concrete changes that they had made to their own coaching practices as a result of participating in the ECTP. Specifically, enabling mastery for all the athletes was expressed as important by nearly all the coaches. The practical approach to this change was that the participating coaches had made efforts to match the level of activity challenges to athletes' abilities using exercises with different levels of difficulty on the training ground.

Limitations: Taking into account the depth and influence of coaches' pre-existing knowledge and values, a brief coach education workshop may not necessarily be enough to stir coaches' self-reported empowering and disempowering behaviors (Gilbert & Côté, 2013). Moreover, having a cost-benefit perspective in mind, it is important to recognize that the ECTP was developed as a theoretically framed training program formatted to ease dissemination and adoption among the larger population of youth sport coaches (Duda et al., 2013).

Conclusions: Although the quantitative findings showed that there were no statistical differences from pre- to post-season in self-reported empowering and disempowering coach behaviors, the post-season interviews showed that the coaches involved in the intervention reported the ECTP to be a useful educational experience. In addition, although there were no associations between the ECTP manual and coaches' post-season behaviors, findings still showed a positive relationship between the perceived usefulness of the ECTP manual and empowering coach behaviors at T1. Conversely, there was no relationship between the perceived usefulness of the ECTP manual and disempowering coach behaviors at T1.

**Article IV A Bayesian Approach to the Validation of the Empowering and
Disempowering Motivational Climate Questionnaire-Coach (EDMCQ-C)**

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Ommundsen, Y. (Submitted).

Objectives: The main aim of this study was to use BSEM to validate the EDMCQ-C using coaches' self-report of their own empowering and disempowering behaviors (Appleton et al. 2016; Muthén & Asparouhov, 2012). A second aim of this study was to examine whether the Norwegian version of the EDMCQ-C would yield cross-cultural equivalence with the French version of the EDMCQ-C.

Design: A cross-sectional study.

Method: Participants consisted of Norwegian and French youth football coaches enrolled in the intervention and control arms of the PAPA project (Duda et al., 2013). The Norwegian sample comprised 222 coaches ($M_{\text{age}} = 42.28$; $SD = 6.07$; Males $n = 202$; Females $n = 20$), whereas the French sample comprised 125 coaches ($M_{\text{age}} = 33.36$; $SD = 12.97$; Males $n = 117$; Females $n = 8$).

Results: Item-level missing data (< 3.2%) were handled by including all available information in the analyses, similar to the FIML estimation. With the BSEM approach, however, the Gibbs sampler is used and it treats the missing observations as unknown values to be estimated. Thus, the estimates were adjusted for the missingness (Asparouhov & Muthén, 2010; Enders, 2010; Gelman et al., 2014). In general, the single-group analyses showed that the data-model fit and factor-loading patterns were relatively similar across the two samples. The five-factor model displayed an adequate data-model fit in the Norwegian sample, but the discrepancy between the observed data and the replicated data was larger in the French sample, as indicated by a larger posterior predictive p (PP p) value. Specifically, the factor-loading pattern was not

coherent and none of the hypothesized factor loadings of the empowering motivational climate items had a CI that did not contain zero. When examining the patterns of correlated residuals, a substantive number of the estimated correlations had a CI that did not contain zero, indicating a substantial degree of overlap at the item level, particularly among the empowering motivational climate items. The hierarchical models displayed similar first-order factor-loading patterns as the five-factor models, and all of the second-order factor loadings had a CI that contained zero. The two-factor model, however, displayed an adequate data-model fit in both samples and displayed a theoretically interpretable factor structure. There were factor loadings in both samples that had a CI containing zero, but most of the hypothesized factor loadings were credible (i.e., CI not containing zero). Lastly, the bifactor models did not display an adequate data-model fit, but the factor-loading pattern in both samples mirrored that of the two-factor models (i.e., credible factor loadings onto the general empowering and disempowering factors). In the cross-cultural equivalence analyses, a two-factor model displayed an adequate data-model fit as well as an interpretable factor structure (i.e., factor-loading pattern) in both samples. None other models displayed an adequate model fit and a theoretically interpretable factor structure in either of the two samples. Therefore, it was decided to examine cross-cultural equivalence using only the two-factor model. To obtain an equivalent configural model, items with a CI containing zero in the single-group analyses were excluded, resulting in a reduced two-factor model (27 out of the original 34 items). In total, seven items were excluded from the multigroup analyses. Thereafter, findings showed that all of the factor loadings were invariant; however, 12 out of 27 intercepts indicated noninvariance. Hence, the invariant factor loadings and intercepts were set to exact equality and the noninvariant intercepts were freely estimated in both groups. This model displayed the best data-model fit as indicated by a *PPp* value of 0.54 and a Deviance Information Criterion value of 23263.31.

Limitations: Although the reduced two-factor model was supported by the observed data in this study, the study cannot claim to have established construct validity of the EDMCQ-C. Construct validity is only inferred by examining the pattern of results obtained across a wide range of studies using the EDMCQ-C (see Widaman et al., 2011 for details). No study has correlated a validated multi-language version of the EDMCQ-C with other established measures of similar as well as different constructs, and only three studies so far have used it in different sport contexts. Hence, much work is still required before the EDMCQ-C is established as a good measure of the coach-created motivational climate, as perceived by coaches themselves.

Conclusions: Findings showed that a reduced two-factor model displayed an adequate data-model fit in both samples. Findings also supported approximate measurement invariance across the two groups. Several intercepts were noninvariant, indicating differences in levels on the underlying items. Finally, it is important to highlight Bayesian analysis and its ability to represent substantive theory (Muthén & Asparouhov, 2012). By using the BSEM approach to statistics, the multidimensional factor structure of the EDMCQ-C was replicated using coaches' self-report of their own empowering and disempowering behaviors.

Article V The Effects of the Norwegian Arm of the Empowering Coaching™ Training Program on Coaches' Self-Reported Behaviors – A Bayesian Approach

Solstad, B. E., Solberg, P. A., Wold, B., Samdal, O., Ronglan, L. T.,
Ivarsson, A., & Ommundsen, Y. (Manuscript in Preparation).

Objectives: The purpose of this study was to investigate the effects of the Norwegian arm of the ECTP on coaches' self-report of their own empowering and disempowering behaviors.

Design: A cluster randomized controlled trial study.

Method: The sample comprised 280 Norwegian youth football coaches with a mean age of 42.28 years ($SD = 6.07$). While the intervention group consisted of 193 coaches ($M_{age} = 41.99$ years, $SD = 6.32$; males $n = 174$; females $n = 19$), the control group consisted of 87 coaches ($M_{age} = 43.19$ years, $SD = 5.15$; males $n = 83$; females $n = 4$). A BSEM approach was chosen because we were interested to learn from the data at hand, and rather than testing the hypotheses using significance testing, p -values, and the presumption of constant effects, the statistical inferences were based on the empirical evidence (Gelman, 2015; Gigerenzer et al., 2004; Van de Schoot et al., 2014).

Results: As shown in Article IV, the Gibbs sampler was used to treat the amount of missing data. The joint posterior distribution is conditional on the observed data, thus the parameter estimates in BSEM are adjusted for the missingness (Asparouhov & Muthén, 2010; Gelman et al., 2014). The model fit the data well with a PPp value of 0.56, and a posterior predictive 95% interval ranging from -280.40 to 259.38. In the bivariate latent change score (BLCS) model, the latent standardized factor loadings ranged from 0.30 to 0.53. Concerning the cross-loadings, they ranged from ± 0.000 to ± 0.20 in the intervention group and from ± 0.000 to ± 0.23 in the control group. The residual correlations ranged from ± 0.001 to ± 0.65 in the intervention group and from ± 0.001 to ± 0.66 in the control group. This, in turn, indicate that there is a significant

amount of overlap between the various items constituting the coach version of the EDMCQ-C. Variances for both intercepts and BLCSs were credible in both groups (i.e., the 95% credibility intervals did not include zero). Additionally, the results showed that the intervention group had, on average, a higher initial level of empowering behaviors as well as a lower initial level of disempowering behaviors in comparison to the control group. Concerning the BLCSs, the results showed that there were no credible changes in either group related to empowering and disempowering coach behaviors. The results from the difference test also showed that there were no credible differences in BLCSs between the two groups, in neither disempowering (-.19, 95% CI = [-.71, .31]) nor empowering coach behaviors (-.01, 95% CI = [-.56, .52]).

Limitations: Within this study, the sample size was rather small, particularly in the control group of coaches. Thus, a greater sample size is preferable in future research. Moreover, although the proportion of female coaches was larger than previous studies, it was still small. Only by intentionally/purposefully recruiting female coaches will the state of the field better represent the current situation in youth sport. Moreover, the items constituting the coach version of the EDMCQ-C did not differentiate between training and competition contexts. This is unfortunate because coaches' recollection of their own interpersonal coaching behaviors can vary considerably between these two contexts (e.g., Van de Pol, Kavussanu, & Ring, 2012).

Conclusions: The BSEM analyses revealed no credible differences in BLCSs between the intervention and the control group, neither in empowering nor in disempowering coach behaviors. Additionally, the results point towards the need for more empirical data on the effectiveness of psychosocial training interventions, especially when it comes to understanding the underlying mechanisms of a positive behavioral change among youth sport coaches. However, the continuing challenge of large-scale psychosocial training interventions will be the relation between being broad enough to encompass a large number of coaches, while at the same time, producing effects on a variety of both coach and athlete outcomes.

Discussion

The Overall Purpose of the Doctoral Thesis

Much of the current academic literature has indicated that coach education research is in its infancy (e.g., Cushion & Nelson, 2013; Evans et al., 2015; Langan et al., 2013; Lauer & Dieffenbach, 2013). Specifically, Langan and colleagues (2013) highlighted that the lack of randomized controlled trial designs, absence of pre-training coach behavior assessment, generally small samples of participants, lack of a theoretical basis, and limited investigation of intervention fidelity are among the main issues of concern. Thus, the overall aim of this doctoral thesis was to contribute to the current paucity of research that focuses on volunteer sport coaches' perspectives at the youth level. To this end, all participating coaches in the Norwegian arm of the PAPA project were involved in this study (Duda et al., 2013). Hence, the purpose of this doctoral thesis was four-fold: (a) to investigate the potential psychological costs and benefits of providing different styles of coaching to young athletes for coaches themselves; (b) to gain insights into what coaches considered to be the merits of participating in the Norwegian arm of the ECTP; (c) to validate a questionnaire that measures coaches' self-report of their own empowering and disempowering behaviors; and (d) to investigate the effectiveness of the ECTP on coaches' self-reported empowering and disempowering behaviors.⁵

Overall, the results showed that provision of a constructive style of coaching to young athletes was related to coaches' basic needs satisfaction (Article I), as well as to a composite score of their psychological well-being (Article II). In contrast, provision of a non-constructive

⁵ With respect to the third and fourth purpose, the reader should bear in mind that the main difference between the frequentist and the Bayesian statistical approach could be outlined as follows: "The probability of the data given the hypothesis does not equal the probability of the hypothesis given the data" (Wagenmakers, Wetzels, Borsboom, & Van der Maas, 2011, p. 426). Thus, instead of overstating the evidence against the null hypothesis, which is a common practice in frequentist statistics when the number of participants are large (Wagenmakers et al., 2011), Bayesian analysis updates researchers' knowledge by quantifying "the change in prior to posterior odds that is brought about by the data" (Wagenmakers et al., 2011, p. 429). Specifically, given that the test statistic may be unlikely under both H_0 and H_A , the essence of Bayesian analysis is its ability to ascribe probabilities to theories as well as theoretically derived hypotheses in the light of new empirical evidence (Chalmers, 1999; Kaplan, 2014; Wagenmakers et al., 2011).

style of coaching to young athletes was associated with impaired psychological well-being, including negative affect (Article II). Further, coaches who participated in the Norwegian intervention arm of the PAPA project did not seem to alter their self-reported empowering and disempowering behaviors from pre- to post-season. Despite this, a subsample of coaches indicated in interview that participation in the ECTP had been a worthwhile educational experience (Article III). To investigate the effectiveness of the ECTP on coaches' self-reported empowering and disempowering behaviors, and given the shortage of validated questionnaires focusing on coaches' perceptions of their own behaviors (Horn, 2008), this doctoral thesis validated the coach version of the EDMCQ-C using the responses of both Norwegian and French youth football coaches. The results indicated that a reduced two-factor model (i.e., empowering and disempowering) produced the best fit to the data (Article IV), contrary to suggestions by recent research focusing on athletes' perceptions of coaches' empowering and disempowering behaviors (see Appleton et al., 2016 for details). Finally, using the validated coach version of the EDMCQ-C, the effectiveness of the Norwegian arm of the ECTP was investigated. The results showed that the Norwegian arm of the ECTP did not have any effect on coaches' self-reported empowering and disempowering behaviors from pre- to post-season (Article V). Theoretical, methodological, and practical implications are discussed in detail in the following sections.

Sports Coaching at the Youth Level

Based on SDT and AGT, several lines of research have been concerned in the investigation of the perceived motivational climate (e.g., Harwood et al., 2015; Ntoumanis, 2012; Roberts, 2012; Weiss et al., 2012). The premise of these lines of research has been to demonstrate how the nature of athletes' experience influences the degree to which either experiences of autonomy, competence, and relatedness, or task and ego criteria of success, are

perceived as salient in the sport context. During the last decades, sport psychology researchers have repeatedly shown that perception of a constructive motivational climate (i.e., autonomy-support, task involvement, and social-support) is related to a number of positive cognitive and affective correlates (e.g., Jaakkola, Ntoumanis, & Liukkonen, 2016; Ntoumanis, Taylor, & Thøgersen-Ntoumani, 2012; Van de Pol, Kavussanu, & Ring, 2012). Conversely, perception of a non-constructive motivational climate (i.e., ego-involving and controlling coaching behaviors) has been shown to relate positively to outcomes reducing the quality of physical and psychological experiences of athletes, including sport performance anxiety (Smith et al., 2007), sources of distress (Pensgaard & Roberts, 2000), and burnout (Ntoumanis et al., 2012).

However, given the reciprocal nature of the coach-athlete relationship (Smith & Smoll, 2007), it is surprising that previous research has more or less neglected to consider the coach's perspective in the sport context. Intuitively, knowing that all people have the need to experience autonomy, competence, and relatedness, regardless of developmental period (Ryan & Deci, 2002), it seems likely that the nature of coaches' experience influences their perceived satisfaction of the three psychological needs, which in turn, will influence the quality of coaches' motivation, psychological experience, and ultimately their interpersonal coach behaviors. Additionally, previous research has looked into the experience of engaging in different types of interpersonal behavior, outlining findings that are useful for sports coaches at all levels of competition. Specifically, to inflict social pain on others is likely to thwart the basic needs for autonomy, competence, and relatedness, thereby contributing to experiences of ill-being (Legate et al., 2013, 2015). In contrast, volitional acts of helping are likely to benefit the helper because his or her acts will satisfy the three basic psychological needs (e.g., Deci et al., 2006; Martela & Ryan, 2015, 2016; Weinstein & Ryan, 2010).

Thus, this doctoral thesis explored whether the provision of different styles of sports coaching to young athletes was related to coaches' experience of basic needs satisfaction and

psychological well-being. Across the two first articles, provision of a constructive style of coaching (e.g., empowering sports coaching) to young athletes was positively related to psychological benefits. Article I showed that parts of the perceived coaching environment, along with coaches' self-determined motivation towards coaching, influenced coaches' basic needs satisfaction via their provision of autonomy-support to athletes. Article II, which introduced a time delay between measures (approximately 5 months), showed that the most empowering provision profile, consisting of high levels of empowering coach behaviors and low levels of disempowering coach behaviors, differed in comparison with the two remaining provision profiles with regard to basic needs satisfaction, positive affect, and negative affect. Article II also examined whether provision of a non-constructive style of coaching to athletes was associated with psychological costs. The findings showed that the least empowering provision profile, consisting of moderate levels of empowering coach behaviors and moderate levels of disempowering coach behaviors, differed in comparison with the other provision profiles with regard to the three aforementioned measures. Specifically, the least empowering provision profile was positively related to lower levels of basic needs satisfaction and positive affect, and higher levels of negative affect. Consequently, the findings consistently support previous research (e.g., Deci et al., 2006; Legate et al., 2013, 2015) by demonstrating the psychological costs and benefits of providing constructive and non-constructive styles of coaching to young athletes for coaches themselves.

This work informs the relatively new models proposed by Stebbings and colleagues (2011, 2012), as well as Rocchi and colleagues (2013). According to Stebbings and colleagues' models, the perceived coaching environment is likely to influence coaches' autonomy-supportive and controlling behaviors via coaches' psychological needs satisfaction and thwarting, and their psychological well- and ill-being. Conversely, Rocchi and colleagues proposed that the perceived coaching environment is likely to influence coaches' autonomy-

supportive behaviors via their self-determined motivation towards coaching. Articles I and II, however, considered the theoretical account of providing both constructive and non-constructive styles of coaching to athletes, which is a complementary theoretical approach that lends insight into the psychological dynamics occurring within the coach-athlete relationship at the youth level. Taking into consideration a limited number of key factors, including the voluntary nature of youth sports coaching, the network of reciprocal causal relations in the coach-athlete relationship, and the well-being of both athletes and coaches themselves, it is important that the topic of volitional acts of providing interpersonal coach behaviors to athletes is employed in future studies. This is because coaches who volitionally provide a constructive style of coaching (e.g., empowering sports coaching) to their athletes are likely to experience autonomy, competence, and relatedness themselves, and thus experience improved engagement, performance, and well-being (Deci et al., 2006; Deci & Ryan, 2012). Athletes who, in turn, perceive a constructive style of coaching in the sport context are likely to experience satisfaction of basic psychological needs, facilitating their autonomous motivation, optimal functioning, and well-being (e.g., Deci & Ryan, 2012; Ntoumanis, 2012; Ryan & Deci, 2007). The dynamics possibly being that a constructive style of coaching elicits positive reactions not only among the coaches, but also among athletes. Thus, given the apparent reciprocity existing within coach-athlete relationships, coaches may benefit from becoming conscious about the advantages associated with a constructive style of coaching, as well as learning how to apply a constructive style of coaching in the sport context. This would aid in fostering multiple win-win situations in the context of organized youth sport.

In terms of future coach education, researchers should emphasize the intrinsic value of providing a constructive style of coaching to athletes for coaches themselves. Considering the hustle and bustle of everyday life and the voluntary nature of sports coaching at the youth level (e.g., Baklien, Ytterhus, & Bongaardt, 2015; Langan et al., 2013), it seems reasonable to argue

that many coaches who attend coach education may be doing so because they feel obligated, and not for intrinsic reasons. Coaches may be pursuing the activity (i.e., attending the coach education workshop) on the basis of controlled motives. Moreover, knowing that the attainment of extrinsic aspirations is related to symptoms of ill-being (see Niemiec, Ryan, & Deci, 2009 for details), it becomes important to acknowledge “what people pursue and why they pursue it both make a significant difference in their psychological well-being” (Deci & Ryan, 2012, p. 92). Therefore, adding information on the psychological benefits of providing a constructive style of coaching to athletes for coaches themselves in future CDPs could make coaches more autonomous in their motivation, and in doing so, change their aspirations (i.e., why they should teach in line with a constructive style of coaching in the sport context) from extrinsic to intrinsic.

The Coach’s Perspective on Youth Sport Coaching Education

Psychosocial training interventions (i.e., CDPs) have been carried out since the late 1970’s (e.g., Smith et al., 1977, 1979). The overall aim of these CDPs (e.g., the CET) has been to improve coaches’ interpersonal effectiveness in such a way that young athletes report higher levels of desirable psychosocial outcomes (e.g., enjoyment, self-esteem, and reduced fear of failure). A major issue in previous CDPs, however, has been the lack of a theoretical basis (Langan et al., 2013). Thus, the latest developments in the coach education literature have been based on theoretical frameworks, including SDT and AGT (e.g., Duda et al., 2013; Smith et al., 2007; Smoll et al., 2007). A consequence of this development is that the coach education literature is replete with studies arguing that coaches need to be empowering and athlete-centered because athletes are likely to report improved engagement, functioning, and well-being if they perceive such interpersonal coach behaviors (e.g., Denison et al., 2015; Quested et al., 2013; Smith et al., 2016). However, given the comprehensiveness of a constructive style of coaching, the complex social system embedded in youth sport contexts, and the lack of self-

awareness among youth sport coaches (Deci & Ryan, 2012; Roberts, 2012; Smoll & Smith, 2002), is it realistic to expect coaches to report a positive behavioral change after attending a CDP ranging in duration between 2- and 6-hour? Until recently, this has been the unquestioned ‘truth’ in the sport psychology literature (e.g., Smith et al., 1979, 2007; Smoll et al., 2007). Importantly, though, the current empirical base on coach education research is limited because no psychosocial training interventions have investigated both pre- and post-training coach behavior assessments, as perceived by the coaches themselves (Langan et al., 2013). Article III showed that coaches who participated in the Norwegian arm of the ECTP did not report a positive behavioral change from pre- to post-season. Of course, this may be explained by factors, such as floor and ceiling effects, inaccurate ratings caused by not realistically judging one’s competence, and the lack of knowledge about what it means to shift from a score of 3 to a score of 4 on an arbitrary metric (Blanton & Jaccard, 2006; Kim et al., 2015; Ward, Guthrie, & Alba, 2014). However, it may also be explained by factors related to the ECTP and its content, and additionally, the process of learning and changing.

Coaches who participated in the Norwegian arm of the ECTP attended a brief (i.e., 6-hour) workshop at the beginning of the season. The aim of the ECTP workshop was threefold. First, to elaborate on the educational value of being an empowering coach. Second, to give insights into the theoretical foundation underlying the ECTP. Finally, to provide guidelines with respect to how to become an empowering coach. Therefore, the ECTP workshop touched upon topics such as the psychological health benefits of playing football, coaching philosophy, the quality of motivation, and the importance of both basic psychological needs satisfaction and the coach-created motivational climate (Duda, 2013; Duda et al., 2013). Moreover, given that a 6-hour workshop cannot address all aspects related to sports coaching at the youth level, coaches were encouraged to become aware, register, and reflect upon their own coaching practices during the sport season. Indeed, particular emphasis was placed on becoming aware

of behaviors reducing athletes' quality of motivation and how behaviors likely to be disempowering might be changed in accordance with the Empowering Coaching™ guidelines. An important question remains as to whether the quality of the content and extensiveness of the ECTP are sufficient to cause a positive behavioral change among the coaches who attended the ECTP workshop. In this respect, it is worth noting that a recent study by Hordvik, MacPhail, and Ronglan (2016) focused on a prospective teacher's longitudinal learning process to teach in accordance with a specific pedagogical model (Sport Education; e.g., Siedentop, Hastie, & Van der Mars, 2011) for teaching in PE. The findings showed that the development of deep understanding and practical teaching knowledge required multiple and comprehensive learning experiences. Specifically, the prospective teacher engaged in 66 hours of attending university classes (predominantly practical), 15 hours teaching during school practicum, and approximately an additional equivalence of 200 hours individual and group work out of scheduled class time (Hordvik et al., 2016). In another study, Cassidy and colleagues (2006) outlined:

“With access to the coaches agreed upon, in March 2003 the CoDe program began, running over a period of 6 months with a two-hour session scheduled every two weeks. The CoDe was not a large-scale coach education program. Rather, it could be described as a boutique, community-oriented, short term (28 hours over 6 months), classroom based, theoretical, educational/personal development coaching program with no assessment component that was offered free of charge to the volunteer coaches and the Erewton Rugby Union.” (p. 148)

With regard to the delivery of the CoDe program to coaches, the emphasis of the CoDe program was on facilitating discussion, interaction, and negotiation of meaning between the participating coaches instead of lecturing about theoretical principles and aspects of sports coaching (Cassidy et al., 2006). The results indicated that coaches attached considerable value to learn about the

implicit relationship existing between instructional methods and athlete learning as well as the reflective process where they were able to think about their own coaching practices. Moreover, coaches noted that the opportunity they were given to discuss, debate, and share their ideas with the other coaches was a valuable experience (Cassidy et al., 2006).

By directly comparing the comprehensiveness of the ECTP with the aforementioned results, it would be optimistic to assume that participation in the Norwegian arm of the ECTP, without taking the efforts of each individual coach into account, would lead to a significant/credible and positive behavioral change in accordance with the guidelines of the Empowering Coaching™ framework (Duda, 2013). Hence, it is justified to consider what could be done differently with regard to the organization and the content components of the ECTP. Article III showed that the participating coaches asked for more training because the Norwegian arm of the ECTP was limited to a 1-day (i.e., 6-hour) workshop. Several coaches pointed to the value of possibly having two or three follow-up sessions to gain more insight, thereby helping them to keep the content of the Empowering Coaching™ framework in focus over time. These findings, in turn, confirm a recent review published by Evans and colleagues (2015) which highlighted, “The latter finding – lack of reporting on maintenance – is a particularly striking result that highlights the limited translation and application of existing interpersonal CDPs within contemporary coach education, despite their potential to influence athlete development” (p. 875). There is potential for the ECTP to influence coaches’ interpersonal behaviors, and thus athletes’ psychosocial development in a positive manner. Indeed, all the coaches who were interviewed confirmed this viewpoint by arguing that the ECTP was a worthwhile educational experience, helping them to reflect on their own coaching practices (Article III). Several coaches also highlighted that the focus on creating a conducive motivational climate and addressing the psychosocial dynamics of coaching in organized youth sport was a somewhat new focus in relation to previous coach education workshops, as those workshops often had a

technical and football-specific content. Thus, a simple way to increase the likelihood of a positive behavioral change in accordance with the Empowering Coaching™ framework would be to increase the number of workshops that are offered within the intervention. Intuitively, it seems fair to argue that very few people are able to understand and change their interpersonal behavior based upon the principles of one single coach education workshop. According to John Dewey's principles of continuity and interaction, Bassey (2010) argued, "all experiences absorb something from those which have gone before and transform the quality of those experiences which come after them" (p. 13). As a consequence, coaches need to attend several coach education workshops, within relatively close proximity, in order for workshops to have any educational value. Indeed, the coach's educational experience "must lead to growth which must lead to further growth" (Bassey, 2010, p. 13).

However, as noted in Article II, another initiative that could have contributed to improved understanding of the Empowering Coaching™ principles, and subsequently made a difference in coaches' self-report of empowering and disempowering behaviors from pre-to-post, was to deliver different versions of the ECTP to the participating coaches. Specifically, Article II showed that coaches' self-reported behaviors could be used to model different profiles of youth sport coaches, which varied in the degree of self-reported empowering and disempowering behaviors. The pre-season measure of coaches' self-reported behaviors may therefore be used as an indication of coaches' preferences in the role as youth sport coaches. Hence, it seems reasonable to suggest that coaches who fall into a more disempowering profile at the pre-season assessment would take a more skeptical position on an empowerment approach to coaching (e.g., Kidman, 2001) because many of these coaches are likely to favor early specialization, social comparison, and a relentless belief in beating the opponents (Bergeron et al., 2015; Cumming, Smoll, Smith, & Grossbard, 2007). Thus, it seems rather inexpedient to invite several types of coaches (displaying more or less empowering and

disempowering coach behaviors) to attend the same coach education workshop. There are (at least) three reasons why this suggestion is appropriate. The first reason is related to the coach education workshop and its content. Specifically, to develop and implement a group-based coach education workshop may be beneficial in terms of facilitating the presentation of content, reflective group-based discussions that allow for difficult and important issues, and learning processes. Yet, by concentrating on group-based workshops, researchers, and coach educators, may miss out on opportunities to have discussions reflecting the heterogeneous group of volunteer youth sport coaches. Thus, the group-based discussions may favor particular views (e.g., a win-oriented model of youth sport; Cumming et al., 2007), which in turn, may inhibit further discussions and development among the participating coaches.

The second reason is linked to the quality of coaches' motivation for attending youth sport coaching education. Indeed, given that people are likely to attain those aspirations that they consider are important, and knowing that the attainment of intrinsic aspirations is related to individuals' well-being (e.g., Deci & Ryan, 2012), it is reasonable to suggest that future coach education workshops should consider the multiple reasons why coaches are engaged in youth sport. Hence, it is important to consider whether coaches who are initially non-constructive (e.g., disempowering) in their way of coaching will be open to the information provided by a coach education workshop, which is based on an empowerment approach to coaching, and additionally, try to adapt their own style of coaching in line with the theoretical guidelines of the workshop. Taking recent pedagogical and psychological literature into account (e.g., Bassey, 2010; Deci & Ryan, 2012), it seems fair to assume that a predominantly disempowering coach is likely to attend an empowerment approach to coach education on the basis of controlled motives, which in turn, require several workshops in order to achieve continuity, interaction between the participants, and a constructive learning process. This is because coaches need to internalize the information provided by the coach education workshop,

and satisfaction of basic needs for autonomy, competence, and relatedness is a requirement for this organismic activity (Deci & Ryan, 2012). Consequently, to tailor future coach education workshops with regard to the quality of coaches' motivation for attending youth sport coaching education may lead to more constructive, serious, and critical discussions between workshop participants, facilitating educational experiences that ultimately will lead to multiple win-win situations in organized youth sport for both coaches and athletes.

The final reason follows directly from the previously mentioned argument and is related to the level of self-awareness among youth sport coaches (e.g., Smith, 2014; Smith & Smoll, 2005, 2011). Indeed, it has been noted, "For the most part, coaches were blissfully unaware of what they were doing. The implication, of course, was that coaches would have to be trained to self-monitor their behavior in order to bring about behavior change" (Smith, 2014, p. 122). Intuitively, it seems preferable to ask coaches to share their own experiences from the training ground, and to evaluate their own coaching practices, in a more homogenous group of coaches. For example, previous research has shown that the willingness-to-share personal information and knowledge is related to relationship closeness and the frequency of interaction (e.g., Collins & Miller, 1994; Tamir & Mitchell, 2012). Hence, to share one's thoughts and beliefs in a group of coaches with a similar mindset may engender social bonds and social alliances between the workshop participants, leading to adaptive advantages in coaches (Tamir & Mitchell, 2012). With regard to self-monitoring of coach behavior, it also seems more beneficial for coach educators to have a homogeneous group of coaches in terms of having the opportunity to provide similar feedback to the workshop participants, thus eliciting group-based discussions.

To further assist coaches in the process of becoming more self-aware of their own interpersonal behaviors, coaches have been given brief (i.e., A5 paper size; approximately 40 pages) coaching manuals in written format. The main aim of these coaching manuals has been to reinforce the messages dealt with during the different coach education workshops (e.g., the

CET and MAC workshops; Smith & Smoll, 2005, 2011) and, thus, to assist coaches in enhancing self-awareness and involving themselves in processes of self-reflection throughout the sport season. A brief coaching manual in written format was also given to the coaches attending the Norwegian arm of the ECTP. Specifically, the ECTP manual was aimed at reflecting the content of the ECTP workshop, thereby helping coaches understand how they could create an empowering motivational climate. Hence, the manual was divided into seven themes that were all related to the creation of an empowering motivational climate: (a) cooperation among peers, (b) emphasis on learning, (c) facilitate athletes' enjoyment and interest, (d) mastery orientation, (e) the need for autonomy, (f) emphasis on athletes' effort and improvement, and (g) taking the perspective of others. Consequently, the ECTP manual contained several questions for reflection, which were intended to increase coaches' levels of self-awareness. For example, "What can you, as a coach, do to promote or inhibit an empowering motivational climate?", "Which characteristics of your team and your club context might prevent you from creating an empowering motivational climate?", and "Provide examples of how you are going to deal with these challenges."

Article III therefore aimed to determine the association between coaches' perceived usefulness of the ECTP manual and their post-season empowering and disempowering behaviors. Although there were no associations between the ECTP manual and coaches' post-season behaviors, findings still showed a positive relationship between the perceived usefulness of the ECTP manual and coaches' empowering behaviors at the beginning of the season. In contrast, there was no relationship between the perceived usefulness of the ECTP manual and coaches' disempowering behaviors at the beginning of the season. Nevertheless, knowing that the participants were encouraged to use the ECTP manual in their everyday life to bring about behavior change in accordance with the Empowering Coaching™ principles, but were not explicitly trained to use the manual in order to self-monitor their own interpersonal behaviors,

it is not surprising that the ECTP manual was unrelated to coaches' post-season behaviors. Furthermore, in order to examine the effectiveness of the ECTP on coaches' perceptions of their own empowering and disempowering behaviors, the Norwegian version of the EDMCQ-C needed to be validated. Hence, the validation process of the EDMCQ-C and, thus, the effectiveness of the Norwegian arm of the ECTP on coaches' self-reported empowering and disempowering behaviors will be discussed in more detail in the sections below.

Assessment of Coaches' Perceptions of their own Behaviors

Articles IV and V adopted a Bayesian perspective on statistics (e.g., Kaplan, 2014; Muthén & Asparouhov, 2012). As mentioned, the main difference between frequentist statistical inference and Bayesian statistical inference is related to *the nature of unknown parameters* (Muthén & Asparouhov, 2012; Van de Schoot et al., 2014). While the parameters of interest are unknown and fixed within the frequentist framework, the same parameters are unknown, but uncertain within the Bayesian framework (Van de Schoot et al., 2014). The uncertainty, however, allows researchers to describe the unknown parameters with a probability distribution, which in turn, makes it possible to say something about the probability of the parameters (Van de Schoot et al., 2014). Zyphur and Oswald (2015) argued, "uncertainty in the effect β is quantified by estimating its probability across a range of values, allowing direct probabilistic statements about β based on the observed data" (p. 4).

Essential to the Bayesian view of probability (i.e., epistemic probability; Kaplan, 2014) is Bayes' theorem, which comprise three main ingredients: (a) the prior knowledge on the parameters of interest, (b) the observed data in hand, and (c) the posterior distribution (Kaplan, 2014; Muthén & Asparouhov, 2012). By explicitly combining the prior knowledge with the observed data in hand, the posterior distribution is obtained, along with a moderation of the researcher's prior knowledge (Kaplan, 2014; Muthén & Asparouhov, 2012). Hence, Kaplan

(2014) argued, “The strength of Bayesian inference lies precisely in its ability to incorporate existing knowledge into statistical specifications” (p. 18). Another strength of Bayesian methods is related to its reliance on *the central limit theorem* (Depaoli & Van de Schoot, 2015; Kaplan, 2014); thus, Bayesian methods are likely to produce reasonable results in small sample contexts (Depaoli & Van de Schoot, 2015). Yet, McNeish (2016) recently argued:

“Although Bayesian methods are better equipped to model data with small sample sizes, estimates are highly sensitive to the specification of the prior distribution. If this aspect is not heeded, Bayesian estimates can actually be worse than frequentist methods, especially if frequentist small sample corrections are utilized.” (p. 750)

To replace the frequentist measure of evidence (e.g., the NHSTP) with Bayesian measures of evidence (e.g., the PPp value), a number of reasons were considered. The psychological literature has put special emphasis on the flexibility of Bayesian methods in the representation of substantive theory (Muthén & Asparouhov, 2012), the opportunity for researchers to estimate all possible cross-loadings and residual covariances in a measurement model (Asparouhov et al., 2015), and publication bias and replication of originally published results (Etz & Vandekerckhove, 2016). Additionally, an appealing feature of Bayesian statistics is its ability to incorporate background knowledge on the parameters in both measurement and structural models (Muthén & Asparouhov, 2012). Hence, the application of Bayesian statistics helps researchers to move away from the strict comparison point of zero effects (i.e., is-it-there-or-is-it-not-there) in psychological science (Gelman, 2015). It is, however, worth recognizing that a change in methods cannot solve the real issues in psychology, such as the acceptance among researchers of varying effects. Gelman (2015) argued:

“The presumption of constant effects corresponds to a simplified view of the world that can impede research discussion. To do helpful science with transportable findings will require grappling with the world’s complexity. Unfortunately, a constant-effects

worldview makes that hard to obtain. So, the problem is more complex than simply changing methods. It requires changing mindsets.” (p. 636)

Furthermore, examining athletes’ perceptions of the coach-created motivational climate using the EDMCQ-C, Appleton and colleagues (2016) argued: “our findings suggested that no one solution provided an accurate representation of the multidimensional and hierarchical conceptualization underpinning the EDMCQ-C” (p. 63). This doctoral thesis therefore set out to improve the EDMCQ-C’s (i.e., the coach version) representation of its target constructs (e.g., task-involving, autonomy-supportive, socially-supportive, ego-involving, and controlling coach behaviors). In line with Smith and McCarthy (1995) who argued for the importance of outlining good scale properties result from refinement procedures replicate on an independent sample, Article IV used Bayesian statistics to validate the multidimensional factor structure of the EDMCQ-C using two samples of youth football coaches’ perceptions of their own empowering and disempowering behaviors.

Across the Norwegian and the French sample of youth football coaches, findings in Article IV supported neither a 34 items five-factor, hierarchical, nor a two-factor BSEM model. This result also remained the same when testing a bifactor BSEM model. It is worth noting, however, that the data supported a reduced two-factor (i.e., empowering and disempowering motivational climates) BSEM model. Thus, the results deviated from the proposed hierarchical, conceptualization of the coach-created motivational climate as perceived by the athletes (Appleton et al., 2016). Indeed, one should not necessarily expect that coaches and athletes should capture the psychological dimensions embedded in the EDMCQ-C equally, thereby paving the way for a similar structuring of the respective dimensions within the two overarching concepts. Yet, the results provided partial support for combining the perspectives of the coach-created motivational climate based on the AGT and SDT literatures into two such overarching concepts of empowering and disempowering motivational climates (Duda, 2013). These

findings, however, may be in line with the intention of the theoretical combination underpinning the Empowering Coaching™ framework (see Duda, 2013 for details). Specifically, Duda (2013) highlighted, “an ‘empowering’ environment is one that is task-involving, autonomy-supportive, and socially-supportive. In contrast, a ‘disempowering’ environment would be highly ego-involving and controlling” (p. 4). Hence, nothing in this statement explicitly indicates that the structure of the coach-created motivational climate is hierarchical in nature. Future research would do well to delve into how different users such as coaches, athletes, and parents may understand and self-report on the empowering and disempowering dimensions, and additionally, the extent to which the structuring of these dimensions may differ between different groups of people.

Considering the shortage of measures focusing on coaches’ perceptions of their own behaviors (e.g., Chelladurai & Riemer, 1998; Yang & Jowett, 2013), the validated coach version of the EDMCQ-C allows researchers to include athletes’ perceptions of their coaches’ behaviors as well as coaches’ perceptions of their own behaviors in the modeling of structural equation models (Article V). It should therefore be noted that a recently published cross-sectional study, comprising of the English, French, Greek, and Spanish arms of the PAPA project (Duda et al., 2013), examined athletes’, coaches’, and observers’ perceptions of the coach-created motivational climate (Smith et al., 2016). While the aforementioned study is an important contribution to the sport psychology literature, Smith and colleagues (2016) did not report any data to support the validity of either the athlete version nor the coach version of the EDMCQ-C (see Smith et al., 2016 for details). The authors based their multilevel analyses on a 30-item version of the EDMCQ-C without providing a rationale of how and why they ended up with the 30-item version. Rather, they referred to Appleton and colleagues (2016), which originally argued: “The evidence from this study suggests the EDMCQ-C should be considered a work in progress” (p. 64). Hence, although Smith and colleagues (2016) extend previous SDT-

and AGT-based research by investigating the relationships between multiple perspectives of the coach-created motivational climate, there are limitations associated with this particular study because it does not provide any empirically-based validity information.

In addition, as indicated above, the validated coach version of the EDMCQ-C makes it easier for researchers to use multilevel modeling techniques in future research focusing on different perspectives of the coach-created motivational climate (e.g., Heck & Thomas, 2015; Little, 2013; Preacher, Zyphur, & Zhang, 2010). Nevertheless, to apply a multilevel modeling approach as an analytic method in future research, researchers still have to validate the athlete version of the EDMCQ-C (Appleton et al., 2016). The attractiveness of multilevel analysis, however, is that athletes who participate within the same team grouping “may share certain similarities by virtue of their membership in that particular group” (Heck & Thomas, 2015, p. 15). Consequently, a greater use of multilevel modeling techniques “will adjust the estimates for the clustering of individuals within groups” (Heck & Thomas, 2015, p. 17). Based on recent developments in the methodological and statistical literature (e.g., Little, 2013; Preacher et al., 2010), researchers should consider to adopt 2-level multilevel structural equation modeling in future modeling of intervention effects.

The Effectiveness of Interpersonal CDPs

It is said, “With great power comes great responsibility.” Based on previous research, it seems safe to argue that a number of complex power relations maintain the coach’s practice in the youth sport context (Denison et al., 2015). Hence, volunteer youth sport coaches have many responsibilities. For example, coaches should create trusting interactions with their athletes, nurture athletes in a developmentally appropriate manner, promote optimal development environments, be caring and conscious of their power by virtue of their role as coach, and position as an adult, in the sport context, show respect for athletes, and face criticism with

friendliness and openness (Harvey & Light, 2013). Yet, countless studies have indicated that coach-athlete relationships are related to a number of physical and psychological ill-being outcomes, such as negative experiences of life and performance satisfaction, negative affect, depression, performance anxiety, and burnout (e.g., Felton & Jowett, 2015; Ntoumanis et al., 2012; O'Rourke, Smith, Smoll, & Cumming, 2014). Consequently, the PAPA project was initiated in five European countries (i.e., England, France, Greece, Norway, and Spain) by a handful of researchers "to promote children's mental and emotional health and physical activity engagement" (Duda et al., 2013, p. 319). In turn, the ECTP was designed with the intent of helping youth sport coaches to "create a sporting environment which was more positive and adaptive for young children" (Duda et al., 2013, p. 319).

In Norway, findings showed that the ECTP failed to induce any measurable effects in coaches' self-reported empowering and disempowering behaviors from pre- to post-season (Article V). More specifically, Article V could not trace any interindividual differences in intraindividual change between coaches who participated in the intervention group compared to coaches in the control group. This finding is important for several reasons. First, previous psychosocial training interventions have solely focused on differences in athletes' perceptions of post-training coach behaviors, thereby disregarding the question of whether and to what extent coaches change their self-reported interpersonal behaviors as part of participating in CDPs (Langan et al., 2013). Second, the testing of the ECTP within the Norwegian arm of the PAPA project was done by relying on a cluster randomized controlled trial design (Article V). Previous psychosocial training interventions have been criticized for their limited use of true experimental designs (Langan et al., 2013). Third, the ECTP was based on a theoretical framework consisting of SDT and AGT (Deci & Ryan, 2000, 2012; Duda, 2013; Nicholls, 1984a, 1989), which in turn, involve an advancement of the coach education literature (Langan et al., 2013). Several explanations may help to explain the lack of measurable effect in the

Norwegian arm of the ECTP with respect to coaches' self-reported empowering and disempowering behaviors. For example, Article V placed special emphasis on the implementation process of the Norwegian arm of the ECTP, the extensiveness of the ECTP workshop as well as the empowering nature of the ECTP workshop (e.g., Søvik et al., 2016; Van Hoye et al., 2015). In addition, inflated self-assessment caused by inability to recognize one's own competence among the coaches, and the similarity between the philosophy of the Empowering Coaching™ framework and the guidelines that regulate organized youth sport in Norway are also discussed within the article. Thus, the following discussion will focus more on coach education and learning.

Langan and colleagues (2013) argued, "Although the review highlighted a once-off group workshop as the favored training format; given such mixed findings concerning intervention effectiveness, an alternative learning format might be warranted" (p. 48). As a consequence, it may be time to evaluate whether the training format of current CDPs (e.g., the CET and the MAC) is sufficient when considering the real-life complex situations in organized youth sport. Consider the following question: Is there any reason to believe that learning will occur during a once-off group workshop, and that coaches will apply this knowledge over a longer period in the youth sport context? As mentioned earlier, the sport psychology literature has typically encouraged coaches to be athlete-centered, autonomy-supportive, and task-involving (Ntoumanis, 2012; Roberts, 2012), without acknowledging the range of tasks that such styles of coaching involve (e.g., Denison et al., 2015; Jones, 2001). However, the sports coaching literature has indicated that "coach education should move from instructor-centered approaches to student-centered; basing the content and the delivery on coach needs (and the needs of the athletes they coach) and how best to engage them" (Lauer & Dieffenbach, 2013, p. 457). In this respect, it is important to acknowledge *the nature of experience* (see Dewey, 1916, 1938 for details). Specifically, Dewey (1916) argued that the nature of experience can

only be understood by considering the two facets of experience; the active and passive facets of experience. The active facet involves various acts of experimentation, whereas the passive facet involves being exposed to some external force (Dewey, 1916). Thus, the combination of these facets of experience implies that people, firstly, act on the behalf of something and then, secondly, are exposed to the naturally occurring consequences. However, it is worth noting that activity alone is essentially meaningless because those changes that occur through various acts of experimentation must be related to the naturally occurring consequences. As such, the experiences have significance because people learn from them (Dewey, 1916). Accordingly, one may differentiate between educative and mis-educative experiences. Dewey (1938) argued:

“If an experience arouses curiosity, strengthens initiative, and sets up desires and purposes that are sufficiently intense to carry a person over dead places in the future, continuity works in a very different way. Every experience is a moving force. Its value can be judged only on the ground of what it moves toward and into. The greater maturity of experience, which should belong to the adult as educator puts him in a position to evaluate each experience of the young in a way in which the one having the less mature experience cannot do. It is then the business of the educator to see in what direction an experience is heading.” (p. 38)

One may therefore question whether a once-off group workshop is an educative or a mis-educative experience. As mentioned, Article III showed that coaches who attended the Norwegian arm of the ECTP noted that the ECTP had been a worthwhile educational experience. Still, they were eager to attend follow-up workshops because they needed to gain a more thorough understanding of the content related to the Empowering Coaching™ framework (Article III). It is therefore questionable whether the experience of a once-off group workshop represents high or low quality. A once-off group workshop is likely to provide coaches with several exemplifications of the content of the CDP and group-based discussions; however,

researchers are often less able to keep track of coaches' acts of experimentation on the training ground. Thus, one may question whether researchers should continue to evaluate the effectiveness of CDPs by relying on only pre- and post-training coach behavior assessments, and thus once-off group workshops. This is because the nature of experience requires coaches to act on the basis of the CDP's principles, which in turn, implies that coaches will experience a range of different consequences. Hence, coaches are likely to have a broad range of experiences when they attend the group workshop for a second time. Hence, two or more group workshops are likely to encourage coaches to consider the content of the CDP, thereby facilitating increased self-reflection among the coaches on their range of experiences. In turn, the self-reflection process may provide the coach with an opportunity to cope with ambiguity created by the mismatch between the CDP's principles and the coaching context, thus accepting the variety of challenges (e.g., to enable athletes to understand the benefits of going along with the CDP's principles) in the role as coach (Denison et al., 2015). In addition, researchers should arrange at least two group workshops in order to more adequately meet the requirement of evaluating each experience of the participating coaches, and the direction each of them are headed during the course of the CDP.

Considering that Article V is the first study investigating the effectiveness of a interpersonal CDP on coaches' self-reported behaviors, there is a great need in the sport psychology literature to continue this line of work by reporting on the maintenance of future interpersonal CDPs on coach outcomes (Evans et al., 2015; Langan et al., 2015). Until future research increases the reporting on maintenance on specific coach outcomes, CDPs have limited translation and application with regard to the broader coach education literature. As part of addressing the challenge of maintenance, future research also needs to consider basic issues associated with scale development (see DeVellis, 2012 for details). Specifically, several methodological considerations (e.g., the substantial degree of overlap at the item-level in the

larger pool of items) need to be dealt with before the coach version of the EDMCQ-C is a valid measure of the coach-created motivational climate (Articles IV and V).

Nearly two decades ago, two studies (Clark & Watson, 1995; Smith & McCarthy, 1995) were published in *Psychological Assessment*, which were supposed to help scale developers (i.e., researchers) to maximize a scale's representation of theoretical constructs. Because the review of these principles is beyond the scope of this doctoral thesis, the following discussion will focus on the creation of valid subscales. Clark and Watson (1995) argued:

“We emphasize again that in making the decision of whether subscales are warranted, both theoretical and empirical considerations should be brought to bear, and data from diverse samples representing the entire range of the scale's target population should be considered.” (p. 318)

In the development of the EDMCQ-C, Appleton and colleagues (2016) reduced the overall number of items from already existing subscales (e.g., the PMCSQ-2) in order to obtain a more manageable number of items assessing features of empowering and disempowering motivational climates. Previous studies have shown that the bivariate correlations between the different subscales ranged from .32 to .70 (e.g., Quested & Duda, 2010; Reinboth, Duda, & Ntoumanis, 2004). Articles IV and V also confirmed these results by reporting a substantive number of correlated residuals at the item-level. Yet, Appleton and colleagues (2016) used the subscales as a basis for the development of the EDMCQ-C. Clark and Watson (1995) argued, “If the average correlation between the A items and the B items is much above .30, there is no justification for dividing the items into two arbitrary subscales; instead, they simply should be summed into a single 20-item score” (p. 318). Thus, the statement made here by Clark and Watson (1995) support Article IV, suggesting that the perspectives of the coach-created motivational climate, which are based on AGT and SDT, should be combined into two overarching concepts of empowering and disempowering motivational climates. Moreover, one

may wonder whether issues concerning the lack of a clear conceptualization, item wording, and the use of one sample of athletes to reduce the overall number of items had influence on the effectiveness of the Norwegian arm of the ECTP on coaches' self-reported empowering and disempowering behaviors (Appleton et al., 2016; Clark & Watson, 1995; Article V). Nevertheless, it seems fair to argue that future research is warranted to rethink the development of the EDMCQ-C (Article IV).

Theoretical and Practical Implications

In pursuit of developing the EDMCQ-C, researchers should focus more on the unique differences within each sub-dimension of the coach-created motivational climate in the further development of the coach and athlete versions of the EDMCQ-C (Article IV). In contrast to task involvement and autonomy-support, social-support refers mainly to coach behaviors that contribute to athletes' perceptions that they are loved, valued, and respected by their coach (Pierce et al., 1992). Autonomy-support differs from the other sub-dimensions of empowering coach behavior by emphasizing that authority figures in the athletic environment (e.g., the coach) should acknowledge the perspectives of athletes, thereby creating athletic environments in which athletes are given some choice (Deci & Ryan, 2012). Task-involving coach behaviors, however, explicitly encourage athletes to use self-referenced criteria to evaluate whether they have gained in level of performance (Nicholls, 1984a, 1989). The two sub-dimensions of disempowering coach behavior are also different from each other. While controlling coach behaviors are concerned with making sure that athletes think, feel, and behave in accordance with the coach's preconceived way of thinking (Deci & Ryan, 2012), ego involvement refers to coaching behaviors focused on evaluating the adequacy of athletes' ability without acknowledging whether the performance was personally challenging to the individual athlete.

In these cases, coaches are solely occupied by comparing the individual athlete's performance with the performances of athletes in a normative reference group (Nicholls, 1984a, 1989).

Thus, the EDMCQ-C holds potential in terms of capturing the multidimensional aspects embedded within the empowering and disempowering dimensions of the coach-created motivational climate. However, this requires a more thorough process in the development of the scale (Clark & Watson, 1995; Smith & McCarthy, 1995). Assuming that researchers focus more on the unique facets of each sub-dimension, and less on retaining items from the original scales, the EDMCQ-C seems a promising measure intended to assess the multidimensional factor structure of the coach-created motivational climate. Supporting our notion, Appleton and colleagues (2016) argued that future research should "ensure the empowering and disempowering climate dimensions are more clearly distinguishable from one another" (p. 63).

Further, an essential implication has long been to teach coaches how to create either an autonomy-supportive or a task-involving motivational climate, and this line of research has proven to be conducive in relation to young athletes' psychosocial outcomes (e.g., self-esteem, anxiety, and sport attrition; Langan et al., 2013; Ntoumanis, 2012). However, researchers must not forget the volunteer youth sport coaches who spend their spare time on the training ground, along with their respective athletes. While recognizing that many coaches may find it particularly interesting to learn and develop for the sake of others, it may also be coaches who are struggling to find time in their daily life. Thus, the effect of daily life activity routines (e.g., work-related activities, family obligations, and the demands of spouse) may lead coaches to be more controlled in their motivation related to attending psychosocial training interventions. This, in turn, highlights the importance of actively emphasizing and communicating the duality of providing constructive and non-constructive styles of coaching to athletes for coaches themselves. Importantly, by pursuing such an approach one may increase the likelihood of transmitting the coach educators' values to coaches' practices on the training ground.

The continuing challenge of large-scale psychosocial training interventions will be the relation between being broad enough to encompass a large number of coaches, while at the same time, producing effects on a variety of both coach and athlete outcomes. That being said, future CDPs must put special emphasis on follow-up workshops, as well as follow-up assessments of coaches' self-reported interpersonal behaviors (Evans et al., 2015; Langan et al., 2013). With regard to the former, it would be beneficial to let coaches attend two or more workshops due to the nature of their own experience (Dewey, 1916, 1938). Given that coach education often is in conflict with coaches' existing biography, and knowing that there is a contradiction between the disciplinary power embedded in youth sport contexts and the content of CDPs, it is worth taking the principle of continuity into account (e.g., Denison et al., 2015; Smoll & Smith, 2002; Stodter & Cushion, 2014). Dewey (1938) argued, "The principle of continuity of experience means that every experience both takes up something from those which have gone before and modifies in some way the quality of those which come after" (p. 35). Hence, the educative process involves growth or development; however, in order to notice whether the growth pattern is adaptive, or maladaptive, it is essential to "specify the direction in which growth takes place" (Dewey, 1938, p. 36). Consequently, both translation and application of future psychosocial training interventions are likely to be more favorable by increasing the number of follow-up workshops and follow-up assessments.

Limitations

The five articles included in this doctoral thesis have several limitations (see each article for detailed information). First, all of the articles relied on self-report data. If this research had also used observations of coaches' behaviors, this information could have been used to adjust coaches' self-report at the pre- and post-season assessments. Second, in Article II, although the latent profiles differed with regard to levels of self-reported empowering and disempowering

coach behaviors, the total number of coaches, particularly in the least empowering profile, was very low. Thus, larger samples of coaches are needed in future studies to maximize the probability of more accurately predicting the impact of providing empowering and disempowering coach behaviors to athletes on subgroups of coaches themselves. Third, some would argue that involvement in a psychosocial training intervention is likely to preclude examination of the naturally occurring relationships between study variables. Referring, however, to the overview of the different latent profiles in Article II, it was not possible to detect any unambiguous increase or decrease in the psychological well-being outcomes over time. If coaches had a clear advantage of participating in the ECTP, then this would have been the case. Fourth, coaches who completed both assessments differed from those coaches who dropped out of the Norwegian arm of the PAPA project. It is therefore worth noting that this issue was handled by using the current state of missing data practice (Enders, 2010). Finally, the overall sample size in this doctoral thesis was relatively small. Future research should therefore attempt to recruit a larger number of coaches from a variety of sports and countries, thus making it possible to compare various groups of coaches and different coaching cultures.

Conclusions

This doctoral thesis made use of different research methods (i.e., quantitative and qualitative methods) and statistical methods (i.e., frequentist and Bayesian methods) in order to answer research questions of varying nature. To summarize the main findings, Articles I and II indicated that coaches who provide a constructive style of coaching to their athletes are likely to experience improved psychological well-being because their basic needs are satisfied. In contrast, Article II indicated that coaches who provide a non-constructive style of coaching to their athletes are likely to experience impaired psychological well-being because their basic needs are thwarted. Article III used a sequential mixed-methods design. The results revealed no

differences in self-reported empowering and disempowering coach behaviors from pre- to post-season among coaches who participated in the intervention group of the Norwegian arm of the PAPA project (Duda et al., 2013). Yet, semi-structured interviews with a subsample of coaches indicated that participation in the Norwegian ECTP had been a worthwhile educational experience. Because of the shortage of validated questionnaires assessing coaches' perceptions of their own behaviors (Horn, 2008), and due to the fact that the Norwegian coach version of the EDMCQ-C needed to be validated in order to investigate intervention effects, Article IV used Bayesian methods to validate the Norwegian coach version of the EDMCQ-C. The results revealed that the original pool of items had to be reduced in order to obtain an adequate data-model fit. Additionally, findings indicated that a reduced two-factor model represented the theoretical concepts of the coach-created empowering and disempowering motivational climates in a better manner, than the previously proposed hierarchical structure of the coach-created motivational climate as perceived by the athletes (Appleton et al., 2016; Article IV). Lastly, building upon the reduced two-factor model above, Article V revealed that the Norwegian arm of the ECTP had no effect on coaches' self-reported empowering and disempowering behaviors from pre- to post-season.

Taken together, findings in this doctoral thesis suggest that sport coaching at the youth level has a dual role; to contribute to both athletes' and coaches' psychological health and foster effective performance in the sport context. Moreover, coach education may be a demanding task for coaches. Indeed, it may be that previous psychosocial training interventions have not quite recognized the full range of challenges related to the implementation of a constructive style of coaching in the youth sport setting. Future research should therefore include more follow-up workshops in order to ensure an even more deepened understanding of the content embedded in CDPs among the coaches. Finally, it is important to include more follow-up

assessments on coach and athlete outcomes in future research, thereby contributing to the reporting on maintenance of psychosocial training interventions (Evans et al., 2015).

Perspectives

Within the realm of the PAPA project (Duda et al., 2013), several studies are currently planned and some are under way, making use of both coach and athlete data across the arms and within the respective arms of the project. Using a variety of analytical approaches, some of these studies will focus on intervention effects on various outcomes, including different perceptions of empowering and disempowering coach behaviors. Hence, it is currently unknown to what extent any of these studies, relevant for comparison, will add support to, or deviate from, the findings presented in this doctoral thesis. Irrespective of this, there are several interesting directions for future research based on the current doctoral thesis. The following outlines four recommendations for future research. First, future studies should include multiple perspectives of the coach-created motivational climate, thereby investigating the network of reciprocal causal relations existing within coach-athlete relationships (Smith & Smoll, 2007). While recent studies have begun to include athletes', coaches', and observers' perceptions of the coach-created motivational climate, and examined interrelationships between these different features of the coach-created motivational climate and athlete outcomes (e.g., Smith et al., 2016), no studies have looked at coach outcomes. Without acknowledging coaches' realities and the specific relations of interaction in which they are involved, future research is likely to present conclusions, which, to a much lesser extent, recognize that physical and psychological functioning among coaches have a correspondingly significance for their athletes' psychological health and effective performance in youth sport contexts (Deci & Ryan, 2012).

Second, future studies should use multilevel modeling techniques (e.g., multilevel structural equation modeling) to model both individual and group processes, which are embedded in hierarchical data structures (Heck & Thomas, 2015; Little, 2013). This is because research on sports teams presents researchers with several opportunities to study different phenomena in hierarchical settings. Specifically, athletes (level 1) participate in specific teams (level 2), which in turn, may be found within a youth sports club (level 3). Because athletes and coaches within different teams interact with each other in a variety of ways, the choice of analytic method needs to consider the shared properties. Moreover, it is important to recognize that both the choice of different research designs and longitudinal data collection represent situations in which a multilevel modeling technique is required. If researchers fail to recognize the importance of such data structures, then their choice of analytic method may “lead to false inferences about the relations among variables in a model” (Heck & Thomas, 2015, p. 2).

In line with this, more longitudinal research is needed to test process-based theories in the fields of sports coaching and sport psychology (e.g., Little, 2013; McArdle & Nesselroade, 2014; Stenling et al., 2017). Recently, Stenling and colleagues (2017) revealed that researchers in sport and exercise psychology have mostly investigated between-person/group differences, ignoring the within-person change. However, to increase the understanding of how, why, and when human behavior changes, researchers need to adopt longitudinal research designs, thereby analyzing psychological and social processes of variability. This, in turn, includes an increased focus among researchers on examining varying treatment effects in cluster randomized intervention studies (see Gelman, 2015 for details). In essence, researchers are encouraged to move “beyond the worldview in which effects are constant and unvarying in their essentials” (Gelman, 2015, p. 633).

Finally, it is important to note that the amount of missing data is related to the ethical quality of research studies (Enders & Gottschall, 2011). Simply put, instead of focusing on the

amount of missing data, researchers should consider whether the underlying assumptions are satisfied (i.e., the missing data mechanism; Enders & Gottschall, 2011). This is because some missing data designs may produce a large amount of missing data, yet producing unbiased parameter estimates (Enders & Gottschall, 2011). For example, future studies are encouraged to incorporate intentional missing data into their data collection designs (Enders & Gottschall, 2011). Enders and Gottschall (2011) argued:

“These so-called planning missingness designs can bolster the ethical quality of a study by reducing costs and respondent burden. Given their potential benefits, planned missing data designs may be an ethical imperative, particularly for high-cost studies.”

(p. 378)

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Article I

Solstad, B. E., Van Hove, A., & Ommundsen, Y. (2015). Social-Contextual and Intrapersonal Antecedents of Coaches' Basic Need Satisfaction: The Intervening Variable Effect of Providing Autonomy-Supportive Coaching. *Psychology of Sport and Exercise*, 20, 84-93. doi:10.1016/j.psychsport.2015.05.001. **Reprinted with permission from Elsevier.**

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Social-contextual and intrapersonal antecedents of coaches' basic need satisfaction: The intervening variable effect of providing autonomy-supportive coaching



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ABSTRACT

Objectives: Based on Self-Determination Theory (SDT; Deci & Ryan, 2012) and in line with Mageau and Vallerand's (2003) motivational model of the coach-athlete relationship, a new model involving antecedents associated with coaches' self-report measure of total need satisfaction (TNS) was tested. This model hypothesized that: (1) coaches' perceptions of a socially united group of athletes and their self-determined motivation for coaching would relate positively to coaches' provision of autonomy-supportive coaching (ASC), whereas perception of parental pressure in the youth sport context would relate negatively to coaches' provision of ASC; (2) coaches' provision of ASC towards their athletes would, in turn, relate positively to their self-report measure of TNS; and (3) the relation between coaches' perceptions of the sport context, along with their self-determined motivation for coaching, and coaches' self-report measure of TNS would be mediated by coaches' own provision of ASC.

Design: A cross-sectional study.

Methods: Participants were 222 ($M_{age} = 42.3$, $SD = 6.1$) youth soccer coaches.

Results: SEM analyses supported the hypothesized model in which coaches' perceptions of a socially united group of athletes and their self-determined motivation for coaching related positively to coaches' self-report measure of TNS through coaches' provision of ASC. In contrast, coaches' perceptions of parental pressure in the youth sport context was unrelated to coaches' self-report measure of TNS via coaches' provision of ASC.

Conclusions: Findings support previous research by demonstrating the psychological benefit of providing autonomy support to others.

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From the perspective of Self-Determination Theory (SDT; Deci & Ryan, 2008, 2012), coaches' autonomy-supportive coaching (ASC) involves coaches relating to their athletes in such a manner that they provide choices in line with specific rules and limits, display patience in relation to their learning process, acknowledge their perspectives, give them a rationale for the various tasks and limits, and provide them with opportunities to solve their technical problems independently. It is especially noteworthy that both receiving and providing of autonomy support have been associated with a number of psychological benefits (e.g., Deci, La Guardia,

Moller, Scheiner, & Ryan, 2006; Jøesaar, Hein, & Hagger, 2012). For example, provision of autonomy support has been found to be positively associated with better relational functioning (Patrick, Knee Canevello, & Lonsbary, 2007), greater job satisfaction (Cheon, Reeve, Yu, & Jang, 2014), and basic psychological need satisfaction (Deci et al., 2006). The sport psychology literature is replete with models testing athletes' perceptions of coaches' autonomy-supportive behaviors (e.g., Balaguer et al., 2012; Jøesaar et al., 2012) as well as models testing antecedents of coaches' self-reported use of an ASC style in the sport context (e.g., Stebbings, Taylor, Spray, & Ntoumanis, 2012). Hence, it would seem useful to propose an additional model testing the potential intervening variable effect of providing ASC to athletes in the sport context. In fact, little is known, from the coach's perspective, about the benefits of providing ASC within the coach-athlete relationship.

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The benefits of providing autonomy support to others

SDT stipulates that three basic psychological needs (i.e., autonomy, competence, and relatedness) have to be satisfied to experience psychological growth, integrity, and well-being. Specifically, the need for autonomy refers to behavior that is regulated and endorsed by the self; that is, the individual experiences a sense of volition, freedom, and choice with regard to his/her actions (Ryan & Deci, 2006). The need for competence refers to the feeling of mastery that occurs when individuals perceive their interaction with their environment in a competent and effective manner (Deci & Ryan, 1985). The need for relatedness concerns an individual's desire to be in a secure communion with others, feeling an emotional and personal bond to other individuals and integration within a social context. Also, relatedness refers to mutual actions, which from the perspective of an individual can be viewed as both the receiving and the providing of love, care, and support (Ryan, 1991). Indeed, SDT proposes that just as receiving autonomy support in the social environment is a necessary condition for need satisfaction to the receiver, providing autonomy support to others would be an equally important condition for need satisfaction to the provider (for a discussion, see Deci et al., 2006). More specifically, Deci et al. (2006) used a dyadic design to examine the effect of providing and receiving autonomy support in close relationships. Findings indicated that receiving and providing autonomy support were both significant predictors of need satisfaction. After controlling for the amount of autonomy support received, results showed that provision of autonomy support was a significant contributor to the individual's self-report measure of relationship quality. The amount of autonomy support provided to the friend also explained significant variance in the general well-being composite.

In another study, Patrick et al. (2007) looked at the extent to which individuals in romantic relationships provided need support for each other. Essentially, findings indicated that the more each romantic partner was aware of the other's basic psychological needs by providing support for the need for autonomy, competence, and, in particular, relatedness to the other, the better relational functioning and well-being were reported by both partners. In addition, Cheon et al. (2014) found that physical education (PE) teachers who provided autonomy-supportive teaching (AST) behaviors to their students over the course of a semester reported greater teaching motivation, teaching skill, and teaching well-being. To summarize, previous studies in the areas of both close relationships and PE have indicated that by providing autonomy support to others, one also contributes to one's self-report measures of relationship quality/functioning, need satisfaction, and well-being.

Notably, while the term "close relationship" often refers to relationships between relative equals (i.e., friends, family members, and romantic partners) (see La Guardia & Patrick, 2008), relationships between a coach and his/her athletes are, in part, defined by the hierarchy that exists between the members of these dyads; that is, the coach is in a superior position in regards to the athlete (Deci & Ryan, 2012). Consequently, the dyadic coach-athlete relationship naturally functions in different ways than what might exist within close relationships. We argue, however, that sport psychology investigators should consider the possibility that coaches' behaviors in the form of autonomy-supportive behaviors may be positively related to their own self-report measure of total need satisfaction (TNS). Consider an example from the coaching context where a coach is providing his/her athletes with ASC. A simple act where the coach is taking their perspectives, encouraging them to initiate certain behaviors, supporting their choices, and being responsive to their thoughts and questions enables the coach to satisfy his/her

needs for autonomy, competence, and relatedness. First, this example highlights that the coach is freely and volitionally engaging in these behaviors (i.e., autonomy). Second, the coach is in a position where he/she is likely to help athletes develop their athletic abilities (i.e., competence). Finally, repeated events where coaches are responsive to athletes' initiatives have a chance to create positive social interaction patterns, and thereby develop a sense of connectedness between the coach and his/her athletes (i.e., relatedness).

Linking coaches' perceptions of the youth sport context and self-determined motivation for coaching to coaches' provision of ASC

As an influential authority figure in the context of youth sport (e.g., Smoll, Cumming, & Smith, 2011), the coach is involved in a number of social interactions (e.g., athletes, parents, other coaches, league administrators, officials) during an ordinary week on the training ground. It was, therefore, important to examine the significance of social-contextual factors on coaches' own provision of ASC in the youth sport context. In a recent study, Stebbings et al. (2012) examined contextual precursors of coaches' self-reported use of ASC. Findings showed that coaches were more likely to report an ASC style when the environment in which they operated in was characterized by opportunities for professional development, along with the feeling of being satisfied with their job security. In contrast, perception of pressure to perform (Iachini, 2013), work-life conflict (Stebbing et al., 2012), and administrative pressure (Rocchi, Pelletier, & Couture, 2013) have all been found to be negatively related to coaches' self-reported use of ASC in the sport context. In this study, however, we examined the association between perceived parental pressure, as perceived by the coach, and coaches' provision of ASC towards their athletes. Previous research has shown that coaches may feel increased hassle when parents: (1) encourage a "winning is everything" philosophy; (2) contradict the coach's instructions; and (3) use controlling verbal reactions and contingencies (Mageau & Vallerand, 2003; Smoll et al., 2011; Streat, 1995). Stated differently, coaches' behaviors will be more controlling and less autonomy-supportive when coaches are exposed to parents who use coercive pressures and demands towards them (Deci & Ryan, 2012).

We also assumed that coaches who perceive their team as a social unity in which athletes: (1) have a lot in common; (2) are trusting, understanding, and counting on each other; and (3) are cooperating and open with each other, would be more able to provide ASC to their athletes, and by doing so, satisfy their own basic psychological needs in the role as youth sport coaches. Considering the reciprocal process in the coach-athlete relationship, coaches' perceptions of the extent to which athletes are socially united seem especially important when studying coaches' own provision of ASC in the sport context. Past research has pointed out that athletes' behaviors have a significant influence on coaches' behaviors (Mageau & Vallerand, 2003). Furthermore, although the impact of social unity among athletes on coaches' ASC has not yet been tested specifically in the sport context, it should be expected that coaches will be more likely to adopt an ASC style when athletes' patterns of interaction can be characterized by trust, understanding, and openness. Conversely, coaches who perceive their team to be characterized by hostility, disagreement, and mistrust would be expected to exert more controlling coaching behaviors in the sport context (for a discussion, see Mageau & Vallerand, 2003). Additionally, from the perspective of SDT, coaches' perceptions of a socially united group of athletes would be positively related to coaches' provision of ASC and their subsequent TNS. Specifically, well-functioning peer relationships within a sport team would

allow coaches to feel self-determined with respect to their own coaching behaviors, competent in developing good relations between the athletes as well as feeling more socially tied to their athletes.

From an applied perspective, ASC can be viewed as a demanding coaching style because the coach needs to: (1) provide structure (i.e., monitor and set clear rules and limits) in order to be able to allow athletes to make a number of choices about their sporting activity; (2) consider whether the athletes have the necessary competence to adequately make a decision within the provided structure; (3) understand why the specific structure is provided in order to give athletes a reason for requested tasks and rules; (4) demonstrate genuine involvement in athletes' athletic development, well-being, and performance; (5) provide positive verbal feedback that focus on the informational aspect of athletes' level of competence without using controlling statements; (6) acknowledge all the athletes' feelings and perspectives, which, in turn, requires high levels of interpersonal understanding; (7) be confident that the athletic environment is adequately structured in terms of providing athletes with opportunities for initiative taking; (8) avoid the general use of controlling statements; and (9) avoid the prevalence of ego-involvement in athletes (Deci & Ryan, 2008; Mageau & Vallerand, 2003). As such, coaches may find that the task of providing ASC in the sport context is more difficult if "athletes cannot be trusted to behave appropriately" (Mageau & Vallerand, 2003, p. 897). Thus, the main argument to be tested in the current study was whether coaches' perceptions of their athletes as a socially united group would be positively related to their TNS as coaches through the coaches' own provision of ASC in the youth sport context.

With respect to coaches' behaviors, SDT refers to various classifications of motivated behavior (Ryan & Deci, 2002). Each of these states of doing an activity, however, represents varying degrees of autonomy. More specifically, SDT maintains that the integrative tendency of autonomy, in terms of the degree to which behaviors are coherent or not with the integrated sense of self, is decisive for whether coaches' behaviors will be classified as more or less self-determined (Deci & Ryan, 2002). As a consequence, motivation is differentiated along the self-determination continuum within SDT (Ryan, 1995). This continuum refers to an individual's experience of autonomy and is anchored by non-self-determined and self-determined motivation (Ryan & Deci, 2002). Self-determined motivation refers to intentional behavior that is congruent with an individual's sense of self, meaning that the individual is behaving based on his/her own values or goals. As such, the individual is experiencing greater ownership to his/her behaviors (Deci & Ryan, 2000). In a recent study, Rocchi et al. (2013) examined various determinants of coaches' self-determined motivation and their self-reported use of ASC. Findings indicated that coaches' self-determined motivation for coaching was an intervening variable in the negative relationship between their perceptions of pressure from the coaching context and their self-reported use of ASC in the sport context. Thus, coaches who reported that they were coaching based on more self-determined reasons were expected to provide more ASC to their athletes than those coaches who reported that they were coaching based on less self-determined reasons.

The present study

The aim of the current study was to use structural equation modeling (SEM; Kline, 2011) to test a new intervening variable model. Specifically, we examined the effect of coaches' perceptions of the youth sport context and their self-determined motivation for coaching on coaches' self-report measure of TNS through their own provision of ASC towards their athletes.

Method

Participants and procedure

The sample consisted of 222 youth soccer coaches (males $n = 202$, females $n = 20$) taking part in the time 1 data collection of the Norwegian arm of the Promoting Adolescent Physical Activity project (the PAPA project; Duda, 2013). More specifically, the PAPA project, a collaboration between five European countries (i.e., Norway, England, Spain, France, and Greece), involved the development of a coach education program and, hence, a commitment to enhancing young peoples' health and well-being via positive experiences in youth soccer. The sample comprised of Norwegian coaches ($n = 214$) and a few other nationalities ($n = 8$). Also, the coaches' age ranged from 16 to 60 years ($M = 42.3$; $SD = 6.1$), and coaches were either coaching 7-a-side ($n = 137$) or 11-a-side teams ($n = 66$). Some coaches were also coaching both ($n = 19$). While several coaches were head coaches on their team ($n = 94$), a majority of the coaches had a coaching certification ($n = 134$) and former playing experience ($n = 204$).

Prior to the recruitment of the coaches, the project was approved by the Norwegian Data Protection Authority (NDPA). The research group invited coaches of youth soccer teams to participate in the project. In agreement with the coach, data collection was arranged at the beginning, or end of the training session. Coaches were informed about their voluntary participation and withdrawal opportunities at any time during the project.

Measures

Parental pressure

Due to the lack of existing measures assessing the relevant external pressure factors within the youth sport context, a 9-item scale was compiled by the Norwegian arm of the PAPA project. The three items used in this study which reflected parental pressure in the sport context, (i.e., parents are (a) interfering with your decisions as coach, (b) insisting that you should increase the focus on sport performance, and (c) concerned with the issue that the best athletes should get the most playing time), were rated by coaches on a 7-point scale, ranging from 1 (never problematic) to 7 (often problematic). Note, however, that this study used latent variable modeling to evaluate scale reliability (see Raykov, 2009). The reliability coefficient of the scale was .80 (95% CI = .75 to .86), with a standard error of .03, and the factor score was higher than the recommended value of .80 (i.e., factor score = .92; see Brown, 2006, p. 36).

Social unity among athletes

The Norwegian arm of the PAPA project was interested to learn more about how coaches perceived the social unity among their athletes, thus a new 6-item scale was compiled following a review of the sport and social psychology literature (e.g., Cameron, 2004; Carron & Brawley, 2008; Fiske, 2004; Paskevich, Estabrooks, Brawley, & Carron, 2001). Coaches then completed a questionnaire that assessed their perceptions of social unity on their team (e.g., athletes are socially united). Each item was responded to on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). In addition, the reliability coefficient of the scale was .79 (95% CI = .73 to .85), with a standard error of .03, and the factor score was higher than .80 (i.e., factor score = .90).

Coaches' self-determined motivation

Coaches completed a Norwegian version of the Coach Motivation Questionnaire (CMQ; McLean, Mallett, & Newcombe, 2012) to assess their self-determined motivation for coaching youth soccer.

This is a 23-item self-report questionnaire designed to assess six forms of motivational regulation: intrinsic motivation (5 items, reliability coefficient = .78; 95% CI = .70 to .86; standard error = .04; e.g., because I find it stimulating), integrated regulation (3 items, reliability coefficient = .67; 95% CI = .59 to .76; standard error = .04; e.g., because coaching is fundamental to who I am), identified regulation (3 items, reliability coefficient = .75; 95% CI = .67 to .83; standard error = .04; e.g., because it contributes to my development as a person), introjected regulation (4 items, reliability coefficient = .51; 95% CI = .41 to .64; standard error = .06; e.g., because I don't want to let my athletes down), external regulation (4 items, reliability coefficient = .82; 95% CI = .77 to .86; standard error = .02; e.g., to be respected by others), and amotivation (4 items, reliability coefficient = .75; 95% CI = .69 to .81; standard error = .03; e.g., I often think my coaching efforts are a waste of time). The items were adapted to the youth soccer context, asking coaches to indicate their reasons for coaching athletes on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Furthermore, a self-determination index (SDI; Blanchard, Amiot, Perreault, Vallerand, & Provencher, 2009) was modeled by using the DEFINE command in Mplus. Specifically, the SDI is a latent construct, which, in this study, had three indicators. In short, this latent construct incorporates information from the six aforementioned motivational subscales, and thus represents one score of self-determined motivation. Each SDI index is, however, computed by using the individual items from the six motivational subscales. Moreover, the individual items are weighted differently based on their respective placement on the self-determination continuum (Blanchard et al., 2009). In line with previous research, we used the following formula to compute each of the three SDI indicators: [(intrinsic motivation \times 3) + (integrated motivation \times 2) + (identified motivation \times 1)] – [(introjected motivation \times 1) + (external motivation \times 2) + (amotivation \times 3)]. The mean factor loading for the three SDI indicators was .82, which explained 67% of the variance.

Provision of autonomy support towards athletes

Coaches completed an adapted Norwegian version of the Health Care Climate Questionnaire (HCCQ; Williams, Grow, Freedman, Ryan, & Deci, 1996). More specifically, five items (reliability coefficient = .61; 95% CI = .52 to .71; standard error = .05; e.g., athletes are given choices and options) from the HCCQ were used to tap the degree to which coaches perceived themselves to provide ASC to their athletes. Additionally, the four remaining items used in this study which reflected provision of ASC were: (a) it is important that athletes experience a sense of self-determination with regard to their own participation in soccer, (b) the coach answers athletes' questions thoroughly and properly, (c) the coach provides athletes with a rationale for the various tasks that he/she propose, and (d) the coach emphasizes that athletes should play soccer because they enjoy it. Coaches gave their responses on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Basic psychological need satisfaction

Coaches completed an adapted and extended Norwegian version of the Basic Satisfaction at Work Scale (BNSAW; Deci et al., 2001) to assess their basic need satisfaction in coaching: need for autonomy (6 items, reliability coefficient = .66; 95% CI = .58 to .75; standard error = .05; e.g., decide how to coach), need for competence (6 items, reliability coefficient = .67; 95% CI = .58 to .75; standard error = .04; e.g., people say I am a good coach), need for relatedness with athletes (8 items, reliability coefficient = .71; 95% CI = .65 to .79; standard error = .04; e.g., get along with athletes), and need for relatedness with people in the football club (9 items,

reliability coefficient = .75; 95% CI = .70 to .82; standard error = .03; e.g., get along with club). The scale consisted of 29 items that asked coaches to indicate their level of need satisfaction on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Due to the focus of the present study, however, we chose to use only one of the relatedness subscales (i.e., need for relatedness with athletes).

Model fit evaluation

In terms of evaluating the fit of a SEM model (see Fig. 1), previous research has to a great extent relied on thresholds for Goodness-of-fit (GOF) indices (Byrne, 2012; Kline, 2011). These fit indices are the chi-square test, the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), the standardized root-mean-square residual (SRMR), and the root-mean-square error of approximation (RMSEA) combined with its 90% CI (Byrne, 2012; Kline, 2011). More specifically, the thresholds values have usually been CFI/TLI \geq .95, RMSEA \leq .06, and SRMR \leq .08 (Byrne, 2012). It is worth noting, however, that researchers should show caution when using these GOF indices as golden rules of fit (Kline, 2011). With respect to this discussion, Kline (2011) has encouraged researchers to use five steps when evaluating the overall model fit. The first step is to always report the chi-square statistics. The second step is to describe the pattern of residuals. The third step is to have a look at the values of approximate fit indexes. The fourth step is to explain why the initial model was re-specified. Finally, the fifth step involves explaining why the initial model was not retained.

Parceling

The model tested in this study (see Fig. 1) contained three exogenous variables (i.e., perception of parental pressure, perception of social unity among athletes, and coaches' self-determined motivation for coaching), one intervening variable (i.e., coaches' provision of ASC), and one endogenous variable (i.e., coaches' self-report measure of TNS). Based on the relatively small sample size, the high number of items per latent variable, and the unidimensional nature of the latent variables (for a discussion, see Little, Rhemtulla, Gibson, & Schoemann, 2013), we decided to use item parcels as manifest indicators of the latent constructs. Importantly, the balancing approach was used to create the item parcels (Little et al., 2013, p. 296). By using the three items of the parental pressure scale as indicators of the latent construct representing coaches' perceptions of parental pressure in the youth sport context, either three or four indicators were assigned to each of the latent variables which is the current requirement in the SEM literature (Brown, 2006; Little et al., 2013).

Results

Preliminary analyses

The preliminary screening focused on the issue of missing data. Specifically, Little's MCAR test ($p = .756$) showed that the missing data was completely random (from .00 to 1.80%). In terms of the multivariate normal distribution, results revealed that the univariate skewness (ranging from -1.49 – 1.46) and kurtosis (ranging from -1.22 – 3.74) values did not exceed the expected values found in a normal distribution (Byrne, 2012). It is important to keep in mind, however, that "the presence of kurtotic variables may be sufficient enough to render the distribution as multivariate non-normal" (Byrne, 2012, p. 100). Therefore, we applied the Full

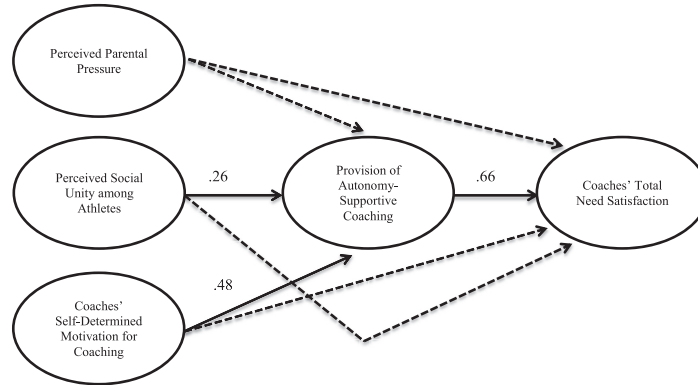


Fig. 1. Structural model of the different types of social-contextual and intrapersonal variables that are affecting coaches' total need satisfaction. Note. The model is based on the bias-corrected bootstrap methods. Also, all regression path coefficients are standardized and non-significant pathways ($p > .05$) are denoted by dotted arrows. For presentation simplicity, indicators and residual covariances are omitted.

Information Maximum Likelihood estimation (FIML) for non-normal conditions. Also, Table 1 includes the factor scores and the correlation matrix for the latent variables.

Confirmatory factor analyses determining the factor structure of the scales

As noted earlier, three indicators were used to specify the three exogenous variables (i.e., perception of parental pressure, perception of social unity among athletes, and coaches' self-determined motivation for coaching), thereby meeting the requirement of a minimum of three indicators for one-factor models (Brown, 2006). It is important to note that this type of solution is just-identified, thus, the goodness-of-fit evaluation does not apply (Brown, 2006). Researchers can, however, still evaluate this type of model in terms of its interpretability and strength of parameter estimates. Hence, the standardized parameter estimates ranged from .64 to .86 for the three latent constructs, thereby, explaining 41%–74% of the variance. Moreover, the latent construct that represented coaches' provision of ASC demonstrated a very good fit to the data: $\chi^2(2) = 2.614$, $p > .05$, SRMR = .02, RMSEA = .04, (90% CI RMSEA = .00–.14), Probability RMSEA $\leq .05 = .45$, CFI = .99, TLI = .97. We also specified a second-order latent construct representing coaches' self-report measure of TNS. The CFA of this latent construct showed an acceptable fit to the data: $\chi^2(32) = 56.853$, $p < .01$, SRMR = .05, RMSEA = .06, (90% CI RMSEA = .03 to .08), Probability RMSEA $\leq .05 = .26$, CFI = .94, TLI = .91.

The structural model

In order to test the hypothesized structural model, a total of 7 paths were specified. Three paths between the three exogenous variables and coaches' provision of ASC, three paths between the three exogenous variables and coaches' self-report measure of TNS, and one path between coaches' provision of ASC and their self-report measure of TNS. According to Kline's (2011) steps of evaluation, first, the chi-square (χ^2) statistic was statistically significant in the structural model ($\chi^2_M = 281.217$, $df_M = 217$, $p < .01$), suggesting that the hypothesized model was inconsistent with the covariance data (Kline, 2011). However, Brown (2006, p. 81) has argued that one important criticism of the χ^2 statistic concerns its underlying distribution. Specifically, the χ^2 statistic is in some instances (e.g., small N , non-normal data) not normally distributed. As a result, the statistical significance of the model χ^2 statistic can be questioned. Second, only 16 out of 277 correlation residuals had a value greater than .10 (ranging from .10 to .51), meaning there was no potential threat to the model's corresponding sample correlation (Kline, 2011). Third, the results revealed that the hypothesized structural model yielded an acceptable fit to the data: $\chi^2(217) = 281.217$, $p < .01$, SRMR = .05, RMSEA = .04, (90% CI RMSEA = .02 to .05), Probability RMSEA $\leq .05 = .97$, CFI = .95, TLI = .94. Also, the structural model was not re-specified using modification indices.

Furthermore, the pathway (i.e., the 95% CI) between coaches' self-report measure of perceived parental pressure and coaches' self-report measure of ASC was statistically non-significant

Table 1
Estimated correlation matrix for the latent variables.

Variable	<i>M</i>	<i>SD</i>	α	Factor score	1	2	3	4	5	6	7	8
1. Perceived parental pressure	2.42	1.17	.80	.92	–							
2. Perceived social team unity	3.95	.44	.79	.90	.04	–						
3. Self-determined motivation	8.92	4.67	–	.93	–.09	.22**	–					
4. Provision of autonomy support	4.22	.38	.61	.86	–.14	.36***	.55***	–				
5. Competence	3.75	.46	.66	.87	–.14*	.34***	.40***	.60***	–			
6. Autonomy	4.14	.46	.66	.88	–.13	.31***	.37***	.55***	.49***	–		
7. Relatedness	4.08	.39	.72	.89	–.18*	.43***	.50***	.75***	.67***	.61***	–	
8. Total need satisfaction	3.99	.34	–	.89	–.19*	.47***	.55***	.82***	.73***	.67***	.91***	–

Note. * $p < .05$; ** $p < .01$; *** $p < .001$; Factor scores $>.80$; The means of latent variables are zero in cross-sectional studies. Therefore, we used SPSS statistics 21 to calculate means and standard deviations.

($-.33$ to $.11$, with a point estimate of $-.11$), as was the pathway between coaches' self-report measure of perceived parental pressure and coaches' self-report measure of TNS ($-.25$ to $.06$, with a point estimate of $-.10$). In contrast, the pathway between coaches' self-report measure of perceived social unity and coaches' self-report measure of ASC was statistically significant ($.08$ – $.45$, with a point estimate of $.26$), and the pathway between coaches' self-report measure of perceived social unity and coaches' self-report measure of TNS was statistically significant ($.01$ – $.39$, with a point estimate of $.20$). Moreover, the pathway between coaches' self-report measure of self-determined motivation for coaching and their self-report measure of ASC was statistically significant ($.27$ – $.69$, with a point estimate of $.48$). However, the pathway between coaches' self-report measure of self-determined motivation for coaching and their self-report measure of TNS was statistically non-significant ($-.07$ to $.34$, with a point estimate of $.14$). Finally, the pathway between coaches' self-report measure of ASC and their self-report measure of TNS was statistically significant ($.41$ – $.91$, with a point estimate of $.66$).

Testing the indirect effect of providing autonomy support

In line with current trends in the statistical literature (e.g., Hayes & Scharkow, 2013; MacKinnon, Kisbu-Sakarya, & Gottschall, 2013), we decided to use the bias-corrected bootstrap confidence interval (CI) to make inferences about standardized indirect effects in this study. Hayes and Scharkow (2013) argued that the bias-corrected bootstrap CI is the most trustworthy test if researchers are concerned with the power of the statistical test. Specifically, bootstrapping is a statistical method that is recommended when researchers are dealing with small-to-moderate sample sizes. Additionally, the bootstrap test is powerful because of its ability to detect the indirect effect in sample distributions that are skewed away from zero (Shrout & Bolger, 2002).

Furthermore, the modern approach when testing the intervening variable effect, is to quantify the indirect effect rather than inferring the existence of this effect based on a set of tests (for a discussion, see Hayes, 2009). Notably, previous research has taken for granted that "... X and Y must be associated in order for M to be a mediator" (Hayes, 2009, p. 413). However, Hayes (2009) pointed out that "... X can exert an indirect effect on Y through M in the absence of an association between X and Y becomes explicable once you consider that a total effect is the sum of many different paths of influence, direct and indirect, not all of which may be a part of the formal model" (p. 414).

In the present study, the structural regression model using 95% bias-corrected bootstrap CI derived from 10,000 resamples demonstrated an acceptable fit to the data: $\chi^2(217) = 296.376$, $p < .001$, SRMR = $.05$, RMSEA = $.04$, (90% CI RMSEA = $.03$ to $.05$), Probability RMSEA $\leq .05 = .92$, CFI = $.95$, TLI = $.94$. More specifically, the indirect effect of perceived social unity on coaches' self-report measure of TNS through coaches' own provision of ASC was not zero by a 95% bias-corrected bootstrap CI ($.01$ – $.34$, with a point estimate of $.17$). The indirect effect of coaches' self-determined motivation for coaching on coaches' self-report measure of TNS through coaches' own provision of ASC was also not zero by a 95% bias-corrected bootstrap CI ($.07$ – $.57$, with a point estimate of $.32$). In contrast, the indirect effect of perceived parental pressure on coaches' self-report measure of TNS through coaches' own provision of ASC was zero by a 95% bias-corrected bootstrap CI ($-.24$ to $.10$, with a point estimate of $-.07$). Note, however, that all the direct paths were statistically non-significant (see Table 2).

The phenomenon of equivalent models in SEM

Based on the cross-sectional nature of our data and the susceptibility of confirmation bias (MacCallum & Austin, 2000), we tested alternative versions to the original model (i.e., models with different substantive implications). We became aware, however, that our two alternative models had equal values of fit statistics as the original model. This phenomenon is typically known as equivalent models (for a discussion, see MacCallum, Wegener, Uchino, & Fabrigar, 1993). More specifically, Kline (2011) argued that "... equivalent models yield the same predicted correlations or covariances but with a different configuration of paths among the same observed variables" (p. 225). Therefore, it is worth noting that researchers have been urged to "generate and evaluate the substantive meaningfulness of equivalent models in empirical studies" (MacCallum & Austin, 2000, p. 213).

So, the first alternative model that we tested was based on an assumption, which was made by R. M. Ryan (personal communication, February 2, 2014). This model involved the following four sequences: social-contextual factors \rightarrow coaches' self-determined motivation for coaching \rightarrow coaches' own provision of ASC \rightarrow coaches' self-report measure of TNS. As noted earlier, this model yielded the same fit to the data as the original model: $\chi^2(217) = 296.376$, $p < .001$, SRMR = $.05$, RMSEA = $.04$, (90% CI RMSEA = $.03$ to $.05$), Probability RMSEA $\leq .05 = .92$, CFI = $.95$, TLI = $.94$. In this model, the indirect effect of perceived social unity on coaches' self-report measure of TNS through coaches' self-report measures of self-determined motivation for coaching and ASC was zero by a 95% bias-corrected bootstrap CI ($-.003$ to $.15$, with a point estimate of $.07$). However, the indirect effect of perceived social unity on coaches' self-report measure of TNS through coaches' own provision of ASC was not zero by a 95% bias-corrected bootstrap CI ($.01$ – $.34$, with a point estimate of $.17$). Additionally, the indirect effect of perceived parental pressure on coaches' self-report measure of TNS through coaches' self-report measures of self-determined motivation for coaching and ASC was zero by a 95% bias-corrected bootstrap CI ($-.01$ to $.03$, with a point estimate of $-.03$). In all the other paths, zero was included in the 95% bias-corrected bootstrap CI.

The second alternative model was based on theoretical models displayed in previous SDT-based research in the sport psychology literature (e.g., Rocchi et al., 2013; Stebbings et al., 2012). Therefore, this model involved the following four sequences: social-contextual factors \rightarrow coaches' self-report measure of TNS \rightarrow coaches' self-determined motivation for coaching \rightarrow coaches' own provision of ASC. This model also yielded the same fit to the data as the original model: $\chi^2(217) = 296.376$, $p < .001$, SRMR = $.05$, RMSEA = $.04$, (90% CI RMSEA = $.03$ to $.05$), Probability RMSEA $\leq .05 = .92$, CFI = $.95$, TLI = $.94$. In this model, the indirect effect of perceived social unity on coaches' own provision of ASC through coaches' self-report measures of TNS and self-determined motivation for coaching was zero by a 95% bias-corrected bootstrap CI ($-.04$ to $.14$, with a point estimate of $.04$). However, the indirect effect of perceived social unity on coaches' own provision of ASC through coaches' self-report measure of TNS was not zero by a 95% bias-corrected bootstrap CI ($.13$ – $.60$, with a point estimate of $.37$). Furthermore, the indirect effect of perceived parental pressure on coaches' own provision of ASC through coaches' self-report measures of TNS and self-determined motivation for coaching was zero by a 95% bias-corrected bootstrap CI ($-.02$ to $.003$, with a point estimate of $-.02$). However, the indirect effect of perceived parental pressure on coaches' own provision of ASC through coaches' self-report measure of TNS was only marginally statistically non-significant ($-.33$ to $.002$, with a point estimate of $-.16$). In all the other paths, zero was included in the 95% bias-corrected bootstrap CI.

Table 2

Standardized total, total indirect, specific indirect, and direct effects.

	Estimate	S.E.	Est./S.E.	Two-tailed p-value
Effects from self-determined motivation for coaching to coaches' self-report measure of TNS				
Total	.46	.09	5.26	.00
Total indirect	.32	.13	2.51	.01
Specific indirect				
Coaches' self-report measure of TNS	.32	.13	2.51	.01
Provision of ASC				
Self-determined motivation for coaching				
Direct				
Coaches' self-report measure of TNS	.14	.13	1.03	.30
Effects from perceived social unity among athletes to coaches' self-report measure of TNS				
Total	.37	.09	4.00	.00
Total indirect	.17	.08	2.10	.04
Specific indirect				
Coaches' self-report measure of TNS	.17	.08	2.10	.04
Provision of ASC				
Perceived social unity among athletes				
Direct				
Coaches' self-report measure of TNS	.20	.11	1.82	.07
Effects from perceived parental pressure to coaches' self-report measure of TNS				
Total	-.17	.09	-1.98	.05
Total indirect	-.07	.09	-.84	.40
Specific indirect				
Coaches' self-report measure of TNS	-.07	.09	-.84	.40
Provision of ASC				
Perceived parental pressure				
Direct				
Coaches' self-report measure of TNS	-.10	.09	-1.10	.27

Note. This table is based on the model indirect command in Mplus (see Geiser, 2013).

Discussion

The purpose of this study was to test a new model of potential antecedents of youth soccer coaches' self-report measure of TNS. Specifically, as there has been very little SDT-based research in sport psychology examining the potential benefits of providing autonomy support to others, our aim was to examine the intervening variable effect of providing ASC to athletes in the youth sport context. Although coaches' perceptions of parental pressure towards coaches was unrelated to coaches' own provision of ASC, the results suggested that coaches' perceptions of social unity among their athletes and their self-determined motivation for coaching were positively associated with coaches' own provision of ASC in the sport context, which, in turn, related positively to coaches' self-report measure of TNS.

Provision of ASC and coaches' self-report measure of TNS

In regards to the intervening variable model, we found that coaches' own provision of ASC to their athletes was positively related to their self-report measure of TNS as coaches. Hence, the results paralleled findings in the area of close relationships research (Deci et al., 2006; Patrick et al., 2007) as well as in the PE setting (Cheon et al., 2014), showing that these also apply to the coach-athlete relationship in the youth sport context. More specifically, this is consistent with Deci and colleagues' (Deci et al., 2006) argument that provision of autonomy support to others will satisfy the provider's basic psychological needs. Coaches who are providing ASC to their athletes will, therefore, be more likely to report TNS within their own coaching roles. This may imply that coaches should gain a more in-depth understanding of the complex set of autonomy-supportive behaviors (Mageau & Vallerand, 2003), and thereby the potential benefits related to both providing and receiving autonomy support in the sport context (Deci et al., 2006). In fact, previous studies (e.g., Côte & Gilbert,

2009) have suggested that coaches should improve their interpersonal knowledge base so that they can continually improve their ability to create and maintain relationships with their athletes.

Linking social-contextual and intrapersonal antecedents to provision of ASC

The results did not support our assumption that the level of parental pressure coaches perceived while being engaged in the youth sport context would be negatively related to their own provision of ASC. This finding is inconsistent with the SDT viewpoint, which emphasizes that individuals will behave in a more controlled way when they experience coercive pressure "to think, feel, or behave in specific ways" (Deci & Ryan, 2012, p. 94). One explanation may be that coaches may have been acting with a sense of congruence in their coaching contexts, meaning that they were fully endorsing the value of providing ASC to their athletes. This argument is supported by Deci and Ryan (2012) who pointed out that to be motivated by self-determined reasons means the individual is fully concurring with the behavior he/she is engaged in. Another possibility, however, is that the parents in this study did not create a sufficiently high level of perceived pressure, which would, ultimately, elicit more controlling coaching behaviors (Mageau & Vallerand, 2003). It should also be kept in mind that all of the coaches in the current study were coaching youth soccer voluntarily. As such, the coaches' engagement, as youth soccer coaches, was less dependent upon athletes' sport performances.

Within this study, the coaches' perceptions of a socially united group of athletes was positively related to their own provision of ASC in the youth sport context. In other words, coaches who perceived that their athletes: (1) had a lot in common; (2) were counting on, trusting, and understanding each other; and (3) were cooperating and open with each other, seemed more apt to provide

ASC. To our knowledge, this finding has not been observed in previous SDT-based research even though athletes' behaviors are known to be an important source of influence to the coach's behavior. Mageau and Vallerand (2003) highlighted that an ASC style represents an attitudinal standpoint where coaches are athlete-centered, meaning that athletes' basic psychological needs are respected and valued by the coach. Of course, it is easier to follow the ASC style when athletes can be trusted to behave properly (Mageau & Vallerand, 2003). Thus, the results indicate that youth sport coaches should consider the influence athletes' degree of social unity may have on their own ability to provide ASC in the sport context.

Also, the current study demonstrated that coaches' self-determined motivation for coaching was positively associated with their tendencies to provide ASC to their athletes. This finding supported previous findings in youth sport as well as the elementary school context (e.g., Rocchi et al., 2013; Roth, Assor, Kanat-Maymon, & Kaplan, 2007). More specifically, Roth et al. (2007) found that teachers' self-determined motivation for teaching was positively associated with their autonomy-supportive behaviors, as was reported by their students. According to Deci and Ryan (2012), self-determined motivation leads individuals to behave in ways that improve both their abilities and well-being, and it is related to behaviors that promote well-being of the collective. Furthermore, self-determined motivation is likely to satisfy individuals' basic psychological needs for autonomy and competence because, by being wholly absorbed in an activity, they are more likely to self-organize their actions and experience mastery (Deci & Ryan, 2012). Thus, we argue that self-determined motivation for coaching youth sport may lead to more provision of ASC in the sport context, which, in turn, may lead to greater need satisfaction among coaches.

The intervening variable effect of providing ASC

The bootstrap method produced both expected and unexpected findings. In line with our expectations, results revealed that the coaches' own provision of ASC operated as an intervening variable in the relationship between the coaches' self-determined motivation for coaching and their self-report measure of TNS, as well as in the relationship between coaches' perceptions of a socially united group of athletes and their self-report measure of TNS. Consequently, these findings have extended previous research by identifying additional explanations for how coaches may satisfy their basic psychological needs while operating in the youth sport context. Recently, Stebbings et al. (2012) found that coaches' self-reporting of their own psychological need satisfaction positively influenced their self-reported use of ASC in the sport context via coaches' self-reporting of psychological well-being. As a result, the intervening variable process in the present study combined with those reported by Stebbings et al. (2012) indicate that there are several variables that are related to coaches' own provision of ASC as well as their self-report measure of TNS as coaches. In terms of the coaches' perceptions of parental pressure in the sport context, the bootstrap method did not support our hypothesis that perceived parental pressure would relate negatively to coaches' self-report measure of TNS via their tendencies of providing ASC. Therefore, future studies would benefit from a more thorough investigation of this indirect process.

A comparison of alternative models

It has been argued that "... it is unrealistic that researchers consider all possible equivalent models. As a compromise, researchers should generate at least a few substantively meaningful

equivalent versions" (Kline, 2011, p. 226). Therefore, the alternative models in this study were generated and evaluated as a response to the fact that alternative models may "... include equally plausible explanations of the data" (MacCallum et al., 1993, p. 185). The generation of alternative models made us, however, aware of the phenomenon of equivalent models; that is, "... models that are indistinguishable from the original model in terms of goodness of fit to the data" (MacCallum et al., 1993, p. 185). As such, we could not resolve the issue of model selection based on measures of fit (MacCallum et al., 1993). However, Kline (2011) has pointed out that "... it behooves the researcher to explain why his or her final model should be preferred over mathematically identical ones" (p. 225). Others have argued that a reasonable approach of dealing with equivalent models involves that: (a) readers should be informed about the most plausible alternative models and (b) researchers should design and conduct future studies (e.g., longitudinal studies) that are less likely to produce equivalent models (see Tomarken & Waller, 2003, p. 583).

As a response to this requirement, the first alternative model tested the indirect effect of social-contextual factors on coaches' self-report measure of TNS through coaches' self-report measures of self-determined motivation for coaching and ASC. This model indicated that coaches' perceptions of social unity among their athletes was positively related to their TNS as coaches through coaches' own provision of ASC in the sport context. In contrast, the second alternative model tested the indirect effect of social-contextual factors on coaches' self-report measure of ASC through coaches' self-report measures of TNS and self-determined motivation for coaching. This model indicated that coaches' perceptions of social unity among their athletes was positively related to coaches' provision of ASC through their TNS as coaches. Taken together, the data indicated that coaches' TNS can be modeled both as a predictor and as an outcome in relation to coaches' ASC. As a result, our findings supported previous SDT-based studies (Deci et al., 2006; Stebbings et al., 2012). Coaches' perceptions of a socially united group of athletes also seemed to play an important role in all the tested models. Moreover, keeping in mind that we only considered two alternative versions of the original model in the current study, both of which offered substantive explanations of the relationship among the latent variables, we are in a position where we cannot claim that the original model is the most plausible representation of the data. However, based on the fact that "... a well-fitting model is one plausible representation of the underlying structure from a larger pool of plausible models" (Tomarken & Waller, 2003, p. 580), we encourage future studies to use a longitudinal design in order to examine the psychological benefits related to providing ASC to athletes during a sport season.

Limitations

Although this study adds to the body of literature in SDT-based sport research, there are some limitations to the current work. The first limitation refers to the cross-sectional design of this study. It was, therefore, not possible to establish any cause and effect relationships in this study. The second limitation concerns the possibility of common method biases in the data set because the data was collected with a self-report, Likert-scale questionnaire (for a review, see Podsakoff, MacKenzie, & Podsakoff, 2003). Finally, the third limitation concerns the marginal reliability coefficients (ranging from .51 to .67) found in 5 of the total 12 subscales used in this study. Note, however, that there has been an extensive discussion related to the usefulness of reliability coefficients (e.g., Cronbach & Shavelson, 2004; Raykov, 2004, 2009; Sijtsma, 2009; Yang & Green, 2011). It is also worth noting that researchers have been encouraged to look at factor determinacy (see Table 1, for factor determinacy), if they want

to know how well their factor (i.e., latent construct) is measured (Muthén & Muthén, 1998–2012). So, although some of the subscales in this study obtained relatively low reliability coefficients, we emphasize that the reader should bear in mind that: (1) the statistical analyses were carried out in line with the recommendations given in the SEM literature (e.g., Brown, 2006; Byrne, 2012; Geiser, 2013; Kline, 2011; MacCallum et al., 1993; Raykov, 2009; Tomarken & Waller, 2003), and (2) "... statistics based on a single test administration do not convey much information about the accuracy of individuals' test performance" (Sijtsma, 2009, p. 107).

Future directions

Future research should examine the importance of providing and receiving autonomy support among athletes participating in a variety of both individual and team sports. Building upon previous research within close relationships (e.g., Deci et al., 2006), future research should examine whether there is a difference between receiving and providing autonomy support to other team members in regards to athletes' self-reported need satisfaction, well-being, and indices of relationship functioning/quality. It would also be worthwhile to investigate whether findings from close relationships research were replicated in the sport context; that is, would providing autonomy support rather than receiving autonomy support be the strongest predictor when both variables are competing for variance in explaining athletes' self-report measures of need satisfaction, motivation, well-being, and relationship functioning/quality.

Conclusion

To date, this is one of the first studies to examine the importance of providing ASC within the sport-coaching role. The findings showed that the coaches' perceptions of a socially united group of athletes and their self-determined motivation for coaching was positively related to coaches' self-report measure of TNS as coaches through coaches' own provision of ASC. Indeed, these findings may help advance the current understanding of the mechanisms that underlie coaches' own provision of ASC in the sport context. However, it is critical that readers understand that we tested two plausible alternative models from the theoretical perspective of SDT, both of which yielded identical measures of fit compared to the original model. Thus, we cannot argue that the original model includes a more superior explanation of the data. However, as noted earlier, a well-fitting model represents one plausible representation of the data. As such, provision of ASC should be considered in future sport psychology research.

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Article II

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Providing Empowering and Disempowering Behaviors to Young Athletes:
Effects on Coaches' Late-Season Well-Being

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ABSTRACT

Objectives: The purpose of this study was to investigate the relationships between providing empowering and disempowering behaviors to young athletes and coaches' psychological well-being across the sport season.

Design: A prospective study.

Methods: The sample comprised 169 Norwegian youth football (i.e., European soccer) coaches with a mean age of 41.99 ($SD=6.32$). Moreover, we were interested in examining heterogeneous groups of coaches showing variability in their self-reporting of empowering and disempowering behaviors towards their athletes. Thus, a person-centered approach was used.

Results: The latent profile analysis revealed three distinct profiles and the relationship between these profiles and coaches' psychological well-being was in line with the hypotheses. Indeed, coaches who provided more empowering and less disempowering behaviors to their athletes at the beginning of the sport season also reported higher levels of psychological well-being at the end of the sport season.

Conclusions: The results indicate that there exists an intrinsic value to why coaches should provide empowering behaviors, as opposed to disempowering behaviors, to their athletes; namely, these actions may be advantageous in terms of improving their own psychological well-being. In practical terms, future coach education may take advantage of these findings by providing coaches another reason for coaching in an empowering manner.

Key words: Youth sport, the coach's perspective, person-centered, psychological well-being

Introduction

Grounded in Self-Determination Theory (SDT; Deci & Ryan, 2000, 2012), a growing body of empirical work in sport psychology has indicated that the provision of autonomy-supportive behaviors to athletes is related to improved well-being and functioning (e.g., Cheon, Reeve, Yu, & Jang, 2014; Solstad, Van Hove, & Ommundsen, 2015). The principles of SDT suggest that when people engage in benevolent acts (e.g., giving something to others), they experience enhanced well-being because their basic psychological needs are satisfied (Martela & Ryan, 2015; Weinstein & Ryan, 2010). By providing autonomy-support to others (i.e., acting in a helpful and need supporting manner), people are likely to feel effective, connect with others, and experience their own behavior as volitional and self-valued (Deci, La Guardia, Moller, Scheiner, & Ryan, 2006; Legate, DeHaan, & Ryan, 2015). A question still unanswered is whether the provision of other types of constructive coaching behaviors to athletes may help to improve coaches' psychological well-being. Additionally, knowing that people may engage in behaviors that place them at risk for experiencing need thwarting (e.g., see Legate et al., 2015; Legate, DeHaan, Weinstein, & Ryan, 2013), a novel area of research would be to determine whether the provision of coaching behaviors, considered non-constructive to athletes, would detract from coaches' psychological well-being. Keeping the above notions in mind, Duda (2013) proposed a new conceptualization of the coach-induced motivational climate, which integrates motivational perspectives on the athletic environment from both SDT and Achievement Goal Theory (AGT; Nicholls, 1989; Roberts, 2012). According to this conceptualization, an empowering coach is characterized by high degrees of autonomy-support, task involvement, and social-support, whereas a disempowering coach is characterized by high degrees of controlling behaviors and ego involvement (Duda, 2013). Thus, the purpose of the current study was to determine the impact of providing empowering and disempowering behaviors to athletes on coaches' own psychological well-being.

Providing Empowering Behaviors to Athletes and its Potential Consequences

While AGT is one of the most popular theories of motivation in sport and exercise psychology (Roberts, 2012), no studies have sought to determine whether providing task-involving behaviors to athletes relate to coaches' psychological functioning. Nevertheless, when people are task involved, the act of performing various achievement tasks is viewed as a goal in itself. Thus, the very act of coaching athletes is likely to be experienced as intrinsically satisfying by a task-involved coach (Nicholls, 1989). When task-involved, coaches are likely to achieve a sense of personal competence and control by helping athletes maximize their potential. Hence, the provision of task-involving behaviors to athletes would be expected to relate positively to coaches' own psychological well-being. Building upon this insight, and based on prior AGT- and SDT-based research (e.g., Deci et al., 2006; Solstad et al., 2015; Treasure & Roberts, 1995), we suggest that coaches who provide task-involving behaviors to their athletes are more likely to promote their own sense of autonomy, in addition to experience a sense of competence in teaching athletes new skills. This is because they freely choose to involve their athletes in various learning situations, thereby changing the locus of responsibility in the sport setting. Furthermore, giving recognition to others and emphasizing that everyone has an important role on the team are both key aspects of providing task-involving behaviors to athletes. It is reasonable to expect that coaches would experience an increased sense of relatedness given that such coach behaviors are likely to elicit increased task cohesion among athletes (Heuzé, Sarrazin, Masiero, Raimbault, & Thomas, 2006). As embedded in the concept of empowering coach behavior, social-support is another behavior with potential implication for coaches' psychological well-being (Duda, 2013). Indeed, social-support involves loving, valuing, and having a deep regard for others (Pierce, Sarason, & Sarason, 1992). Thus, guided by SDT (Ryan & Solky, 1996), we suggest that providing social-support to athletes would satisfy the need for relatedness among coaches.

Providing Disempowering Behaviors to Athletes and its Potential Consequences

The general belief guiding the sport psychology literature has been that providing controlling and ego-involving behaviors to athletes has mainly negative effects on athletes' psychological and physical well-being (see Ntoumanis, 2012; Roberts, 2012, for details). The issue of whether such behaviors may have detrimental influence on coaches' own well-being; however, has yet to be addressed in the literature. This is unfortunate considering that recent research has revealed the psychological costs of hurting others (Legate et al., 2013, 2015), as well as the network of reciprocal causal relations that exist within the coach-athlete relationship (Smith & Smoll, 2011). The research above remind us that coaches' behaviors towards their athletes, including the coercive ones, may negatively influence coaches' psychological well-being through athletes' reactions to such behaviors. Moreover, the tenants of SDT suggest that "controlling contexts are ones that pressure people to think, feel, or behave in specific ways through the use of coercive or seductive pressures and demands" (Deci & Ryan, 2012, p. 94). Hence, the seeming disparity in thinking about controlling behaviors, by only taking the perceiver perspective, may limit the way in which researchers conceptualize their future research. Informed by recent empirical work (e.g., Legate et al., 2013, 2015), we suggest that when coaches provide controlling behaviors to athletes, it is therefore detrimental to the coaches' sense of psychological well-being, as these acts would surely thwart their psychological needs. This suggestion takes the more commonly viewed perspective (i.e., in current sport psychology literature) of the athletes perceiving controlling behaviors from their coach, and instead views the effects of the controlling behavior from the perception of the coaches themselves. By providing controlling behaviors to athletes, coaches would likely experience a diminished sense of autonomy because they expose themselves to a greater risk of experiencing interpersonal conflicts with their own athletes. This, in turn, implies that coaches may perceive the sport setting as a pervasive condition of threat, leading to more coercive and

defensive behaviors, and thus thwarting of their need for autonomy. When coaches provide controlling behaviors to their athletes, they are also more likely to experience a diminished sense of competence by having contributed to frustration or thwarting of athletes' own basic psychological needs, which in turn, could be linked to a reduction in athletes' inherent drive and interest. Accordingly, coaches are likely to perceive inferior long-term performances and weakened functioning among their athletes, in which case the coaches' need for competence could be thwarted. Lastly, coaches who provide controlling behaviors to their athletes would likely experience a diminished sense of relatedness; because, controlling coaching relates to behaviors which focus on imposing a specific and preconceived way for athletes behaving while participating in the sporting activity. As such, controlling coaching behaviors fully contradict autonomy-supportive behaviors in which direct expressions of caring, involving oneself in the life of others, and taking another's perspective are in forefront (Deci & Ryan, 2012).

Ego involvement, by comparison, is a concept commonly referred to in both the AGT- and SDT-based literatures (e.g., Deci & Ryan, 1985; Nicholls, 1989; Ryan, 1982). According to AGT, the state of ego involvement refers to "the desire to enhance the self by establishing one's superiority relative to others, even when one might not be directly competing with or even imagining any specific others" (Nicholls, 1989, p. 87). Whereas SDT assumes that ego-involved individuals "become invested in, and pressure themselves toward, particular outcomes. They evaluate themselves in terms of the outcomes they attain" (Deci & Ryan, 1985, p. 108). In other words, when ego-involved, individuals become involved with the activity at hand because they want to prove their normative competence, as their goal is to preserve their self-esteem (Deci & Ryan, 1985). Hence, this state of involvement includes an external perceived locus of causality and extrinsic motivation, thus creating an internally controlling motivational orientation (Ryan, 1982). It appears intuitive that the provision of ego-involving behaviors to athletes, in any athletic event in which every coach and athlete struggles for supremacy, will be

associated with various indices of psychological ill-being (e.g., negative affect, distress, shame, and guilt). This is because coaches are likely to feel pressure either from their internal states (e.g., self-evaluations on performance) or from the environment (e.g., other coaches and/or parents) to engage in behaviors that will increase the likelihood of emerging victorious (i.e., providing ego-involving behaviors to athletes). In addition, when ego-involved, coaches are likely to “be in a controlling mode vis-à-vis themselves” (Deci & Ryan, 1985, p. 109). Hence, coaches in such a state are in danger of undermining their own intrinsic motivation towards coaching (Deci & Ryan, 1985).

Additionally, because the coach-athlete relationship involves a network of reciprocal causal relations (Smith & Smoll, 2011), it is vital to consider the role of empathy in relation to coaches’ provision of ego-involving behaviors to their athletes. The problem of providing ego-involving behaviors to athletes is that athletes’ ability is judged as high or low with reference to that of others (Nicholls, 1989). It must therefore be emphasized that there will always be athletes who are judged to be below average in ability, regardless of whether athletes are brought together or kept apart on the basis of their current ability level. Ego-involved coaches are likely to experience athletes who are in distress, experiencing a state in which their self-esteem is ‘on the line’, and thus undergoing more pressure and tension from their coaches (e.g., Deci & Ryan, 1985; Ntoumanis, Taylor, & Thøgersen-Ntoumani, 2012). A recent study, however, has revealed that only autonomous motivation mediates the association between empathetic concern and helping behaviors, while controlled motivation had no such effect (Pavey, Greitemeyer, & Sparks, 2012). Prior AGT-based research (e.g., Pensgaard & Roberts, 2000; Smith, Smoll, & Cumming, 2007) gathers that there is an increased risk that ego-involved coaches will only be autonomously motivated to help their best athletes, leaving a large proportion of their athletes in distress. Nevertheless, coaches who provide ego-involving behaviors to their athletes, while at the same time focusing on the emotions of all their athletes,

are likely to experience a decrease in their functioning and psychological health. This is mainly because the quality of coach-athlete interactions will provide coaches with feedback comprising of information that will make them feel less effective as coaches, less able to connect with their athletes, and less volitional in their role as coaches.

The Current Study

It is currently known that people may be better identified as belonging to certain clusters, which again relate differently to outcomes under study (e.g., Morin, Morizot, Boudrias, & Madore, 2011). Hence, the primary purpose of this study was to use a person-centered approach to test the hypothesis that providing empowering behaviors, as opposed to disempowering behaviors, would be positively related to coaches' self-report of psychological well-being. Research also needs to examine these relations across a sport season to account for method bias by introducing a time delay between measures (see Podsakoff, MacKenzie, & Podsakoff, 2012 for details). Therefore, we aimed to identify unique subgroups of coaches based on their level of self-reported empowering and disempowering behaviors at the beginning of the sport season (T1) to predict their self-report of basic psychological needs satisfaction and psychological well-being at the end of the sport season (T2).

Method

Participants

Data in the current study are part of the Norwegian intervention arm of the larger Promoting Adolescent Physical Activity (PAPA) project (Duda et al., 2013).¹ The study sample comprised 169 youth football coaches (males $n=152$; females $n=17$) ranging in age from 16 to

¹ The participating coaches received the six-hour Empowering Coaching™ training program (ECTP) at the beginning of the season. Coaches' self-reports of their own empowering and disempowering behavior, however, were assessed before they attended the ECTP. It should also be noted that it went approximately 5-months between the pre- and post-test assessment.

60 years ($M=41.99$; $SD=6.32$). Additionally, most coaches self-identified as Norwegian ($n=163$), whereas the rest were Scandinavian ($n=1$), European ($n=2$), North American ($n=1$), South American ($n=1$), and Asian ($n=1$). The coaches also reported that their average coaching experience was 7.10 years ($SD=5.27$).

Procedure

After the Norwegian arm of the PAPA project received approval from the Norwegian Centre for Research Data (NSD), a sample of football clubs in the southern part of Norway was contacted by e-mail and informed about the purpose of the study. Contact information was then obtained from those football clubs willing to participate. Moreover, the football club management was given written information, which was relayed to the coaches, about the voluntary aspect of participating in the study and the research team's plan to ensure data confidentiality. Information was also given to the football club management, telling coaches about their opportunities, at any time, to withdrawal from the study. Lastly, members of the research team distributed the questionnaire to the main and assistant coaches, which filled it out before or after a training session, and required the average coach to spend 20 minutes to fill out the questionnaire.

Measures

Empowering and disempowering coaching behaviors

Coaches' self-report of empowering and disempowering behaviors were assessed using a reduced Norwegian version of the following questionnaires: the Health Care Climate Questionnaire (HCCQ; Williams, Grow, Freedman, Ryan, & Deci, 1996), the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton, Duda, & Yin, 2000), the Social Support Questionnaire (SSQ; Sarason, Sarason, Shearin, & Pierce, 1987), and the

Controlling Coach Behaviors Scale (CCBS; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010). It is also worth noting that previous studies have confirmed the reliability of these scales (e.g., Quedsted & Duda, 2010; Reinboth, Duda, & Ntoumanis, 2004; Solstad et al., 2015; Stebbings, Taylor, Spray, & Ntoumanis, 2012).

The empowering dimension of coaches' self-reported behaviors consisted of autonomy-supportive behaviors (4 items; Raykov's (2009) coefficient $\rho = .64$; 95% CI = [.54-.73]; S.E. = .05; FS = .81; e.g., athletes are given choices and options), task-involving behaviors (6 items; coefficient $\rho = .80$; 95% CI = [.74-.86]; S.E. = .03; factor score (FS) = .90; e.g., the coach is encouraging players to try new skills), and socially-supportive behaviors (3 items; coefficient $\rho = .64$; 95% CI = [.52-.75]; S.E. = .06; FS = .81; e.g., athletes can count on the coach, no matter what happens). Conversely, the disempowering dimension of coaches' self-reported behaviors consisted of controlling behaviors (5 items; coefficient $\rho = .76$; 95% CI = [.69-.83]; S.E. = .04; FS = .89; e.g., the coach is less supportive towards athletes when they are not performing well on practices and in competitions) and ego-involving behaviors (5 items; coefficient $\rho = .69$; 95% CI = [.62-.76]; S.E. = .04; FS = .86; e.g., the coach devotes most of his/her attention to the best players). Note that coaches' responses were made on a 5-point Likert-type scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Basic psychological needs satisfaction

Coaches completed 10 items from the sport adapted, Norwegian version of the Basic Needs Satisfaction at Work Scale (BNSAW; Deci et al., 2001). As such, coaches' experience of needs satisfaction consisted of need for competence (4 items; coefficient $\rho = .56$; 95% CI = [.45-.67]; S.E. = .06; FS = .80; e.g., , I do well as a coach, and), need for autonomy (3 items; coefficient $\rho = .64$; 95% CI = [.52-.77]; S.E. = .06; FS = .84; e.g., I decide how to coach), and need for relatedness (3 items; coefficient $\rho = .67$; 95% CI = [.56-.78]; S.E. = .06; FS =

.88; e.g., I get along with players). In addition, coaches' responses were made on a 5-point Likert-type scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Evidence to support the reliability of this scale has also been provided in the sporting domain (e.g., Solstad et al., 2015; Stebbings et al., 2012).

Psychological well-being

Nine items from the Norwegian version of the Positive Affect Negative Affect Scale (PANAS; Crocker, 1997) assessed coaches' positive affect (5 items; coefficient $\rho = .83$; 95% CI = [.77-.90]; S.E. = .03; FS = .92; e.g., pleased, thrilled, joyful, enthusiastic, and proud) and negative affect (4 items; coefficient $\rho = .77$; 95% CI = [.62-.92]; S.E. = .08; FS = .89; e.g., unhappy, angry, frustrated, and depressed). Responses were made on a 7-point Likert-type scale, ranging from 1 (*not very often*) to 7 (*all the time*). Additionally, four items from the Norwegian version of the Trait Subjective Vitality Scale (TSVS; Ryan & Frederick, 1997) assessed coaches' experience of feeling energized and really alive in their everyday life (4 items; coefficient $\rho = .88$; 95% CI = [.85-.92]; S.E. = .02; FS = .96; e.g., full of vitality, looking forward to, alert and awake, and lots of energy). Responses were made on a 5-point Likert-type scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Evidence for the reliability of these scales has also been garnered by prior research (e.g., Stebbings et al., 2012).

Data Analysis

Before performing the Latent Profile Analysis (LPA; Morin et al., 2011) using *Mplus* 7.31, several confirmatory factor analyses (CFA) were conducted to examine the factor structure of the respective scales. More specifically, we used a goodness-of-fit (GOF) evaluation to determine whether each of the CFA's were able to reproduce the observed relationships among the indicators in the sample data (Brown & Moore, 2012). Consequently,

a number of global GOF indices were used to evaluate the acceptability of each CFA model: the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Moreover, recognizing that GOF evaluation is a highly debated topic among methodologists (Brown & Moore, 2012), we deemed the fit to be acceptable when the following criteria were met: $CFI \geq .90$, $RMSEA \leq .08$, and $SRMR \leq .08$.

It is worth noting that we used Full Information Maximum Likelihood (FIML) to deal with the missing data reported in the current study. FIML is currently regarded as the state-of-the-art missing data technique when the data satisfies the missing at random (MAR) mechanism (Enders, 2010; Lang & Little, 2016). This missing data technique is considered superior to other traditional techniques (e.g., pairwise and listwise deletion) because it “maximizes statistical power by borrowing information from the observed data” (Enders, 2010, p. 87). Indeed, recent research has shown that FIML is effective in reducing biases due to selective attrition (e.g., Hallgren & Witkiewitz, 2013).

Using the robust maximum likelihood estimator (i.e., MLR), the LPA was performed to identify subgroups within the population based on coaches’ self-report of empowering and disempowering behaviors at T1. Within the LPA framework, posterior class probabilities are estimated to decide each participant’s profile belonging (Nylund, Asparouhov, & Muthén, 2007). More specifically, the participants will be directed towards the profile where they have the highest probability. A sequence of nested models, starting with one profile, was compared to examine whether more complex models (i.e., a model containing one more profile) fitted the data better than more parsimonious models. In the current study, models with one to five profiles were tested on statistical criteria and substantive meaning to identify the optimal model. Different criteria were used to determine the best model (Nylund et al., 2007). First, the Bayesian Information Criterion (BIC; Henson, Reise, & Kim, 2007) and the sample-size

adjusted BIC (SSA-BIC; Yang, 2006) were inspected, with lower values indicating better model fit. Second, the bootstrap likelihood ratio test (BLRT; Nylund et al., 2007) was used to compare the fit of two competing models. Statistically significant tests ($p < .05$) indicate that the current model solution fits the data better than a model solution with one less profile. Third, the entropy criterion was examined, which indicates how accurately people are profiled into their respective profiles (Aldridge & Roesch, 2008). Values closer to 1 indicate better accuracy (Berlin, Williams, & Parra, 2014). Fourth, the authors conducted an expert evaluation to select the solution that was most meaningful from a theoretical perspective.

To investigate whether coaches in the identified latent profiles differed with regard to obtained level of psychological well-being (i.e., basic needs satisfaction, affective states, and subjective vitality), the 3-step approach (BCH) was used (Asparouhov & Muthén, 2014). Indeed, the psychological well-being variables were treated as auxiliary variables and continuous distal outcomes that were compared between the different profiles. We used 100 random start values for each model, with the 20 best retained for the final solution. To avoid local maxima, the final solution was replicated with 1500 random start values (Geiser, 2013). In the 3-step approach, an overall test of association using Wald's test is calculated together with pairwise profile comparison.

Results

Table 2 displays the mean structure information, coefficient ρ , FS, and the correlations between the latent constructs constituting coaches' self-report of empowering and disempowering behaviors. With regard to missing data, 47 coaches (27.8%) dropped out of the current study. The results, using both independent t tests and Little's missing completely at

random (MCAR) test, showed that the data did not satisfy the MCAR mechanism.² For this reason, and as mentioned earlier, we used FIML to handle the missing data (Enders, 2010).

Confirmatory Factor Analyses

CFA solutions in which the number of freely estimated parameters equals the number of elements in the input matrix are referred to as just-identified solutions (Brown & Moore, 2012). Coaches' self-report measure of social support at T1 could only be estimated, as it could not be evaluated, using GOF indices, due to its lack of indicators. In contrast, the CFA solution of the latent construct representing coaches' self-report measure of autonomy-support at T1 yielded a good fit to the data: $\chi^2(2) = 2.985, p > .05$, SRMR = .03, RMSEA = .05, (90% CI RMSEA = .00 to .17), CFI = .98. So did the latent construct constituting coaches' self-report measure of task involvement at T1: $\chi^2(9) = 6.745, p > .05$, SRMR = .03, RMSEA = .00, (90% CI RMSEA = .00 to .07), CFI = 1.00. Additionally, the fit of the latent construct representing coaches' self-report measure of ego involvement at T1 was good: $\chi^2(5) = 2.239, p > .05$, SRMR = .02, RMSEA = .00, (90% CI RMSEA = .00 to .07), CFI = 1.00. The CFA solution of coaches' self-report measure of their controlling coaching behaviors at T1 also provided a good fit to the data: $\chi^2(5) = 4.108, p > .05$, SRMR = .02, RMSEA = .00, (90% CI RMSEA = .00 to .10), CFI = 1.00. Moving on to the psychological well-being outcomes at T2, the fit of the three latent constructs that constituted coaches' basic needs satisfaction (i.e., competence, autonomy, and relatedness) yielded a good fit to the data: $\chi^2(32) = 39.054, p > .05$, SRMR = .06, RMSEA = .04, (90% CI RMSEA = .00 to .08), CFI = .95. Coaches' self-report measure of subjective vitality indicated a good fit to the data as well: $\chi^2(2) = .661, p > .05$, SRMR = .01, RMSEA =

² Little's MCAR test was significant ($\chi^2 = 169.08; df = 89; p < .001$). Moreover, two of the four *t* tests (Bootstrap) revealed that dropouts reported lower levels of need satisfaction ($t = -4.02; df = 81; p < .001$; BC 95% CI[-.37 - -.12]; Cohen's *d* effect size = .70) and positive affect ($t = -2.77; df = 69; p < .01$; BC 95% CI[-.76 - -.12]; Cohen's *d* effect size = .52) at T1. Dropouts, however, were not significantly different from those coaches who completed both assessments on subjective vitality ($t = -1.86; df = 76; p = .067$; BC 95% CI[-.48 - .01]; Cohen's *d* effect size = .32) and negative affect ($t = 1.46; df = 79; p = .149$; BC 95% CI[-.06 - .49]; Cohen's *d* effect size = .25).

.00, (90% CI RMSEA = .00 to .13), CFI = 1.00. Lastly, the latent constructs that represented coaches' self-report measures of positive and negative affect yielded an acceptable fit to the data: $\chi^2(26) = 39.455, p < .05, SRMR = .07, RMSEA = .07, (90\% \text{ CI RMSEA} = .01 \text{ to } .10), CFI = .95$.

Latent Profile Analysis

The results from the LPA indicated that the model with a 3-profile solution provided the best fit to the data (see Table 1 for model fit indices). The three profiles contained 47 (profile 1), 15 (profile 2), and 107 (profile 3) youth football coaches, respectively. The three profiles differed in terms of degrees of self-reported empowering and disempowering behaviors. We have therefore used the following labeling concerning the three different profiles: most empowering profile, less empowering profile, and least empowering profile. While previous studies have used wording such as high, moderate, and low (e.g., Ivarsson et al., 2015), we considered it more appropriate to differentiate between the different profiles by using adverbs. The main reason for this was due to rather high self-report values of autonomy-support, task involvement, and social-support in the least empowering profile. The subscale scores for the three latent profiles are provided in Table 2.

Results from the 3-step approach were also used to analyze whether latent profile membership could predict measures of psychological well-being at T2. Statistical significant differences between the three latent profiles were obtained for basic needs satisfaction ($\chi^2(2) = 23.14, p < .001$), positive affect ($\chi^2(2) = 16.40, p < .001$), and negative affect ($\chi^2(2) = 11.91, p = .003$). There was, however, no statistical significant difference between the three latent profiles in subjective vitality at T2 ($\chi^2(2) = 1.95, p = .378$). Briefly, coaches in the most empowering profile differed from coaches in the two other profiles in terms of reporting higher levels of basic needs satisfaction and positive affect, and lower levels of negative affect, at the

end of the competitive season. Due to the increased tendency of method bias in cross-sectional studies (Podsakoff et al., 2012), we also decided to report the relationship between the predictor and the criterion variables at T1. The findings indicated that there were statistical significant differences between the three latent profiles in basic needs satisfaction ($\chi^2(2) = 53.13, p < .001$), subjective vitality ($\chi^2(2) = 8.81, p = .012$), positive affect ($\chi^2(2) = 69.80, p < .001$), as well as negative affect ($\chi^2(2) = 18.98, p < .001$). Note also that χ^2 values and effect sizes (Cohen's *d*) for pair-wise comparisons between the three profiles are presented in Table 4.

Discussion

We set out to identify unique subgroups of youth football coaches, with respect to their empowering and disempowering behaviors, at the beginning of the sport season in order to examine whether subgroup belonging predicted coaches' basic needs satisfaction and psychological well-being at the end of the sport season. Based on recent research (e.g., Deci et al., 2006; Duda, 2013; Legate et al., 2013, 2015; Solstad et al., 2015), it was hypothesized that coaches who provide empowering behaviors, rather than disempowering behaviors, to their athletes would be more likely to report higher levels of needs satisfaction and psychological well-being. Results partly confirmed our hypotheses; namely, that an empowering profile at T1 (i.e., providing high levels of empowering and low levels of disempowering coaching behaviors to athletes) was positively related to coaches' own needs satisfaction and positive affective state, and negatively related to their negative affective state at T2.

The results revealed three distinct profiles that varied in terms of level of self-reported empowering and disempowering coaching behaviors. Thus, it seems that coaches who report that they provide high levels of empowering and low levels of disempowering behaviors (i.e., the most empowering profile) at the beginning of the sport season are more apt to report high levels of psychological well-being at the end of the sport season. Statistical significant

differences on self-report measures of needs satisfaction, positive affect, and negative affect were obtained between these profiles, respectively. Profile differences indicate that coaches in the most empowering profile reported higher levels of needs satisfaction and positive affect, and lower levels of negative affect, at the end of the season compared to the two other profiles. Hence, the results suggest that coaches who emphasize an empowering interpersonal style of coaching may personally benefit from these actions in terms of improved psychological health in their role as coaches. The psychological processes underpinning these benefits are unclear. One theoretical line of reasoning would be that empowering coaching behaviors enhance psychological growth in athletes eliciting observable positive reactions (Duda, 2013), which in turn, influence coaches' self-perceived ability in such a way that their young athletes develop and thrive (Smith & Smoll, 2011). Another explanation might be that the provision of empowering behaviors, such as providing autonomy-support, social-support, and emphasizing criteria for mastery that are personally controllable, are all expressions of helping behaviors (Martela & Ryan, 2015; Weinstein & Ryan, 2010) that benefit not only the receiver, but the provider as well (Deci et al., 2006). Indeed, such behaviors, indicative of empathetic, prosocial acts, have been shown to be positively related to basic psychological needs satisfaction (Cheon et al., 2014; Solstad et al., 2015).

Our findings suggest that by providing empowering behaviors to athletes, coaches may be able to satisfy their own psychological needs, thereby underlining the importance of empowering behaviors for both coaches and athletes. It is also noteworthy that the current study extends the plethora of AGT-based studies mainly focused on athletes' psychosocial outcomes by indicating that providing task-involving behaviors to athletes, in association with autonomy-supportive and socially-supportive behaviors, relates positively to coaches' psychological well-being. Our results add up to the theoretical prediction that people are likely to experience enjoyment, satisfaction, and intrinsic interest when they participate under task-involving

conditions in the sport setting (Roberts, 2012). Although Nicholls's theorizing has mainly been used to argue for the influence of the coach-induced motivational climate on outcomes in athletes (Roberts, 2012), Nicholls (1989) still argued, "Working under these different conceptions of ability will have related consequences for the experience of interest or enjoyment in a performance task" (p. 86). More specifically, the very act of emphasizing that accomplishing, understanding, and learning are desirable aspirations for athletes, there is also reason to believe that coaches are using these criteria to evaluate their own performances and subsequent well-being in their role as coaches. The reason for this is that it would seem difficult for coaches to draw athletes' attention towards task-involving principles (e.g., noting whether their performance level is improving), which is known to enhance athletes' well-being (Ntoumanis et al., 2012), without attending to these principles for themselves, as a source to their own functioning and well-being. Indeed, when coaches emphasize improvement and learning, and observe that their athletes thrive and enhance their well-being based on task-involving principles, it seems likely that coaches themselves would experience well-being for the same reasons. As such, athletes may be seen as an important source to coaches' well-being by validating their value system and educational preference as coaches.

Building upon the notion that people may engage in behaviors that place them at risk of experiencing frustration or thwarting of their basic psychological needs (Legate et al., 2013, 2015), we also illuminated the potential negative psychological effects of providing disempowering behaviors to athletes across the sport season. Our results indicate that the effect of being in the least empowering profile at the beginning of the season was related to relatively low levels of both psychological needs satisfaction and positive affect, and high levels of negative affect, compared to the other two profiles. These findings provide new insight into the psychological dynamics of providing disempowering behaviors to athletes. Existing research has almost solely been concerned with athletes' perceptions of their coaches' behaviors

(Ntoumanis, 2012; Roberts, 2012). However, considering the possible implications (e.g., negative affect, distress, shame, and guilt) for those coaches who act on the basis of control-determined reasons, it is sobering that this topic has been neglected in sport psychology research in the past. There is research to show that empathetic concern relates positively to helping behavior (Pavey et al., 2012), which in turn, has been shown to be positively related to basic needs satisfaction (Martela & Ryan, 2015; Weinstein & Ryan, 2010). Our results suggesting that the provision of disempowering behaviors to athletes detracts from the coaches' own psychological well-being is therefore not surprising.

Being categorized into a specific profile was not related to coaches' self-reporting of subjective vitality at the end of the sport season. This may be because, as opposed to psychological needs satisfaction and affect, subjective vitality was not framed as football-specific; rather coaches were asked whether they had felt energized and really alive in their daily life during the last month. Hence, a number of non-football specific factors may have influenced coaches' self-reporting of subjective vitality (e.g., close relationships, work-related issues, and different types of illnesses).

Applied Implications

The findings point towards the importance of coach development programs (CDPs) aimed at altering the interpersonal behaviors of youth sport coaches. While previous research has mostly focused on the process of altering coaches' behaviors to improve athletes' psychosocial outcomes (Langan, Blake, & Lonsdale, 2013), this study, along with recent SDT-based research (e.g., Cheon et al., 2014; Solstad et al., 2015), indicates that future CDPs should also emphasize the intrinsic value of providing empowering behaviors to athletes for coaches themselves. Importantly, considering the hustle and bustle of everyday life and the voluntarily nature of youth sports coaching (Baklien, Ytterhus, & Bongaardt, 2015; Langan et al., 2013), it

seems safe to argue that many coaches who attend coach education may be doing so because they feel obliged to do so. In other words, coaches may be pursuing the activity (i.e., attending the coach education workshop) on the basis of controlled motives. Moreover, knowing that the attainment of extrinsic aspirations is related to symptoms of ill-being (Niemic, Ryan, & Deci, 2009), it becomes important to recognize that “what people pursue and why they pursue it both make a significant difference in their psychological well-being” (Deci & Ryan, 2012, p. 92). Therefore, adding information on the benefits of providing empowering behaviors to athletes for coaches themselves in future CDPs could make coaches more autonomous in their motivation, and in doing so, change their aspirations (i.e., why they should learn to be more empowering in the sport setting) from extrinsic to intrinsic.

A Methodological Consideration

Strengths of this study include fulfilling certain methodological requirements. For example, the concept of psychological well-being was not dependent on coaches’ short-term memory and the amount of dropouts in this study was not significant (Podsakoff et al., 2012). Hence, we considered it appropriate to introduce the time lag between the two occasions of measurement (Podsakoff et al., 2012). In fact, Podsakoff and colleagues (2012) argued:

“This can diminish method bias by increasing the difficulty of responding stylistically, eliminating the saliency of any contextually provided retrieval cues, and/or reducing the respondent’s ability to use previous answers to fill in gaps in what is recalled or to use prior responses to answer subsequent questions.” (p. 563)

Furthermore, considering the many flaws of the null hypothesis significance testing procedure (NHSTP; Ivarsson, Andersen, Stenling, Johnson, & Lindwall, 2015), it is also worth noting that we estimated effect sizes in this study. We observed that the strengths of the results (i.e., effect sizes) varied throughout the season. In almost all cases (i.e., differences between the three

profiles), the effect sizes were significantly reduced from T1 to T2. Consequently, without accounting for the issue of method bias in the current study, we would have increased the risk for committing a Type I error (Podsakoff et al., 2012).

Limitations

The first limitation of this study concerns the group sizes in the three latent profiles. Although the profiles differed with regard to levels of self-reported empowering and disempowering coaching behaviors, the total number of coaches, particularly in the least empowering profile, was very low. Therefore, larger samples are needed in future studies to maximize the probability of more accurately predicting the impact of providing empowering and disempowering behaviors to athletes on subgroups of coaches themselves. Thus, we are careful not to generalize our findings to other samples of youth sport coaches. The second limitation concerns the fact that those coaches who completed both assessments differed from those coaches who dropped out of the study. This issue, however, was handled by using the current state of missing data practice (i.e., FIML). The third limitation of our study concerns the involvement of the sample in an intervention program. Some would argue that the involvement per se is likely to preclude examination of the naturally occurring relationships between the study variables. Nevertheless, referring to the overview of the different latent profiles, we were not able to detect any unambiguously increase or decrease in the psychological well-being outcomes over time. If coaches had a clear advantage of participating in the intervention program, then this would have been the case. Finally, the current study is based on coaches' self-perceptions only. Therefore, we cannot be certain whether coaches' level of self-reported empowering and disempowering behaviors reflects observed assessments of such behaviors.

Conclusions

These findings are important for those involved in the progression of youth sport participation. An essential implication has long been to teach coaches how to create either an autonomy-supportive or a task-involving motivational climate, and this line of research has proven to be conducive in relation to young athletes' psychosocial outcomes (e.g., self-esteem, anxiety, and sport attrition). Researchers, however, must not forget the countless volunteer coaches who spend their spare time on the training ground, along with their respective athletes. While recognizing that many coaches may find it particularly interesting to learn and develop for the sake of others, we also want to emphasize that it may be coaches who are struggling to find time in their daily life. Consequently, the effect of daily life activity routines (e.g., work-related activities, family obligations, and the demands of spouse) may lead coaches to be more controlled in their motivation related to attending various CDP initiatives, which in turn, highlights the importance of actively emphasizing and communicating the duality of providing empowering and disempowering behaviors to athletes for coaches themselves. Importantly, by pursuing such an approach one may indeed increase the likelihood of transmitting the coach educators' values to coaches' own coaching practices on the training ground.

Finally, continuing to use a person-centered approach may help in the development of new CDPs focused on improving the performance conditions in youth sport for both athletes and coaches. Indeed, our findings indicate that coaches can be grouped into different profiles using their self-reported coaching behaviors as a grouping variable. Thus, future research should perhaps consider creating CDPs with different contents based on coaches' personal characteristics, and in doing so, create CDPs that may be more effective.

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Table 1.*Model fit criteria.*

	2 Profiles	3 Profiles	4 Profiles	5 Profiles
BIC	983.37	920.10	916.84	911.10
Sample Adjusted BIC	932.71	850.44	828.19	803.45
LO-Mendell Rubin LRT Test	$p<.001$	$p=.06$	$p=.30$	$p=.32$
Bootstrapped Likelihood Ratio Test	$p<.001$	$p<.001$	$p<.001$	$p<.001$
Entropy	.91	.92	.88	.88

Table 2.*Means, standard deviations, coefficient rho, factor scores, and correlation matrix.*

	<i>M (SD)</i>	<i>rho</i>	<i>FS</i>	1	2	3	4	5
1. AS	4.18 (.41)	.64	.81	1				
2. TI	4.26 (.41)	.80	.90	.77**	1			
3. SS	4.26 (.49)	.64	.81	.67**	.73**	1		
4. EI	2.11 (.59)	.69	.86	-.19*	-.33**	-.32**	1	
5. CB	1.97 (.58)	.76	.89	-.43**	-.52**	-.54**	.52**	1

Note. *= $p<.05$; **= $p<.01$

Table 3.

An overview of the different latent profiles.

	Most empowering	Least empowering	Less empowering
AS	4.66	3.64	4.06
TI	4.77	3.68	4.12
SS	4.82	3.50	4.12
EI	1.82	2.55	2.17
CB	1.50	2.84	2.05
Basic needs T1	4.28	3.66	3.91
Basic needs T2	4.25	3.65	3.98
Sub Vitality T1	4.09	3.68	3.74
Sub Vitality T2	4.02	3.94	3.85
Positive Affect T1	6.27	4.75	5.49
Positive Affect T2	6.09	4.98	5.63
Negative Affect T1	1.64	2.97	1.98
Negative Affect T2	1.71	2.91	2.11

Table 4.

*χ^2 statistics and Cohen's *d* effect sizes for the differences between profiles.*

	Profile 1 vs. 2	Profile 1 vs. 3	Profile 2 vs. 3
T1 Basic Need satisfaction	$\chi^2 = 30.62^{**}$ $d = 1.70$	$\chi^2 = 39.11^{**}$ $d = 1.12$	$\chi^2 = 5.39^*$ $d = -0.69$
T2 Basic Need satisfaction	$\chi^2 = 23.14^*$ $d = 1.13$	$\chi^2 = 16.50^{**}$ $d = 0.72$	$\chi^2 = 3.58$ $d = -0.63$
T1 Subjective vitality	$\chi^2 = 3.00$ $d = 0.53$	$\chi^2 = 8.08^*$ $d = 0.51$	$\chi^2 = 0.08$ $d = -0.08$
T2 Subjective vitality	$\chi^2 = 0.09$ $d = 0.09$	$\chi^2 = 1.92$ $d = 0.24$	$\chi^2 = 0.15$ $d = 0.11$
T1 Positive affect	$\chi^2 = 25.45^{**}$ $d = 1.73$	$\chi^2 = 51.62^{**}$ $d = 1.16$	$\chi^2 = 5.66$ $d = -0.75$
T2 Positive affect	$\chi^2 = 4.06^*$ $d = 0.72$	$\chi^2 = 13.41^{**}$ $d = 0.62$	$\chi^2 = 1.36$ $d = -0.41$
T1 Negative affect	$\chi^2 = 12.55^{**}$ $d = -1.22$	$\chi^2 = 8.83^*$ $d = -0.50$	$\chi^2 = 6.78^*$ $d = 0.88$
T2 Negative affect	$\chi^2 = 1.98$ $d = -0.50$	$\chi^2 = 9.96^*$ $d = -0.53$	$\chi^2 = 0.87$ $d = 0.33$

Note: All χ^2 analyses used one degree of freedom.

*= $p < .05$

**= $p < .001$

Article III

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Pre- to Post-Season Differences in Empowering and Disempowering Behaviors among Youth
Football Coaches: A Sequential Mixed Methods Study

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Abstract

The aim of this study was to investigate differences in self-reported behaviors among youth football (i.e., European soccer) coaches from pre- to post-season, and additionally, their evaluative reactions to participation in the Norwegian arm of the Empowering Coaching™ training program (ECTP). A total of 193 coaches (174 males; 19 females; $M = 41.99$; $SD = 6.32$) completed a questionnaire concerning their use of empowering and disempowering behaviors at the beginning and end of the sport season. Moreover, 12 of these coaches (10 males; 2 females; $M = 41.67$; $SD = 5.68$) were interviewed at the end of the sport season using semi-structured interviews. Whereas coaches' empowering and disempowering behaviors did not differ from pre- to post-season, post-season interviews showed that participation in the ECTP led coaches to reflect on their coaching practices, facilitating an increased focus on enabling autonomy and involvement for the players and more attention paid to the players' feelings of mastery.

Key words: youth sport coaching education, mixed methods research, sport psychology, sports coaching, the PAPA project, the coach's perspective

Introduction

The coaching process in youth sport involves a number of skills, such as dealing with the learning and progression of athletes (Cassidy, Jones, & Potrac, 2015; Jones, 2007), developing team cohesion (Loughead & Bloom, 2013), increasing the empathic understanding in the coach-athlete relationship (Lorimer & Jowett, 2013), developing life skills in athletes (Gould, Carson, & Blanton, 2013), and enhancing psychosocial development among athletes (Lauer & Dieffenbach, 2013). Unfortunately, prior research has demonstrated that most of the coaches in youth sport are volunteers with a lack of formal training in handling many of the aforementioned challenges (Langan, Blake, & Lonsdale, 2013; Lauer & Dieffenbach, 2013). Hence, an extensive body of research on youth sport coaching education has been conducted within the realm of both sports coaching and sport psychology (e.g., Langan et al., 2013; Lauer & Dieffenbach, 2013; Trudel, Gilbert, & Werthner, 2010). While the former has focused on research topics, including coach development (Trudel, Culver, & Werthner, 2013), coaches' knowledge and learning (Gilbert & Côté, 2013; Griffiths & Armour, 2013), and coach education pedagogy (Jones, Morgan, & Harris, 2012), the latter has mainly been dedicated to examine psychosocial factors (e.g., self-esteem, anxiety, and sport attrition) associated with youth sport participation (Langan et al., 2013). In this respect, it is important to note that although previous psychosocial training interventions have been provided to coaches, Langan and colleagues (2013) highlighted that the outcomes have only been assessed in players. Thus, after reviewing the sport psychology literature (e.g., Smith, Smoll, & Cumming, 2007), they were unable to find studies that had collected data on both pre- and post-training coach behaviors (Langan et al., 2013). Within the sports coaching literature (e.g., Cushion & Nelson, 2013; Jones & Wallace, 2005), however, it is worth noting that, nearly a decade ago, Cassidy, Potrac, and McKenzie (2006) reported on coaches' perceptions of a theory-based coach education program. Typically, the sports coaching literature has dealt with learning processes rather

than specific outcomes of psychosocial training interventions. Admitting the value of this approach, there is still a need within the field of sport psychology to trace outcomes of psychosocial training interventions. The aim of the current study was therefore to advance the sport psychology literature by investigating pre- to post-season differences in self-reported coach behaviors among coaches who participated in the Norwegian arm of the Empowering Coaching™ training program (ECTP; Duda, 2013), and report on coaches' subjective experiences of participating in the ECTP.

The Empowering Coaching™ Framework

Sport researchers from five European countries (i.e., England, France, Greece, Norway, and Spain) have recently developed the larger Promoting Adolescent Physical Activity (PAPA) project in which the ECTP was delivered to coaches in the context of youth football (Duda et al., 2013). The aim of the ECTP was to help coaches understand how to foster quality motivation and, ultimately, make participation in youth football more engaging, empowering, and enjoyable. The theoretical underpinnings of the ECTP were based on the theoretical principles of Achievement Goal Theory (AGT; Nicholls, 1989) and Self-Determination Theory (SDT; Deci & Ryan, 2012). While AGT is a social-cognitive theory of motivation that focuses on the demonstration of perceived ability in the achievement setting, SDT is an organismic theory that maintains that all individuals have basic psychological needs to be autonomous, competent, and feel related to others in order to experience psychological growth, integration, and well-being (Deci & Ryan, 2012; Nicholls, 1989).¹ It is also worth noting that the theoretical integration of these motivational theories represents an advancement of the sport psychology literature because the lack of a

¹ It is worth noting that autonomy is distinct from individualism and independence (Chirkov, Ryan, Kim, & Kaplan, 2003). Autonomous behavior means that individuals are behaving with a sense of volition, willingness, and congruence. Put differently, individuals who are autonomous are fully endorsing and concurring with the behavior they are engaged in (Deci & Ryan, 2012).

theoretical basis has constituted a major obstacle for many previous psychosocial training interventions (Langan et al., 2013).

Both of these theories place great emphasis on the role of significant others (e.g., coaches, parents) in creating the motivational climate in youth sport settings (Deci & Ryan, 2012; Roberts, 2012). Based on the assumption that individuals are able to judge their ability, or competence, as high or low with reference to both their past athletic performances and as relative to that of others, AGT distinguishes between motivational climates that are more or less task- and/or ego-involving (Nicholls, 1989). This difference manifests itself in the way that coaches structure the athletic environment; that is, a task-involving coach will encourage players' efforts to succeed, while an ego-involving coach will treat players differently based on their success on normative achievement tasks (Nicholls, 1989). Conversely, SDT is concerned with factors in the sport setting that either facilitate or impair satisfaction of the three basic psychological needs. As such, autonomy-supportive climates, rather than controlling climates, are ones in which players' basic psychological needs are assumed to be satisfied, thereby promoting their experiences of autonomous motivation and athletic behaviors that further their own capabilities and thriving in sport (Deci & Ryan, 2012). In addition, the literature on social-support has repeatedly shown that people who have a network of supportive others are more likely to report positive psychological and physical well-being outcomes (e.g., Pierce, Sarason, & Sarason, 1992; Ryan & Solky, 1996). Hence, athletic environments that are capable of establishing a culture of supportiveness are more likely to have players who thrive and develop (Reinboth, Duda, & Ntoumanis, 2004).

Applied to the ECTP, an empowering motivational climate is an athletic environment in which coaches focus on task-involving, autonomy-supportive, and socially-supportive features of the sporting activity; while a disempowering motivational climate is created when ego-involving and controlling principles and features are guiding coaches' engineering of the athletic

environment. This theoretical integration, however, makes it possible to teach coaches how to create a conducive motivational climate that has the potential to optimize the what (i.e., the goal content), why (i.e., goal motives), and how (i.e., the coach's influence on his/her athletes) of players' participation in sport (Duda, 2013; Kidman, 2001).

The Empowering Coaching™ Workshop and Manual

Like other psychosocial training interventions (e.g., Coach Effectiveness Training, CET; Mastery Approach to Coaching, MAC; see Smith & Smoll, 2011), coaches who participated in the ECTP also attended a brief (i.e., six-hour) workshop at the beginning of the sport season. The aim of the ECTP workshop was threefold. First, to elaborate on the educational value of being an empowering coach. Second, to give insights into the theoretical foundation underlying the ECTP. Third, to provide guidelines with respect to how to become an empowering coach. Therefore, the ECTP workshop touched upon topics, such as the psychological health benefits of playing football, one's coaching philosophy, the quality of motivation, and the importance of both basic psychological needs satisfaction and the coach-created motivational climate. Moreover, given that a six-hour workshop cannot address all aspects related to sports coaching at the youth level, coaches were also encouraged to become aware, register, and reflect upon their own coaching practices during the sport season. Indeed, particular emphasis was placed on becoming aware of behaviors reducing players' quality of motivation and how behaviors likely to be disempowering might be changed in accordance with the Empowering Coaching™ guidelines. To further assist coaches in the process of becoming more empowering, coaches were given a brief (i.e., A5 paper size; 38 pages) coaching manual in written format. The main aim of this coaching manual was to reinforce the messages dealt with during the ECTP workshop and, thus, to assist coaches in enhancing self-awareness and involving themselves in processes of self-reflection throughout the season.

To our knowledge, no previous studies have examined the role of providing coaches with coaching manuals. Hence, we also examined the association between the perceived usefulness of the ECTP manual and coaches' post-season empowering and disempowering behaviors. The ECTP manual was aimed at reflecting the content of the ECTP workshop, thereby helping coaches understand how they could create an empowering motivational climate. The manual was divided into seven themes that all were related to the creation of an empowering motivational climate: (a) cooperation among peers, (b) emphasis on learning, (c) facilitate players' enjoyment and interest, (d) mastery orientation, (e) the need for autonomy, (f) emphasis on players' effort and improvement, and (g) taking the perspective of others. Thus, the ECTP manual contained several questions for reflection, which were intended to increase coaches' levels of self-awareness. For example, what can you, as a coach, do to promote or inhibit an empowering motivational climate? Next, which characteristics of your team and your club context might prevent you from creating an empowering motivational climate? Finally, coaches were asked to give examples of how they were going to deal with these challenges.

Implementing an Empowering Sports Coaching Philosophy at the Youth Level

Even though it may be obvious that empowerment, as a motivational approach, is a comprehensive and, at times, very demanding coaching style, researchers hardly mention the number of difficult aspects related to the implementation of this style of sports coaching (e.g., Denison, Mills, & Konoval, 2015; Jones, 2001; Nelson, Cushion, Potrac, & Groom, 2014). As mentioned earlier, the main goal of an empowerment approach to sports coaching is to enhance sport coaches' ability to understand the role of satisfaction of psychological needs for autonomy, competence, and relatedness, along with the demonstration of self-referenced ability, thereby enhancing young players' learning experiences, well-being, and athletic performances (Deci &

Ryan, 2012; Duda, 2013; Kidman, 2001; Nicholls, 1989). Indeed, developing an athlete-centered approach to coaching (e.g., empowering athletes) might seem contradictory, or at least difficult, in a context in which unbalanced coach-athlete power relations, with coaches in control, is normalized (Denison et al., 2015). Nevertheless, working towards greater empowerment for athletes, would seem educationally worthwhile because the coach then is concerned with supporting players to become involved in decision-making processes and to raise their self-awareness and self-sufficiency (Kidman, 2001). Hence, players who perceive an empowering style of sports coaching are likely to make informed decisions and help them to become more self-regulated and to further develop as athletes (Duda, 2013; Kidman, 2001).

A real hurdle to overcome, however, is that an empowering style of coaching “does not succeed on its own” (Kidman, 2001, p. 147). Indeed, the empowering approach to sports coaching requires the coach to work on a range of tasks, including developing and practicing the empowering strategies, gaining the support of players, parents, other coaches, and administrators, and enabling players to understand the benefits of going along with the empowering principles (Kidman, 2001). Additionally, based on the extremely complex social system embedded in youth sport settings (Denison, et.al., 2015; Smith, 2014; Smith & Smoll, 2011), coaches must self-reflect on their own coaching practices in order to further develop and improve. The self-reflection process may provide the coach with an opportunity to “cope with ambiguity in the coaching context” (Jones & Wallace, 2005, p. 119), and accepting the variety of challenges in the role as coach. As such, inviting coaches to processes of self-reflection and consciousness raising should be regarded as an essential aspect of any psychosocial training intervention (Jones & Wallace, 2005; Kidman, 2001; Smith, 2014; Smith & Smoll, 2011). Consequently, to drive the fields of sports coaching and sport psychology forward, it would seem important to acquire additional knowledge about experiences and lessons learned for coaches who participate in a psychosocial training intervention.

Combining Survey Research and Qualitative Interviewing

During the last decade, it has become more common in sport psychology research to explore how synergistic combinations of both quantitative and qualitative methods may offer a more nuanced understanding of a given phenomenon (e.g., Partington & Cushion, 2013). The mixing of quantitative and qualitative methods is referred to as mixed methods research (MMR; e.g., Johnson, Onwuegbuzie, & Turner, 2007). It has been argued that researchers should “strategically combine qualitative and quantitative methods, approaches, and concepts in a way that produces complementary strengths and nonoverlapping weaknesses” (Johnson et al., 2007, p. 127). Hence, we added interviews to our survey data to enrich and deepen our understanding of participating in a psychosocial training intervention. In doing so, we complemented the quantitative strategy with the qualitative belief that maintains that each individual (i.e., the coach) is the only source of his/her experience (Hesse-Biber & Leavy, 2010; Johnson & Onwuegbuzie, 2004). For example, using such a methodology may be beneficial in terms of understanding how and to what extent the individual coach manages to integrate main elements of the ECTP into his/her existing knowledge base (e.g., Gilbert & Côté, 2013; Griffiths, & Armour, 2013). If we only had considered pre- to post-season differences in self-reported coach behaviors, each coach’s subjective view of the content embedded in the ECTP would not have been accounted for. A sequential mixed methods design, in which participants are selected for a qualitative follow-up, is therefore a recommended way to draw from the strengths of both methods (see Ivankova, 2014 for details).

A recurring, yet often overlooked topic in the context of MMR is the influence of different philosophical perspectives (i.e., the underlying assumptions; see Hathcoat & Meixner, 2015). For example, researchers may identify with a postpositivist claim when modeling latent variables in structural equation modeling (SEM), whereas they may adopt the position of a social constructionist when interpreting qualitative interviews (Hathcoat & Meixner, 2015; Hesse-Biber

& Leavy, 2010). The shift between methods, however, is in alignment with pragmatism, which is the most frequently used philosophical position in MMR (Hathcoat & Meixner, 2015; Johnson et al., 2007). In brief, because pragmatism negates a distinction between the philosophical positions, it represents a pragmatic, or “whatever-works”, maxim serving as an exacerbating factor with regard to the issue of incompatibility (Hathcoat & Meixner, 2015). More specifically, the conditional incompatibility thesis argues that the mixing of quantitative and qualitative methods is inconsistent and, thus, inappropriate (Hathcoat & Meixner, 2015). Among methodological purists, it is argued, “since qualitative and quantitative inquiry is informed by contradictory ontological and epistemological assumptions it is inappropriate to integrate these techniques within a single study” (Hathcoat & Meixner, 2015, p. 4). Therefore, knowing that incompatibility may occur under certain conditions (e.g., researchers may choose particular techniques, methods, and/or decisions rather than others), researchers are encouraged to be mindful and transparent regarding the influence of philosophical perspectives in their mixed methods studies (see Hathcoat & Meixner, 2015 for details).

Also, researchers are required to address the meta-inferences resulting from their entire study when conducting sequential MMR. Meta-inferences refer to conclusions based on inferences from both the quantitative and qualitative parts of a mixed methods study (Ivankova, 2014). Indeed, it has been highlighted that “integration of the inferences derived deductively and inductively is a critical stage in a mixed methods study process and researchers should adhere to rigorous standards for assessing inference quality to ensure their credibility and validity” (Ivankova, 2014, p. 26). To accommodate this requirement, we used a three-step procedure to ensure the quality of the meta-inferences that are generated in sequential mixed methods designs. The three-step procedure involved the following parts: (a) selecting a purposefully subset of the questionnaire respondents,

(b) using the results from the post-season interviews to elaborate on the quantitative results, and finally (c) observing interaction between the quantitative and qualitative findings (Ivankova, 2014).

The Current Study

The aim of the current study was to investigate pre- to post-season differences in self-reported coach behaviors among coaches who participated in the Norwegian arm of the ECTP, and their subjective experiences of participating in the ECTP. Hence, three research questions were outlined. First, to examine whether coaches who participated in the ECTP differed in their self-reported empowering and disempowering behaviors from pre- to post-season. Second, to determine the association between coaches' perceived usefulness of the ECTP manual and their post-season empowering and disempowering behaviors. Third, to gain insights into what coaches considered to be the utility value of participating in the ECTP.

Methods

Participants and Procedures

The quantitative sample of coaches consisted of 193 youth football coaches (males $n = 174$; females $n = 19$) taking part in the data collection of the Norwegian arm of the PAPA project (Duda et al., 2013). The coaches' age ranged from 16 to 60 years ($M = 41.99$; $SD = 6.32$), and the sample consisted of Norwegian coaches ($n = 187$) and a few other nationalities ($n = 6$). While several of the coaches had coaching knowledge equivalent to the Union of European Football Associations (UEFA) C coaching license ($n = 96$), only a small proportion of the coaches had completed the UEFA B coaching license ($n = 10$). A total of 87 coaches did not report any type of UEFA certification. The participants had also been coaching their current team for 4.26 years ($SD = 2.10$). Conversely, the qualitative sample of coaches consisted of 12 coaches (males $n = 10$; females $n =$

2), which were recruited from the overall pool of clubs in the intervention arm. Of these 12, 7 were coaching boys ($n = 7$) and five were coaching girls ($n = 5$) teams. Further, 4 of the 12 coaches were coaching at the U13 level with the remaining eight coaching at the U11 level, and their mean age was 41.67 years ($SD = 5.68$) and mean experience as a coach was 6.92 years ($SD = 5.26$). In addition, each team came from one of the three regions in the southern part of Norway: (a) the southeastern, (b) the northern, and (c) the western. This selection led to a 4-4-4 teams in each region. Note also that the final selection of the teams was based on the coaches' willingness to participate; hence, the selection ended when we reached 12 teams.

Prior to recruitment of the participating football clubs, the Norwegian Centre for Research Data (NSD) approved the Norwegian arm of the PAPA project. Each football club and its respective coaches were then contacted and informed about the purpose of the study. When permission to approach the football clubs was granted, members of the research team visited each club and distributed the questionnaire to the head and assistant coaches. The coaches were also given written information about the voluntary aspect of participating in the study, and were informed about their opportunities, at any time, to withdrawal from the study.

Measures

Motivational climate. Coaches' self-reported empowering and disempowering behaviors were assessed using a reduced, Norwegian version of the following questionnaires: the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton, Duda, & Yin, 2000), the Health Care Climate Questionnaire (HCCQ; Williams, Grow, Freedman, Ryan, & Deci, 1996), the Social Support Questionnaire (SSQ; Sarason, Sarason, Shearin, & Pierce, 1987), and the Controlling Coach Behaviors Scale (CCBS; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010). Coaches were asked to indicate how well the various items corresponded to their actual

behaviors on a five-point Likert-like scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), and having the item stem “On my team.”

The empowering dimension of the questionnaire consisted of task-involving behaviors (8 items, Raykov’s (2009) coefficient $\rho = .84$; 95% CI = [.79-.88]; S.E. = .02; e.g., the coach is encouraging players to try new skills), autonomy-supportive behaviors (4 items, coefficient $\rho = .59$; 95% CI = [.47-.70]; S.E. = .06; e.g., players are given choices and options), and socially-supportive behaviors (3 items, coefficient $\rho = .64$; 95% CI = [.52-.75]; S.E. = .06; e.g., players can count on the coach, no matter what happens). Conversely, the disempowering dimension of the questionnaire consisted of ego-involving behaviors (7 items, coefficient $\rho = .79$; 95% CI = [.73-.84]; S.E. = .03; e.g., the coach devotes most of his/her attention to the best players) and controlling behaviors (6 items, coefficient $\rho = .77$; 95% CI = [.70-.83]; S.E. = .03; e.g., the coach is less supportive towards players when they are not performing well on practices and in football matches). Additionally, the subscale measuring the perceived usefulness of the ECTP manual consisted of 5 items (coefficient $\rho = .90$; 95% CI = [.86-.94]; S.E. = .02; e.g., the workbook has served as a good tool for self-reflection). The questions were developed for the evaluation of the ECTP workshop at the end of the season, and coaches responded to each question on a five-point Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The stem for all questions was “I feel that.” Finally, the validity coefficients (i.e., the factor score of each latent construct) ranged from .92 to .96, thereby meeting the recommended requirement of .90 (see Brown, 2006, pp. 36-37).

Based on the psychometric advantages of parcels as opposed to items (Little, 2013), we aggregated, following the procedures and rationale for creating univariate parcels with the balancing approach; the three items belonging to the social-supportive subscale into one parcel, the eight items belonging to the task-involving subscale into two parcels, and the four items belonging

to the autonomy-supportive subscale into one parcel. In addition, the seven items representing the ego-involving subscale were aggregated into two parcels and the six items that constituted the controlling subscale were assigned to three parcels.

Latent Variable Modeling

Model estimation. In this study, 121 (62.7%) of the participating coaches responded to both questionnaire rounds (i.e., T1 = baseline; T2 = the repeated assessment); hence, 24 (12.4%) coaches responded only on T2 and 48 (24.9%) coaches responded only on T1, respectively.² With respect to missing data, we therefore assumed that a missing not at random (MNAR) mechanism could be evident in the data (see Enders, 2010 for details). Thus, a comparison of various estimation methods (i.e., robust Full Information Maximum Likelihood (FIML) estimation vs. Multiple Imputation; MI) was carried out in *Mplus* 7.31.³ It is, however, worth noting that “maximum likelihood and multiple imputation parameter estimates are not robust to departures from an MAR mechanism” (Enders, 2010, p. 289). In such cases, researchers are recommended to use MNAR models to perform their statistical analyses (Enders, 2010). Despite this relatively new way of dealing with MNAR data, researchers are also able to use ad hoc approaches when they are faced with this type of missing data (Enders, 2010). Indeed, it has been argued that researchers could “generate multiple imputations under an MAR mechanism, then add a constant to the imputed

² We performed independent samples t-tests in SPSS 21 to determine whether or not there were differences between dropouts and those coaches who responded on both assessments across the season. Bootstrap results, which was based on 10,000 resamples, revealed that dropouts reported higher levels of disempowering behaviors ($t = -3.03$; $df = 164$; $p < .05$; BC 95% CI[-.33 - -.07]; $d = .55$) and lower levels of empowering behaviors at T1 ($t = 3.21$; $df = 164$; $p < .05$; BC 95% CI[.11 - .45]; $d = .53$). Thus, the preliminary analysis indicated that the missing data could be MNAR (Enders, 2010). Implications of this finding will be discussed later in this study.

³ The longitudinal measurement model, using robust FIML estimation, yielded an acceptable fit to the data: $\chi^2(134) = 225.49$, $p < .001$, SRMR = .10, RMSEA = .06, (90% CI RMSEA = .05 to .07), CFI = .94. Imputing the missing responses (i.e., 200 imputed datasets), however, produced a better fit to the data: $\chi^2(134) = 192.07$, $p < .001$, SRMR = .08, RMSEA = .05, (90% CI RMSEA = .03 to .06), CFI = .96.

values to compensate for the possibility that the MAR-based imputations may be too high or too low” (Enders, 2010, p. 289). Applying Cohen’s benchmark for a medium effect size ($d = .50$), we subtracted one-half of a standard deviation (SD) unit from all the mean scores (Enders, 2010). For example, in this study, the SD of empowering behaviors, at T1, was 0.37, thus a constant of 0.18 was subtracted from the imputed data (Enders, 2010). Moreover, the idea of adding a constant to the imputed values is to investigate whether “the imputed data sets with and without the constant values may help assess whether the mean is sensitive to departures from an MAR mechanism” (Enders, 2010, p. 289). We therefore analyzed the dataset two times; namely, one with adding the constant to the imputed values and one without.

Invariance analyses. Measurement invariance has become more popular the last decade (Little, 2013). This may be due to the increased awareness among researchers that parameter estimates need to be invariant in order to compare them over time and across groups (Sass, 2011). As a researcher, however, there are some choices in regards to the scale setting of latent variables in SEM (Little, 2013). In this study, we chose the effects coding method of scaling, which is a relatively new and non-arbitrary method of identifying and scaling latent variables (Little, Slegers, & Card, 2006). This method is useful for analyses “where the means of the indicators and latent constructs are of key interest” (Little et al., 2006, p. 59). In addition, this method is well suited for measurement invariance analyses with both single-group and multiple-occasions models (Little et al., 2006).

Measures of overall model fit. The following model fit measures were used to evaluate the fit of the tested models: the Comparative Fit Index (CFI), the Standardized Root Mean Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA) in combination with its 90% confidence interval (CI). The model fit, however, was deemed acceptable if $CFI > .90$, $RMSEA < .08$, and $SRMR < .08$ (Little, 2013).

Invariance fit measures. Based on previous research (e.g., Sass, 2011), we used different invariance model fit measures to determine whether the more restrictive invariant models yielded acceptable fit to the data. The test of weak factorial invariance used the criteria as follows: $\Delta CFI < .01$, $\Delta RMSEA < .015$, and $\Delta SRMR < .03$. The test of strong factorial invariance used the following criteria: $\Delta CFI < .01$, $\Delta RMSEA < .015$, and $\Delta SRMR < .01$.

Semi-Structured Interviewing

Interviews. The recruitment of coaches for the post-season semi-structured interviews was based on the following eligibility criteria: (a) the coach's team had participated at both baseline and follow-up, (b) each region in the southern part of Norway was represented by four teams, and (c) teams with players of varying ages and at least one girl team were included in the sample. The individual interviews followed an interview guide focusing on coaches' views on motivation (e.g., how would you describe motivation), coaches' experiences with the ECTP (e.g., if you look back on this season, did you learn anything by participating in the ECTP), and perceived changes during the season (e.g., if you've made any changes, which benefits have you experienced as a result of making these changes). Note also that the second and third author, together with a research fellow, conducted all the interviews.

Interpretive interview data. The interviews were analyzed in light of the following questions: (a) what were the coaches' perceptions of the ECTP, (b) what did they learn, and (c) what elements of the ECTP content did they apply in their own coaching practices. When analyzing and presenting the data, we applied a hybrid analysis including both a data-driven inductive approach and a deductive a priori approach (Fereday & Muir-Cochrane, 2006). A hybrid analysis was found suitable, as the purpose of the analysis was to explain as well as illuminate the survey data, but at the same time being open to coaches' own experiences in a more inductive manner.

First, the interview transcripts were read and re-read to get a first impression of the data. The formal analysis began with a breakdown of the informants' responses into thematic themes or units of analysis or meaning units (e.g., perceptions of the ECTP, learning experience, and coaching practices). Second, after having identified meaningful units within each interview, the next step involved a cross-comparison to identify similarities in the reflections and possible crossover themes across the informants. Third, differences and similarities were discussed to secure common understanding and trustworthy interpretations. To provide critical assessment of the text and to help reveal patterns, two of the co-authors carried out the analysis separately (Fereday & Muir-Cochrane, 2006). The three themes that explicitly related to the ECTP that emerged from the interview transcripts were: (a) the value of the content and the training program, (b) the importance of autonomy, involving the players, and the feeling of mastery, and (c) change in coaching practice.

Results

The Longitudinal CFA Model

Table 1 displays the mean structure information, factor scores, and the correlations between the latent constructs in this study. The coaches reported stable levels of both self-reported empowering and disempowering behaviors across the season. Further, the longitudinal null model that represented coaches' self-report measures of empowering and disempowering behaviors over time displayed the following result: $\chi^2 (171) = 1577.40, p < .001$. The longitudinal measurement model, with strong factorial invariance constraints in place, yielded a good fit to the data: $\chi^2 (134) = 192.07, p < .001, SRMR = .08, RMSEA = .05, (90\% \text{ CI } RMSEA = .03 \text{ to } .06), CFI = .96$. The increasingly restricted models (i.e., configural, weak, and strong invariance) with their fit statistics, respectively, are presented in Table 2.

We used the Wald test statistics to examine whether the latent factor means of coaches' self-reported empowering and disempowering behaviors were equivalent or different from zero across the season (Enders, 2010). Adding the constant to the imputed data ($n = 200$ imputed datasets), the result from the Wald z test for empowering behaviors was $\omega = .17$ ($p = .68$), and the result from the Wald z test for disempowering behaviors was $\omega = 1.00$ ($p = .32$). Without adding the constant to the imputed data, however, the result from the Wald z test for empowering behaviors was $\omega = .23$ ($p = .63$), and the result from the Wald z test for disempowering behaviors was $\omega = .55$ ($p = .46$). Consequently, findings indicated that the latent factor means did not depart from an MAR mechanism.

Mplus 7.31 also provides advanced tactics to both make pairwise comparisons and estimate effect sizes of repeated measures. Therefore, we used the model constraint command to compute and test new parameters (i.e., the change score for each latent factor and Cohen's effect size d). Findings showed that the change in self-reported empowering behavior was nearly zero ($\Delta = .01$; $d = .03$), as was the change in self-reported disempowering behavior ($\Delta = .01$; $d = .03$).

The Association between the ECTP Manual and Coaches' Self-Reported Behaviors

We investigated the relationships between the ECTP manual and coaches' post-season empowering and disempowering behaviors. The questionnaire measuring coaches' perceptions of the ECTP manual displayed a very good fit to the data: $\chi^2(5) = 8.37$, $p > .05$, SRMR = .02, RMSEA = .06, (90% CI RMSEA = .00 to .13), CFI = .99. Additionally, the longitudinal structural model (see Figure 1) yielded a good fit to the data: $\chi^2(227) = 306.62$, $p < .001$, SRMR = .07, RMSEA = .04, (90% CI RMSEA = .03 to .05), CFI = .96. The standardized association between the manual and coaches' post-season empowering behaviors was non-significant ($\beta = .04$; $p = .66$), as was the standardized association between the manual and coaches' post-season disempowering behaviors

($\beta = -.03$; $p = .70$). Nevertheless, the ECTP manual was positively related to empowering behaviors ($r = .19$; $p = .04$) and negatively related to disempowering behaviors ($r = -.18$; $p = .06$) at T1.

Post-Season Interviews

Theme 1: The value of the ECTP content and the training

All the coaches perceived the ECTP to be useful, concrete, and had good and practical examples to demonstrate the content. Several highlighted that the focus on creating a conducive motivational climate and addressing the psychosocial dynamics of coaching in youth sport was a somewhat new focus in relation to previous coaching courses; as such courses often had a technical and football-specific content, “Important themes to highlight as previous training courses have little focus on these themes” (Coach 2; C2). However, several coaches also expressed that the content was somewhat familiar, but still gave them a reminder. Some expressed that the training increased their confidence in their role as a coach, “It has helped me, even though I share the philosophy and the ideas the course is built on, it has made me more conscious and has confirmed that what I am doing is right” (C10).

Another point highlighted was that even though some of the content was already known, some expressed that, “It still made me reflect on my own coaching practice” (C9). A third point was that the coaches really valued the opportunity to discuss and reflect together with other coaches, as one expressed, “It was invaluable to be able to discuss with the other coaches that day, so much expertise gathered in one room” (C5).

In correspondence to the value of the content, the coaches asked for more training in these matters, as this training was limited to a one-day (i.e., six-hour) workshop. Several pointed to the value of possibly having two or three follow-up sessions to gain more insight and help them keep the intervention content in focus over time. For example, one of the coaches still asked for

opportunities to help him/her stay focused, “Very useful with the lectures that day, but it tends to slip, so a follow-up with a day or two would have been helpful” (C4). The coaches who belonged to the same club were able to discuss and reflect together after the initial training. Others who did not have that possibility expressed, “The club could have facilitated a meeting once or twice a month for sharing experiences and keeping focus” (C8).

Theme 2: The importance of autonomy; involving the players, and the feeling of mastery

With regard to what the coaches perceived they learned from the training, two themes were highlighted. The first theme was the importance of autonomy, involving the players in both training and matches to keep them motivated:

“So that was something I picked up on during the course, that autonomy is important to enable players to feel ownership for what they are doing, and maybe that gives extra motivation, as when they have made their own suggestions, then they have to follow up on their own choices.” (C11)

Or as another coach put it:

“Autonomy, talking to the players and asking what they think they need to practice on, getting them involved in the choices they make... the most important part is the process, that they have a say and feel that they are being heard, not merely the coach telling them everything they have to do.” (C1)

Another point that is closely linked to the previous one was to put the players in focus and see everyone: “We are youth football coaches and it is important to see every player (not only the most clever ones) ... So, I think that was what I got most out of the training” (C2).

The second theme was how important the feeling of mastery was for sustained motivation. Several coaches had previously been focusing on mastery, but they expressed having gained more knowledge on how this might influence players' motivation:

“We discussed a lot how important motivation is for learning new skills. If you are demotivated then you will not be able to utilize instructions and learn new skills, and if you do not master them you will not keep on training, so enabling mastery at one's own level right from the beginning is the most important.” (C5)

Theme 3: Change of coaching practice

Along with their outlining of learning outcomes, the coaches expressed some concrete changes that they had made to their own coaching practices as a result of the increased insight. One change was enabling autonomy and involvement for the players through arranging player meetings for discussion on what the players wanted to achieve with the team, how and what to focus on at the pitch, and enabling the players to create their own rules for respectful interaction and a good social environment.

The importance of balancing rules and regulations with having fun was also perceived as important and, for some, this included loosening up a bit and switching focus, “I have loosened up a bit on the pitch and am not so occupied with discipline... thinking that it isn't that important if they meet up five minutes late. The training was a reminder to me, that the most important is to have fun and that they keep playing football as long as possible” (C7).

The second change the coaches made was to pay more attention to the players' feelings of mastery. Several coaches highlighted that the training had made them more aware of paying attention to those players that were not as skilled. Enabling mastery for all the players was expressed as important by nearly all the coaches. The practical approach to this was that they had

taken on more differentiation in general and used exercises with different levels of difficulty on the pitch, “Take, for instance, the crossover passing. Some might do this in a fast pace while others have to lower the tempo and focus on the basic skills needed to be able to apply this” (C4). They also structured more of the training in small groups, linking together players at similar skill levels:

“We have players who can pass the ball 60 meters across the pitch and some that manage only 6 meters, so they will not benefit from doing the same exercise. We therefore put those with similar skills in groups that match their skill level.” (C5)

The participating coaches also expressed being more aware of giving individual feedback, and applying the same exercises more than once in order to be able to monitor improvements. Before participating in the ECTP, coaches had typically used a variety of exercises because they believed it would be boring for the players to do the same exercise over and over again. Lastly, the players were given more opportunities to play in the same positions in each match to make them more secure in their role on the team.

Discussion

Three research questions were formulated in the current study. First, do coaches who participate in the ECTP differ in their self-reported empowering and disempowering behaviors from pre- to post-season? Second, is there a relationship between coaches’ perceived usefulness of the ECTP manual and their post-season empowering and disempowering behaviors? Third, what do coaches consider to be the utility value of participating in the ECTP? The quantitative results showed that coaches’ self-reported empowering and disempowering behaviors did not differ from pre- to post-season. In addition, the quantitative results showed that coaches’ perceptions of the ECTP manual, as a useful educational tool, did not relate to their post-season empowering and disempowering behaviors. The post-season interviews, however, showed that coaches perceived

themselves to benefit from participation in the ECTP. Although coaches highlighted that having the opportunity to participate in follow-up sessions would have been valuable, they also reported that their participation had led them to reflect on as well as change their own coaching practices in order to facilitate greater involvement and mastery experiences for their current players. We start out with a discussion of the philosophical implications of using both quantitative and qualitative methods in a sequential MMR study. We then discuss our findings. Next, we outline the limitations of our data and plausible future directions. We close this study with a summary of our findings.

Drawing on the Strengths of both Quantitative and Qualitative Methods

With respect to the scientific explanation of our results, it is worthwhile to consider the philosophical implications of combining quantitative and qualitative methods in a sequential mixed methods study (Borsboom, Mellenbergh, & Van Heerden, 2003; Hathcoat & Meixner, 2015; Hesse-Biber & Johnson, 2013). Hence, we must embark upon a philosophical discussion of the meaning of the results presented in the current study. Moving from latent variable modeling in SEM to individuals' subjective beliefs involve a shift in philosophical approach; hence, researchers move from a postpositivist stance towards a social constructionist stance (Hesse-Biber & Johnson, 2013; Johnson & Onwuegbuzie, 2004). The shift in philosophical approach also implies that the underlying assumptions change, assuming there are both 'one reality awaiting to be discovered' and 'multiple realities' (Hesse-Biber & Johnson, 2013). As a consequence, we must consider the ontologies of latent variables and social constructionism (e.g., Borsboom et al., 2003; Bryman, 2012; Hesse-Biber & Leavy, 2010). The ontology of latent variables may be divided into three ontological frameworks: realism, constructivism, and operationalism (Borsboom et al., 2003). However, to connect the operational latent variable (i.e., a function of the observed variables) to the formal latent variable (i.e., the independent variable in a regression model is latent instead of

manifest), researchers have little choice in freely choosing among the three aforementioned frameworks (see Borsboom et al., 2003 for details). In fact, researchers must choose realism, maintaining that “theories are true or false, theoretical entities exist, and theoretical entities are causally responsible for observed phenomena” (Borsboom et al., 2003, p. 208), partly because the search of matching theoretical relations and relations in reality, the choice of a reflective measurement model, and the idea of estimation invoke the ontological stance of realism. For example, the reflective measurement model in SEM implies that “the response on the questionnaire items is thought to vary as a function of the latent variable. In this case, variation in the latent variable precedes variation in the indicators” (Borsboom et al., 2003, p. 208). Additionally, it is worth noting that Borsboom and colleagues (2003) argued that:

“One may reframe this question as the question of whether latent variable models are philosophically neutral. It has been argued that this is not the case. The mathematical and empirical connotations of the latent variable may be considered neutral. In a sense, neither requires the word latent; the formal latent variable is a mathematical concept, and the operational latent variable is a weighted sumscore. It is in the connection between these two concepts when we use the syntax of latent variable theory to estimate something with the weighted sumscore that the theory takes side with realism.” (p. 216)

Conversely, social constructionism involves concepts, such as understanding, interpretation, and social meaning (see Hesse-Biber & Leavy, 2010 for details). Moreover, the social constructionist posits that subjective meaning is constructed in either the interactions taking place between individuals, or between individuals and objects (Hesse-Biber & Leavy, 2010). This, in turn, implies that “the only way to understand social reality is from the perspective of those enmeshed within it” (Hesse-Biber & Leavy, 2010, p. 17).

Taken together, and given the “need to distinguish along a continuum aspects of inquiry that are relatively neutral from those that are more prescriptive in character” (Hathcoat & Meixner, 2015, p. 5), we will now discuss whether the issue of incompatibility occurs, or fails to occur, in this study. In the pursuit of investigating the formulated research questions, we included two contradictory philosophical positions within the current study (Borsboom et al., 2003; Hesse-Biber & Leavy, 2010). Nevertheless, the interested reader should keep in mind that the qualitative inquiry in this study was based on a hybrid approach, involving the “the data-driven inductive approach and the deductive a priori template of codes approach” (Fereday & Muir-Cochrane, 2006, pp. 82-83). Thus, given that interviews may be relatively neutral (Hathcoat & Meixner, 2015), and that the interviews were partly analyzed using a deductive approach, it seems proper here to argue that the issue of incompatibility failed to occur in the current study. It should, however, be noted that this would not have been the case if the qualitative inquiry was solely based on a data-driven inductive approach. This, in turn, is important with regard to the issue of integration, which is “a defining feature of MMR, indicating a merging or synthesis at different levels of inquiry, such as data, design, and/or interpretations” (Hathcoat & Meixner, 2015, p. 14).

Making Sense of the Quantitative and Qualitative Findings

This study collected data on both pre- and post-training coach behaviors, and subsequently used a confirmatory factor analysis (CFA) framework to compare the latent factor means of coaches’ self-reported empowering and disempowering behaviors. Langan and colleagues (2013) argued in their systematic review that “future research should extend evaluation of interventions to include assessments of coach behaviors both before and after coaches receive the intervention” (p. 46). Additionally, this study demonstrated that the longitudinal measurement model of coaches’ self-reported empowering and disempowering behaviors retained strong factorial invariance. It is

well understood that measures need to possess strong factorial invariance in order to compare latent factor means (i.e., equal factor loadings and intercepts over time; see Little, 2013; Sass, 2011). Thus, the tested measurement model reduced the probability of making “inaccurate inferences associated with statistical and practical significance” (Sass, 2011, p. 347).

While this study did not examine the effectiveness of the ECTP and did not include observed coach behavior, our findings parallel previous research suggesting that coach education initiatives have a relatively limited impact on coaches’ actual coaching practices (e.g., Côté, 2006; Stodter & Cushion, 2014). For example, Côté (2006) argued that two main factors generally limit the impact of coach education initiatives. First, despite being theoretically informed, brief programs are hardly enough to prepare coaches for the reality that meet them in the coaching context. Second, the top-down approach in designing coach education programs may limit the possibility that behaviors and philosophies embedded in coach education programs transfer to real coaching situations on the training ground. In addition, Stodter and Cushion (2014) argued that the relation between coaches’ learning and coach education could be referred to as a study of cultures in conflict. The results from their study revealed apparent contrasts between coaches’ distinctive club cultures and the implicit philosophy of the coach education program. These coaches were apt to focus on the program material that complemented their existing knowledge and practices and, therefore, were more likely to reject the ideas that were discordant to their views on what had previously worked in their practice contexts displaying minimal changes in observed behaviors over time.

The post-season interviews, however, showed that all coaches perceived the content of the ECTP as valuable and useful. For example, coaches expressed that the ECTP provided a somewhat new focus compared to previous experiences from other coach education programs, which was considered largely technical and football-specific in nature. This finding is consistent with those

from previous research suggesting that coach education programs have “tended to prioritize knowledge related to the technical, tactical, and bio-scientific aspects of sporting performance” (Cassidy et al., 2006, p. 154). As highlighted in the first theme, the interviews showed that the coaches valued the opportunity they were given to discuss and reflect with other coaches during the ECTP workshop session. In this respect, it is likely that the coaches who participated in the ECTP would have further benefited from increased interaction with other coaches during the season because it could, to a greater extent, have contributed to their own knowledge development. This is in line with Cassidy and colleagues (2006), which found that the coaches who participated in the CoDe program also valued the opportunity they were given to discuss, debate, and share ideas with other coaches while participating in the CoDe program. The ECTP might also have benefited from communicating the intrinsic value of providing empowering and disempowering behaviors to players for coaches themselves. Indeed, previous research has shown that provision of autonomy-supportive behaviors to others is positively related to the providers’ experience of psychological well-being (e.g., Deci, La Guardia, Moller, Scheiner, & Ryan, 2006; Solstad, Van Hoyer, & Ommundsen, 2015). Including this piece of evidence into the ECTP could therefore help raise the coaches’ consciousness on the advantages of being an empowering coach even further.

Moreover, the limited self-awareness among youth sport coaches of how they actually behave in relation to their players has been highlighted as a problematic issue in previous research (Partington & Cushion, 2013; Smith, 2014; Smith & Smoll, 2011). This being said, the participating coaches may have given pre-test responses based on inaccurate perceptions of their actual behaviors, and then adjusted their responses on the post-test because they became more aware of what it takes in practice to be an empowering coach, as opposed to a disempowering coach, after they attended the ECTP workshop. On the other hand, the limited change in coaches’ self-reported behaviors may very well be a consequence of both conceptual and operational

limitations induced by ceiling and floor effects, respectively (Ward, Guthrie, & Alba, 2014). Conceptually, coaches reported high baseline values of empowering behaviors and relatively low baseline values of disempowering behaviors, thus, these coaches, exemplified with empowering behaviors, may have “passed a threshold where further improvement is difficult to perceive reliably and judgments regarding improvement become difficult” (Ward et al., 2014, p. 695). From an operational perspective, a prerequisite for determining statistical change is that the latent construct actually has the sufficient sensitivity to register a change, should it occur.

As argued by Langan and colleagues (2013), previous psychosocial training interventions have been criticized for relying on designs with obvious weaknesses. To meet with some aspects of this criticism, the ECTP took advantage of recent calls in the sport psychology literature by also including pre-training coach behaviors and investigation of intervention fidelity (e.g., Duda et al., 2013; Van Hoya et al., 2015). Despite a number of improvements (e.g., a more extensive didactic presentation of the training content) made use of within the PAPA project, seemingly even helping coaches to be more self-aware of their own behaviors does not seem sufficient to change their self-reported behaviors during the season. This being said, a second follow-up assessment might have increased the possibility of detecting change in self-report of behaviors that were needing of more time to become a part of coaches’ own coaching practices. Indeed, it has been argued that “the lack of follow-up is also a major issue with applied coaching research” (Langan et al., 2013, pp. 46-47).

Furthermore, the post-season interviews showed that the participating coaches expressed certain attitudes that were in line with the intended effects of the ECTP. The second theme in the qualitative results section particularly highlighted two important issues: (a) the importance of autonomy and involvement, and (b) the players’ feelings of mastery. With regard to the former, it seemed that some of the coaches had not previously considered the implicit relationship existing between the psychological need to be autonomous and players’ type of motivation and

performance. For example, one of the coaches mentioned that the ECTP had taught him/her the importance of letting players act with a sense of volition to help facilitate the quality of their own motivation. This result, however, fits well with the argument of Deci and Ryan (2012), arguing that “a central function served by the concept of autonomy within SDT is to differentiate types of motivation with their corresponding qualities of functioning” (p. 86). As a consequence, the educational experience may have influenced the coaches’ self-reporting to be more realistic in the sense that coaches’ responses at T2 may have been more in line with their actual behavior after having participated in the ECTP. Continuing to incorporate the concept of autonomy in future research seems therefore necessary if the goal is to promote autonomous motivation, psychological health, and effective performance among children and adolescents who participate in youth sport.

The other key finding in the second theme reflected the importance of considering players’ feelings of mastery. Although several coaches had previously focused on this issue, they expressed having increased their understanding of the relationship existing between the feeling of mastery and players’ sustained motivation after participating in the ECTP. The participating coaches highlighted that the ECTP had taught them that players need to feel mastery to keep on training because motivated players will largely make more use of the coach’s instructions and learn new sport-specific skills, which in turn, will produce strengthened feelings of mastery. According to previous research (e.g., Cassidy et al., 2006), existing coach education initiatives have, to a lesser extent, focused on the pedagogical as well as the psychological aspects of the role as coach in youth sport. Despite the limited change in self-reported empowering and disempowering behaviors from pre- to post-season, findings from this study seem somewhat promising. It would be useful, however, if future research provided youth sport coaches with the opportunity to gain deeper insights into the influence of interpersonal contexts on players’ feelings of being competent. This

is because numerous studies over the years have demonstrated the crucial role of competence in the development of young people (Deci & Roberts, 2012; Roberts, 2012).

In contrast to recent research (e.g., Stodter & Cushion, 2014) and our quantitative results, the post-season interviews indicated that the participating coaches had made changes to their own coaching practices, which were in line with the guidelines given by the conceptual and empirical foundation of the ECTP (Duda, 2013). In practical terms, this meant that the coaches: (a) arranged player meetings to involve their players in decision making regarding the team, (b) balanced rules and regulations with having fun, (c) paid attention to all players on their team, (d) focused on enabling mastery for all their players, and (e) provided individual feedback to each player. One may question, however, whether linking players who are at a similar skill level together is a reasonable strategy in relation to players' quality of motivation and their intentions to continue playing football in the future (Roberts, 2012; Smith & Smoll, 2011). Roberts (2012) argued that this would actually require coaches to treat all the skill groups similarly by giving equal instructional time, opportunities, encouragement, and attention to the different groups of players.

Put in perspective, findings from the interviews, in combination with the interpretation that the ECTP content may have led to a calibration (i.e., in this case standstill) of the coaches' responses to the empowering and disempowering climate aspects, open up for a more optimistic evaluation of the impact of the ECTP on the participating coaches. Taking stages of change as a starting point, it may well be that the ECTP helped move the coaches from a pre-contemplation stage to a contemplation stage in which coaches raised their consciousness and started to reflect on their personal behavior – typical processes of change between the pre-contemplation and contemplation stage (see Courneya & Bobick, 2000 for details). In terms of the results from the post-season interviews, these entailed few individuals. Hence, generalizing these findings to the total sample of coaches may represent a problem (Bryman, 2012). Indeed, the interview data in the

current study can only be referred to as “a database for making judgments about the possible transferability of findings to other milieux” (Bryman, 2012, p. 392).

Finally, no studies have specifically tested the relationship between handing out coaching manuals with guidelines for creating a conducive motivational climate and post-season coach behaviors. Therefore, in an attempt to advance the current sport psychology literature, we examined the perceived usefulness of the ECTP manual on coaches’ post-season empowering and disempowering behaviors. Although there were no associations between the ECTP manual and coaches’ post-season behaviors, findings still showed a positive relationship between the perceived usefulness of the ECTP manual and coaches’ empowering behaviors at the beginning of the sport season. In contrast, there was no relationship between the perceived usefulness of the ECTP manual and coaches’ disempowering behaviors at the beginning of the sport season. We did not trace the amount of use of the ECTP manual throughout the sport season, thus future research should certify the extent to which coaching manuals are used during the sport season by coaches participating in the intervention arm of future psychosocial training interventions. Moreover, it is worth noting that a large proportion of coaches are blissfully unaware of what they are doing on the training ground, or in competitions, and additionally, that athletes are far more accurate perceivers of coaches’ actual behaviors than coaches themselves are (see Smith, 2014 for details). Thus, given that the participating coaches were encouraged to use the ECTP manual in their everyday life to bring about behavior change in accordance with the Empowering Coaching™ guidelines, but were not explicitly trained to use the manual in order to self-monitor their own coaching behavior, it is not surprising that the ECTP manual was unrelated to coaches’ post-season behaviors.

Limitations and Future Directions

It is important for the interested reader to be aware of certain limitations in the current study. First, this study relied on self-report data. This might be a limitation because self-report data and actual behaviors are rarely completely matched (Baumeister, Vohs, & Funder, 2007). Future research focusing on psychosocial training interventions should therefore include observational data on coaches' behaviors (Smith & Smoll, 2011). Second, the current design was not set out to examine intervention effects. Rather, our main purpose was to follow coaches participating in the ECTP from pre- to post-season as well as taking advantage of a combination of quantitative and qualitative inquiries. Previous reviews, however, has emphasized the need of follow-up assessment in future studies (e.g., Langan et al., 2013). This is because one cannot estimate the shape of the change in coaches' self-reported behaviors by relying only on two assessment points. By including more assessment points, preferably more than three, researchers could examine the shape of the trajectory. As such, we would be in a better position tracing whether positive opinions and reported learning outcomes emanating from the interviews could be mirrored in coaches' self-reporting of empowering and disempowering behaviors at a later stage. Third, we detected differences in self-reported empowering and disempowering behaviors at T1 between dropouts and those coaches who responded on both of the repeated measures. Ad hoc sensitivity analyses were therefore performed to test the MAR-based estimates. Findings showed that the multiple imputation parameter estimates did not depart from an MAR mechanism. It is, however, worth noting that the Wald z test estimates were higher for empowering behaviors and lower for disempowering behaviors when the constants were not added to the imputed values.

Finally, taking into account the depth and influence of coaches' pre-existing knowledge and values, a brief coach education program may not necessarily be enough to stir coaches' behaviors (e.g., Côté, 2006; Gilbert & Côté, 2013; Stodter & Cushion, 2014). Nevertheless, it

should be kept in mind that pre- to post-season differences in coaches' self-reported behaviors may have been suppressed by ceiling and/or floor effects as well as conceptual changes in coaches' understanding of what it means to be empowering and disempowering based on their participation in the ECTP. Lastly, having a cost-benefit perspective in mind, it is also important to recognize that the ECTP was developed as a theoretically framed training program formatted to ease dissemination and adoption among the larger population of youth sport coaches (Duda et al., 2013).

Conclusions

This study examined pre- to post-season differences in self-reported empowering and disempowering behaviors among coaches who participated in the Norwegian arm of the ECTP using a sequential mixed methods design. Although the quantitative results showed that there was no statistical difference from pre- to post-season in self-reported empowering and disempowering coach behaviors, the post-season interviews showed that the participating coaches reported the ECTP to be a useful educational experience. Indeed, coaches noted that the ECTP had made them reflect on their own coaching practices, leading to an increased focus on players' need for autonomy and feelings of mastery. Thus, a sequential mixed methods design may be a strategy helping sport psychology researchers to provide more complete and insightful answers to their research questions in coach education.

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Figure legend

Figure 1 – Structural model of empowering and disempowering coach behaviors at T1 and T2, and the influence of the ECTP manual.

Note. All regression path coefficients are standardized and non-significant pathways ($p > .05$) are denoted by dotted arrows. For presentation simplicity, indicators and residual covariances are omitted.

TABLE 1*Means (adjusted means), Standard Error (adjusted S.E.), factor scores, and correlations for the study variables*

	<i>M</i>	<i>S.E.</i>	<i>Factor scores</i>	1	2	3	4
1. Empowering behaviors (T1)	4.24 (4.05)	.03 (.03)	.95	-			
2. Disempowering behaviors (T1)	2.10 (1.87)	.04 (.04)	.93	-.69***	-		
3. Empowering behaviors (T2)	4.25 (4.06)	.03 (.03)	.96	.72***	-.56***	-	
4. Disempowering behaviors (T2)	2.11 (1.89)	.04 (.04)	.92	-.53***	.70***	-.55***	-

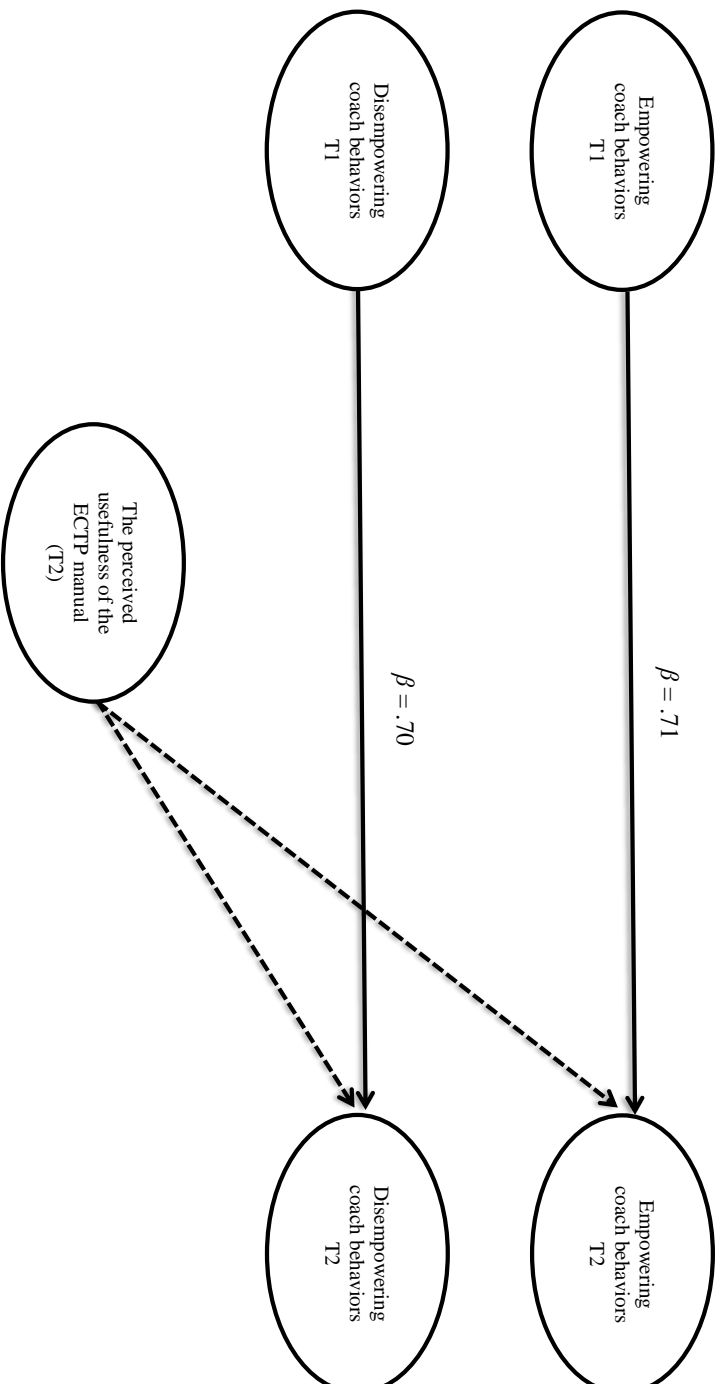
Note: Correlations involving T1-T2 variables $N = 193$. Factor scores $> .80$. *** $p < .001$.

TABLE 2

Model fit statistics for the tests of empowering and disempowering coach behaviors across two repeated measures

Model tested	χ^2	df	p	RMSEA	Δ RMSEA	RMSEA 90% CI	SRMR	Δ SRMR	CFI	Δ CFI	Pass?
Empowering/ disempowering coach behaviors											
The null model	1577.401	171	.0000	---	---	---	---	---	---	---	---
Configural invariance	175.689	120	.0007	.049	---	[.032; .064]	.075	---	.960	---	Yes
Weak invariance	181.097	127	.0012	.047	-.002	[.030; .062]	.079	+.004	.961	+.001	Yes
Strong invariance	192.067	134	.0008	.047	---	[.031; .062]	.078	-.001	.958	-.003	Yes
Constraining latent factor means over time	192.724	136	.0010	.046	-.001	[.030; .061]	.078	---	.959	+.001	Yes

Note. The test of longitudinal factorial invariance was conducted on the Norwegian group of intervention coaches $N = 193$.



Article IV

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A Bayesian Approach to the Validation of the Empowering and Disempowering Motivational
Climate Questionnaire-Coach (EDMCQ-C)

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Abstract

The purpose of this study was to validate the Empowering Disempowering Motivational Climate Questionnaire-Coach (EDMCQ-C) using Bayesian methods. Importantly, though, we sought to validate the EDMCQ-C using coaches' self-report of their own behavior. Participants were two samples of youth football (i.e., European soccer) coaches. The first sample comprised 222 Norwegian coaches ($M = 42.28$; $SD = 6.07$; Males $n = 202$; Females $n = 20$), whereas the second sample comprised 125 French coaches ($M = 33.36$; $SD = 12.97$; Males $n = 117$; Females $n = 8$). Findings showed that a reduced two-factor model displayed an adequate data-model fit in both samples. Findings also supported approximate measurement invariance across the two groups. Several intercepts were noninvariant, indicating differences in levels on the underlying items. Concerning future research, we encourage researchers to rethink the development of the EDMCQ-C due to its difficulties with replicating the original proposed factor structure.

Key words: Bayesian statistics, scale validation, EDMCQ-C, the coach's perspective, self-assessment, approximate measurement invariance

Introduction

John G. Nicholls acknowledged in 1979 that a justifiable goal in achievement settings ought to be equality of optimum motivation in young people's development (Nicholls, 1979). To be more specific, it was argued that the situations in which people find themselves might produce "inequalities in the motivation necessary to develop skills" (Nicholls, 1979, p. 1075). Indeed, in the aftermath of this publication, empirical evidence repeatedly indicated that the environment plays a critical role in the shaping and socializing of individuals' motivational patterns (e.g., Ames & Archer, 1988; Ryan, 1982). Thereafter, a significant amount of research has been undertaken to examine how the coach-created achievement setting (i.e., the motivational climate; Ames, 1992) influences athletes' cognitive and affective processes, and thus their achievement behavior in sport (see Harwood, Keegan, Smith, & Raine, 2015 for a review).

Two contemporary theories of motivation; namely, Achievement Goal Theory (AGT; Nicholls, 1989) and Self-Determination Theory (SDT; Deci & Ryan, 2012) have guided the majority of research on motivational topics in sport and physical activity settings. In a recent study, however, Duda (2013) proposed a new conceptualization of the coach-created motivational climate, and in doing so, the two theoretical frameworks were integrated in such a way that the what (i.e., the goal content), why (i.e., goal motives), and how (i.e., the coach's influence on his/her athletes) of coaches' behaviors were addressed. More specifically, coach behaviors, which have been shown to hold motivational significance for athletes, were united in the underlying dimensions of 'empowering' and 'disempowering' coach behavior. Thus, the Empowering and Disempowering Motivational Climate Questionnaire-Coach (EDMCQ-C) was composed by relying on a number of previous multi-item measures designed to assess contextual influences, all derived from the AGT and SDT perspectives (see Appleton, Ntoumanis, Quested, Viladrich, & Duda, 2016 for details). The primary focus in past research on the coach-created motivational

climate in youth sport has been on athletes' perceptions of their coaches' behaviors, whereas coaches' perceptions of their own behavior has tended to be an overlooked aspect in previous studies (Horn, 2008). Consequently, this study attempted to fill this void by validating the EDMCQ-C from the perspectives of youth football coaches. We also used Bayesian statistics, which represent a different theoretical and statistical validation approach compared to the commonly applied frequentist approach (i.e., maximum likelihood estimation).

The Concepts of Empowering and Disempowering Coach Behavior

In the process of validating the EDMCQ-C from the coach's perspective, it is also worth noting the origin of the concepts of empowerment and disempowerment, thereby discussing whether these concepts are akin with the concepts referred to in the AGT and SDT literatures. The concept of psychological empowerment evolved originally from Paulo Freire's published work in the early 1970's, and it provides explanations for inequalities among different groups of people living in the society (Stephens, 2008). Moreover, its underlying philosophy is concerned with the fact that participation is of no real benefit to individuals unless it also includes helping them to gain control of the activities they are involved in (Stephens, 2008; Zimmerman, 1995).

Building upon the foregoing, Nicholls (1979), too, argued that all children should have equal opportunities for attaining their intellectual potential. Indeed, it was argued, "fulfillment of potential is taken to mean that everybody should achieve the best that is possible for them. Therefore, equality is conceived so that it implies maximum quality" (Nicholls, 1979, p. 1071). Hence, Nicholls holds that task involvement is a type of coach behavior that aims to enhance athletes' sense of certainty in accomplishing achievement tasks that they feel uncertain of being able to complete, thereby also increasing their faith in their own athletic abilities and perceived competence (Nicholls, 1989). The concept of psychological empowerment and empowering coach

behavior also fits well with the SDT framework (Deci & Ryan, 2012). SDT emphasizes that in order for people to remain autonomous in their life activities, they ought to find themselves in situations characterized by an autonomy-supportive interaction style. The reason for this is that people are acknowledged in this type of situation, which in turn, means that they are given some choice and are encouraged to contribute with their own opinion (Carpentier & Mageau, 2013; Deci & Ryan, 2012).

Disempowerment, in contrast, involves depriving individuals of authority, personal control, and influence (Zimmerman, 1995). Hence, the process of experiencing disempowering coach behavior is likely to make athletes feel ineffectual, less in control, and unimportant, thereby adversely affecting the quality of their participation in sport. From the AGT perspective, ego-involving coach behaviors revolve around whether athletes' ability is judged as either high or low on the basis of the ability of athletes in a normative reference group (Nicholls, 1984). This type of coach behavior focuses on athletes' ability relative to that of other team members. More specifically, although ego-involving coaches acknowledge that task mastery is improved by effort (Nicholls, 1984), it is still those athletes achieving task mastery with minimum effort who are given the most attention by the coach (i.e., the most talented athletes). Hence, ego-involving coach behaviors pay little attention to task difficulty, the pace of instruction, and the fact that each athlete learns at a different pace (Ames, 1992). Athletes finishing at a slower pace, and particularly those who are judged low in ability, may therefore develop a somewhat ambivalent view regarding effort and performance (Nicholls, 1984). While acknowledging that effort is needed to develop athletic skills, and that practicing with high levels of effort is a requirement to accomplish personally valued and personally challenging achievement tasks, athletes may indeed experience this requirement as very challenging. First, learning is an insufficient basis of perceived competence in an ego-involving climate. Second, optimum effort will eventually reveal athletes' current level of

performance (Nicholls, 1989). Consequently, ego-involving coaches may limit the chances of a large proportion of athletes demonstrating their athletic ability, and ultimately of fulfilling their athletic potential. This, in turn, implies that athletes' proactive behaviors, including the continuation of sport-specific practice taking place outside the training ground (e.g., Baker & Young, 2014), are likely to decrease over time. Additionally, ego-involving coach behaviors stand in contrast to the importance of optimum motivation in the development of youth athletic potential. Indeed, in alignment with the concept of empowerment, Nicholls (1979) argued, "If we observe that all children are optimally motivated, we are on the way to the goals of quality and equality. When any children are not optimally motivated we are making less than desirable progress toward these goals" (p. 1072).

Complementing the preceding arguments concerning disempowerment, SDT maintains that "in healthy individual development, people move in the direction of greater autonomy" (Deci & Ryan, 2012, p. 85). This stands in contrast to controlling coaching contexts, which are focused on imposing specific and preconceived ways of thinking, feeling, and behaving upon others (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010). Controlling coach behaviors are likely to induce a change in athletes' values and behavioral regulations; namely, changing the regulation of athletes' achievement behaviors from internal to external (Deci & Ryan, 2012). Thus, disempowering the athletes. Moreover, SDT typically refers to controlled extrinsic motivation when people enter situations in which they enact behaviors that represent some form of reward or punishment, or in other words, a contingency that is controlled by the coach. This, in turn, means that the process involving young athletes esteeming themselves to the degree that they perform well in sport will, in most cases, lead to achievement behaviors that are motivationally unstable in the long-term (Deci & Ryan, 2012). The underlying mechanism is that the behavioral and psychosocial outcomes are contingent on the perceived approval by the coach; hence, the coercive

force from the coaching context reduces the autonomy of athletes' achievement behaviors (Deci & Ryan, 2012).

Taken together, it seems that the concepts of empowering and disempowering coach behavior can be used to unite the conceptual distinctions between the AGT and SDT literatures in relation to the coach-created motivational climate.

Bayesian Statistics

Bayesian statistics have become increasingly popular in the past couple of decades (e.g., Kaplan, 2014; Van de Schoot et al., 2014; Zyphur & Oswald, 2015). This also applies in the sport psychology literature (e.g., Niven & Markland, 2016; Stenling, Ivarsson, Johnson, & Lindwall, 2015). It is worth noting, however, that recent research has warned proponents of the 'Bayesian revolution' against creating a new universal method of statistical inference (Gigerenzer & Marewski, 2015), as has been the case for significant p values the last half century (e.g., Gigerenzer, Krauss, & Vitouch, 2004; Ivarsson, Andersen, Stenling, Johnson, & Lindwall, 2015). That being said, compared with frequentist statistics (i.e., null hypothesis significance testing procedure; NHSTP), the Bayesian approach has several advantages. First, Gelman (2015) recently questioned whether $p < .05$ represents an eternal truth or even some version of the truth. In his response, special emphasis was put on the two following reasons: (a) uncertainty; and (b) variation. With regard to the former, knowing that statistically significant findings may both be representing the wrong direction as well as be an overestimate of the underlying effect (Gelman, 2015), Bayesian inference may help researchers with the uncertainty related to their own research findings. This, in turn, has to do with the fact that Bayesian results are more intuitive in nature, thus the interpretation is much more straightforward (Zyphur & Oswald, 2015). Specifically, the Bayesian view of probability is related to degrees of knowledge or degrees of belief (Van de Schoot et al., 2014; Zyphur & Oswald,

2015), and in line with this view, researchers can make inferences about their model given the observed data at hand, instead of making inference about their model given that the null hypothesis is true.

Additionally, we recognize that interactions among situational and personal factors in the athletic environment have a tendency to vary, meaning that research findings are likely to differ among individuals (e.g., athletes, coaches) who perform under different performance scenarios. Hence, it is hardly appropriate to draw statistical inferences (i.e., to accept or reject the research hypothesis based on the obtained p value) about parameters in a model using data from a single study (Gelman, 2015). Indeed, while frequentist statistics test the null hypothesis repeatedly, which in turn is similar to disregarding the importance of knowledge generated by previous studies, incorporation of background knowledge is an integral part of Bayesian estimation (Van de Schoot et al., 2014). Thus, the Bayesian approach to statistics has the ability to reduce the ‘noise patterns’ exceeding the threshold value for statistical significance (Gelman, 2015).

Second, Bayesian statistics is the only method that allows estimation of all possible residual correlations and cross-loadings without compromising model identification (Asparouhov, Muthén, & Morin, 2015; Zyphur & Oswald, 2015). This, in turn, will likely reduce positive bias in the data, thereby having important implications for maintaining the multi-dimensional characteristics of the psychometric measure, the discriminant and predictive validity of the latent variables, and the diagnostic usefulness of the multi-dimensional measure (see Kaplan, 2014; Van de Schoot et al., 2014; and Zyphur & Oswald, 2015 for more advantages on Bayesian statistics). Lastly, we would also like to acknowledge:

“Little is gained from switching to Bayes if you remain within a traditional hypothesis testing framework. We must move beyond the idea that effects are ‘there’ or not and the idea that the goal of a study is to reject a null hypothesis.” (Gelman, 2015, p. 640)

The Current Study

The validation process involves cross-validating the factor structure of the EDMCQ-C by using several groups of people, and in doing so, ensuring that the results remain the same in other samples from the same population (Gelman, 2015). In this regard, researchers are encouraged to conduct a measurement invariance (MI) analysis (Muthén & Asparouhov, 2013). Simply put, MI refers to the fact that constructs need to be factorially invariant (i.e., equal across time and/or groups) in order to compare them (Little, 2013). Furthermore, as mentioned previously, little research has been conducted on measures focusing on coach behaviors, as perceived by the coaches themselves. Hence, the main purpose of the current study was to use Bayesian Structural Equation Modeling (BSEM; Muthén & Asparouhov, 2012) to validate the EDMCQ-C using coaches' self-report of their own empowering and disempowering behaviors. A second purpose of this study was to examine cross-cultural equivalence of the EDMCQ-C. To this end, we used responses of both Norwegian and French youth football coaches that took part in the Promoting Adolescents Physical Activity (PAPA) project (see Duda et al., 2013 for details).

Methods

Participants and Procedure

The participants were 222 Norwegian (M age = 42.28 years; SD = 6.07; Males n = 202; Females n = 20) and 125 French (M age = 33.36 years; SD = 12.97; Males n = 117; Females n = 8) youth football coaches participating in the Norwegian and French arm of the PAPA project, respectively (Duda et al., 2013). In addition, the participating coaches had an average coaching experience of 7.41 years (SD = 6.88).

Prior to recruitment of the various football clubs, the Norwegian Centre for Research Data as well as the Joseph Fourier University Ethics Committee approved two arms of the PAPA project.

Each football club and its respective coaches were contacted and informed about the purpose of the study. When permission to approach the football clubs was granted, the research group in each of the two countries visited the clubs and distributed the questionnaire to the coaches. In addition, the coaches were given written information about the voluntary aspect of participating in the study and were informed about their opportunities to withdrawal from the study at any time.

Measures

Motivational climate. The EDMCQ-C comprises short form versions of the four following sub-scales: The Health Care Climate Questionnaire (HCCQ; Williams, Grow, Freedman, Ryan, & Deci, 1996), the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton, Duda, & Yin, 2000), the Social Support Questionnaire (SSQ; Sarason, Sarason, Shearin, & Pierce, 1987), and the Controlling Coach Behaviors Scale (CCBS; Bartholomew et al., 2010). Thus, the scale originally included 34 Likert-type items¹ reflecting aspects of empowering and disempowering motivational climates (Appleton et al., 2016). Note that the participating coaches in the current study filled out a Norwegian or French version of the EDMCQ-C, and that their responses were given on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

The empowering dimension consisted of task-involving behaviors (7 items; the coefficient Omega (e.g., Widaman, Little, Preacher, & Sawalani, 2011), $\omega = .81$; validity coefficient (VC) = .90; 95% CI = [.77-.84]; S.E. = .02; e.g., the coach is encouraging players to try new skills), and autonomy-supportive behaviors (4 items; $\omega = .60$; VC = .78; 95% CI = [.49-.69]; S.E. = .05; e.g., players are given choices and options).² Conversely, the disempowering dimension consisted of

¹ The original EDMCQ-C consisted of 34 items (Appleton et al., 2016), however, due to some negative and non-significant factor loadings across the two samples; the scale was reduced to 27 items in the current study.

² The latent factor representing coaches' socially-supportive behaviors consisted of two items, thus it was under-identified and could not be evaluated in terms of using GOF indices (Brown, 2006).

controlling behaviors (7 items; $\omega = .58$; $VC = .87$; 95% $CI = [.46-.66]$; $S.E. = .07$; e.g., the coach is less supportive towards players when they are not performing well on practices and in football matches), and ego-involving behaviors (7 items; $\omega = .74$; $VC = .90$; 95% $CI = [.68-.78]$; $S.E. = .02$; e.g., the coach devotes most of his/her attention to the best players).

Statistical Analysis

First, we examined the factorial structure in each sample separately by specifying and comparing a series of models following Appleton and colleagues (2016); five-factor BSEM, hierarchical BSEM, two-factor BSEM, and bifactor BSEM. In addition to the models tested by Appleton and colleagues (2016), we also estimated a reduced two-factor model (empowering and disempowering) as an alternative model. The lack of a consistent hierarchical or bifactor structure in Appleton and colleagues (2016) might suggest that a model with a simpler factor structure describes the data better. The five-factor and the two-factor models were both first-order models with correlated latent factors. The hierarchical BSEM contained five first-order factors and two correlated second-order factors, where the first-order factors (i.e., task-involvement, ego-involvement, autonomy support, social support, and controlling behaviors) were permitted to load onto one of two higher-order factors (i.e., empowering or disempowering motivational climate). The bifactor measurement model has recently been rediscovered to be a viable approach to assess dimensionality in multi-dimensional measures (Reise, 2012). Multi-dimensional measures, such as the EDMCQ-C, often correspond to a bifactor pattern (at least theoretically) with one or more general latent constructs alongside several latent subdimensions more narrowly defined (Myers, Martin, Ntoumanis, Celimli, & Bartholomew, 2014). With a bifactor model it is possible to simultaneously examine two sources of construct-relevant variance in terms of the influence of the general latent construct as well as the specific dimensions or subdomains on the items (Morin,

Arens, & Marsh, 2016). The general and specific factors were specified as orthogonal to ensure interpretability (Chen, West, & Sousa, 2006; Reise, 2012).

Second, we examined cross-cultural equivalence of the EDMCQ-C between the Norwegian and French samples by estimating approximate MI (Van de Schoot et al., 2013). The final model to be tested for cross-cultural equivalence was chosen based on an adequate data-model fit and a theoretically interpretable factor structure.

The Bayesian models were estimated with Markov Chain Monte Carlo (MCMC) simulation procedures and the Gibbs sampler. In all models, except the bifactor models, we specified zero mean, small-variance priors (0.01) on the cross-loadings and correlated residuals so that 95% of the loading variation is within ± 0.20 (Muthén & Asparouhov, 2012). In the bifactor models, we specified zero mean, small-variance priors (0.01) only on the cross-loadings. We used standardized factor indicators and factors; hence, a loading of ± 0.20 is considered small. A fixed number of iterations (50,000) were specified for each of the four MCMC chains when estimating the BSEM models. Every 10th iteration was used for estimating the posterior distributions by the use of thinning (THIN option in *Mplus*). Thinning is useful for reducing the autocorrelations (i.e., dependency) between the MCMC draws (Gelman et al., 2014), and makes the estimation less computationally demanding when a large number of iterations is needed for convergence (Muthén, 2010). The first half of the MCMC iterations (25,000) was discarded as burn-in iterations. Model convergence was assessed with the potential scale reduction factor (PSRF; Brooks & Gelman, 1998) and a PSRF around 1 (e.g., < 1.1 , Gelman et al., 2014) was considered to be evidence of convergence (Kaplan & Depaoli, 2012). Trace plots were also inspected to ensure that the multiple chains converged to a similar target distribution (Depaoli & Van de Schoot, 2015).

The fit of the BSEM models was assessed with the posterior predictive p (PPP) value and the 95% credibility interval. A low PPP value (approaching 0) is considered a poor-fitting model

(Levy, 2011; Muthén & Asparouhov, 2012). A well-fitting model should have a PPP value of around 0.50 and a symmetric 95% credibility interval centering on zero. There is still no consensus on the criteria for the PPP value but simulations suggest that PPP values of 0.10, 0.05, or 0.01 appears reasonable (Muthén & Asparouhov, 2012). The 95% credibility intervals, generated for all parameters, were used to interpret the parameter estimates. If the 95% credibility interval did not include zero, it was considered as a meaningful/credible parameter estimate (Zyphur & Oswald, 2015).

With multi-group BSEM we examined approximate MI between the Norwegian and French samples (Muthén & Asparouhov, 2013; Van de Schoot et al., 2013). We explored three types of MI: configural, metric, and scalar invariance (Meredith, 1993; Vandenberg & Lance, 2000). Configural invariance implies that the same configuration of zero and non-zero loadings is exhibited in both groups. Analyses of metric invariance examine whether respondents across groups attribute the same meaning to the latent factor(s), whereas analysis of scalar invariance, in combination with metric invariance, examines whether respondents across groups attribute the same meaning to the latent factor(s) as well as equality in the levels of the underlying items (Van de Schoot, Lugtig, & Hox, 2012).

Three different zero mean, small-variance prior specifications were used (0.05, 0.01, and 0.005) when estimating the difference in factor loadings (approximate metric invariance) and intercepts (approximate scalar invariance) between the groups. These small-variance priors allows for some ‘wobble-room’ in the differences between parameters, which are assumed to be approximately zero but not exactly zero. Following Muthén and Asparouhov’s (2013) two-step approach we first estimated approximate MI for all factor loadings and intercepts simultaneously; in the second step, the noninvariant parameters were freely estimated and invariant parameters were constrained to exact equality. Model comparisons were evaluated with the deviance

information criterion (DIC), and a lower value indicates a better-fitting model (Asparouhov et al., 2015).

Item-level missing data (< 3.2%) were handled by including all available information in the analyses, similar to the full information maximum likelihood (FIML) estimation. With the BSEM approach, the Gibbs sampler is used and treats the missing observations as unknown values to be estimated, therefore, the estimates will be adjusted for the missingness (Asparouhov & Muthén, 2010; Enders, 2010; Gelman et al., 2014).

Results

Descriptive and Preliminary Analyses

Means, standard deviations, skewness, and kurtosis for all items are displayed in Table 1. The participants reported relatively high scores, around four or above, on the items related to an empowering coaching climate and lower on the items related to a disempowering coaching climate. Most items displayed low skewness and kurtosis values, though some items (e.g., TI9, AS2, and CO6 in the French sample) displayed high kurtosis values indicating a leptokurtic distribution for these items.

Single-Group Analyses

Data-model fit of each of the *a priori* specified models are displayed in Table 2. The data-model fit and factor loading patterns were relatively similar across the two samples. The five-factor model displayed an adequate data-model fit in the Norwegian sample, but the discrepancy between the observed data and the replicated data was larger in the French sample, as indicated by a larger PPP value. The factor loading pattern, however, was not coherent and none of the hypothesized factor loadings of the empowering motivational climate items had a CI that did not contain zero

(see Table 3). When examining the patterns of correlated residuals, a substantive number of the estimated correlations had a CI that did not contain zero, indicating a substantial degree of overlap at the item-level, particularly among the empowering motivational climate items. The hierarchical models displayed similar first-order factor loading patterns as the five-factor models, and all of the second-order factor loadings had a CI that contained zero.

The two-factor model displayed an adequate data-model fit in both samples (see Table 2) and also displayed a theoretically interpretable factor structure (see Table 4). There were factor loadings in both samples that had a CI containing zero but most of the hypothesized factor loadings were credible (i.e., CI not containing zero). Lastly, the bifactor models did not display an adequate data-model fit but the factor loading pattern (see Tables 5 and 6) in both samples mirrored that of the two-factor models (i.e., credible factor loadings onto the general empowering and disempowering factors). This, in turn, suggest that the EDMCQ-C is best represented by a first-order two-factor model.

Cross-Cultural Equivalence

A two-factor model displayed an adequate data-model fit as well as an interpretable factor structure (i.e., factor loading pattern) in both samples. None of the other models displayed an adequate model fit and a theoretically interpretable factor structure in either of the two samples. We therefore chose to examine cross-cultural equivalence in the two-factor model. To obtain an equivalent configural model we excluded items with a CI containing zero in the single-group analyses, which resulted in a reduced two-factor model (see Table 7). In the Norwegian sample items TI4, CO9, and CO10 had CIs containing zero and in the French sample items TI1, AS1, SS3, CO1, and CO10 had CIs containing zero. In total, seven items were excluded from the multigroup analyses. Of the three multigroup models, with different priors on the parameter differences, only

the model with a 0.05 prior variance on the factor loading and intercept differences displayed an adequate data-model fit (see Table 8). As seen in Table 9, all of the factor loadings were invariant, but 12 out of 27 intercepts indicated noninvariance. In the second step, the invariant factor loadings and intercepts were set to exact equality and the noninvariant intercepts were freely estimated in both groups. This latter model displayed the best data-model fit as indicated by the PPP and the DIC (see Table 8). The multigroup analyses suggest that although the coaches in Norway and France seem to have attributed the same meaning to the latent empowering and disempowering latent factors, they did not display equal levels of several of the underlying items. Hence, the scaling of the latent variables seemed to differ somewhat between the two groups.

Discussion

The main purpose of this study was to validate the multi-dimensional factor structure of the EDMCQ-C using the responses of Norwegian and French youth football coaches. The results supported neither a 34 items five-factor, hierarchical, nor a two-factor BSEM model. This result also remained the same when testing a bifactor BSEM model. Our data, however, supported a reduced two-factor (i.e., empowering and disempowering motivational climates) BSEM model. This model provides partial support for integrating the perspectives of the coach-created motivational climate based on AGT and SDT into two overarching concepts of empowering and disempowering motivational climates (Duda, 2013).

The EDMCQ-C Viewed from the Bayesian Statistical Approach

In contrast to frequentist statistics, the Bayesian approach shows evidence for one of several competing models by directly supporting the probability of one of them (Zyphur & Oswald, 2015). In this study using the responses of youth football coaches, our reduced two-factor model (i.e., 27

out of the original 34 items; Appleton et al., 2016) outperformed the other four models (i.e., a 34 items five-factor, hierarchical, two-factor, and a bifactor BSEM model). By using Bayesian methods, our data provide empirical evidence supporting the theoretical concepts of empowering and disempowering motivational climates. The observed data, however, indicated that a two-factor model may better represent the underlying conceptual model than the proposed hierarchical, conceptualization of the coach-created motivational climate (Appleton et al., 2016). Our findings may very well be in line with the intention of the theoretical integration underpinning the Empowering Coaching™ framework (Duda, 2013). In fact, Duda (2013) argued, “an ‘empowering’ environment is one that is task-involving, autonomy-supportive, and socially-supportive. In contrast, a ‘disempowering’ environment would be highly ego-involving and controlling” (p. 4). In our view, nothing in this statement explicitly indicates that the structure of the coach-created motivational climate is hierarchical in nature. Thus, future examination of this issue may benefit from the use of Bayesian statistics.

Our findings deviated from the proposed hierarchical, conceptualization of the coach-created motivational climate (Appleton et al., 2016). With this in mind, it is important to recall:

“The goal of hypothesis testing in the Bayesian framework is not to make statements in support or refutation of a null hypothesis, but rather to fully summarize the distribution of the parameters of interest and to examine the predictive quality of a proposed model.”
(Kaplan, 2014, p. 286)

Our data indicated that some of the items constituting the original EDMCQ-C did not work well. Seven of the items had to be deleted in order to obtain an adequate data-model fit in both samples of coaches. Additionally, as indicated by several residual correlations, there was a substantial degree of overlap at the item-level among the remaining items. One viable explanation of this overlap may be the influence of method bias in self-completion questionnaire data (Podsakoff,

MacKenzie, & Podsakoff, 2012). It is argued that “the major concern with measuring different constructs with the same method is the danger that at least some of the observed covariation between them may be due to the fact that they share the same method of measurement” (Podsakoff et al., 2012, p. 540). Indeed, residual correlations often lead to poor item quality (i.e., method biases influence item reliability and validity; Podsakoff et al., 2012), making it more difficult for respondents to distinguish between the various items. In this respect, however, it is important to recall that the approximate MI analyses revealed that the participating coaches attributed the same meaning to the latent variables. This, in turn, provides empirical evidence for the translation process of the EDMCQ-C, at least from English to Norwegian and French, respectively. Nevertheless, future research may consider conducting a differential item functioning (DIF) analysis of the original EDMCQ-C (see Appleton et al., 2016 for details). A DIF analysis is commonly used in cross-lingual testing to determine whether assessments are equivalent across different languages (Benítez, Padilla, Montesinos, & Sireci, 2016). Recent empirical findings, emanating from the Program for International Student Assessment (PISA), have indicated that problematic issues often are related to either different interpretation patterns or response processes (Benítez et al., 2016).

It is also worth mentioning that the two-factor (i.e., empowering and disempowering) model in this study, involving both invariant factor loadings and intercepts, and 12 noninvariant intercepts, displayed the best data-model fit. As such, the inequality in the levels of the underlying specific items (e.g., two ego-involving, three autonomy-supportive, two socially-supportive, and five controlling items) need to be elaborated in more detail. Examining the mean and the standard deviation of each of the items, it became apparent that the Norwegian coaches seemed to be more concerned with ego-involving aspects of coach behavior (e.g., best athletes should play, favoring some athletes) than the French coaches. Conversely, the French coaches reported higher levels of

controlling coach behaviors (e.g., shouting at athletes, threats to punish) compared to the Norwegian coaches. Moreover, while the differences were smaller in terms of self-reported empowering coach behaviors, the standard deviations still revealed differences between the participating coaches, particularly in the French sample of coaches (standard deviation ranging from 0.791 to 1.448 in the French sample of coaches; standard deviation ranging from 0.527 to 1.104 in the Norwegian sample of coaches).

The reasons for the observed difference concerning the inequality in the levels of the underlying specific items are unknown. One explanation, however, may be attributed to organizational differences within football in the two countries influencing coaches' values, norms, and priorities. As opposed to France, the prevalence and practice of academies, typically representing performance values, has generally been low among Norwegian football clubs. The Norwegian Confederation of Sports also has its own provisions and guidelines for sport participation involving children and adolescents. In addition, the French Football Federation has formal coaching licensing as a requirement for the recruiting of their volunteer youth sport coaches, whereas Norwegian football clubs have been reluctant to request this (see Haugaasen, 2015; Van Hoye et al., 2015 for details).

The Use of Short Forms in Sport Psychology Research

The EDMCQ-C consists of two equal versions; namely, a coach version (the coach's perception of his/her own behavior) and an athlete version (the athlete's perception of his/her coach's behaviors). This was done in order to examine the reciprocal causal relations existing between coaches and athletes (Smith & Smoll, 2007). In order to fulfill this mission, it was considered important to rely on short forms of previous multi-item measures (see Appleton et al., 2016, pp. 57-58). This procedure, however, is likely to produce "a measure of the construct that

has poorer psychometric properties than does the original long form” (Widaman et al., 2011, p. 39-40). Appleton and colleagues (2016) did not discuss the potential limitations related to using short forms of measures. Given that the coach version of the EDMCQ-C mirror the athlete version, and in light of our findings, we raise some questions regarding the procedures in developing the EDMCQ-C. To obtain manageable scales and to best preserve the content of the five climate dimensions, the original pool of 67 items reflecting these dimensions was reduced to 34 items using a sample of 378 British male and female athletes (see Appleton et al., 2016 for details). According to Widaman and colleagues (2011), this approach for constructing a short form measure has certain flaws. The main reason for this is that the item selection is based on a single data set, thereby capitalizing the results on chance. Indeed, the results of this particular structural equation model only apply to a single data set of British athletes. If researchers, however, want to rely entirely on short forms of original scales, a justifiable approach for developing these forms would rather be to locate a subset of items, which maintain the factorial integrity of the respective theoretical constructs. Briefly, in terms of a preferred procedure, Widaman and colleagues (2011) argue that the first model should involve the original scales and some other carefully chosen constructs. Then, in the second model, the aim should be to replicate all aspects (e.g., mean, variance, and associations between the constructs) of the first model with a subset of items. Finally, the second model should be repeated several times until the researchers identify an optimal subset of items that represents the original scales in a conceptually coherent manner.

Based on a 30-item version of the EDMCQ-C using coaches’ self-report of their own behavior, a recent study confirmed the foregoing arguments by reporting relatively low scale reliability levels for three of the five subscales (see Smith et al., 2016 for details). Even though no explanation was given to the interested reader of how they ended up with a 30-item scale, Smith and colleagues (2016) argued, “the subscales for task- and ego-involving were close to acceptable

levels (i.e., 0.69 and 0.67). Subscales tapping autonomy support, controlling, and relatedness support were lower (i.e., 0.50, 0.60, and 0.50, respectively)” (p. 55). These findings are very similar with the scale reliability levels that are reported in the current study, thus indicating limitations regarding the process of generating the 34-item coach version of the EDMCQ-C.

In pursuit of developing the EDMCQ-C, researchers should focus more on the unique differences within each sub-dimension of the coach-created motivational climate in the further development of the EDMCQ-C. In contrast to task involvement and autonomy-support, social-support refers mainly to coach behaviors that contribute to athletes’ perceptions that they are loved, valued, and respected by their coach (Pierce, Sarason, & Sarason, 1992). Autonomy-support differs from the other sub-dimensions of empowering coach behavior by emphasizing that authority figures in the athletic environment (e.g., the coach) should acknowledge the perspectives of athletes, thereby creating athletic environments in which athletes are given some choice (Deci & Ryan, 2012). Task-involving coach behaviors, however, explicitly encourage athletes to use self-referenced criteria to evaluate whether they have gained in level of performance (Nicholls, 1989). The two sub-dimensions of disempowering coach behavior are also different from each other. While controlling coach behaviors are concerned with making sure that athletes think, feel, and behave in accordance with the coach’s preconceived way of thinking (Deci & Ryan, 2012), ego involvement refers to coaching behaviors focused on evaluating the adequacy of athletes’ ability without acknowledging whether the performance was personally challenging to the individual athlete. In these cases, and as mentioned previously, coaches are solely occupied by comparing the individual athlete’s performance with the performances of athletes in a normative reference group (Nicholls, 1989).

In sum, the EDMCQ-C holds potential in terms of capturing the multi-dimensional aspects embedded within the empowering and disempowering dimensions of the coach-created

motivational climate. This, however, requires a more thorough process in the development of the scale. Assuming that researchers focus more on the unique facets of each sub-dimension, and less on retaining items from the original scales, the EDMCQ-C seems a promising measure intended to assess the multi-dimensional factor structure of the coach-created motivational climate. Supporting our notion, Appleton and colleagues (2016) also argued that future research should try to “ensure the empowering and disempowering climate dimensions are more clearly distinguishable from one another” (p. 63).

Limitations

There are some limitations in the current study, which require acknowledgment for future research inquiries. First, although the reduced two-factor model was supported by the observed data in this study, we cannot claim to have established construct validity of the EDMCQ-C. Indeed, construct validity is only inferred by examining the pattern of results obtained across a wide range of studies using the EDMCQ-C (Widaman et al., 2011). No study has correlated the EDMCQ-C with other established measures of similar as well as different constructs, and only three studies so far have used it in different sport contexts. Hence, much work is still required before the EDMCQ-C is established as a good measure of the coach-created motivational climate. Future research should also address the criterion validity of the EDMCQ-C; that is, examining the predictive ability and concurrent correlations of this measure with other latent variables (Widaman et al., 2011). Second, the sample size of this study was relatively small. Future studies should therefore attempt to recruit a larger number of coaches from a variety of sports and countries, thereby making it possible to compare various groups of coaches and different coaching cultures.

Conclusions

Based on a Bayesian approach to statistics, the data in this study supported a reduced two-factor model representing the theoretical concepts of the coach-created empowering and disempowering motivational climates. Nevertheless, future research ought to rethink the development of the EDMCQ-C. Taking into account the limitations of short forms, the effects of method bias in self-report questionnaires, and the evidence of publication bias in psychological science (Etz & Vandekerckhove, 2016; Podsakoff et al., 2012; Widaman et al., 2011), it seems pertinent to focus more on the distinctive aspects of each climate dimension in future refinement of the scale. In doing so, we argue that Duda's (2013) conceptualization of the coach-created motivational climate would indeed contribute to the advancement of the literature in sport psychology. Alternatively, researchers may equally well use the original scales because the difference would be the name of the theoretical constructs and additionally that the scales would possess better psychometric properties (Widaman et al., 2011).

Finally, it is important to highlight Bayesian analysis and its ability to represent substantive theory (Muthén & Asparouhov, 2012). Indeed, by using this approach to statistics, we were able to replicate the multi-dimensional factor structure of the coach-created motivational climate using coaches' self-report of their own empowering and disempowering behaviors.

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Table 1

Item means, standard deviations, skewness, and kurtosis in the Norwegian and French sample.

	Norwegian sample ($n = 222$)				French sample ($n = 125$)			
	<i>M</i>	<i>SD</i>	Skew	Kurt	<i>M</i>	<i>SD</i>	Skew	Kurt
TI1	4.16	0.61	-0.45	1.17	3.74	1.00	-0.63	-0.27
TI2	4.42	0.52	0.04	-1.34	4.36	0.73	-1.03	0.86
TI3	4.46	0.52	-0.03	-1.53	4.42	0.78	-1.88	4.93
TI4	3.85	0.85	-1.21	2.38	4.22	1.01	-1.57	2.25
TI5	4.03	0.55	-0.15	0.95	4.09	0.90	-1.22	1.82
TI6	3.99	0.64	-0.50	1.01	4.12	0.84	-1.19	2.00
TI7	4.18	0.56	-0.59	3.86	4.34	0.73	-1.38	3.26
TI8	4.10	0.61	-0.41	0.96	4.28	0.80	-1.50	3.47
TI9	4.59	0.52	-0.66	-0.93	4.65	0.67	-2.92	11.72
EI1	1.64	0.72	1.11	1.65	2.40	1.15	0.41	-0.77
EI2	1.91	0.75	0.46	-0.23	1.88	0.94	0.95	0.29
EI3	1.91	0.88	0.70	-0.27	2.45	1.22	0.39	-0.98
EI4	2.77	1.06	-0.10	-0.86	2.04	1.22	0.91	-0.32
EI5	2.78	0.97	-0.16	-0.70	1.66	1.08	1.65	1.73
EI6	2.47	1.10	0.22	-0.94	1.63	0.96	1.55	1.76
EI7	2.81	1.03	-0.16	-0.91	1.87	1.12	1.25	0.84
AS1	3.85	0.70	-0.63	1.16	3.18	1.19	-0.29	-0.88
AS2	4.44	0.63	-0.99	1.46	4.55	0.81	-2.48	7.10
AS3	4.07	0.55	-0.13	0.86	4.14	0.91	-1.50	2.85
AS4	4.22	0.53	-0.02	0.84	4.43	0.84	-2.32	6.66
AS5	4.53	0.53	-0.41	-1.22	4.42	0.97	-2.10	4.32
SS1	4.32	0.67	-1.29	4.42	4.33	0.79	-1.53	3.62
SS2	4.30	0.60	-0.61	1.36	4.09	0.95	-1.30	1.87
SS3	4.13	0.60	-0.43	1.21	3.84	1.03	-0.99	0.78
CO1	2.10	0.79	0.32	-0.38	2.78	1.22	-0.03	-1.09
CO2	1.98	0.89	0.85	0.69	1.78	1.06	1.32	0.85
CO3	2.26	0.92	0.43	-0.16	1.83	0.96	0.99	0.42
CO4	2.82	0.91	-0.04	-0.01	2.99	1.39	-0.11	-1.28
CO5	1.81	0.76	0.71	0.13	2.37	1.16	0.49	-0.73
CO6	1.96	0.78	0.66	0.27	1.39	0.85	2.65	7.08
CO7	1.40	0.67	1.97	4.78	2.52	1.31	0.25	-1.22
CO8	1.50	0.74	1.57	2.58	3.02	1.44	-0.14	-1.34
CO9	3.57	0.95	-0.71	0.23	2.22	1.28	0.64	-0.83
CO10	3.12	0.93	-0.21	0.03	2.41	1.26	0.28	-1.21

Table 2

BSEM model fit of the five-factor, two-factor, hierarchical, bifactor, and reduced EDMCQ-C (Norwegian sample, n = 222, French sample n = 125).

			2.5%	97.5 %	
Nor	#fp	PP <i>p</i>	PP limit	PP limit	DIC
Five-Factor	809	.640	-128.736	97.888	19582.563
Hierarchical	805	.723	-134.002	71.905	19584.893
Two-Factor	698	.620	-120.455	88.461	19774.129
Bifactor	272	.000	138.801	315.620	19384.885
Reduced two-factor	460	.583	-92.687	72.403	15567.777
Fr					
Five-Factor	809	.841	-162.658	54.821	11517.803
Hierarchical	805	.872	-168.275	44.285	11500.371
Two-Factor	698	.744	-144.111	70.343	11598.700
Bifactor	272	.000	78.923	269.514	11001.835
Reduced two-factor	460	.672	-103.257	64.846	8966.159

Note. Nor = Norwegian, Fr = French, #fp = number of free parameters, PP *p* = posterior predictive *p* value, DIC

= deviance information criterion.

Table 3

Standardized factor loadings in the five-factor model in the Norwegian sample (n = 222) and French sample (n = 125).

	TI		EI		AS		SS		CO	
	Nor	Fr	Nor	Fr	Nor	Fr	Nor	Fr	Nor	Fr
TI1	0.069	0.315	0.016	-0.029	0.024	0.014	-0.001	0.002	0.015	-0.073
TI2	0.111	0.381	-0.028	0.020	0.031	-0.020	0.019	0.001	-0.001	0.030
TI3	-0.009	0.288	-0.024	-0.003	0.014	0.046	0.012	0.039	-0.012	-0.005
TI4	-0.371	0.379	0.080	0.059	0.024	0.033	0.014	0.006	0.076	0.026
TI5	0.143	-0.216	-0.014	0.003	0.012	0.079	0.030	0.050	-0.042	-0.042
TI6	0.448	0.226	-0.007	-0.039	0.013	-0.014	0.019	0.018	-0.020	0.040
TI7	0.108	0.155	0.049	-0.025	0.016	-0.006	0.025	0.022	-0.074	-0.014
TI8	0.363	0.234	-0.026	-0.027	0.021	0.032	-0.009	-0.013	0.057	-0.037
TI9	0.098	0.198	-0.023	0.072	0.016	0.023	0.004	0.031	-0.028	-0.026
EI1	0.017	-0.022	0.556*	0.450*	0.009	-0.033	0.014	0.010	0.017	-0.037
EI2	0.028	0.016	0.475*	0.600*	0.015	0.020	-0.002	0.004	0.052	-0.021
EI3	0.012	-0.015	0.568*	0.582*	0.019	0.015	0.019	-0.019	0.072	0.073
EI4	-0.005	0.041	0.715*	0.534*	0.005	0.002	0.002	-0.004	-0.007	0.004
EI5	-0.011	-0.017	0.465*	0.419*	0.007	-0.020	0.013	0.004	-0.002	-0.009
EI6	-0.017	0.018	0.660*	0.524*	0.019	0.019	0.015	0.042	-0.063	0.015
EI7	0.008	-0.007	0.681*	0.528*	0.011	-0.006	0.011	0.035	0.030	0.041
AS1	0.017	0.010	0.041	-0.046	0.234	0.391	0.008	0.014	-0.021	0.007
AS2	-0.010	0.011	-0.008	-0.006	-0.199	0.457	0.031	0.008	-0.023	-0.021
AS3	0.025	0.051	-0.004	0.011	0.150	-0.039	0.027	-0.027	-0.049	0.015
AS4	0.053	0.068	0.066	-0.032	0.086	0.035	0.003	0.014	0.076	-0.058
AS5	0.032	0.014	0.033	-0.019	-0.001	0.360	0.032	0.005	0.029	0.046
SS1	0.021	0.009	-0.033	-0.038	0.008	0.041	0.272	-0.024	-0.018	-0.036
SS2	0.011	0.021	-0.011	0.010	0.016	-0.008	0.120	-0.139	0.005	0.044
SS3	0.037	0.002	-0.055	0.017	0.015	0.004	-0.105	0.774	-0.032	0.017
CO1	0.003	-0.008	0.031	0.004	0.007	-0.002	0.013	0.009	0.348	0.409*
CO2	0.015	0.021	0.066	0.008	0.000	0.046	0.002	0.019	0.367	0.268
CO3	-0.025	-0.033	-0.011	0.033	0.017	0.020	0.019	0.010	0.495*	0.409*
CO4	0.021	-0.005	0.022	0.014	0.009	-0.008	0.006	0.010	0.409	0.562*
CO5	-0.025	0.023	0.057	-0.005	0.019	0.021	0.018	0.003	0.466*	0.452*
CO6	-0.001	0.067	0.055	0.121	0.011	0.031	-0.003	0.017	0.489*	0.100
CO7	0.025	-0.026	0.018	0.020	0.004	-0.011	0.017	-0.009	0.454*	0.588*
CO8	0.025	0.033	-0.032	0.003	0.002	-0.006	0.011	0.027	0.500*	0.635*
CO9	-0.018	0.014	0.020	0.023	0.007	0.023	0.016	-0.035	0.141	0.303
CO10	0.002	-0.012	-0.008	-0.027	0.008	0.007	0.022	0.025	0.284	0.372

Note. *Credibility interval did not include zero. Nor = Norwegian, Fr = French, TI = task-involving, EI = ego-

involving, AS = autonomy support, SS = social support, CO = controlling behaviors.

Table 4

Standardized factor loadings in the two-factor model in the Norwegian sample (n = 222) and French sample (n = 125).

	Nor		Fr	
	Empowering	Disempowering	Empowering	Disempowering
TI1	0.569*	0.011	0.106	-0.061
TI2	0.662*	-0.022	0.565*	0.029
TI3	0.597*	-0.046	0.585*	0.004
TI4	0.099	0.071	0.379*	0.099
TI5	0.637*	-0.046	0.619*	-0.063
TI6	0.616*	-0.005	0.619*	-0.009
TI7	0.594*	-0.019	0.539*	-0.042
TI8	0.635*	0.020	0.670*	-0.038
TI9	0.631*	-0.029	0.643*	0.028
EI1	0.008	0.574*	0.005	0.496*
EI2	-0.019	0.632*	0.048	0.490*
EI3	0.088	0.717*	0.010	0.653*
EI4	0.039	0.588*	0.064	0.426*
EI5	0.009	0.373*	-0.049	0.492*
EI6	0.017	0.494*	-0.026	0.662*
EI7	0.069	0.607*	-0.083	0.613*
AS1	0.462*	-0.011	0.268	0.014
AS2	0.523*	-0.005	0.610*	0.013
AS3	0.565*	-0.026	0.595*	0.001
AS4	0.663*	0.119	0.593*	-0.122
AS5	0.631*	0.066	0.544*	0.036
SS1	0.592*	-0.030	0.580*	-0.026
SS2	0.616*	-0.023	0.475*	0.026
SS3	0.595*	-0.084	0.294	0.039
CO1	-0.090	0.536*	-0.003	0.275
CO2	-0.012	0.543*	-0.075	0.377*
CO3	-0.064	0.602*	-0.083	0.544*
CO4	0.029	0.341*	0.043	0.484*
CO5	-0.062	0.651*	-0.003	0.430*
CO6	-0.092	0.498*	-0.080	0.422*
CO7	0.004	0.576*	-0.004	0.445*
CO8	-0.055	0.472*	0.150	0.425*
CO9	0.009	-0.026	0.018	0.463*
CO10	0.137	0.016	-0.019	0.299

Note. *Credibility interval did not include zero. Nor = Norwegian, Fr = French.

Table 5

Standardized factor loadings in the bi-factor model (Norwegian sample, n = 222). Weakly-informative priors on cross-loadings.

	Specific factors					General factors	
	TI	EI	AS	SS	CO	Empowering	Disempowering
TI1	0.040	0.053	0.052	0.018	-0.044	0.550*	
TI2	0.029	0.001	0.020	-0.014	-0.061	0.658*	
TI3	0.032	0.009	-0.005	0.007	-0.067	0.621*	
TI4	-0.033	0.178*	0.052	0.044	0.031	0.162	
TI5	0.060	-0.001	0.012	0.086	-0.062	0.616*	
TI6	0.229	-0.044	0.029	-0.010	-0.028	0.552*	
TI7	0.078	0.094	0.058	0.120	-0.078	0.550*	
TI8	0.099	-0.074	0.081	-0.081	-0.085	0.584*	
TI9	0.035	0.018	-0.028	-0.045	-0.037	0.618*	
EI1	0.010	0.057	0.043	0.019	0.036		0.542*
EI2	0.006	0.063	0.034	0.005	0.151		0.574*
EI3	0.003	0.073	0.025	0.036	0.020		0.684*
EI4	0.013	0.738*	-0.008	-0.026	0.031		0.454*
EI5	0.018	0.181*	0.030	0.044	-0.020		0.362*
EI6	-0.002	0.221*	0.017	0.003	-0.035		0.469*
EI7	0.017	0.746*	0.021	0.022	0.085		0.425*
AS1	0.024	-0.006	0.185	0.012	-0.097	0.450*	
AS2	0.002	-0.023	-0.170	0.126	-0.027	0.500*	
AS3	0.030	-0.041	0.209	0.058	-0.072	0.530*	
AS4	0.034	0.158*	0.050	-0.090	0.052	0.633*	
AS5	0.015	0.026	-0.157	0.042	0.005	0.591*	
SS1	0.019	-0.032	-0.009	0.522	-0.067	0.553*	
SS2	0.020	-0.010	-0.024	0.040	-0.011	0.633*	
SS3	0.030	-0.042	0.032	-0.066	-0.119	0.597*	
CO1	0.000	0.095	-0.005	0.000	0.547		0.362*
CO2	0.006	0.039	0.009	-0.065	0.285		0.414*
CO3	-0.007	0.049	-0.008	-0.005	0.518		0.454*
CO4	0.015	0.099	0.046	0.018	0.017		0.274*
CO5	-0.016	0.047	-0.003	0.016	0.395		0.550*
CO6	0.001	0.094	-0.029	-0.028	0.036		0.523*
CO7	-0.008	-0.186*	-0.025	-0.053	0.054		0.620*
CO8	-0.005	-0.023	-0.014	-0.047	0.074		0.456*
CO9	0.015	0.059	0.032	0.023	-0.109		0.034
CO10	0.025	0.049	0.022	-0.016	-0.155		0.030

Note. TI = task-involving, EI = ego-involving, AS = autonomy support, SS = social support, CO = controlling

behaviors. *Credibility interval did not include zero.

Table 6

Standardized factor loadings in the bi-factor model (French sample, n = 125). Weakly-informative priors on cross-loadings.

	Specific factors					General factors	
	TI	EI	AS	SS	CO	Empowering	Disempowering
TI1	0.023	-0.050	0.016	-0.025	-0.046	0.134	
TI2	0.074	-0.023	0.012	0.009	0.042	0.522*	
TI3	0.058	0.055	0.023	0.024	0.040	0.621*	
TI4	0.018	0.030	0.007	-0.002	-0.028	0.270*	
TI5	0.034	-0.048	0.019	0.107	0.036	0.617*	
TI6	0.089	-0.125	0.017	-0.016	0.026	0.625*	
TI7	0.137	-0.111	0.011	0.000	0.021	0.532*	
TI8	0.069	-0.023	0.023	0.005	-0.006	0.702*	
TI9	0.051	0.119	0.005	0.007	0.018	0.656*	
EI1	0.011	0.138	0.012	-0.003	-0.029		0.378*
EI2	0.005	-0.062	0.012	-0.019	-0.010		0.409*
EI3	0.002	0.339	0.014	0.033	0.082		0.583*
EI4	0.023	-0.020	0.013	-0.039	0.020		0.377*
EI5	-0.011	0.361	-0.024	0.030	-0.036		0.456*
EI6	0.000	0.433	0.011	-0.021	-0.015		0.613*
EI7	-0.009	0.209	-0.002	0.007	0.007		0.613*
AS1	0.006	0.010	0.024	0.015	-0.046	0.171	
AS2	0.010	0.031	0.030	0.081	-0.012	0.539*	
AS3	0.034	-0.130	0.027	-0.045	0.022	0.582*	
AS4	0.025	0.033	-0.193	-0.015	0.052	0.682*	
AS5	0.025	-0.033	0.134	0.021	0.028	0.519*	
SS1	0.017	0.029	0.017	0.444	0.008	0.559*	
SS2	0.013	-0.104	0.002	0.055	0.015	0.405*	
SS3	0.013	0.048	0.008	0.036	0.012	0.236*	
CO1	0.007	-0.048	0.011	-0.028	0.104		0.261*
CO2	0.006	-0.021	0.009	-0.078	-0.149		0.393*
CO3	-0.007	-0.013	0.015	-0.025	0.008		0.552*
CO4	0.008	0.024	0.011	0.037	0.089		0.422*
CO5	0.001	0.017	-0.016	-0.025	0.030		0.378*
CO6	0.003	0.130	0.125	0.038	-0.139		0.427*
CO7	0.013	-0.027	0.014	-0.005	0.435		0.460*
CO8	0.026	0.021	0.016	0.027	0.506		0.367*
CO9	-0.003	0.046	0.006	0.042	-0.008		0.377*
CO10	-0.006	-0.011	0.006	0.025	0.009		0.310*

Note. TI = task-involving, EI = ego-involving, AS = autonomy support, SS = social support, CO = controlling

behaviors. *Credibility interval did not include zero.

Table 7

Standardized factor loadings in the reduced two-factor model in the Norwegian sample (n = 222) and French sample (n = 125).

	Nor		Fr	
	Empowering	Disempowering	Empowering	Disempowering
TI1 ^a				
TI2	0.670*	-0.018	0.586*	0.030
TI3	0.620*	-0.030	0.572*	0.009
TI4 ^a				
TI5	0.645*	-0.042	0.639*	-0.057
TI6	0.604*	-0.026	0.638*	-0.011
TI7	0.554*	-0.031	0.568*	-0.032
TI8	0.627*	0.014	0.685*	-0.029
TI9	0.616*	-0.049	0.644*	0.049
EI1	0.005	0.586*	0.023	0.509*
EI2	-0.035	0.614*	0.045	0.483*
EI3	0.066	0.717*	0.012	0.636*
EI4	0.046	0.626*	0.062	0.454*
EI5	0.037	0.451*	-0.021	0.564*
EI6	0.016	0.520*	-0.022	0.690*
EI7	0.066	0.635*	-0.082	0.620*
AS1 ^a				
AS2	0.539*	-0.007	0.619*	0.021
AS3	0.544*	-0.034	0.605*	0.006
AS4	0.649*	0.110	0.602*	-0.094
AS5	0.649*	0.063	0.557*	0.029
SS1	0.607*	-0.022	0.596*	-0.021
SS2	0.662*	-0.007	0.454*	0.019
SS3 ^a				
CO1 ^a				
CO2	-0.019	0.518*	-0.059	0.426*
CO3	-0.083	0.567*	-0.070	0.562*
CO4	0.036	0.374*	0.041	0.496*
CO5	-0.099	0.604*	0.005	0.453*
CO6	-0.080	0.535*	-0.087	0.440*
CO7	0.008	0.568*	-0.003	0.370*
CO8	-0.052	0.466*	0.131	0.349*
CO9 ^a				
CO10 ^a				

Note. Nor = Norwegian, Fr = French.

^aItem not included in the reduced model. *Credibility interval did not include zero.

Table 8

Model fit of the approximate invariance test in the two-factor models.

Model	#fp	λ prior	ν prior	PP p	2.5% PP limit	97.5 % PP limit	DIC
Two-Factor							
Step 1	920	.05	.05	.568	-128.520	109.154	23271.993
Step 2 ^a	878	-	-	.538	-124.405	109.904	23263.306
Step 1	920	.01	.01	.009	23.707	260.773	23409.029
Step 1	920	.005	.005	.001	66.080	301.209	23446.774

Note. #fp = number of free parameters, PP p = posterior predictive p value, DIC = deviance information criterion.

^aInvariant parameters in step 1 were constrained to equality and noninvariant parameters were freely estimated in both groups.

Table 9

Approximate measurement invariance of the factor loadings and intercepts.

	Factor loadings		Deviations from the mean		Intercepts		Deviations from the mean	
	<i>M</i>	<i>SD</i>	Fr	Nor	<i>M</i>	<i>SD</i>	Fr	Nor
TI1 ^a								
TI2	0.639	0.080	0.030	-0.030	-0.029	0.061	-0.056	0.056
TI3	0.598	0.081	0.062	-0.062	-0.034	0.061	-0.044	0.044
TI4 ^a								
TI5	0.658	0.079	0.113	-0.113	-0.040	0.061	-0.009	0.009
TI6	0.628	0.079	0.050	-0.050	-0.038	0.059	0.014	-0.014
TI7	0.572	0.081	0.034	-0.034	-0.025	0.059	0.065	-0.065
TI8	0.667	0.076	0.055	-0.055	-0.014	0.058	0.060	-0.060
TI9	0.636	0.078	0.043	-0.043	-0.040	0.059	-0.001	0.001
EI1	0.597	0.087	0.076	-0.076	0.016	0.060	0.077	-0.077
EI2	0.577	0.084	0.112	-0.112	-0.010	0.060	0.016	-0.016
EI3	0.638	0.074	0.084	-0.084	-0.030	0.059	0.096	-0.096
EI4	0.582	0.087	0.083	-0.083	-0.071	0.062	-0.099	0.099
EI5	0.615	0.079	0.005	-0.005	-0.024	0.059	-0.014	0.014
EI6	0.558	0.087	0.011	-0.011	-0.049 ^b	0.062	-0.136 ^b	0.136 ^b
EI7	0.519	0.086	0.074	-0.074	0.082 ^b	0.059	0.351 ^b	-0.351 ^b
AS1 ^a								
AS2	0.601	0.090	0.002	-0.002	0.018	0.061	0.013	-0.013
AS3	0.667	0.080	0.047	-0.047	0.040 ^b	0.060 ^b	0.212 ^b	-0.212 ^b
AS4	0.560	0.089	-0.046	0.046	-0.061	0.059 ^b	-0.208 ^b	0.208 ^b
AS5	0.473	0.075	0.047	-0.047	-0.102	0.052 ^b	-0.386 ^b	0.386 ^b
SS1	0.549	0.074	0.002	-0.002	-0.081	0.052 ^b	-0.295 ^b	0.295 ^b
SS2	0.606	0.074	-0.015	0.015	-0.092	0.054 ^b	-0.306 ^b	0.306 ^b
SS3 ^a								
CO1 ^a								
CO2	0.509	0.090	-0.003	0.003	-0.025	0.059	-0.073	0.073
CO3	0.573	0.080	-0.009	0.009	-0.045	0.057 ^b	-0.176 ^b	0.176 ^b
CO4	0.434	0.104	0.093	-0.093	-0.002	0.061	0.059	-0.059
CO5	0.497	0.088	0.031	-0.031	0.059	0.060 ^b	0.257 ^b	-0.257 ^b
CO6	0.468	0.077	-0.028	0.028	-0.033	0.055 ^b	-0.235 ^b	0.235 ^b
CO7	0.323	0.091	0.031	-0.031	0.026	0.058 ^b	0.371 ^b	-0.371 ^b
CO8	0.236	0.090	0.027	-0.027	0.048	0.054 ^b	0.450 ^b	-0.450 ^b
CO9 ^a								
CO10 ^a								

Note. ^aItem not included in the reduced model. ^bNoninvariant parameter. Nor = Norwegian, Fr = French.

Article V

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The Effects of the Norwegian Arm of the Empowering Coaching™ Training Program on
Coaches' Self-Reported Behaviors – A Bayesian Approach

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Abstract

Objectives: The aim of this study was to investigate the effect of the Norwegian arm of the Empowering Coaching™ training program (ECTP) on interindividual differences in intraindividual change in coaches' self-report of their own empowering and disempowering behaviors.

Design: A cluster randomized controlled trial study.

Methods: The sample comprised 280 Norwegian youth football (i.e., European soccer) coaches with a mean age of 42.28 years ($SD=6.07$). While the intervention group consisted of 193 coaches ($M=41.99$ years, $SD=6.32$; males $n=174$; females $n=19$), the control group consisted of 87 coaches ($M=43.19$ years, $SD=5.15$; males $n=83$; females $n=4$). A multiple-group analysis performed with Bayesian Structural Equation Modeling (BSEM) and Bivariate Latent Change Scores (BLCS) was used to investigate whether participation in the ECTP resulted in increased empowering, and/or decreased disempowering, coach behaviors.

Results: The BSEM analyses revealed no credible differences in BLCSs between the intervention and the control group, neither in empowering nor in disempowering coach behaviors.

Conclusions: Our findings point towards the need for more empirical data on the effectiveness of psychosocial training interventions, especially when it comes to understanding the underlying mechanisms of a positive behavioral change among youth sport coaches. However, the continuing challenge of large-scale psychosocial training interventions will be the relation between being broad enough to encompass a large number of coaches, while at the same time, producing effects on a variety of both coach and athlete outcomes.

Key words: the PAPA project, coach development programs, youth football coaches, Bayesian methods

Introduction

A plethora of studies have shown that coaches play a crucial role in influencing athletes' perceptions of the motivational climate in sport contexts (e.g., Atkins, Johnson, Force, & Petrie, 2015; Cumming, Smoll, Smith, & Grossbard, 2007; Stenling, Lindwall, & Hassmén, 2015; Van de Pol, Kavussanu, & Kompier, 2015). The perception of constructive coach behaviors (i.e., task involvement, autonomy-support, and social-support) have been related to self-determined motivation (Hein & Jøesaar, 2015), enjoyment (Jaakkola, Ntoumanis, & Liukkonen, 2016), and physical and psychological well-being (Reinboth, Duda, & Ntoumanis, 2004). In contrast, the perception of destructive coach behaviors (i.e., ego involvement and controlling behaviors) is related to over-concern for mistakes (Ommundsen, Roberts, Lemyre, & Miller, 2006), performance anxiety (O'Rourke, Smith, Smoll, & Cumming, 2014), burnout (Ntoumanis, Taylor, & Thøgersen-Ntoumani, 2012), and intentions to drop out of sport (Quested et al., 2013). Hence, coach development programs (CDPs) have been developed in order to improve coaches' understanding of their own interpersonal behavior on athletes' outcomes (e.g., Evans, McGuckin, Gainforth, Bruner, & Côté, 2015; Langan, Blake, & Lonsdale, 2013; Lauer & Dieffenbach, 2013). However, a prerequisite for changes to occur among athletes is that coaches have changed their interpersonal behaviors as a consequence of participating in a CDP. Researchers have neglected to measure this issue in previous studies (see Langan et al., 2013 for a review). Thus, the aim of this study was to investigate whether participation in the Norwegian arm of the Empowering Coaching™ Training Program (ECTP) had an effect on Norwegian youth football (i.e., European soccer) coaches' self-reported empowering and disempowering behaviors (Duda et al., 2013).

The Empowering Coaching™ Framework

One major limitation in previous research has been the lack of theory-based interventions (Langan et al., 2013). Therefore, the ECTP draws on two contemporary theories of motivation: the Achievement Goal Theory (AGT; Nicholls, 1989) and the Self-Determination Theory (SDT; Deci & Ryan, 2012; Ryan & Deci, 2002). Both theories are well-validated, and have been used as frameworks when designing psychosocial training interventions in different sport and exercise settings (Langan et al., 2013; Lauer & Dieffenbach, 2013). A distinguishing feature between these two theories is the psychological constructs that constitute the overall goal of action. Self-Determination Theory holds that satisfaction of three basic psychological needs (i.e., autonomy, competence, and relatedness) is an organismic necessity if people want to experience growth, integration, and well-being. In addition, people are likely to be drawn towards situations that support these three needs, whether or not they are explicitly conscious of these psychological needs as innate requirements (Ryan & Deci, 2002). Conversely, AGT assumes that people's behavior is directed by the desire to feel competent (Nicholls, 1989). Nevertheless, instead of referring to competence as a unitary concept, Nicholls (1989) has argued that competence could either be defined in terms of noticing whether one's level of performance improves (i.e., task involvement) or by establishing one's superiority while competing with others on performance tasks that are highly valued by both oneself and others (i.e., ego involvement). It is also worth noting that these perceptions of competence have different consequences for one's experience in the achievement setting (Nicholls, 1989). For example, while task involvement has been shown to relate to well-being outcomes, such as enjoyment, harmonious passion, and vitality, ego involvement has been linked to ill-being outcomes, including stress, performance anxiety, and burnout (Roberts, 2012).

Within the Empowering Coaching™ framework (Duda, 2013), these psychological constructs provide the basis for categorizing the coach-created motivational climate as empowering

or disempowering. Coaches who are empowering will use behaviors that are referred to as task-involving, autonomy-supportive, and socially-supportive, yet coaches who are disempowering will use behaviors that is referred to as ego-involving and controlling. Empowering coaches wish to promote self-referenced perception of competence and basic needs satisfaction among their athletes, whereas disempowering coaches are more apt to emphasize achievement tasks in which athletes are evaluated in terms of their performance in comparison to a normative reference group. Thus, the disempowering coach is less concerned about whether their athletes' psychological needs are satisfied (see Duda, 2013 for details).

Although much effort has been put into developing psychosocial training interventions in youth sport (e.g., Smith & Smoll, 2011), Langan and colleagues (2013) have argued that "it is difficult to draw firm conclusions concerning the effect of non-formal coach education interventions on coaches' interpersonal effectiveness" (p. 46). One reason may be due to the methodological quality of former studies (Langan et al., 2013). For instance, in the three studies which received a strong overall rating by Langan and colleagues (2013), Smith, Smoll, and colleagues evaluated the effect of interventions based on Coach Effectiveness Training (CET) and Mastery Approach to Coaching (MAC; Smith, Smoll, & Cumming, 2007; Smith, Smoll, & Curtis, 1979; Smoll, Smith, & Cumming, 2007). However, these studies have at least four methodological weaknesses which are important to elaborate in more detail in the subsequent sections.

First, the authors did not include assessments of both pre- and post-training coach behaviors, as perceived by the coaches themselves. Former psychosocial training interventions have only been indirect in nature, meaning that the particular CDP have been provided to coaches whereas the effects have been assessed using athletes' self-report of their coaches' behaviors (Langan et al., 2013). Thus, it seems reasonable to argue that one should demonstrate a change in coaches' self-report of their own interpersonal behavior as a result of a CDP before extending the

evaluation of the effect to include changes in athletes' perceptions of their coaches' behaviors. In doing so, future research could argue that the observed differences between the intervention and control conditions are due to the effectiveness of the CDP.

Second, the samples of coaches participating in the three aforementioned studies were generally small, ranging from 34 to 37 coaches, hence, more coaches should be recruited. Moreover, because only four female coaches participated in the MAC intervention, and none in the CET intervention (Smith et al., 1979, 2007; Smoll et al., 2007), it is difficult to generalize the results of these studies to female coaches coaching individual athletes or teams in youth sport.

Third, it is also important to be aware of the duration of the workshops included in the CET and MAC interventions. Although it has been indicated that it is possible to influence positive changes in coaches' behaviors with a 75-120-min workshop (Smith et al., 1979, 2007; Smoll et al., 2007), it is well known that these studies relied on post-training group differences among the participating athletes only (approximately 12 weeks passed after the CET and MAC workshops were conducted to the post-season assessment session took place). Hence, indices of the effectiveness in these studies may have resulted from "pre-existing differences between the groups of coaches and not the intervention per se" (Langan et al., 2013, p. 46).

Finally, all three studies relied on the null hypothesis significance testing procedure (NHSTP) when estimating the effect of the CET and MAC interventions. However, the nature of the NHSTP and its related *p*-value have been referred to as neither reliable nor objective (Nuzzo, 2014), a mindless ritual inhibiting statistical thinking and compromising intellectual integrity (Gigerenzer, Krauss, & Vitouch, 2004), invalid (Ivarsson, Andersen, Stenling, Johnson, & Lindwall, 2015), and a misleading measure of evidence (Gelman, 2013). Additionally, although it was highlighted that the MAC condition reported a significantly higher mean level of mastery climate compared to the control condition (Smith et al., 2007), it was further argued that "coaches

in both conditions created motivational climates that were, on average, more mastery-oriented than ego-oriented” (Smith et al., 2007, p. 50). Thus, acknowledging the issue of reproducibility in psychological science (e.g., Etz & Vandekerckhove, 2016), one may wonder whether a replication attempt of this particular study would provide evidence supporting the original research findings.

The Current Study

The aim of this study was to investigate the effects of participating in the Norwegian arm of the ECTP on coaches’ self-report of their own empowering and disempowering behaviors. Moreover, a Bayesian statistical approach was chosen because we were interested in learning from the data at hand, and rather than testing the hypotheses using significance testing, *p*-values, and the presumption of constant effects, the statistical inferences were based on the empirical evidence (Gelman, 2015; Gigerenzer et al., 2004; Van de Schoot et al., 2014; Zyphur & Oswald, 2015).

Method

Participants and Procedure

The total sample consisted of 280 youth football coaches (257 males; 23 females)¹, assigned to either the intervention ($n = 193$; $M = 41.99$ years, $SD = 6.32$; 174 males, 19 females) or the control group ($n = 87$; $M = 43.19$ years, $SD = 5.15$; males $n = 83$; females $n = 4$) of the Norwegian arm of the PAPA project (Duda et al., 2013). The majority of the sample was Norwegian ($n = 269$) and a few had other nationalities ($n = 11$). Of the 280 coaches, 222 (79.3%) completed the pre-season measures (T1), whereas 203 (72.5%) completed the post-season measures (T2).

¹ Note that 51 coaches in the intervention condition did not participate in the ECTP. The results, however, remained similar when these coaches were excluded from the Bayesian analyses. Therefore, all analyses were conducted for the full sample of coaches ($N = 280$).

In terms of prior coach education, few coaches in the control group reported coaching knowledge equivalent to the Union of European Football Associations (UEFA) 'C' coaching license ($n = 22$). In contrast, a larger proportion of the coaches in the intervention group reported coaching knowledge equivalent to the UEFA 'C' coaching license ($n = 68$). A few coaches in the intervention group also reported having completed the UEFA B coaching license ($n = 10$). With regard to prior coach experience, coaches in the intervention group reported a mean coaching experience of 7.1 years ($SD = 5.3$), while coaches in the control group reported a coaching experience of 5.9 years ($SD = 3.3$).

The Norwegian arm of the PAPA project was approved by the Norwegian Centre for Research Data (NSD) before the various football clubs and their respective coaches were contacted and informed about the purpose of the study. When permission to approach the football clubs was received, members of the research group visited the clubs and distributed a questionnaire (described below) to the participating coaches. During this meeting, coaches were given information about the voluntary aspect of participating in the study and were informed about their opportunities to withdrawal from the study at any time.

The Norwegian Arm of the PAPA Project

The Norwegian arm of the ECTP was tested using a cluster randomized controlled trial, meaning that football clubs were randomized to participate in either the intervention or the control group (Duda et al., 2013). The reason for using clubs rather than individuals, was to avoid the possibility that coaches in the intervention group interacted with coaches in the control group and, possibly, sharing the content of the ECTP with them. The recruitment of coaches was organized in collaboration with the Norwegian Football Association and its local football clubs in the southern part of Norway. Coaches were recruited from 46 different football clubs that had 109 registered

boys' and girls' teams (boys' $n = 66$; girls' $n = 43$). Of these teams, 33 clubs and 80 teams were randomized to the intervention group. Coaches who were allocated to the intervention group were invited to participate in the 360 min ECTP workshop ahead of the season during the spring of 2011. The workshop was led by trained coach educators (CEs) who were recruited and trained by the members of a Norwegian research group (Søvik et al., 2016a; Van Høye et al., 2015). The main focus of this workshop was on how coaches could enhance the qualitative aspects of athletes' motivation. The workshop content and learning activities were also intended to support coaches in their efforts to understand and implement the strategies outlined by the ECTP framework in such a way that their athletic environments would become more empowering and, therefore, less disempowering (Duda et al., 2013).

Measures

The coach-created motivational climate

A reduced, and currently validated, Norwegian version of the Empowering and Disempowering Motivational Climate Questionnaire-Coach (EDMCQ-C; Solstad et al., 2016c) was used to measure coaches' self-reported empowering and disempowering behaviors. This scale comprises short forms of the four following subscales: The Health Care Climate Questionnaire (HCCQ; Williams, Grow, Freedman, Ryan, & Deci, 1996), the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton, Duda, & Yin, 2000), the Social Support Questionnaire (SSQ; Sarason, Sarason, Shearin, & Pierce, 1987), and the Controlling Coach Behaviors Scale (CCBS; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010). The coaches responded to these measures on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

The empowering dimension of the scale consisted of task-involving coach behaviors (7 items; the coefficient Omega; see Widaman, Little, Preacher, & Sawalani, 2011, for details, $\omega =$

.81; validity coefficient [VC] = .90; 95% CI = [.76-.85]; S.E. = .02; e.g., the coach is encouraging athletes to try new skills) and autonomy-supportive coach behaviors (4 items; ω = .60; VC = .79; 95% CI = [.49-.68]; S.E. = .05; e.g., athletes are given choices and options).² Conversely, the disempowering dimension of the scale consisted of controlling coach behaviors (7 items; ω = .72; VC = .87; 95% CI = [.65-.77]; S.E. = .03; e.g., the coach is less supportive towards athletes when they are not performing well on practices and in football matches) and ego-involving coach behaviors (7 items; ω = .78; VC = .93; 95% CI = [.72-.82]; S.E. = .03; e.g., the coach devotes most of his/her attention to the best athletes).

The Bayesian Statistical Approach

Only the elements of Bayesian statistics that are relevant to the current study are addressed. Simply put, in contrast to frequentist statistical inference (i.e., the null ritual; e.g., Gigerenzer et al., 2004; Ivarsson et al., 2015), Bayesian statistical inference is focused on characterizing uncertainty (Kaplan, 2014). Although frequentist statistics assume that there is only one true value of the parameter in the population, Bayesian statistics view probability in terms of the subjective experience of uncertainty, which in turn, implies that unknown parameters are treated as uncertain and described by a probability distribution (Van de Schoot et al., 2014). Thus, Bayesian analysis incorporates existing background knowledge on the parameters in a given model into the statistical specifications, thereby combining previous knowledge with the observed data at hand in the posterior distribution. As such, instead of providing researchers with either statistically significant or non-significant results (Gigerenzer et al., 2004; Nuzzo, 2014), Bayesian statistical inference provides researchers with updated knowledge (Van de Schoot et al., 2014).

² The latent factor reflecting coaches' self-reports of their socially-supportive behaviors could not be evaluated because it was under-identified. Stated differently, this latent factor had only two indicators (Brown, 2006).

As such, it seems reasonable to argue that Bayesian modeling of intervention effects, in the presence of uncertainty, will lead to a better understanding of future research findings for two reasons. First, treatment effects found in social science research are likely to vary (Gelman, 2015). As the youth sport context represents an extremely complex social system (Smith & Smoll, 2011) involving a large amount of variation and uncertainty, it may be time to move “beyond the worldview in which effects are constant and unvarying in their essentials” (Gelman, 2015, p. 633). This implies that sport psychology researchers, to a greater extent, need to accept that their research findings are contextually bound, and thereby involving them to rather study how the effects vary “under different conditions and for different people” (Gelman, 2015, p. 636).

Second, as mentioned, Bayesian analysis involves incorporating past knowledge on the parameters constituting the model into the analysis (Kaplan, 2014; Van de Schoot et al., 2014), also referred to as subject-matter knowledge (Gelman, 2015). For example, to test a null hypothesis of no main effect in causal or predictive models, involving the coach-created motivational climate, is rather dubious. A significant number of both previous and recent studies have shown positive effects of task-involving/autonomy-supportive/socially-supportive climates and negative effects of ego-involving/controlling climates on both athletes’ and coaches’ outcomes (e.g., Atkins et al., 2015; Cumming et al., 2007; Reinboth et al., 2004; Solstad, Ivarsson, Haug, & Ommundsen, 2016a; Solstad, Van Høye, & Ommundsen, 2015; Stenling et al., 2015; Van de Pol et al., 2015). By applying Bayesian statistics, future studies could more easily evaluate the plausibility of previous research findings (Van de Schoot et al., 2014), which in turn, meets the requirement of increased replication of studies in psychological science (Etz & Vandekerckhove, 2016).

Bayesian Analysis

Descriptive statistics were obtained using the JASP software package (Love et al., 2015). Bayesian correlation analyses were conducted to investigate the relationships between empowering and disempowering behaviors in each condition (intervention and control). For all analyses, a Bayes Factor (BF) was calculated. The BF quantifies the evidence provided by the observed data of one statistical hypothesis over the other (H_0 vs. H_A), and a BF larger than 1 indicates stronger evidence for H_A in comparison to H_0 (Ivarsson et al., 2015). In the current study, a BF above 10 was determined to be evidential. In other words, a BF of 10 indicates that H_A is 10 times more likely than H_0 in the observed data.

To analyze the potential effectiveness of the Norwegian arm of the ECTP on coaches' self-reported empowering and disempowering behaviors, a BLCS model, with a multiple-group model was used (see McArdle & Nesselroade, 2014 for details). One categorical variable with two known classes was used as the grouping variable (i.e., the classes were intervention and control). In the BLCS model, a latent change score represents the absolute change between the construct measured at T1 and T2. In this study, two LCSs were specified within the model: the first involved a LCS for empowering coach behavior, while the second involved a LCS for disempowering coach behavior. In the BLCS model, both factor loadings and intercepts were constrained to be equal across the sport season and between the two groups (i.e., strong measurement invariance; see Little, 2013). To test if there was a difference in change between the intervention and control groups, a difference test was performed between the BLCSs obtained from the two groups.

As noted above, one of the major differences between the frequentist and the Bayesian statistical paradigm is that all unknown parameters within the Bayesian paradigm can incorporate (un)certainty, defined by a probability distribution. Conversely, the same parameters within the frequentist paradigm are fixed but unknown (Van de Schoot & Depaoli, 2014). In the current study,

the default non-informative prior distribution in *Mplus* 7.4 (Muthén, 2010) was used. Model convergence was assessed with the potential scale reduction factor (PSRF; Brooks & Gelman, 1998), and a PSRF around 1 is considered as evidence of convergence (Kaplan & Depaoli, 2012). Bayesian models were implemented using Markov Chain Monte Carlo (MCMC) simulation procedures with the Gibbs sampler, and specified a fixed number of 130,000 iterations for each of the two MCMC chains (the first half are used as the ‘burnin phase’ as default). Model convergence was assessed using both statistical criteria (i.e., $PSRF < 1.1$; see Asparouhov & Muthén, 2010) and visual inspection of trace plots to ensure that multiple chains converged to a similar target distribution (Van de Schoot et al., 2014). In the BSEM approach, missing data are treated as unknown values to be estimated by the Gibbs sampler. All variables (both missing data, latent variables, and parameters) are uncertain and have a joint posterior distribution. The joint posterior distribution is conditional on the observed data and therefore the parameter estimates in BSEM are adjusted for the missingness (e.g., Asparouhov & Muthén, 2010; Enders, 2010; Gelman, Carlin, Stern, & Rubin, 2014).

Model fit of the BSEM models were assessed using the posterior predictive p (PP p) value and the 95% credibility interval. A well-fitting model should have a PP p value around 0.50 in combination with a symmetric 95% credibility interval centering on zero. In terms of criteria for acceptable PP p values, no consensus has been reached, yet results from simulation studies have suggested that values of 0.10, 0.05, or 0.01 should be considered as reasonable (see Muthén & Asparouhov, 2012 for details).

For each parameter, a credibility interval was calculated. In contrast to the frequentist confidence interval, the credibility interval allows researchers to calculate an interval that indicates the probability (e.g., 95%) that the parameter of interest lies between the two values given the observed data. This is an intuitive and meaningful interpretation that is easier to communicate than

the frequentist confidence interval because it provides the probability that a certain parameter lies between two numbers (Van de Schoot et al., 2014). If the 95% credibility interval did not include zero, recommendations from Zyphur and Oswald (2015) were used and conclusions that the null hypothesis was rejected as improbable were drawn.

Given recent statistical recommendations, the researchers used informative priors for the factor loadings within the measurement model (Gucciardi & Jackson, 2015). Based on the findings from Solstad and colleagues (2016c), all factor loadings were given an informative prior of 0.50, combined with a standard deviation of 0.28. In terms of cross-loadings, zero-mean, small variance informative priors of 0.01 were used. For residual correlations, small variance informative priors were used; inverse Wishart prior distribution $IW(0, 16)$. This prior indicates prior zero-means and variances of 0.01 (De Bondt & Petegem, 2015).³

Results

Means, standard deviations, and correlation matrices for the latent variables are presented in Tables 1 and 2. The model fit the data well with a PPp value of 0.56, and a posterior predictive 95% interval ranging from -280.40 to 259.38. In the BLCS model, the latent standardized factor loadings ranged from 0.30 to 0.53. Concerning the cross-loadings they ranged from ± 0.000 to ± 0.20 in the intervention group and from ± 0.000 to ± 0.23 in the control group. The residual correlations ranged from ± 0.001 to ± 0.65 in the intervention group and from ± 0.001 to ± 0.66 in the control group. This indicates that there is a significant amount of overlap between the various items constituting the coach version of the EDMCQ-C. Variances for both intercepts and BLCSs were credible in both groups (i.e., the 95% credibility intervals did not include zero).

³ The model was estimated with 2 chains (BSEED Chain 1 = 100).

The results showed that the intervention group had, on average, a higher initial level of empowering behaviors as well as a lower initial level of disempowering behaviors in comparison to the control group (see Table 3). Concerning the BLCs, results indicated that there were no credible changes in neither empowering nor disempowering behaviors in either group (see Table 3 for estimates). In addition, the results from the difference test showed that there were no credible differences in BLCs between the two groups, in neither disempowering (-.19, 95% CI = [-.71, .31]) nor empowering coach behaviors (-.01, 95% CI = [-.56, .52]).

Discussion

The aim of this study was to investigate the effects of participating in the Norwegian arm of the ECTP on coaches' self-reported empowering and disempowering behaviors. In contrast to previous research (e.g., Smith et al., 1979, 2007; Smoll et al., 2007), the specific appeal of this study lies in the fact that BSEM was used to analyze "interindividual differences in true intraindividual change over time – that is, change scores corrected for random measurement error" (Geiser, 2013, p. 145). The BSEM findings showed that the ECTP failed to induce any measurable effects in coaches' self-reported empowering and disempowering behaviors from pre- to post-season. As such, there were not any interindividual differences in intraindividual change between coaches who participated in the intervention group compared to coaches in the control group.

One viable explanation as to why the Norwegian arm of the ECTP failed to induce a change in coaches' self-report of their empowering and disempowering behaviors could be attributed to the implementation process of the ECTP. Nonetheless, comparing the implementation process among certified Norwegian and French CEs in the ECTP, a recent publication showed that all the CEs understood and taught in line with the principles of the ECTP framework when they delivered the workshops (Van Hove et al., 2015). In fact, it was argued that the Norwegian CEs delivered the

content of the ECTP with higher fidelity, and reported greater enjoyment and pace scores during the implementation process, compared to the French CEs (Søvik, Larsen, Tjomsland, & Samdal, 2016a; Van Hoyer et al., 2015). The results also revealed that the Norwegian CEs spent 47.71 hours to deliver the content of the ECTP to the participating coaches, covered 91% of the key ideas embedded within the ECTP framework, and created learning environments that were more empowering (94%) than disempowering (26%) in nature (Van Hoyer et al., 2015). Thus, one may wonder why the exposure did not alter coaches' self-reported empowering and disempowering behaviors from pre- to post-testing. There are several reasons for this. First, Côté (2006) previously argued that the lack of knowledge transfer to 'real' coaching situations is due to the brief course format of CDPs and the top-down approach in designing large-scale CDPs. With regard to the former, because the majority of coaches were novice, it is not surprising that the 6-hour ECTP workshop did not influence coaches' self-report of empowering and disempowering behaviors. It is, however, important to recognize that the certified CEs in the Norwegian arm of the ECTP indicated that the workshop should include more practical exercises, be more time consuming, and devote more of the intended time to discussion between the participating coaches (Van Hoyer et al., 2015). With regard to the extensiveness of the ECTP workshop, the PAPA project was a large, EU-funded project carried out in five European countries, including England, France, Greece, Norway, and Spain (Duda et al., 2013). Because the aim was to enhance the health and well-being among youth 10-14 years old for both sexes, the format of the workshop needed to be extensive enough to include the principles of the Empowering Coaching™ framework, but at the same time simple enough to address a large number of coaches. Future research should therefore investigate whether other course formats could be used in CDPs.

Second, one might suggest that coaches who experienced the CEs as empowering, instead of disempowering, would become more convinced to use the proposed ECTP strategies in their

own coaching practices (Aelterman, Vansteenkiste, Van Keer, & Haerens, 2016; Reeve & Cheon, 2016). For example, it has been indicated that physical education (PE) teachers who experience need-supportive teaching during teacher training are more inclined to a proposed change, thereby also producing greater intentions among the PE teachers to change their teaching behavior (Aelterman et al., 2016). In that relation it is worth mentioning that interviews with a sample of the coaches who participated in the Norwegian arm of the ECTP showed that the training program led to reflections on coaching athletes in youth football (Solstad et al., 2016b). This, in turn, made coaches more aware of the importance of involving athletes in decisions and experiencing mastery for sustained quality motivation. The participating coaches, however, highlighted that they would have appreciated two or three follow-up sessions to keep up with the strategies proposed by the Empowering Coaching™ framework throughout the sport season (see Solstad et al., 2016b; Søvik, Larsen, Tjomsland, & Samdal, 2016b, for details). Hence, it is suggested that future CDPs increase the number of workshop sessions during the sport season.

Third, based on their relatively low coaching education level, it may be that the coaches gave inaccurate ratings of their own empowering and disempowering behaviors when entering the Norwegian arm of the ECTP. Indeed, research has repeatedly indicated that individuals who are unskilled are likely to report difficulties in recognizing their own incompetence, thereby leading to inflated self-assessments (e.g., Dunlosky & Rawson, 2012; Ehrlinger, Mitchum, & Dweck, 2016; Kim, Chiu, & Bregant, 2015; Kruger & Dunning, 1999). Hence, given the limited self-awareness among youth sport coaches, and the lack of knowledge about what it means to shift from a score of 3 to a score of 4 on an arbitrary metric, one may wonder whether it is reasonable to ask coaches to rate themselves before they participate in a CDP (Blanton & Jaccard, 2006; Smith & Smoll, 2011). Instead of continuing this type of practice, future research may include a pre-workshop package in order to reduce the gap between what coaches currently know about coaching young

athletes and what they need to know about the dynamics of coaching in youth sport. In addition, a pre-workshop package ought to include strategies that both direct coaches' attention to the challenging aspects of a given task (e.g., providing more empowering and less disempowering coach behaviors to athletes) and decrease desired self-relevance perceptions among the participating coaches. This is mainly because recent research has indicated that individuals who perceive a task to be less important to the self, and are directed toward difficult problems, are likely to improve the accuracy of their own self-assessments (Ehrlinger et al., 2016; Kim et al., 2015).

One final reason as to why the Norwegian arm of the ECTP may have failed to induce an effect on coaches' self-reported empowering and disempowering behaviors is related to the philosophy of the Empowering Coaching™ framework. Such framework is in alignment with the provisions and guidelines that regulate youth sport in Norway. More specifically, a subsample of the coaches who participated in the Norwegian intervention group expressed that the content was somewhat familiar to them (Solstad et al., 2016b; Søyvik et al., 2016b). However, interindividual differences in self-reported empowering and disempowering coach behaviors were also evident among the Norwegian intervention coaches at the pre-season assessment (Solstad et al., 2016a). Therefore, one possibility would be to differentiate the content in future CDPs based on coaches' thoughts about their own interpersonal coaching behaviors.

A Methodological Consideration

To support the validity of our findings, it has recently been proposed to “conduct strictly confirmatory studies and analyze the results with statistical tests that are conservative rather than liberal” (Wagenmakers et al., 2011, p. 426). In this respect, it is important to recall that the current study used Bayesian statistics, and as outlined above, there are many advantages of using a Bayesian statistical approach (e.g., Kaplan, 2014; Muthén & Asparouhov, 2012; Van de Schoot et

al., 2014; Zyphur & Oswald, 2015). The main difference between the frequentist and the Bayesian statistical approach can be outlined as follows: “The probability of the data given the hypothesis does not equal the probability of the hypothesis given the data” (Wagenmakers et al., 2011, p. 426). Thus, instead of overstating the evidence against the null hypothesis, which is a common practice in frequentist statistics when the number of participants are large (Wagenmakers et al., 2011), Bayesian analysis updates researchers’ knowledge by quantifying “the change in prior to posterior odds that is brought about by the data” (Wagenmakers et al., 2011, p. 429). Stated differently, given that the test statistic may be unlikely under both H_0 and H_A , the essence of Bayesian analysis is its ability to ascribe probabilities to theories as well as theoretically derived hypotheses in the light of new empirical evidence (Chalmers, 1999; Kaplan, 2014; Wagenmakers et al., 2011).

Limitations

Study limitations must be acknowledged related to both findings and interpretations. First, the sample size was rather small, particularly in the control group of coaches. Thus, a greater sample size is preferable in future research. Moreover, although the proportion of female coaches was larger than previous studies, it was also small. Only by purposefully recruiting more female coaches will the state of the field better represent the current situation in youth sport. Future studies may focus on sports where a larger proportion of the coaches is women, such as gymnastics, equestrian, and ballet. Second, this study relied on coaches’ self-report of their own empowering and disempowering behaviors. If we additionally had used observation of coaches’ actual behavior, this information could have been used to adjust coaches’ self-report at the pre- and post-season assessments. In this way, we could have made sure that the strategies of the ECTP were being used by the coaches on the training ground. Finally, the items constituting the coach version of the EDMCQ-C did not differentiate between training and competition contexts. This is unfortunate

because coaches' recollection of their own interpersonal coaching behaviors can vary considerably between these two contexts (Van de Pol, Kavussanu, & Ring, 2012).

Conclusion

Although the investigation of pre- and post-training coach behaviors in this study represents a step in the right direction, future studies ought to include both coaches and athletes in evaluating the effectiveness of CDPs. In doing so, researchers could explore whether there are differences in responses among coaches and athletes who participate in the intervention group, as opposed to those who participate in the control group. This would reveal whether coaches attending the ECTP changed their own coaching practices in line with the principles of the CDP, and whether this change also was visible in the responses of their athletes. Another suggestion is also to include the CEs in the modeling of the data. Thus, future research need to use multilevel modeling techniques when examining intervention data (Evans et al., 2015; Langan et al., 2013). The reason for this is that athletes who participate within the same team grouping “may share certain similarities by virtue of their membership in that particular group” (Heck & Thomas, 2015, p. 15). Therefore, a greater use of multilevel modeling techniques “will adjust the estimates for the clustering of individuals within groups” (Heck & Thomas, 2015, p. 17). Future studies should also address the long-term changes in coaches' self-report of their own interpersonal coaching behaviors (i.e., external validity) as opposed to solely focusing on the effectiveness of various CDPs (i.e., internal validity). Indeed, it has recently been argued, “The latter finding – lack of reporting on maintenance – is a particularly striking result that highlights the limited translation and application of existing interpersonal CDPs within contemporary coach education, despite their potential to influence athlete development” (Evans et al., 2015, p. 876).

In conclusion, knowing that physical activity interventions have had only limited effects on the overall activity levels of children (see Metcalf, Henley, & Wilkin, 2012 for a review), it is important that youth sport is a good place for children and adolescents to thrive and develop their lifelong physical activity habits. Future research is needed to build upon the innovative aspects of the PAPA project, thereby ensuring that more youth sport coaches learn how to create an athletic environment that enhances the quality of athletes' motivation, well-being, and long-term participation in organized youth sport (Duda et al., 2013).

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Table 1

Descriptive statistics for the intervention condition

	<i>M</i>	<i>SD</i>	1	2	3	4
1. Empowering behaviors T1	4.30	0.38	1			
2. Disempowering behaviors T1	2.11	0.49	-.47*	1		
3. Empowering behaviors T2	4.33	0.42	.57*	-.34*	1	
4. Disempowering behaviors T2	2.10	0.48	-.31*	.64*	-.20	1

Note. * $BF > 10$.

Table 2

Descriptive statistics for the control condition

	<i>M</i>	<i>SD</i>	1	2	3	4
1. Empowering behaviors T1	4.23	0.30	1			
2. Disempowering behaviors T1	2.25	0.53	-.32	1		
3. Empowering behaviors T2	4.28	0.32	.42	-.28	1	
4. Disempowering behaviors T2	2.29	0.46	-.32	.72*	-.43*	1

Note. * $BF > 10$.

Table 3

Parameter estimates (β) with 95% credibility intervals

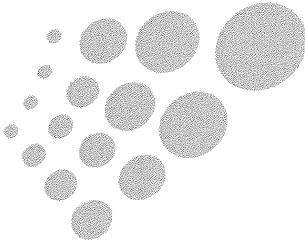
Parameter	Intervention group	Control group
Change empowering behaviors	.11 [-.26, .51]	.09 [-.42, .69]
Change disempowering behaviors	.15 [-.28, .61]	.32 [-.18, 1.17]
Initial level of empowering behaviors	.26 [-.04, .55] ^a	0
Initial level of disempowering behaviors	-.28 [-.59, .04] ^a	0

Note. ^aThe estimates for these parameters represent a score for the differences in parameter values between the intervention and the control group. The estimates for the control group are therefore constrained to be zero.

Appendices

Appendix I

Letter of Support (the Norwegian Football Federation)



Norges Fotballforbund
The Football Association of Norway
NO-0840 Oslo, Norway
Telefon: 04420, Fax: +47 21 02 93 01
International calls: +47 21 02 93 00
www.fotball.no



3th December 2007

To whom it may concern

Re: FP7-HEALTH-2007-B Promoting Adolescent health through an intervention aimed at improving the quality of their participation in Physical Activity: The PAPA Project.

The Football Association of Norway (NFF) is footballs governing body in Norway. The NFF is the organisation that provides all recognised and accredited (UEFA) coach education within Norway. NFF is owned by all football clubs in Norway, and work to develop the game in all aspects. Research and cooperation with external organisations is part of this strategy. NFF is a UEFA and FIFA member. The NFF are delighted to be able to provide this letter of support for the research programme outlined above.

This project aims to develop a theoretically based coach education programme and the NFF enthusiastically endorses this effort (1) to foster children's sense of autonomy and their adoption of a healthy lifestyle through sport, and (2) to give coaches concrete strategies for the development of life skills via sport engagement.

The emphasis behind the proposed work is on the positive effects that football engagement can provide for young people, if an adaptive climate is ensured within the sport experience and coaches have the necessary skills to promote health-related behaviours and positive attitudes among young people. The NFF supports the project's focus in terms of its important implications for football coaches and their players, namely, boys and girls aged 10-14 years old – which is a critical development period.

The NFF is a leading institution in the process of developing Coach Education to suit the best interest of players. It is our hope that this project will provide us with useful knowledge, and by this benefit coaches, players and the local communities.

With kind regards,
The Football Association of Norway


Mr. Audun Fevik
Director of Grassroots & Amateur Football



Besøksadresse/Visiting Address:
Norges Fotballforbund/The Football Association of Norway
Sognsveien 75J, Ullevaal Stadion



Appendix II

Contract for Cooperation PAPA and the Norwegian Football Federation



Universitetet i Bergen
Psykologisk Fakultet
HEMIL-senteret

9. apr. 2010

Samarbeidsavtale for PAPA prosjektet (partnere Norges idretthøgskole & HEMIL-senteret, Universitetet i Bergen) og Norges fotballforbund

Forskningsgruppen for PAPA prosjektet (“**Promoting Adolescent health through an intervention aimed at improving the quality of their participation in Physical Activity**”) ved Norges idretthøgskole og HEMIL-senteret, (Helse-miljø og levekår), Universitetet i Bergen ønsker å inngå en samarbeidsavtale med Norges Fotballforbund i forbindelse med planlegging, iverksetting og gjennomføring av forskningsprosjektet PAPA blant trenere og spillere i organisert aldersbestemt fotball i Norge. En innledende orientering om forskningsprosjektet til NFF ble gitt i brev datert 4 mai 2009 fra forskningsgruppen ved leder Yngvar Ommundsen til tidligere generalsekretær Karen Espelund. I to oppfølgende møter med NFF (13. mai og 18. november 2009) har vi redegjort for verdi/gevinst for NFF av et samarbeid om PAPA sett med våre øyne:

- Videreføring og oppfølging av tidligere forskningssamarbeid NIH & Senter for medisinske atferdsfag & NFF (Ommundsens doktorgradsavhandling 1992: ”Self-evaluation, affect and dropout in the soccer domain – a prospective study of young male Norwegian players”)– **NFF som fortsatt Forskningsaktør**
- Gi NFF grunnlag for etablering av en ytterligere forbedret forskningsbasert faglig plattform for arbeid med aldersbestemt fotball – **NFF som Faglig kunnskapsprodusent**
- Gi NFF et styrket faglig grunnlag i promoteringen av en utvidet forståelse av trenerrollen i breddefotballen – **NFF som iscenesetter av en faglig/forskningmessig begrunnet trenerrolle i breddefotballen**
- Sette NFF ytterligere på kartet i helse-Norge som leverandør av fotball og fysisk aktivitet som del av helsefremmende arbeid blant barn & ungdom – **NFF som Folkehelsearbeider**

- Utvikle aldersbestemt fotball i en retning som også kan bidra til økt spilleravkastning/bedre spillerutvikling – **NFF som Spillerutvikler og Prestasjonsprodusent**

Med ovennevnte som bakteppe inngås en samarbeidsavtale mellom forskningsgruppen i PAPA prosjektet ved Norges idrettshøgskole og NFF ved breddeavdelingen om følgende sider ved planlegging, iverksetting og gjennomføring av PAPA prosjektet:

- NFF bistår PAPA prosjektet ved å stille seg bak prosjektets formål og ide (jmf oversendt anbefalelsesbrev datert 3. desember 2007 - vedlagt)
- NFF bistår prosjektgruppen med profilering av PAPA prosjektet i Norge
 - kontakt med massemedia, valg av en anerkjent trener/fotballspiller som kan bidra til å profilere PAPA i Norge. Eksemplifisering: Ole Gunnar Solskjær som ”ambassadør/PAPA profileringsperson?
- NFF bistår PAPA prosjektet ved å gi mulighet til å linke prosjektets nasjonale web-side opp mot NFF sin hjemmeside
- NFF bistår PAPA prosjektet ved å legge inn linken til PAPA prosjektets nasjonale (Norges idrettshøgskole & Universitetet i Bergen) og sentrale web-side (University of Birmingham) på NFF sin hjemmeside
- NFF bistår PAPA prosjektet ved å innta en ”Gatekeeper” rolle overfor det aldersbestemte fotball Norge – kretser & lag ved rekrutteringsprosessen av ”eksperttrenere” og aktuelle lag og trenere til kontroll og intervensjonsgruppe
 - Hvordan sikre god interesse/oppslutning/deltagelse blant trenere og eksperttrenere?
- NFF bistår i PAPA prosjektet med råd og veiledning i arbeidet med kulturell tilpasning av intervensjonsprogrammet til norsk aldersbestemt fotball
- NFF bistår i PAPA prosjektet med råd og veiledning i forbindelse med rekruttering av aktuelle ”Eksperttrenere” og praktisk hjelp i forbindelse med forespørsel til disse om:
 - å bli skolert i en opplæringspakke for eksperttrenere som setter dem i stand til å lære opp trenere i en egen intervensjonspakke for disse
 - Å ha ansvar for å gjennomføre etterfølgende opplæring av trenere for intervensjonslagene basert på en slik opplæringspakke
- NFF bistår i PAPA prosjektet med råd, veiledning og praktisk hjelp i prosessen med rekruttering av klubber/lag til intervensjons- og kontrollgrupper
 - Eksempelvis kontaktveier: Via kretser, rett på klubb, rett på kontaktperson (trener/leder lag?)
- NFF bistår i PAPA prosjektet med råd, veiledning og praktisk hjelp i prosessen med motivering av aktuelle trenere til å delta i prosjektet - både trenere for intervensjonslag og kontrollag
 - Foreslå ulike incitamentersom kan motivere til deltagelse (kursbevis etc)
- NFF bistår i PAPA prosjektet med råd, veiledning og praktisk hjelp vedrørende administrering/organisering av implementeringen av intervensjonen
 - Erfaringer fra egne NFF kurs: Tidspunkt for kurskvelder (ukedager, helger) – hva er best? Hvem kommer på kurs?
 - Hvor er det formålstjenlig å avholde opplæringsseanser med trenere for intervensjonslag? (skoler, klubbhus andre steder)
 - NFF sørger for en person som holder kontakt med og følge opp trenere som har sagt seg villig til å delta i intervensjonen

- NFF sørger for en person som har det logistiske overoppsynet med gjennomføringen av intervensjonen (følge opp at folk møter, registrere forfall, gi melding om tid og sted for avvikling etc)
- NFF bistår med råd og støtte i knyttet til prosjektgruppens (Bergensmiljøet) organisering og gjennomføring av datainnsamlinger på spillere og trenere
- NFF bidrar til å sikre at framtidige prosjektresultater inngår i organisasjonens egen opplæringsportefølje overfor trenere aldersbestemt fotball
- NFF bistår med faglig ekspertise i forbindelse med produksjon av materiell til opplæringsprogrammet (intervensjonspakken) som skal anvendes på trenerne
- Norges idrettshøgskole finansierer en stilling som medarbeider i prosjektet i en 40% stilling for perioden 1. mai 2010 til 1 mai 2011 med kr. 175.000,- via interne prosjektmidler bevilget til PAPA prosjektet.
- Etter avtale i møte 18. mars 2010 mellom Yngvar Ommundsen, Norges idrettshøgskole og Alf Hansen, breddesjef NFF, besørger NFF ansettelse av denne prosjektmedarbeideren blant ansatte hos seg. NFF har ansvar for å finne egnet person til stillingen med basis i samtaler i møte 18. mars, og for at tilsatt person følger opp arbeidsoppgaver som vil bli angitt for stillingen. Arbeidsoppgavene og estimert tidsperiode for gjennomføring av disse vil bli spesifisert i eget brev på et oppfølgende tidspunkt med basis i sider ved planlegging, iverksetting og gjennomføring av PAPA prosjektet nevnt i denne samarbeidsavtalen.
- NFF sørger for at prosjektmedarbeideren løser de pålagte oppgavene i samvirke med aktuelle ressurspersoner i NFF sitt kretsapparat til beste for prosjektet.

Oslo/Bergen den 9/4.....2010

For Norges Fotballforbund.....P. Glomsaker.....
 Generalsekretær Paul Glomsaker

For PAPA prosjektet Norges idrettshøgskole, Seksjon for Coaching og psykologi
Pierre-Nicolas Lemyre..... Pierre-Nicolas Lemyre, Seksjonsleder

For PAPA prosjektet Norges idrettshøgskole, Forskningscenter for Trening og Prestasjon.....
 Jostein Hallèn, Leder Jostein Hallèn

For PAPA prosjektet HEMIL-senteret, (Helse-miljø og levekår),
 Universitetet i Bergen.....
 Professor Bente Wold Bente Wold

Appendix III

Application for Ethical Review

<p style="text-align: center;">UNIVERSITY OF BIRMINGHAM APPLICATION FOR ETHICAL REVIEW</p>

Who should use this form:

This form is to be completed by PIs or supervisors (for PGR student research) who have completed the University of Birmingham Ethical Review of Research Self Assessment Form and have decided that further ethical review and approval is required before the commencement of a given Research Project.

Please be aware that all new research projects undertaken by postgraduate research (PGR) students first registered as from 1st September 2008 will be subject to the University's Ethical Review Process. PGR students first registered before 1st September 2008 should refer to their Department/School/College for further advice.

Researchers in the following categories are to use this form:

1. The project is to be conducted by:
 - staff of the University of Birmingham; or
 - a research postgraduate student enrolled at the University of Birmingham (to be completed by the student's supervisor);
2. The project is to be conducted at the University of Birmingham by visiting researchers.

Students undertaking undergraduate projects and taught postgraduates should refer to their Department/School for advice.

NOTES:

- Answers to questions must be entered in the space provided – the beginning of an answer field will be indicated by a grey bar ().
- Use the up and down arrow keys to move between answer fields; use the side scroll bar to navigate around the document.
- An electronic version of the completed form should be submitted to the Research Ethics Officer, at the following email address: aer-ethics@contacts.bham.ac.uk. Please **do not** submit paper copies.
- If, in any section, you find that you have insufficient space, or you wish to supply additional material not specifically requested by the form, please it in a separate file, clearly marked and attached to the submission email.
- If you have any queries about the form, please address them to the [Research Ethics Team](#).

**UNIVERSITY OF BIRMINGHAM
APPLICATION FOR ETHICAL REVIEW**

OFFICE USE ONLY:
Application No:
Date Received:

1. TITLE OF PROJECT

Promoting Adolescent health through an intervention aimed at improving the quality of their participation in Physical Activity (PAPA)

2. THIS PROJECT IS:

- University of Birmingham Staff Research project
- University of Birmingham Postgraduate Research (PGR) Student project
- Other (Please specify):
A collaborative EU-funded project involving the following universities:
University of Birmingham
Universitetet I Bergen, Norway
Universitat de València, Spain
Universite Joseph Fourier Grenoble, France
Panepistimio Thessalias, Greece
Norwegian School of Sport Sciences, Norway
York St. John University, UK
Universitat Autonoma de Barcelona, Spain

3. INVESTIGATORS

a) PLEASE GIVE DETAILS OF THE PRINCIPAL INVESTIGATORS OR SUPERVISORS (FOR PGR STUDENT PROJECTS)

Name: Title / first name / family name	Prof. Joan L. Duda
Highest qualification & position held:	PhD/Professor of Sport Psychology
School/Department	School of Sport and Exercise Sciences
Telephone:	414 2737
Email address:	J.L.DUDA@bham.ac.uk

Name: Title / first name / family name	
Highest qualification & position held:	
School/Department	
Telephone:	
Email address:	

b) PLEASE GIVE DETAILS OF ANY CO-INVESTIGATORS OR CO-SUPERVISORS (FOR PGR STUDENT PROJECTS)

Name: Title / first name / family name	Dr. Nikos Ntoumanis (Dr. Jennifer Cumming)
Highest qualification & position held:	PhD
School/Department	School of Sport and Exercise Sciences
Telephone:	4147981 (4142877)
Email address:	N.Ntoumanis@bham.ac.uk (J.Cumming@Bham.ac.uk)

c) In the case of PGR student projects, please give details of the student

Name of student:		Student No:	
Course of study:		Email address:	
Principal supervisor:			

Name of student:		Student No:	
Course of study:		Email address:	
Principal supervisor:			

4. ESTIMATED START OF PROJECT Date:

ESTIMATED END OF PROJECT Date:

5. FUNDING

List the funding sources (including internal sources) and give the status of each source.

<i>Funding Body</i>	<i>Approved/Pending /To be submitted</i>
EU (FP7 Framework)	Approved

If applicable, please identify date within which the funding body requires acceptance of award:

Date:

If the funding body requires ethical review of the research proposal at application for funding please provide date of deadline for funding application:

Date:

6. SUMMARY OF PROJECT

Describe the purpose, background rationale for the proposed project, as well as the hypotheses/research questions to be examined and expected outcomes. This description should be in everyday language that is free from jargon. Please explain any technical terms or discipline-specific phrases.

The background of this project is related to the role of sport in two recent White Papers from the European Commission on an integrated EU approach to reducing ill health and enhancing health and well-being. The project centres on the development and validation of a new method in health promotion, namely a community-based coach education program aimed at promoting the psychosocial development and adoption of healthy lifestyles among young people in Europe. The proposed project will foster collaboration between major research groups representing 5 countries (8 universities) in the European Community and promote the integration of their ongoing research efforts centred on health promotion in youth from two perspectives, namely (a) motivational processes and optimal functioning in the physical domain among young people, and (b) cross-national differences in and socio-environmental impacts on children's health behaviour. In terms of the study design, the PAPA project will examine differences between the provision of youth sport and its health related impacts as currently exists in the targeted countries and a youth sport intervention designed to enhance personal competence, relatedness and self determination of the young players aged 10-14 and their adoption of a healthy lifestyle. In examining the effectiveness of the intervention programme, the pre- and post-season (plus beginning of the subsequent season follow-up) perceptions and self-reported behaviours of players in the intervention arm (representing 50 grassroots football teams) will be contrasted to a control group of 30 grassroots football teams. We expect that the athletes in the experimental condition, compared to those in the standard provision condition, will report significant increases in adaptive indices of personal and contextual motivation, physical activity levels and self-reported health behaviours (i.e., smoking, healthy eating). The prototype intervention will be developed in the UK and will be subsequently rolled out and tested in the other 4 partner countries. It should be clarified here that in all 5 countries the intervention will be essentially the same but there will be some minor adaptations to allow for differences in language (e.g., in terms of how questionnaire items are phrased) and structure of football by the respective Football Associations. The national Football Associations in each country have agreed to participate in the development and implementation of the intervention.

7. CONDUCT OF PROJECT

Please give a description of the research methodology that will be used

The project will commence in the UK with the development and pilot testing of the coach training prototype. Based on available literature and the expertise of the UK team, an intervention programme will be developed which will be subsequently utilised by expert coaches (provided by the English FA) to train the coaches of the 50 participating teams in the experimental arm of the intervention.

The intervention material will include visuals (PPT, DVD and support website) and implementation guidelines and will be first pilot tested with small samples of expert coaches and trainee coaches. Focus group interviews with expert and trainee coaches will also be used to evaluate the pilot prototype intervention. Further input and comments will be solicited by three leaders in youth development, health behaviour, and/or motivation psychology. Once finalised, the EU partners will translate the prototype intervention material and conduct necessary cultural adaptations based on the feedback from and collaboration with experienced coaches in their respective countries. Further, all questionnaires will be psychometrically tested and validated in each country, if this has not been done previously.

The main trial in each of the countries will commence with a two-day group training (in various regional locations) of the expert coaches who will deliver the intervention. The training will be based on the principles of self-determination theory (Deci & Ryan, 2002) and achievement goal frameworks (Ames, 1992; Nicholls, 1989) and will aim to develop a number of coaching behaviours and strategies that support athletes' autonomous motivation and facilitate the satisfaction of their psychological needs. One month after the initial training session, a follow-up session with the trained coaches will take place aimed at reinforcing good practice. Throughout the whole season, the trained coaches will receive monthly follow-up calls/text messages from the expert coaches to ensure maintenance and allow issues of clarification. In each country, websites will be used to promote and support the intervention. Fifty teams will be allocated to the experimental arm of the intervention and thirty teams, who will continue to receive a standard provision of football coaching, will serve as the control arm.

Observation sheets (rated by trained research assistants) will be developed to examine coach fidelity in terms of the implementation of the prototype intervention. To this purpose, a sample of training sessions will be videotaped. Athletes in both arms will complete questionnaires that will measure perceptions of the coaching motivational climate, motivation for participation in sport, feelings of autonomy, competence and relatedness, their self esteem, indices of mental and emotional well-being (e.g., positive and negative affect), self-reported physical activity, smoking and healthy eating. In 3 of the countries represented in the PAPA Consortium (i.e., the UK, France, and Greece), we will compare level of objective leisure-time physical activity participation (as assessed via small unobtrusive gadgets called accelerometers) between the two arms. All measures will be taken pre- and post- football season as well as the beginning of the subsequent season. (The latter will serve as the follow-up measure).

8. DOES THE PROJECT INVOLVE PARTICIPATION OF PEOPLE OTHER THAN THE RESEARCHERS AND SUPERVISORS?

Yes No

Note: "Participation" includes both active participation (such as when participants take part in an

interview) and cases where participants take part in the study without their knowledge and consent at the time (for example, in crowd behaviour research).

If you have answered NO please go to Section 18 . If you have answered YES to this question please complete all the following sections.

9. PARTICIPANTS AS THE SUBJECTS OF THE RESEARCH

Describe the number of participants and important characteristics (such as age, gender, location, affiliation, level of fitness, intellectual ability etc.). Specify any inclusion/exclusion criteria to be used.

Young football players will be asked to fill in established questionnaires. The players will be both males and females, aged 10-14, from 80 grassroots level football teams (50 in the intervention and 30 in the control arm). In each participating country, the players will come from a number of different regions. The trainee coaches (from the 50 teams in the intervention arm) will also serve as participants in the study. They will be requested to complete questionnaires assessing their views regarding the motivational climate they create, the degree to which they support their players' needs for competence, autonomy and relatedness and their coaching efficacy. We do not have any demographic information for these coaches at the moment but some information will be requested at the onset of the questionnaires to be completed. With respect to the intervention coaches specifically, we also aim to assess their objective coaching behaviours (in terms of their autonomy supportive and task- and ego-involving features) across a minimum of 1 practice and 1 competitive match.

10. RECRUITMENT

Please state clearly how the participants will be identified, approached and recruited. Include any relationship between the investigator(s) and participant(s) (e.g. instructor-student).

Note: Attach a copy of any poster(s), advertisement(s) or letter(s) to be used for recruitment.

Representatives of the English FA have agreed to help up identify potential teams that could participate in our project. Football Associations in the partner countries will offer similar help. All teams will be sent a copy of the questionnaire pack and an information sheet explaining the purposes of the project and requesting the participation of their coaches and players. There will be random selection of clubs to the intervention and control group. The national football associations involved will be encouraged to provide similar training for the control group coaches after the intervention period is complete to ensure that they and their players are offered the same developmental opportunities as the intervention group.

11. CONSENT

a) Describe the process that the investigator(s) will be using to obtain valid consent. If consent is not to be obtained explain why. If the participants are minors or for other reasons are not competent to consent, describe the proposed alternate source of consent, including any permission / information letter to be provided to the person(s) providing the consent.

The children's parents, guardians or another legally recognised person as defined by national laws, need to be informed and will be the person(s) asked, in ample time prior to the data collection taking place, to provide the legal consent for their child's participation in the project. Children informed consent will also be obtained; on the days of data collection all children will be provided with a clear opportunity of not participating despite a legal consent from their parents or guardians. Lastly, informed consent forms will be obtained from coaches.

Note: Attach a copy of the Participant Information Sheet (if applicable), the Consent Form (if applicable), the content of any telephone script (if applicable) and any other material that will be used in the consent process.

b) Will the participants be deceived in any way about the purpose of the study? Yes No

If yes, please describe the nature and extent of the deception involved. Include how and when the deception will be revealed, and who will administer this feedback.

12. PARTICIPANT FEEDBACK

Explain what feedback/ information will be provided to the participants after participation in the research. (For example, a more complete description of the purpose of the research, or access to the results of the research).

All participating clubs will receive written feedback in non-technical language which will provide a conceptual background to the project, summarise the main findings, and will offer appropriate practical recommendations. Further, the main findings and practical implications stemming from the project will be available via a project-specific website and will be disseminated via budgeted workshops.

13. PARTICIPANT WITHDRAWAL

a) Describe how the participants will be informed of their right to withdraw from the project.

All invited coaches and football players will be given the opportunity to withdraw from the implementation of the intervention and the data collection at any point they may decide. This will be stated both in the information sheets/consent forms and in verbal communication to them. The parents/legal guardians will be encouraged by the researchers to follow their child to the football training sessions so that they can observe how the intervention is implemented and thus decide if they at any point want to withdraw their consent for their child's participation in the study. Data already obtained from withdrawn participants will still be used for statistical analysis, unless we are told otherwise. Athletes or their parents can inform us either directly or via their coach that they do not want their data to be used in our project. Similarly, coaches who decide to withdraw from the study can inform us that they do not want their data to be used in our project. Athletes who withdraw from the study will not complete any further questionnaires. However, those who are members of teams allocated to the experimental arm of the intervention cannot withdraw from the intervention. This is because the coach motivational strategies, developed and refined by our training programme, will often apply to the whole team, not just individual team members. From an ethical perspective, we do not think that this is problematic as the implemented coach motivational strategies cannot be in any way harmful to these athletes.

b) Explain any consequences for the participant of withdrawing from the study and indicate what will be done with the participant's data if they withdraw.

There will be absolutely no consequences. The data of those withdrawn will be kept securely with the rest of the data (unless they request us to destroy their data) and might be used for analytic purposes depending on the extent and the pattern of missing data.

14. COMPENSATION

Will participants receive compensation for participation?

- i) Financial
- ii) Non-financial

Yes No
Yes No

If **Yes** to **either** i) or ii) above, please provide details.

If participants choose to withdraw, how will you deal with compensation?

N/A

15. CONFIDENTIALITY

- a) Will all participants be anonymous?
- b) Will all data be treated as confidential?

Yes No
Yes No

Note: Participants' identity/data will be confidential if an assigned ID code or number is used, but it will not be anonymous. Anonymous data cannot be traced back to an individual participant.

Describe the procedures to be used to ensure anonymity of participants and/or confidentiality of data both during the conduct of the research and in the release of its findings.

In all consent forms and information sheets it will be clearly stated that the data will be kept confidential. No parents or coaches will be allowed to see the athlete data. All data will be analysed at group level, so individual data will not be released when the findings are published. All questionnaires will be kept anonymous (a dummy code will be generated to match questionnaires over time). The same applies to the data (questionnaire based and observational) obtained from the coaches.

If participant anonymity or confidentiality is not appropriate to this research project, explain, providing details of how all participants will be advised of the fact that data will not be anonymous or confidential.

N/A

16. STORAGE, ACCESS AND DISPOSAL OF DATA

Describe what research data will be stored, where, for what period of time, the measures that will be put in place to ensure security of the data, who will have access to the data, and the method and timing of disposal of the data.

During the project, the questionnaire and observational data will be stored in locked cabinets in the laboratories of the participating universities. No individuals, other than the researchers on this project, will have access to the data. All questionnaires will be shredded five years after the completion of the project. Obviously, the electronic database will be kept indefinitely but these will not be shared with a third party. The electronic database will include dummy ID's and not individuals' names.

17. OTHER APPROVALS REQUIRED? e.g. Criminal Records Bureau (CRB) checks

YES NO NOT APPLICABLE

If yes, please specify.

We will ask for CRB checks (in countries where such checks exist) for all researchers who will be employed on the project.

18. SIGNIFICANCE/BENEFITS

Outline the potential significance and/or benefits of the research

This is the first large-scale intervention study that aims to train coaches to adopt a motivationally enhancing coaching style and examine the effects of this training on young people's motivation, psychological well-being, physical activity levels, and health behaviours. The aim of the education program is to improve the quality of children and adolescents' participation in leisure-time physical activity, and involves a systematic effort to influence the main arena for organized leisure activities among young people: i.e., youth sport programs. With respect to the need for encouraging active lifestyles, recent EU White Papers on nutrition, overweight and obesity emphasise the importance of sport engagement as a tool for the provision of health-enhancing physical activity. With this background in mind, the project centres on the development and validation of a new method in health promotion, namely a community-based coach education program aimed at promoting the psychosocial development and adoption of healthy lifestyles among young people in Europe. Through its emphasis on physical activity promotion during childhood and adolescence, as well as its aim of providing children and adolescents with empowering social environments during their involvement in leisure activities, the project can provide knowledge about how to respond to major health issues, in particular the global epidemic of obesity, but also mental health problems evident among youth such as low self esteem and depression.

19. RISKS

a) Outline any potential risks to **INDIVIDUALS**, including research staff, research participants, other individuals not involved in the research and the measures that will be taken to minimise any risks and the procedures to be adopted in the event of mishap

There are no risks to individuals. All participants will be asked to complete established questionnaires that have been extensively used in the past with young people (or in the case of coaches, adults in leadership positions).

b) Outline any potential risks to **THE ENVIRONMENT and/or SOCIETY** and the measures that will be taken to minimise any risks and the procedures to be adopted in the event of mishap.

N/A

20. ARE THERE ANY OTHER ETHICAL ISSUES RAISED BY THE RESEARCH?

Yes No

If yes, please specify

21. CHECKLIST

Please mark if the study involves any of the following:

- Vulnerable groups, such as children and young people aged under 18 years, those with learning disability, or cognitive impairments
- Research that induces or results in or causes anxiety, stress, pain or physical discomfort, or poses a risk of harm to participants (which is more than is expected from everyday life)
- Risk to the personal safety of the researcher
- Deception or research that is conducted without full and informed consent of the participants at time study is carried out
- Administration of a chemical agent or vaccines or other substances (including vitamins or food substances) to human participants.
- Production and/or use of genetically modified plants or microbes
- Results that may have an adverse impact on the environment or food safety
- Results that may be used to develop chemical or biological weapons

Please check that the following documents are attached to your application.

	ATTACHED	NOT APPLICABLE
Recruitment advertisement	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Participant information sheet	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Consent form	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Questionnaire	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Interview Schedule	<input type="checkbox"/>	<input checked="" type="checkbox"/>

22. DECLARATION BY APPLICANTS

I submit this application on the basis that the information it contains is confidential and will be used by the University of Birmingham for the purposes of ethical review and monitoring of the research project described herein, and to satisfy reporting requirements to regulatory bodies. The information will not be used for any other purpose without my prior consent.

I declare that:

- The information in this form together with any accompanying information is complete and correct to the best of my knowledge and belief and I take full responsibility for it.
- I undertake to abide by University Code of Conduct for Research (<http://www.ppd.bham.ac.uk/policy/cop/code8.htm>) alongside any other relevant professional bodies' codes of conduct and/or ethical guidelines.
- I will report any changes affecting the ethical aspects of the project to the University of Birmingham Research Ethics Officer.
- I will report any adverse or unforeseen events which occur to the relevant Ethics Committee via the University of Birmingham Research Ethics Officer.

Name of Principal investigator/project supervisor:

Professor Joan L. Duda

Date:

17th September 2009

Please now save your completed form, print a copy for your records, and then email a copy to the Research Ethics Officer, at aer-ethics@contacts.bham.ac.uk. As noted above, please do not submit a paper copy.

Appendix IV

Letter from Regional Committees for Medical and Health Research Ethics



UNIVERSITETET I BERGEN

Regional komité for medisinsk og helsefaglig forskningsetikk, Vest-Norge (REK Vest)

Bente Wold

bente.wold@psyhp.uib.no

HEMIL-senteret

Universitetet i Bergen

Vår ref

2010/671

Dato

26.03.10

Ad. prosjekt: Trivsel i barne- og ungdomsfotball (2010/ 671)

Det vises til din søknad datert 25.02.10.

Komiteen behandlet søknaden i møtet den 18.03.10.

Hensikten med prosjektet er å tilby opplæring om motivasjon til fotballtrenere, og se om det skjer en forandring i spillernes motivasjon og engasjement i forhold til fotball i løpet av fotballsesongen. Målet med opplæringsprogrammet er å fremme kvaliteten i barn og unges deltakelse i idrett. Prosjektets formål ligger utenfor helseforskningslovens virkeområde (§§ 2,4b), og man anser derfor ikke prosjektet som fremleggingspliktig for REK.

En gjør oppmerksom på at prosjekter som ikke omfattes av helseforskningsloven, men som innebærer behandling av personopplysninger (herunder aidentifiserbare opplysninger) skal fremlegges for et personvernombud/Norsk samfunnsvitenskaplig datatjeneste.

Vedtak:

Søknaden avvises da prosjektet ligger utenfor komiteens mandat. Prosjektet kan således i prinsippet gjennomføres uten godkjenning fra REK, som ikke har innvendinger mot at resultatene eventuelt blir publisert.

Vennlig hilsen

Jon Lekven
leder

Camilla Gjerstad
rådgiver

(Brevet er godkjent for elektronisk utsending uten signatur)

Postadresse:

REK Vest
Postboks 7804
5020 Bergen

E-post: rek-vest@uib.no

Hjemmeside:

<http://helseforskning.etikkom.no/xnet/public>

Regional komité for medisinsk
og helsefaglig forskningsetikk,
Vest-Norge

Telefon 55 97 84 97 / 98 / 99

Besøksadresse:

2. etasje, sentralblokken,
Haukeland universitetssykehus

Org no. 874 789 542

Ny ordning fra 01.07.09:

En gjør oppmerksom på at denne søknaden er vurdert i henhold til helseforskningsloven, som ble satt i kraft 01.07.09. Dette innebærer at REK fra og med denne dato har kompetanse til å godkjenne opprettelse og endring av forskningsbiobank, å innvilge dispensasjon fra taushetsplikt og å gi tillatelse til bruk av personopplysninger til forskning.

De regionale komiteene for medisinsk og helsefaglig forskningsetikk foretar sin forskningsetiske vurdering med hjemmel i helseforskningsloven § 10, jfr. forskningsetikkloven § 4.

Saksbehandlingen følger forvaltningsloven. Komiteenes vedtak etter forskningsetikklovens § 4 kan påklages (jfr. forvaltningsloven § 28) til Den nasjonale forskningsetiske komité for medisin og helsefag. Klagen skal sendes REK Vest (jfr. forvaltningsloven § 32). Klagefristen er tre uker fra den dagen du mottar dette brevet (jfr. forvaltningsloven § 29).

Appendix V

Information Letter (Coach)



UNIVERSITETET I BERGEN
HEMIL - senteret



Informasjon om prosjektet ”Trivsel i barne- og ungdomsfotball”

Kjære trener,

Tusen takk for at du/dere har sagt dere villige til å delta i forskningsprosjektet ”**Motiverende Lederskap i fotball**” ved å delta på kurset i ”Motiverende Lederskap” samt takke ja til å svare på spørreskjemaene våre. Gjennom dette er du/dere med på å gi dere selv og oss (Universitetet i Bergen, Norges idrettshøgskole og vår alliansepartner Norges Fotballforbund) ny kunnskap om trivsel, motivasjon og læring i fotballen for barn og unge

Det er avgjørende at vi i forskningsprosjektet får mulighet til å samle inn utfylte spørreskjemaer før du/dere skal på kurs den 27. Mars.

Praktisk gjennomføring: Det varierer en del hvor lang tid det tar å fylle ut spørreskjema, men de fleste av spillerne vil bruke ca. 30-40 minutter. Vi ber om å få benytte ca 20 minutter av treningen, og ca 20 minutter etter treningen også, og at du bidrar med å tilrettelegge for et egnet sted for utfylling av skjema, og motivere spillerne til å være med. Det vil være vanskelig å få til en god datainnsamling utendørs, særlig dersom været er dårlig, så vi håper dere har tilgang til et klubbhus, klasserom eller lignende der det er tilgang til bord og stoler, og der spillerne ikke må sitte for tett. Vi tar med materiell for utfylling (blyanter og lignende).

NB! Viktig!:

- Foreldre informeres i forkant om at treningen denne dagen vil ta noe lenger tid enn vanlig.
- At alle spillerne på laget møter opp for denne treningen eller samlingen for spillerne (også spillere som måtte være skadet og ikke kan delta på selve treningen)

Informasjon til foreldre: Prosjektet er meldt til Etikk-komiteen ved Universitetet i Birmingham, som er behandlingsansvarlig institusjon for prosjektet. Når det gjelder undersøkelsen blant spillerne, innebærer tillatelsen passivt samtykke fra foreldrene. Det er derfor viktig at vi får informert foreldre om at de har mulighet til å trekke barna sine fra deltagelse i denne studien dersom de skulle ønske det.

Dette kan vi praktisk løse på følgende måter:

1. Du kan videresende vedlegget som kom med denne e-posten (*informasjon om studien til foreldre.doc*) til spillere og foreldre
2. Du kan skrive ut vedlegget og dele ut på neste trening.
3. Vi kan sende deg informasjonsskrivet i posten, som du kan dele ut på trening.

Vennligst gi beskjed tilbake på epost dersom du vil ha tilsendt disse info-skrivene i posten, ellers antar vi at du sender denne informasjonen videre selv.

Personvern: Det er helt frivillig for spillerne å delta i spørreskjemaundersøkelsene, og all informasjon som han/hun gir fra seg vil bli behandlet helt konfidensielt. Informasjonen som samles inn vil være aidentifisert, hvilket betyr at ingen skal skrive sitt navn på skjemaene, og data vil bli lagret i aidentifisert form, slik at det ikke vil være mulig å identifisere den enkelte trener eller spiller direkte. Selv om det hjelper vår studie om alle spørsmålene er besvart, er dere ikke forpliktet til å svare på alle spørsmålene. Det er mulig til å trekke seg fra studien på ethvert tidspunkt ved å informere oss. Dersom du senere velger å trekke deg, vil det ikke få innvirkning på forholdet til fotballkretsen eller Norges Fotballforbund.

Vi vil bruke datamaterialet til vitenskapelig arbeid, og publisere resultatene i vitenskapelige tidsskrifter. Det vil ikke være mulig å gjenkjenne enkeltpersoner eller –lag i publikasjoner. Når studien er fullført vil din klubb motta en rapport der hovedresultatene fra studien blir presentert sammen med våre konklusjoner og anbefalinger. Denne rapporten vil foreligge i anonym form.

Vi trenger følgende informasjon fra deg snarest og innen onsdag 9/3:

- 1. Tid og sted** (besøksadresse til banen/stedet dere trener) for gjennomføring av spørreskjema-undersøkelsen.
- 2. Tilgang på lokaliteter** for utfylling av skjemaene: **Klubbhus m/ bord & stoler? Garderobe? Kun ute?**
- 3. Hvor mange trenere og hvor mange spillere** som vil være til stede. Vi ønsker at spillere som er skadet blir bedt om å komme denne dagen, og at alle trenere på laget også fyller ut trenerskjemaet.
- 4. Kun dersom du vil ha informasjonsskriv til foreldre sendt i posten: Din postadresse.**

Vår frist for å organisere denne datainnsamlingen er ganske kort. Vi håper på din velvilje og samarbeid for å få dette til på en god måte. Vi vil ringe deg dersom vi ikke hører fra deg.

Vi er svært takknemlige for at du/dere er villige til å stille opp for denne svært viktige studien. Kunnskapen vi får fra dette prosjektet vil gi oss verdifull kunnskap som i løpet av kort tid vil kunne bli brukt til å tilrettelegge for at flere barn og unge skal få en positiv opplevelse av å spille fotball og ha en fysisk aktiv livsstil.

Vennlig hilsen

Bente Wold, professor HEMIL-senteret, Universitetet i Bergen
Yngvar Ommundsen, professor, Norges idrettshøgskole

Kontaktopplysninger for prosjektleder:

Bente Wold, HEMIL-senteret, Det psykologiske fakultet, Universitetet i Bergen.

bente.wold@uib.no, tlf. 5558 3223, mobil 90 53 26 67.

Appendix VI

Questionnaire (Coach)



UNIVERSITETET I BERGEN
HEMIL - senteret



TRIVSEL I BARNE- OG UNGDOMSFOTBALL

SPØRRESKJEMA TIL TRENERE

Vår 2011



UiB, Christiesgt.13 – 5015 Bergen Telefon: 55 58 28 08 Telefax: 55 58 98 87
post@hemil.uib.no

INSTRUKSJONER

Vennligst svar på alle spørsmålene så ærlig og nøyaktig som mulig.

Husk at ingen andre enn forskerne får se skjemaet etter du har fylt det ut. Det er heller ingen riktige eller gale svar, så svar slik du virkelig føler.

Hvis noe er forvirrende, be om hjelp, så skal vi hjelpe deg.

Mange av spørsmålene handler om ditt fotballag, spillerne på laget, eller dine følelser og hvordan du opplever det å være fotballtrener.

Noen av spørsmålene kan virke veldig like. Det skal de også være.

Bente Wold

Professor, Universitetet i Bergen

Yngvar Ommundsen

Professor, Norges Idrettshøgskole

1. Skriv inn fødselsdagen din her: _____ / _____ / _____

For eksempel, dersom fødselsdagen din er 17. august 1975, skriv : 17 / august / 1975

2. Hvor mange brødre og søstre har du? (inkludert halv-brødre og halv-søstre)

0	1	2	3	4	5	6	Mer enn 6
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Kjønn : Kvinne Mann

4. Hva heter laget du er trener for (Klubb, Gutter/Jenter, Aldersgruppe)

5. Spiller laget du trener 7'er eller 11'er fotball?

7'er	<input type="checkbox"/>
11'er	<input type="checkbox"/>

6. Hvor mange timer per uke trener laget? _____ timer per uke

7. Hvor mange ganger per uke trener laget ? _____ ganger per uke

8. Hvor mange av disse treningene per uke er du med på? _____ ganger i uken.

9. Hvilken av de følgende kategoriene beskriver best din etniske bakgrunn? (sett kryss i bare én boks)?

- Norsk
- Nordisk (ikke norsk)
- Annen europeisk (ikke nordisk)
- Afrikansk
- Nord-Amerikansk
- Sør-Amerikansk
- Asiatisk
- Fra midtøsten
- Annet

10. Hvor lenge har du vært fotballtrener? _____ år _____ måneder

11. Hvor lenge har du vært trener for dette laget som du er trener for i dag? _____ år _____ måneder

12. Har du formell trener-kompetanse ? Dersom du har, vennligst skriv navn på sertifisering og organisasjon der du ble sertifisert.

13. Har du selv vært aktiv fotballspiller? Ja Nei

14. Dersom du selv har vært/er aktiv spiller, hvilket nivå var/er det høyeste du har konkurrert på?

- Har ikke vært aktiv spiller
- Toppnivå/eliteserie
- 1.-3. divisjon
- 4. divisjon eller lavere
- Bedriftsfotball
- Juniornivå
- Annet

15. Har du selv barn som spiller fotball: Ja Nei

16. Har du barn som spiller på laget du selv trener: Ja Nei

17. Hvor mange trenere er det på dette laget?

- En
To
Flere enn to

18. Dersom det er mer enn én trener, hvordan vil du beskrive ansvarsfordelingen mellom dere?

a) Vi har/tar like mye ansvar

b) Jeg er hoved-trener og den/de andre assisterer

c) Jeg assisterer en annen hovedtrener

d) Annen type arbeidsfordeling beskriv _____



19. Nedenfor står en del utsagn som beskriver hvorfor du er fotballtrener. **Sett en ring for hvert utsagn rundt det svaret som passer best med dine grunner for å være fotballtrener.**

Jeg er fotballtrener..	Svært Uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
1. fordi jeg synes det er moro	1	2	3	4	5
2. fordi det er bra for meg	1	2	3	4	5
3. fordi det bidrar til min personlige utvikling	1	2	3	4	5
4. fordi jeg ikke vil svikte spillerne mine	1	2	3	4	5
5. for å bli respektert av andre	1	2	3	4	5
6. selv om jeg ofte tenker at min trenerinnsats er bortkastet tid	1	2	3	4	5
7. fordi det gir meg en god følelse	1	2	3	4	5
8. fordi å være fotballtrener er en viktig ting i livet mitt	1	2	3	4	5
9. fordi det passer med mine personlige mål	1	2	3	4	5
10. fordi jeg ville følt det som et nederlag om jeg sluttet	1	2	3	4	5
11. for å få anerkjennelse	1	2	3	4	5
12. men noen ganger vet jeg ikke helt hvorfor jeg fremdeles holder på med dette	1	2	3	4	5



Jeg er fotballtrener..	Svært Uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
13. fordi jeg liker å bruke energien/kreftene mine på dette	1	2	3	4	5
14. fordi det passer godt med mine personlige verdier	1	2	3	4	5
15. fordi det gir meg mulighet til å oppnå mine personlige mål	1	2	3	4	5
16. fordi jeg føler ansvar for spillernes prestasjoner	1	2	3	4	5
17. fordi jeg gjerne vil bli verdsatt	1	2	3	4	5
18. men noen ganger krever det mer enn jeg føler jeg får tilbake	1	2	3	4	5

Jeg er fotballtrener..		Svært Uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
19.	fordi jeg liker det		1	2	3	4 5
20.	fordi jeg virkelig vil vinne		1	2	3	4 5
21.	fordi jeg liker belønningene (for eksempel pokaler, anerkjennelse) som følger med det å vinne		1	2	3	4 5
22.	men noen ganger lurur jeg på om jeg har lyst å fortsette å være trener		1	2	3	4 5
23.	fordi jeg liker å være sammen med spillerne		1	2	3	4 5



20. For hvert utsagn, sett ring rundt det svaret som passer best med din opplevelse av å være fotballtrener i løpet av den siste måneden.

		Svært Uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
1.	Jeg føler jeg har mye å si når det gjelder å bestemme hvordan jeg ønsker å lede og trene laget mitt	1	2	3	4	5
2.	Jeg liker godt spillerne jeg trener	1	2	3	4	5
3.	Jeg liker godt folkene i denne klubben	1	2	3	4	5
4.	Jeg føler meg ikke veldig kompetent på treningene	1	2	3	4	5
5.	Folk i klubben sier at jeg er en god trener	1	2	3	4	5
6.	Jeg føler meg presset i denne klubben	1	2	3	4	5
7.	Jeg går godt overens med spillerne jeg trener	1	2	3	4	5
8.	Jeg går godt overens med folk i klubben	1	2	3	4	5
9.	Jeg holder meg mye for meg selv på treningene	1	2	3	4	5
10.	Jeg er ikke mye sammen med andre i klubben	1	2	3	4	5
11.	Jeg føler meg fri til å bruke mine egne ideer og meninger når jeg trener laget mitt	1	2	3	4	5
12.	Jeg føler at jeg er venn med spillerne jeg trener	1	2	3	4	5
13.	Jeg er venner med andre folk i klubben	1	2	3	4	5

		Svært Uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
14.	Jeg har fått mulighet til å lære meg nye ting om hvordan jeg kan være en god (fotball) trener	1	2	3	4	5
15.	Ledelsen i klubben bestemmer hvordan treningene mine skal organiseres	1	2	3	4	5
16.	Jeg synes stort sett at jeg presterer bra som trener	1	2	3	4	5
17.	Klubben tar hensyn til hvordan jeg har det personlig	1	2	3	4	5
18.	Jeg får sjelden muligheten til å vise hva jeg kan som trener	1	2	3	4	5
19.	Spillerne jeg trener bryr seg om meg	1	2	3	4	5
20.	Folk i klubben bryr seg om meg	1	2	3	4	5
21.	Det er ikke mange spillere på laget mitt som jeg føler meg tett knyttet til	1	2	3	4	5
22.	Det er ikke mange folk i klubben som jeg føler meg tett knyttet til	1	2	3	4	5
23.	Jeg føler at jeg stort sett kan være meg selv når jeg trener laget mitt	1	2	3	4	5
24.	Det virker som om spillerne jeg trener ikke liker meg særlig godt	1	2	3	4	5
25.	Det virker som om folk i klubben ikke liker meg særlig godt	1	2	3	4	5
26.	Jeg føler meg ikke spesielt kompetent som fotballtrener	1	2	3	4	5
27.	Jeg har få muligheter til å bestemme hvordan jeg organiserer treningene	1	2	3	4	5
28.	Spillerne jeg trener er vennlig innstilt mot meg	1	2	3	4	5
29.	Folk i klubben er vennlig innstilt mot meg	1	2	3	4	5



21. Alle trenere har ulik tilnærming til hvordan de velger å trene laget sitt. Vi vil gjerne vite mer om hvordan du er som trener for laget ditt. Les de følgende utsagnene, og **sett ring rundt tallet som best gjenspeiler hvor enig du er i de følgende utsagnene.**

På laget mitt...	Svært uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
1. oppfordrer jeg spillerne til å prøve ut ting de ikke kan fra før	1	2	3	4	5
2. er jeg mindre vennlig med spillerne dersom de ikke prøver å se ting på min måte	1	2	3	4	5
3. gir jeg spillerne mine valg og alternativer	1	2	3	4	5
4. prøver jeg å sørge for at spillerne føler seg vellykket når de gjør sitt beste	1	2	3	4	5
5. bytter jeg ut spillerne når de gjør feil	1	2	3	4	5
6. synes jeg det er viktig at spillerne spiller fotball av egen vilje	1	2	3	4	5
7. er jeg mindre støttende overfor spillerne når de ikke trener eller spiller godt	1	2	3	4	5
8. kan spillerne stole på at jeg bryr meg, uansett hva som skjer	1	2	3	4	5
9. vier jeg mesteparten av oppmerksomheten min til de beste spillerne	1	2	3	4	5



På laget mitt...	Svært uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
10. kjefter jeg på spillerne dersom de gjør feil	1	2	3	4	5
11. roser jeg spillerne når de forbedrer seg	1	2	3	4	5
12. er jeg mindre oppmerksom mot spillere som gjør meg misfornøyd	1	2	3	4	5
13. belønner jeg spillere som jobber hardt	1	2	3	4	5
14. setter jeg pris på spillerne som personer, ikke bare som fotballspillere	1	2	3	4	5
15. lar jeg spillerne gjøre noe som er ekstra gøy mot slutten av treningen, men bare dersom de har gjort en god jobb underveis	1	2	3	4	5
16. svarer jeg grundig og skikkelig på spørsmål dersom spillerne spør meg om noe	1	2	3	4	5
17. overser jeg spillere som skuffer meg/gjør meg misfornøyd	1	2	3	4	5

	På laget mitt...	Verken enig eller uenig				
		Svært uenig	Uenig	Enig	Svært Enig	
18.	sørger jeg for at hver spiller bidrar til laget på en eller annen måte	1	2	3	4	5
19.	har jeg favorittspillere	1	2	3	4	5
20.	belønner jeg bare spillerne dersom de har spilt godt	1	2	3	4	5
21.	roses jeg spillerne som har spilt best på kamper	1	2	3	4	5
22.	prøver jeg å forklare spillerne hvorfor de skal gjøre de tingene jeg foreslår	1	2	3	4	5
23.	sørger jeg for at alle har en viktig rolle på laget	1	2	3	4	5
24.	skjeller jeg ut spillere foran andre for å få dem til å gjøre ulike ting	1	2	3	4	5
25.	får de beste spillerne spille mest	1	2	3	4	5
26.	holder jeg kontroll på treningene ved å true spillerne med straff	1	2	3	4	5



	På laget mitt...	Verken enig eller uenig				
		Svært uenig	Uenig	Enig	Svært Enig	
27.	lytter jeg åpent og uten å dømme når spillerne forteller meg om hvordan de har det	1	2	3	4	5
28.	sørger jeg for at alle spillerne opplever at de er delaktig i lagets suksess	1	2	3	4	5
29.	bruker jeg hovedsaklig belønning/ros for å få spillerne til å gjøre de tingene jeg vil de skal gjøre	1	2	3	4	5
30.	oppmuntrer jeg spillerne til å hjelpe hverandre med å lære nye ting	1	2	3	4	5
31.	prøver jeg å finne ut hva spillerne gjør på fritiden	1	2	3	4	5
32.	synes jeg det er viktig at spillerne synes det er gøy å holde på med fotball	1	2	3	4	5
33.	har jeg noen favorittspillere på laget	1	2	3	4	5
34.	oppfordrer jeg spillerne til å jobbe sammen som et lag	1	2	3	4	5

22. Alle trenere er ulike med hensyn til hva de føler at de gjør bra eller dårlig sammen med laget sitt.

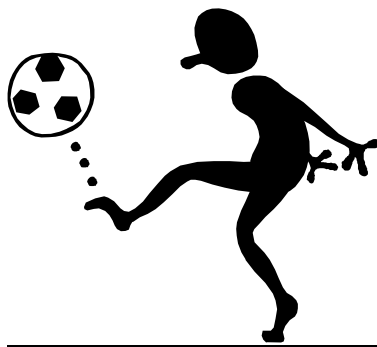
Sett ring rundt det tallet som representerer hvor stor tro du har på dine evner i forhold til de ulike ferdighetene som står under.

Hvor stor tro har du på at du kan:	Ingen tro										Svært stor tro
1. bidra til at spillere bevarer troen på seg selv	0	1	2	3	4	5	6	7	8	9	
2. finne ut av motstanderlagets sterke sider i kamp	0	1	2	3	4	5	6	7	8	9	
3. forberede spillerne mentalt på kamp	0	1	2	3	4	5	6	7	8	9	
4. anvende ulik taktikk i kamp	0	1	2	3	4	5	6	7	8	9	
5. oppmuntre til gode moralske holdninger	0	1	2	3	4	5	6	7	8	9	
6. bygge et positivt selvbilde hos spillerne	0	1	2	3	4	5	6	7	8	9	
7. demonstrere ferdigheter /øvelser innen fotball	0	1	2	3	4	5	6	7	8	9	
8. endre eget spill /taktikk slik at det tilpasses ulike kampsituasjoner	0	1	2	3	4	5	6	7	8	9	



Hvor stor tro har du på at du kan:	Ingen tro										Svært stor tro
9. finne ut av motstanderes svakheter i kampsituasjoner	0	1	2	3	4	5	6	7	8	9	
10. motivere spillerne	0	1	2	3	4	5	6	7	8	9	
11. ta viktige avgjørelser under kamp	0	1	2	3	4	5	6	7	8	9	
12. utvikle/bygge samhold i laget	0	1	2	3	4	5	6	7	8	9	
13. fremme en fair play holdning hos spillerne	0	1	2	3	4	5	6	7	8	9	
14. veilede spillerne i forhold til teknikk/ferdigheter	0	1	2	3	4	5	6	7	8	9	
15. utvikle spillernes tro på seg selv	0	1	2	3	4	5	6	7	8	9	
16. utvikle spillernes talent	0	1	2	3	4	5	6	7	8	9	

Hvor stor tro har du på at du kan:		Ingen tro										Svært stor tro									
17.	fremme spillernes /lagets sterke sider under kamp	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
18.	identifisere spillernes talent	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
19.	fremme god sportsånd	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
20.	oppdage tekniske /ferdighetsmessige feil	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
21.	tilpasse kampstrategier med utgangspunkt i lagets ferdighetsnivå	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
22.	lære bort ferdigheter i fotball	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
23.	bygge lagets tro på seg selv	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
24.	fremme en holdning om å respektere hverandre	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9



23. Alle trenere ønsker å gjøre sitt beste, men noen ganger kan dette være vanskelig på grunn av faktorer som du ikke selv har kontroll over. For hvert utsagn under, **sett en ring rundt det tallet som passer best med de utfordringene du møter som trener for laget.**

Utfordringer	Aldri problematisk							Ofte problematisk						
1. Foreldre insisterer på at du bør øke fokus på prestasjoner.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
2. Foreldre insisterer på at du bør øke fokus på å ivareta spillernes trivsel.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
3. Foreldre som er opptatt av at de beste spillerne skal få spille mest i kamp.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
4. Foreldre som blander seg inn i dine avgjørelser som trener.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
5. Folk i klubben insisterer på at du bør øke fokus på prestasjoner.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
6. Folk i klubben insisterer på at du bør øke fokus på å ivareta spillernes trivsel.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
7. Mangelfulle treningsfasiliteter/utstyr.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
8. Disiplinærproblemer i spillergruppa.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
9. Vanskelig å få foreldre til å stille opp for laget.	1	2	3	4	5	6	7	1	2	3	4	5	6	7



24. Sett en ring rundt det svaret som passer best med hvor ofte de følgende følelsene har preget deg når du har trent dette laget i løpet av den siste måneden.

I løpet av den siste måneden mens jeg har trent dette laget har jeg stort sett følt meg...	Sjelden/aldri		Noen ganger			Alltid	
	1	2	3	4	5	6	7
1. glad	1	2	3	4	5	6	7
2. fornøyd	1	2	3	4	5	6	7
3. misfornøyd/ulykkelig	1	2	3	4	5	6	7
4. aggressiv	1	2	3	4	5	6	7
5. lykkelig/ oppstemt	1	2	3	4	5	6	7
6. frustrert/irritert	1	2	3	4	5	6	7
7. begeistret/frydefull	1	2	3	4	5	6	7
8. trist/lei meg	1	2	3	4	5	6	7
9. entusiastisk	1	2	3	4	5	6	7
10. stolt	1	2	3	4	5	6	7

25. Under står noen utsagn relatert til hverdagslivet ditt (alt du vanligvis gjør) og ikke bare til fotballgjerningen din. Sett en ring rundt svarene som passer best med hvordan du generelt har kjent deg den siste måneden.

Den siste måneden har jeg stort sett...	Svært uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
1. følt meg opplagt	1	2	3	4	5
2. vært i godt humør	1	2	3	4	5
3. gledet meg til hver dag	1	2	3	4	5
4. følt meg kvikk og våken	1	2	3	4	5
5. hatt masse energi	1	2	3	4	5

26. Hva tenker du nå for tiden om hvor lenge du kommer til å fortsette å være fotballtrener?

	Svært uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
1. Jeg har tenkt å fortsette som fotballtrener neste sesong	1	2	3	4	5
2. Jeg kan tenke meg å fortsette å trene dette laget til neste sesong.	1	2	3	4	5

27. For hvert utsagn under, sett en ring rundt tallet som passer best med din oppfatning av forholdet mellom spillerne på laget

	På fotball-laget jeg er trener for...	Svært uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
1.	har spillerne mye til felles	1	2	3	4	5
2.	forstår spillerne hverandre godt	1	2	3	4	5
3.	er spillerne åpne med hverandre	1	2	3	4	5
4.	stoler spillerne på hverandre	1	2	3	4	5
5.	har spillerne et godt samhold	1	2	3	4	5
6.	stiller spillerne opp for hverandre	1	2	3	4	5

TUSEN TAKK FOR HJELPEN!

Appendix VII

Interview Guide (Coach)

INTERVJUGUIDE breddefotballtrenere September – November 2011

Vi har invitert deg til dette intervjuet fordi vi ønsker å få dine tilbakemeldinger på kurset motiverende ledelse som du var med på i vår. Vi ønsker å få høre litt om hva du lærte på kurset og hvilke erfaringer du har i forhold til å bruke kunnskapen og strategiene du lærte på kurset. Din tilbakemelding, både vedrørende dine tanker og refleksjoner knyttet til programmets verdi, styrker og svakheter, og også knyttet til hvordan vi organiserte kursingen, kan bringe oss et viktig skritt framover i evalueringen av motiverende ledelse i norske klubber.

Det er ikke noe rett eller galt svar på spørsmålene. Dine synspunkt og kommentarer er viktige, uansett om de er positive eller negative. Og så er det selvfølgelig slik at det er opp til deg hva du vil fortelle, hvordan du vil fortelle det, og hvor mye du vil si. Du trenger ikke å bekymre deg for at vi forventer at du skal si noe spesielt, din erfaring er uansett viktig for oss.

Be om tillatelse til å ta opptak av samtalen....

Først av alt, ønsker jeg å få vite litt om din fotballerfaring som trener og spiller...

- Hvor lenge du har vært trener?
- Alder på spillere?
- Antall treninger pr uke?
- Egen spillererfaring?

Klubbens visjoner / sportslig plan og støtte...

- Hvordan er klubben din organisert?
- Hvilken oppfølging får du som trener fra klubbens ledelse?
- Har din klubb en felles målsetning / visjon for klubbens arbeid med barne- og ungdomsfotball?
 - o På hvilken måte formidles / diskuterer klubbledelsen denne med dere?
- Hvordan / hvem rekrutterte deg til å delta på Motiverende lederskap kurset?

Da har jeg lyst til å gå videre med og snakke om hvordan du opplever trenerrollen / treneroppgaven.

- Kan du si noe om hvorfor du begynte som trener?
- Hvordan vil du beskrive din trenerfilosofi?
- Hva synes du er din viktigste oppgave som trener?

- Kan du beskrive så detaljert som mulig en typisk treningsøkt fra dere kommer på banen og til dere er ferdige/går hjem?
 - Hva gjør du? (hvordan organiserer du treningen?)
 - Hvordan møter du og snakker du til spillerne?

- Kan du på samme måte beskrive en kamp fra dere møtes til dere forlater garderoben etter kampen?
 - Hva snakker du med spillerne om?
 - Involverer du spillerne i valg av taktikk o.l.?

Da du var på kurs i vår, antar jeg at dere brukte en del tid på å diskutere barn og ungdoms motivasjon for å spille fotball.

- Hva betyr motivasjon for deg?
- Hvordan kan du vite om en spiller er motivert?
- Hvordan kan en fotballtrener fremme spillernes motivasjon?
 - Kan du gi noen praktiske eksempler på hvordan (du kan) spillernes motivasjon kan fremmes?

- Hva betyr autonomi for deg?
- Hvordan kan du legge til rette for at spillerne dine blir hørt, får være med å påvirke og ta egne valg? (medbestemmelse og autonomi)
 - Kan du gi noen eksempler på hvordan dette kan gjøres?
- Er det noe forskjell i spillernes medbestemmelse på trening og i kamp?
 - Evt. På hvilken måte / Hvordan?

- Hvor viktig synes du det er at spillerne dine opplever en viss grad av medbestemmelse? (bli hørt, får være med å påvirke?)
 - Hvorfor synes du dette er viktig / ikke viktig?

- Hvor viktig synes du det er at en spiller føler seg som en del av laget?
 - Hvorfor er det viktig / ikke viktig?

- Hvordan kan du som trener bidra til at spillerne dine føler seg som en del av laget?
 - Kan du gi noen eksempler på hvordan du kan gjøre dette?
 - Er det en forskjell i spillernes følelse av å være en del av laget på trening og i kamp? (Dersom, hvorfor er det slik tror du?)
 - Hvordan kan du få dem som sitter på benken / står på sidelinjen til å føle at de hører til / er inkludert?

- Hvor viktig synes du det er at en spiller føler de får ting til på trening og i kamp?
 - Hvorfor synes du dette er viktig / ikke viktig?
- Hvordan kan du som trener bidra til at en spiller føler at de får det til?

- Er det en forskjell i spillernes følelse av å få til ting på trening og i kamp?
- I hvilken grad har du benyttet deg av e-læringen som har vært tilgjengelig på PAPA prosjektets hjemmeside?
 - Hvor mange av testene har du gjennomført?
 - På hvilken måte har dette vært nyttig / ikke nyttig?

I hvilken grad har du benyttet deg av arbeidsboken som et planleggingsredskap denne sesongen? Kan du si noe om hvorfor eller hvorfor ikke?

- Hvis du nå tenker tilbake på denne fotballsesongen, hva synes du er det viktigste du har lært gjennom deltakelse på kurset Motiverende ledelse samt e-læringen i løpet av sesongen?
 - Hvorfor trekker du fram nettopp dette / hva er grunnen til at dette er det viktigste?
 - Har dette påvirket til trenerfilosofi?
- Kan du si noe om hvor lett eller vanskelig det har vært å bruke det du lærte på kurset i din praktiske trener hverdag?
- Hvorfor var det vanskelig eller lett (barriere)?
- Hva skulle eventuelt til for at du skulle kunne bruke det?
- Har innholdet i kurset vært positivt mottatt av spilleren og foreldre, eventuelt medtrenere?
- Dersom du har gjort noen endringer,
 - Hvilke fordeler har du erfart som et resultat av å gjøre disse endringene, enten for deg selv eller spillerne dine?
 - Kan du gi et eksempel?
- Har du forslag til andre måter vi kunne ha organisert motiverende ledelseskurset på for å fremme din kompetanse som fotballtrener?
 - Andre kommentarer ifh til din erfaringer med motiverende ledelse?

Takk!

