

Contexts, Motivation, and Coaching Behaviours – A Self-Determination Theory Perspective on
Coach-Athlete Relationships

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To the Ottawa synchronized skating community,
for giving me the opportunity to live this research.

ABSTRACT

Based in Self-Determination Theory (SDT), the overall objective of this thesis was to explore how the coaching context, coach psychological needs, and coach motivation influenced coaches' interpersonal behaviours when they interacted with their athletes, and how these interpersonal behaviours impacted athletes' psychological needs and motivation in sport. This objective was achieved through a series of 10 studies, looking at different samples of coaches and athletes, divided into four manuscripts. First, there was a need to create a measure that captured both perceptions of others', as well as self-reports of the six interpersonal behaviours according to SDT (autonomy-support, competence-support, relatedness-support, autonomy-thwarting, competence-thwarting, and relatedness-thwarting). As such, in Manuscript #1, the Interpersonal Behaviours Questionnaire (IBQ) was created and validated as a general measure of perceptions of other people's interpersonal behaviours (Study 1 $N = 534$ students; Study 2 $N = 351$ students) and as a self-report of interpersonal behaviours used in general (Study 3 $N = 607$ students). In Manuscript #2, the validity of the measure was extended to include the sport context by testing the scale with coaches and athletes. Specifically, Study 1 ($N = 239$ athletes) validated the measure with a sample of athletes reporting on their coaches' behaviours, and Study 2 ($N = 240$ coaches) looked at coaches' reports of their own behaviours in their interactions with their athletes. Overall, the results of these five studies provided support for the factor structure and validity of the IBQ as a measure of perceived and self-reported interpersonal behaviours in both the general context, as well as sport. Next, Manuscript #3 explored the antecedents of coaches' reported interpersonal behaviours. Specifically, Study 1 ($N = 56$ coaches) looked at the coaching context in order to identify the factors that had the largest impact on coaches' experiences. In Study 2 ($N = 310$ coaches), the relationship between coaches' psychological needs, motivation

for coaching, and interpersonal behaviours was explored to confirm the sequence occurred as would be expected according to SDT. Finally, in Study 3 ($N = 225$ coaches), the influence of the contextual factors on coaches' psychological needs, motivation, and interpersonal behaviours was examined. Overall, the results supported that coaches in a supportive context experienced increased need satisfaction, higher autonomous motivation for coaching, and were more likely to engage in supportive interpersonal behaviours with their athletes; while coaches in a thwarting context experienced increased need frustration, higher controlled motivation, and were more likely to engage in thwarting interpersonal behaviours. Finally, Manuscript #4 explored the outcomes of coaches' interpersonal behaviours. First, Study 1 ($N = 180$ athletes) looked at athletes' perceptions of their coaches' behaviours and how their perceptions impacted psychological needs and motivation in sport. Lastly, Study 2 ($N = 278$ athletes; $N = 53$ coaches) explored whether coaches' self-reports of their interpersonal behaviours were in line with their athletes' same perceptions of these behaviours, and explored the factors that were related to whether coaches and athletes were in agreement. These last two studies found that supportive interpersonal behaviours promoted need satisfaction and autonomous motivation for athletes; while thwarting interpersonal behaviours promoted need frustration and controlled motivation for athletes. Overall, this thesis helped extend the existing research in motivational psychology and helped address some important limitations.

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CONTRIBUTION OF AUTHORS

This thesis consists of an introduction, four manuscripts in article form, and a general discussion. The introduction (Chapter 1) provides a broad overview of the theoretical framework guiding the research, the four manuscripts (Chapters 2 – 5) summarize the findings of the research, and the general discussion (Chapter 6) provides an integration of these findings.

I, Meredith Rocchi, am responsible for all of the conceptualization, data collection, analyses, and writing of this thesis, and am the primary author of all four manuscripts. My thesis supervisor, Dr. Luc Pelletier, provided feedback at all stages of this thesis from the planning phase to the final draft, and is the secondary author on all of the manuscripts.

I had some assistance from colleagues on the first two manuscripts. Susanna Cheung, Daniel Baxter, and Dr. Simon Beaudry assisted with item creation, decision-making, interpretation, analyses, and writing for Manuscript 1 (Chapter 2) entitled: “Assessing Need-Supportive and Need-Thwarting Interpersonal Behaviours: The Interpersonal Behaviours Questionnaire (IBQ)”. As such, they are officially listed as co-authors on the manuscript. For Manuscript 2 (Chapter 3) entitled: “The Validity of the Interpersonal Behaviour Questionnaire in Sport”, Philippe Desmarais assisted with the data collection and is also listed as a co-author on this manuscript.

TABLE OF CONTENTS

Abstract.....	Iii
Acknowledgements.....	v
Contribution of Authors	vii
Table of Contents.....	viii
List of Tables.....	xiii
List of Figures.....	xv

Chapter 1 – General Introductions

Problem Statement.....	1
Theoretical Background.....	2
Self-Determination Theory.....	3
Understanding Contextual Motivation.....	5
Interpersonal Behaviours.....	6
Self-Determination Theory and Sport.....	8
Limitations.....	11
Current Research.....	15
Proposed Model.....	16
Coaching Context.....	16
Coach Needs.....	20
Coach Motivation.....	21
Coach Behaviour.....	21
Athlete Needs.....	23
Athlete Motivation.....	23
Research Objectives.....	23
Manuscript #1.....	24
Manuscript #2.....	24
Manuscript #3.....	25
Manuscript #4.....	27
Anticipated Contributions.....	29
References.....	31

Chapter 2 – Assessing Need-Supportive and Need-Thwarting Interpersonal Behaviours: The Interpersonal Behaviours Questionnaire (IBQ)

Abstract.....	43
Introduction.....	44
Self-Determination Theory.....	44
Supporting Psychological Needs.....	45
Limitations of Past Research.....	47
Present Research.....	49
Study 1.....	49
Method.....	50
Item Development.....	50

Participants.....	51
Materials.....	51
Analyses.....	53
Results.....	53
Discussion.....	60
Study 2.....	61
Method.....	61
Participants.....	61
Materials.....	62
Results.....	63
Discussion.....	64
Study 3.....	64
Method.....	65
Participants.....	65
Materials.....	65
Analyses.....	67
Results.....	67
Discussion.....	69
General Discussion.....	69
Limitations.....	70
Future Directions.....	71
References.....	72
Tables.....	80

Chapter 3 – The Validity of the Interpersonal Behaviours Questionnaire in Sport.

Abstract.....	86
Introduction.....	87
Self-Determination Theory and Sport.....	87
Need Supportive and Need Thwarting Interpersonal Behaviours.....	89
Limitations of Existing Research.....	90
Present Research.....	92
Study 1.....	93
Method.....	93
Participants.....	93
Procedures.....	94
Materials.....	94
Analyses.....	96
Results.....	97
Discussion.....	99
Study 2.....	100
Method.....	100
Participants.....	100
Procedures.....	100
Materials.....	101
Analyses.....	102

Results.....	103
Discussion.....	104
General Discussion.....	105
Limitations.....	106
Future Directions.....	107
References.....	108
Tables.....	114

Chapter 4 – The Coaching Context, Needs, Motivation, and Coaching Behaviour

Abstract.....	117
Introduction.....	118
Self-Determination Theory	118
Coaches' Interpersonal Behaviours.....	120
Determinants of Coaches' Interpersonal Behaviours.....	121
Limitations.....	123
Present Research.....	124
Study 1.....	126
Method.....	126
Participants.....	126
Procedures.....	127
Measures.....	130
Analyses.....	131
Results	131
Discussion	134
Study 2.....	134
Method.....	135
Participants.....	135
Procedures.....	135
Measures.....	135
Analyses.....	138
Results.....	139
Discussion.....	142
Study 3.....	143
Method.....	143
Participants.....	143
Procedures.....	144
Measures.....	144
Analyses.....	149
Results.....	149
Discussion.....	154
General Discussion.....	155
Limitations.....	157
Future Research.....	159
References.....	160
Tables.....	168

Figures.....	180
 Chapter 5 – Exploring Coach-Athlete Relationships	
Abstract.....	183
Introduction.....	184
Self-Determination Theory Overview	184
Coach-Athlete Relationships.....	185
Coach Interpersonal Behaviours.....	186
Limitations.....	188
Present Research.....	189
Study 1.....	191
Methods.....	192
Participants.....	192
Procedures.....	192
Materials.....	192
Analyses.....	194
Results.....	195
Discussion.....	196
Study 2.....	197
Method.....	199
Participants.....	199
Procedures.....	199
Materials.....	200
Analyses.....	202
Results.....	203
Discussion.....	213
General Discussion.....	214
Limitations.....	216
Future Directions.....	218
References.....	220
Tables.....	227
Figures.....	232

Chapter 6 – General Discussion

Summary of Thesis Objectives.....	235
Key Findings.....	236
Manuscript #1.....	237
Manuscript #2.....	238
Manuscript #3.....	239
Manuscript #4.....	241
Collective Implications Across Studies	243
Support for the IBQ as a Valid Measurement Tool.....	243
Understanding the Full Motivational Sequence in Sport.....	245
Antecedents of Coach Impression Management.....	247

Limitations and Directions for Future Research.....	248
Coaching Context.....	248
Self-Report Data	249
Cross-Sectional Design	249
Coaching Level	250
Determinants of Impression Management.....	250
General Psychological Needs and Motivation.....	251
Other Outcomes of Coach Motivation.....	252
Implications for Coach Training.....	253
New Lines of Inquiry.....	256
Conclusions.....	258
References.....	259

Appendices

Appendix A.....	263
Appendix B.....	265
Appendix C.....	266
Appendix D.....	267
Appendix E.....	268
Appendix F.....	269
Appendix G.....	270
Appendix H.....	271
Appendix I.....	272
Appendix J.....	273
Appendix K.....	274
Appendix L.....	275
Appendix M.....	276
Appendix N.....	277
Appendix O.....	280
Appendix P.....	281
Appendix Q.....	282
Appendix R.....	283
Appendix S.....	284

LIST OF TABLES

Table 1.1	<i>Study 1: CFA results</i>	74
Table 1.2	<i>Study 1 and 2: Final items with standardized factor loadings (FL) and standard errors (SE).</i>	75
Table 1.3	<i>Study 1, 2 and 3: Subscale correlations, means, standard deviations, and internal consistency</i>	76
Table 1.4	<i>Study 1 and 2: Descriptive Statistics and Correlations with Outcome Variables.</i>	77
Table 1.5	<i>Study 3: Final items with standardized factor loadings (FL) and standard errors (SE)</i>	78
Table 1.6	<i>Study 3: Descriptive Statistics and Correlations with Outcome Variables for the IBQ-Self.</i>	79
Table 2.1	<i>Study 1 and 2: Final items with standardized factor loadings (FL) and standard errors (SE)</i>	110
Table 2.2	<i>Study 1 and 2: Factor correlations, variance, means, standard deviations, and internal consistency</i>	111
Table 2.3	<i>Study 1 and 2: Descriptive Statistics and Correlations with Outcome Variables for the IBQ (Study1) and the IBQ-Self (Study 2)</i>	112
Table 3.1	<i>Study 1: Descriptive Statistics for Contextual Factor Variables</i>	166
Table 3.2	<i>Study 1: Top 5 Importance Rankings</i>	167
Table 3.3	<i>Study 2: Descriptive Statistics for Model Variables</i>	168
Table 3.4	<i>Study 2: Factor Correlations</i>	170
Table 3.5	<i>Study 3: Descriptive Statistics for Model Variables</i>	171
Table 3.6	<i>Study 3: Factor Correlations for Model 1.</i>	173
Table 3.7	<i>Study 3: Factor Correlations for Model 2.</i>	174
Table 3.8	<i>Study 3: Factor Correlations for Model 3</i>	175
Table 3.9	<i>Study 3: Factor Correlations for Model 4</i>	176

Table 3.10	<i>Study 3: Indirect Effects of Contextual Factors on Coach Motivation</i>	177
Table 4.1	<i>Descriptive Statistics for Study 1 and 2 Variables.....</i>	224
Table 4.2	<i>Study 1 and 2: Correlations between model variables.....</i>	225
Table 4.3	<i>Study 2: Frequencies of athlete interpersonal behaviours over, under, and in agreement with coaches' self-reports.</i>	226
Table 4.4	<i>Study 2: Results of the polynomial regression analyses predicting athletes' need satisfaction and frustration.</i>	227

LIST OF FIGURES

Figure 3.1	<i>Proposed Model</i>	178
Figure 3.2	<i>Study 2: Final Model with Standardized Regression Coefficients</i>	179
Figure 3.3	<i>Study 3: Model Results with Standardized Regression Coefficients</i>	180
Figure 4.1	<i>Study 1: Athlete Perception Path Model with Standardized Regression Coefficients</i>	229
Figure 4.2	<i>Study 2 Athlete Perception Path Model with Standardized Regression Coefficients</i>	230
Figure 4.3	<i>Athlete Need Satisfaction and Need Frustration as Predicted by Coach Self-Reports and Athlete Perception of Interpersonal Behaviours Discrepancy</i>	231

CHAPTER ONE

GENERAL INTRODUCTION

Problem Statement

Traditionally, the majority of coaching research has focused on how coaches can promote the best outcomes for their athletes or how they acquire information, without taking into consideration their personal challenges or the psychological factors that impact their ability to coach (McLean & Mallet, 2012). Sport coaching is very complex, requiring many talents and skills. Depending on the context, coaches are required to be motivators, teachers, leaders, administrators, planners, managers, performers, and negotiators (Giges, Petitpas, Vernacchia, 2004).

Coaches play an instrumental role in athletes' sport experience. Specifically, they are responsible for teaching fundamental skills, strategies, and sportspersonship (Feltz, Hepler, Roman, & Paiement, 2009) and are responsible for promoting the optimal functioning of their athletes (Duda & Balaguer, 2007; Smoll & Smith, 2006). Coaches create sporting environments that allow athletes to develop motivation towards sport (Mallet, 2005), which leads to an increase in athlete engagement (Alvarez, Balaguer, Castillo, & Duda, 2009) and an overall increase in positive youth development (Conroy & Coatsworth, 2006). Research examining the specific mechanics of the coach-athlete relationship has found that this relationship influences athlete satisfaction (Salminen & Liukkoken, 1996), motivation (Mageau & Vallerand, 2003), performance (Butler, 1997), psychosocial development (Petitpas, Cornelius, Van Raalte, & Jones, 2005), and well-being (Mageau & Vallerand, 2003).

Despite the clear evidence showing that coaches have an influence on athletes, research has focused very little on coaches' psychological experiences (Alcaraz, Torresgrosa, Viladrich,

Ramis, & Cruz, 2014). Since coaches play such an instrumental role with athletes, research should examine coaches' needs and experiences in their own right, in addition to their behaviour with their athletes (Giges et al., 2004). Coaches are most likely to reach their potential when they are not faced with obstacles (Giges, 2000); therefore, understanding the antecedents of coaching behaviour will help coaches reach their potential in terms of their psychological well-being and performance as a coach (Horn, 2002). Furthermore, increasing the understanding of the specifics of these factors will create opportunities to develop coach training and intervention programs that could improve the quality of coaching (Horn, 2002).

The goal of this program of research is to examine the coaching context and factors that influence coaches, while taking into consideration their behaviour with their athletes.

Theoretical Background

In recent years, coach research has grown in popularity. Research in coaching has examined how they learn (Cote, 2006), how they coach (Cushion, 2007), and how they became coaches (Busser & Carruthers, 2010), among many other topics. These areas of research, however, do not take into consideration how they are interacting with their coaching context and how they are overcoming the challenges they face in their coaching experiences. One area of research that could address this limitation is motivational psychology. Motivational psychology provides a comprehensive framework for examining the factors acting on individuals and speaks to the conditions that lead to a successful or unsuccessful experience (Hagger & Chatzisarantis, 2007). According to McLean (2010), coach motivation plays an important role in promoting a healthy coaching environment and coaches should reflect on and be aware of the reasons they coach and how the various factors in their coaching context interact.

A leading theory of motivation, Self Determination Theory (SDT; Deci & Ryan, 1985) provides important insight into understanding coach motivation, including the reasons they participate, continue to coach, experience success, and enjoy what they do. This theory was selected because it moves beyond simply evaluating coaches' motivation towards their coaching. It provides an appropriate framework for understanding how coaches' motivation for coaching is influenced by the context in which they coach, and also how their motivation predicts their behaviour while interacting with their athletes.

Self-Determination Theory

SDT is a theory of motivation, built on the assumption that humans have innate tendencies to grow and to integrate on-going life experiences (Deci & Ryan, 2002). SDT postulates an organismic perspective where it is assumed that humans are active organisms, naturally inclined toward development, mastering challenges, meeting their potential, and integrating new experiences into a coherent and unified self (Deci & Ryan, 2000).

Contrary to other theories of human motivation that aim to explain motivation in terms of quantity or strength (Bandura, 1996; Baumeister & Vohs, 2007), SDT proposes that it is the quality of the motivation that is important. According to SDT, there are three distinct types of motivation (amotivation, extrinsic motivation, and intrinsic motivation) that lead to different affective, cognitive, and behavioural outcomes based on the degree to which the behaviour has been internalized and integrated into the self. Internalization refers to the assimilation of values or external demands, while integration refers to the final step of this process when the values or external demands become an integral part of the personality of the individual. This process can be viewed in terms of a continuum where the three types of motivation are divided into behavioural regulations that are placed from the least internalized to the most (Ryan, 1995).

When considering the continuum, Deci and Ryan (2000) propose that the least internalized form of motivation is amotivation, which consists of non-regulation. It is marked by a lack of intention to act (Deci & Ryan, 2002). Moving along the continuum toward more internalized forms of motivation, is extrinsic motivation; which Deci and Ryan (1985; 2000) suggest can be divided into four types of regulation: external, introjected, identified, and integrated. External regulation refers to instances where rewards or avoidance of punishment energize and direct behaviour. Introjected regulation marks the beginning stages of the internalization process, when behaviours are enacted in order to avoid feelings of guilt or shame. These first three behavioural regulations (non-regulation, external, and introjected) are considered to be more controlling in nature, where the origin of the behaviour comes from outside the self. Moving along the continuum, identified regulation represents behaviours that are pursued because they have become personally important and valuable. Finally, there is integrated regulation, which is the most internalized form of extrinsic motivation, and occurs when the behaviour is in line with the individual's goals, objectives, and needs. The last orientation is intrinsic regulation, where the pleasure derived from the behaviour is experienced while doing the behaviour itself. It is characterized by a spontaneous engagement in the activity that is fuelled by interest, curiosity, and the challenge of the task. These final three regulations (identified, integrated, and internal) are considered to be more autonomous in nature since the behaviour originates from within (Deci & Ryan, 2002).

It is important to note that although the process of internalization is a natural human tendency, SDT posits that the extent it will occur depends on the satisfaction of the three basic psychological needs (autonomy, competence, and relatedness). Autonomy is seen when individuals act in line with their own interests and values. In this case, behaviour is an expression

of the self, and the origin of behaviours comes from within. Competence is seen in an individual's interactions with their environment, when they have the opportunity to seek challenges, express their capacities, and develop their confidence. Finally, relatedness is seen as a sense of belonging with others and the community as a whole. It is achieved through interpersonal connections and reciprocal care between others. These three needs are said to be innate, universal across cultures, and evident in all development periods (Deci & Ryan, 2002).

Understanding Contextual Motivation

When considering individuals' motivation for specific activities, SDT posits that the reasons people engage in those behaviours is the result of contextual factors related to the specific life domain, and the extent to which psychological needs are satisfied within this domain (Deci & Ryan, 2002; Vallerand, 1997). Specifically, contextual factors refer to aspects of the social environment that influence individuals and these factors can include both the structure of the environment and the people within it. These factors do not impact their motivation directly, instead their influence is indirect through the extent to which they support or thwart the basic psychological needs (Deci & Ryan, 2000; Deci, Shwartz, Sheinman, & Ryan, 1981; Vallerand, 2000). When considering the individuals within a specific context, the extent to which they will support someone's basic psychological needs is dependent on the extent they engage in need-supportive interpersonal behaviours (Deci & Ryan, 1985). That is, how their behaviours support others' needs for autonomy, competence, and relatedness. If someone's psychological needs are met in a given domain, they will experience an increase in autonomous motivation towards the activity (Vallerand, 1997). Although need-supportive behaviours can be described in terms of each of the three basic psychological needs, the majority of current research has focused on autonomy-supportive behaviours. Autonomy-supportive behaviours include: providing choice,

giving a rationale, acknowledging others' feelings or perspectives, and providing opportunities for independent work (e.g. Deci & Ryan, 2002; Gillet, Vallerand, Amoura, & Baldes, 2010; Mageau & Vallerand, 2003).

Research has also shown that the context can have a detrimental impact on psychological needs (Sheldon, 2011). Specifically, if the context, or people within it, undermines an individual's psychological needs, it leads to need frustration and, subsequently, controlled motivation within that context (Sheldon & Filak, 2008). Traditionally, in most domains (i.e., sport, work, etc.), this area of research has received less attention than the impacts of need satisfaction (Bartholomew, Ntoumanis, Ryan, & Thogersen-Ntoumani, 2011).

In general, the more autonomous orientations (identified, integrated, and internal regulation) are considered optimal when compared with the controlling ones (amotivation, external, and introjected regulation). Specifically, the more autonomous regulatory styles are found to lead to better learning, interest, effort, performance, self-esteem, life satisfaction, persistence, and health (Mageau & Vallerand, 2003). Alternatively, the controlling regulation styles are associated with negative outcomes like decreased health, vitality, persistence, success, and increased exhaustion (Deci & Ryan, 2000).

Interpersonal Behaviours

Interpersonal interactions are a key part of the human experience and the style of these interactions (i.e., interpersonal behaviours) plays a key role in determining the social contexts in which people live. SDT posits that there are six distinct interpersonal behavior styles that promote different outcomes. Need-supportive interpersonal behaviours (autonomy, competence, and relatedness-support) promote need satisfaction; while need-thwarting interpersonal behaviours (autonomy-thwarting, competence-thwarting, and relatedness-thwarting) lead to need

frustration for an individual within a given context (Deci & Ryan, 2000). Findings suggest that this is especially relevant in supervisor-subordinate relationships (i.e., parent-child, teacher-student, coach-athlete) as the supervisor plays a major role in setting the interpersonal context for the subordinate (Mageau & Vallerand, 2003).

Since it is well established that need-supportive interpersonal behaviours lead to need satisfaction within a context and positive motivational outcomes for the people within those contexts, understanding the factors that predict the use of these behaviours is also very important. According to SDT, when an individual's psychological needs are met and they experience autonomous motivation, they are more likely to engage in need-supportive interpersonal behaviours (autonomy, competence, and relatedness-support) with others; whereas need frustration and controlled motivation should lead to increased need-thwarting interpersonal behaviours (autonomy, competence, and relatedness-thwarting) (Deci & Ryan, 2000). The antecedents of these constructs were first examined in an education setting.

In the first study to explore the relationship between motivation and subsequent need-supportive behaviours, Pelletier, Seguin-Levesque, and Legault (2002) focused on the relationship between perceptions of contextual factors, motivation, and autonomy-supportive behaviours in teachers. They found that an autonomy-supportive teaching context lead to increased teacher autonomous motivation, which subsequently predicted an increase in teachers' reported use of autonomy-supportive behaviours in their teaching. Taylor, Ntoumanis, and Standage (2008) built upon this model and determined that teachers' psychological need satisfaction mediated the relationship between teachers' perceptions of their context and their motivation for teaching.

Since an absence of need-supportive behaviours does not necessarily mean there is a presence of need-thwarting behaviour, it is important to examine both types of behaviour independently (Sheldon, 2011; Sheldon & Filak, 2008). Soenens and colleagues (Soenens, Sierens, Vansteenkiste, Dochy, & Goossens, 2012) examined the antecedents of autonomy-thwarting teaching behaviour. They found that increased controlled motivation for teaching led to emotional exhaustion and depersonalization, which predicted autonomy-thwarting interpersonal behaviours.

Additional studies have continued to build upon these models and have extended the findings to other fields such as teaching (Taylor, Ntoumanis, & Smith, 2009) and parenting (Jungert et al., 2015). These findings support that there is a sequence where a perceived need-supportive social context will lead to an increase in need satisfaction and autonomous motivation for that person, which subsequently leads to an increase in reported need-supportive interpersonal behaviours when they interact with other people.

Self-Determination Theory and Sport

Extensive research has been done in sport using SDT (Deci & Ryan, 2008) and the majority of this research has focused on athletes. For example, evidence suggests that autonomous motivation for sport predicts long-time commitment and greater interest for athletes (Briere, Vallerand, Blais, & Pelletier, 1995). The fulfillment of the three basic needs in sport has also been examined and results have shown that need satisfaction is associated with increased vitality, sport satisfaction, and an absence of aversive physical symptoms in both youth (Reinboth, Duda, & Ntoumanis, 2004) and adult athletes (Adie, Duda, & Ntoumanis, 2008). Through numerous studies, SDT has examined why some athletes are motivated by external factors like rewards, pressure, or status; while others are driven by internal factors like interest,

curiosity, and improvement. SDT has helped explain, across multiple levels of different sports, why some athletes show an enduring desire to pursue their sport and why others do not (Standage & Ryan, 2012).

Recently, SDT research has begun examining coaches; however, the focus of this research has been mostly on athletes' perceptions of their coaches. Studies examining coaches' use of need-supportive interpersonal behaviours found that athletes who perceive their coaches as being autonomy-supportive, experience an increase in need satisfaction and subsequent autonomous motivation (e.g., Conroy & Coatsworth, 2007; Gagne, Ryan, & Bargmann, 2003; Pelletier, Fortier, Vallerand, & Briere, 2001; Smith et al., 2016). This increase in need satisfaction and autonomous motivation is related to better performance, increased persistence, increased self-determined motivation, increased learning, and enhanced psychological well-being (e.g., Adie, Duda, & Ntoumanis, 2012; Allen & Hodge, 2006; Amorose & Anderson-Butcher, 2007; Gillet et al., 2010).

Since the majority of coaching research in SDT has focused on how coaches' behaviour impacts the quality of athletes' motivation, coaches' own motivation, well-being, and coaching experiences have received less empirical attention (McLean, Mallet, & Newcombe, 2012). Some recent studies have begun addressing this limitation. Specifically, McLean, Mallett and Newcombe (2012) examined coaches from a range of sports and competition levels and looked at common reasons for coaching. They found that when coaches were more autonomously motivated, external pressures, such as competition stress, did not impact them. In a different study, McLean and Mallet (2012) examined the reasons coaches were coaching. They found that connection with sport, coach and athlete development, external influences (like winning or

prestige), and internal influences (like enjoyment and passion) were the main reasons coaches decided to get involved.

An important reality of the coaching role is that the fundamental purpose is to teach athletes in a given sport. Whether conscious of this or not, coaches' ultimate purpose is to create a context for athletes where they can thrive and reach their potential. Since coaches' behaviours have such a profound impact on the athlete experience, and the coaches' and athletes' experiences are interconnected (Amorose & Anderson-Butcher, 2007), coaching research should aim to examine the coaching context and coaches' realities, within the context of their interactions with their athletes. Since need-supportive interpersonal behaviours have been shown to promote a number of positive outcomes for athletes, understanding why these behaviours occur for coaches in a sport context is very important. Using previous research in other fields under the SDT framework, it can be hypothesized that several aspects of the coaching context could impact coaches' need satisfaction and frustration in coaching, which then impacts their motivation for coaching and their subsequent use of need-supportive or need-thwarting behaviours with their athletes (Taylor et al., 2008). Some aspects of this model have already been examined in the coaching context.

Stebbing, Taylor, and Spray (2011) found that the coaches' perception of the satisfaction of the three basic psychological needs predicted an increase in well-being, which subsequently predicted autonomy-supportive coaching behaviours. In the same study, they found that the frustration of the three psychological needs was associated with ill-being and predicted autonomy-thwarting interpersonal behaviours with athletes. In a separate study, Stebbings and colleagues (Stebbing, Taylor, Spray, & Ntoumanis, 2012) examined how contextual factors, like job security, work-life conflict, and professional development opportunities were related to

coaches' need satisfaction or need frustration, well-being or ill-being, and subsequent use of autonomy-supportive and autonomy-thwarting behaviours. Finally, Rocchi, Pelletier, and Couture (2013) examined basketball coaches and found that perceptions of administrative pressure and athletes' motivation were related to coach autonomous motivation, and the use of autonomy-supportive coaching behaviours with their athletes.

Limitations

Although there have been significant advances in coach motivation research, there remain some limitations. Specifically, the limitations include: (1) the full motivational sequence has not been tested with a coaching population, that is the relationship between the coaching context, coaching psychological needs, coach motivation, and coach interpersonal behaviours; (2) the contextual factors that have been examined in relation to coach psychological needs and motivation have not included some of the important factors that are unique to the coaching context; (3) coaching research has not examined the antecedents of competence- and relatedness-supportive and thwarting behaviour, only autonomy-support and autonomy-thwarting behaviour; (4) coaching research on autonomy-supportive behaviour has relied exclusively on self-reported measures; and, finally, (5) coaching research examining all need-supportive and -thwarting behaviours has not concurrently examined the impact of these reported behaviours on athletes to confirm it leads to the expected outcomes according to SDT. These limitations are discussed in detail below.

Firstly, the current coach motivation research in SDT has examined some aspects of the full motivational sequence, but not all of the elements concurrently. Specifically, Stebbings and colleagues (2012) examined the relationship between contextual factors, coach need satisfaction and frustration, and autonomy-supportive or autonomy-thwarting coaching behaviours; while

Rocchi and colleagues (2013) examined contextual factors, coach motivation, and autonomy-supportive coaching behaviours. In line with SDT, to understand motivation within a specific context, contextual factors, psychological needs, motivation, and an outcome should all be considered simultaneously. Furthermore, existing research in sport has only recently begun exploring the role of need frustration (Stebbing et al., 2013) and controlled motivation (Langan et al., 2015) concurrently alongside need satisfaction and autonomous motivation. Since these constructs are not opposites (Sheldon, 2011), and individuals can experience both need satisfaction and frustration (Sheldon & Gunz, 2009), as well as autonomous and controlled motivation at the same time (Yli-Piipari, Watt, Jaakola, Liukkonen, & Nurni, 2009), it is essential to examine all of these constructs at once. Testing the full model where the influence of the coaching context on both coach need satisfaction and frustration, and the influence of these on coaches' autonomous and controlled motivation for coaching, and how their motivation relates to their interpersonal behaviours with athletes, would help consolidate the existing literature on coaches. Through these analyses, the results would create a parsimonious model, built within a strong theoretical framework, for understanding the coaching context, while considering coaches' interactions with their athletes.

Next, the contextual factors that have been examined specifically in coaching in relation to coach need satisfaction or motivation have been inspired from other fields like teaching or work. For example, work-life conflict was examined in relation to coach need satisfaction since the organizational psychology literature suggested that it had a negative impact on employees' need satisfaction (Major, Klein, & Ehrhart, 2002). To date, job security, work-life conflict, professional development opportunities, athlete motivation, and administrative pressure have been examined in relation to need satisfaction and motivation, and have been shown to have a

significant impact on coaches (Stebbing et al., 2012; Rocchi et al., 2013). There are other factors that have been tested in the context of motivation in other domains, such as performance evaluation, time constraints, and emotional exhaustion, that may also be relevant to coaches and should be examined (Soenens et al., 2012; Taylor et al., 2009). Finally, there are many factors that are unique to the coaching context that should also be considered. For example, in youth coaching, parents play an instrumental role in the sport context and have a direct impact on coaches (Appleton, Hill, & Hall, 2011). The coaching literature examined the influence of parents' on other aspects of coaching and it would be important to see how parents influence coaches' psychological needs, motivation, and subsequent use of interpersonal behaviours.

Next, coaching research should focus on examining the factors that predict all three types of need-supportive and need-thwarting behaviours (i.e., all six interpersonal behaviours). To date, no studies have examined the factors that predict autonomy-supportive behaviours, as well as competence and relatedness-supportive behaviours (e.g., Taylor et al., 2008; Pelletier et al., 2002). SDT stipulates that supporting all three psychological needs, beyond just autonomy, should lead to an increase in need satisfaction in athletes and a subsequent increase in athletes' autonomous motivation for sport (e.g., Pomerantz, Cheung, & Qin, 2012). Amorose and Anderson-Butcher (2007) examined the relationship between athletes' perceived autonomy, competence, and relatedness-support from their coaches and found it was related to their motivation. Additionally, since coaches may also engage in need-thwarting behaviours and the absence of need-support does not necessarily mean the coach is using need-thwarting styles (Sheldon & Filak, 2008), coaching research should also examine the factors that predict all three types of need-thwarting behaviour (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010). Again, when considering need-thwarting, autonomy-thwarting behaviours have received the

most attention (Stebbing et al., 2012) and research should also examine the antecedents of competence and relatedness-thwarting interpersonal behaviour in coaches. One reason for this limitation is that there is currently no validated measure available for examining all six types of interpersonal behaviours according to SDT. There are existing measures that look at one or two dimensions (i.e., autonomy-supportive, autonomy-thwarting, and relatedness-supportive: Smith et al., 2015) or at all six dimensions of need satisfaction and frustration (i.e., Chen et al., 2015), but no measures focusing on all six need-supportive and need-thwarting interpersonal behaviours that can be adapted to multiple domains (i.e., Skinner, Johnson & Snyder, 2015; parenting behaviour measure). In order to address the limitation related to the lack of research, there is a need to develop and validate an instrument designed to assess either perceptions or self-reports, of all six types of need-supportive and need-thwarting interpersonal behaviours.

Furthermore, a large portion of the research examining coaches' interpersonal behaviours to date has relied on coaches' self-reports of their need-supportive or need-thwarting behaviours (Stebbing et al., 2012; Rocchi et al., 2013). Although self-report measures play an essential role in understanding behaviours, previous research has suggested that self-reported measures have limitations and are not always reliable indicators of actual or perceived behaviour (e.g., Baumeister, Vohs, & Funder, 2007). Researchers have also relied on athletes' perceptions to examine coaches' behaviours (e.g., Amorose & Anderson-Butcher, 2007; Conroy & Coatsworth, 2007; Gaudreau et al., 2016); however, to date, self-report measures remain the primary means through which coaches' own behaviour is examined. To address this, Smith and colleagues (2016) observed coaches in terms of their autonomy-supportive, autonomy-thwarting, and relatedness-supportive behaviours with their athletes and asked the athletes to report on their coaches. Overall, they found some evidence for relationships between coaches' self-reports and

athletes' observations of these behaviours; however, these relationships were not strong and not consistent across all of the cultures they studied. Although these findings represent an important first step in addressing the existing limitations within the coaching literature, research should continue to investigate all types of coach interpersonal behaviours according to SDT in order to determine whether coaches' self-reported interpersonal behaviours are related to their actual behaviours with their athletes.

Finally, to date, no studies have explored the impact of all six types of coach interpersonal behaviours to determine if they lead to the expected outcomes for athletes. Specifically, previous research on athletes has shown that perceptions of coaches' autonomy-supportive behaviours are related to a number of positive outcomes (i.e., Alvarez et al., 2009) and perceptions of autonomy-thwarting behaviours are related to negative outcomes (Bartholomew et al., 2011). Newer research has begun exploring other dimensions like relatedness support (i.e., Williams, Whipp, Jackson, & Dimmock, 2013); however, the six types of interpersonal behaviours have not been examined concurrently to confirm they lead to the expected outcomes for athletes.

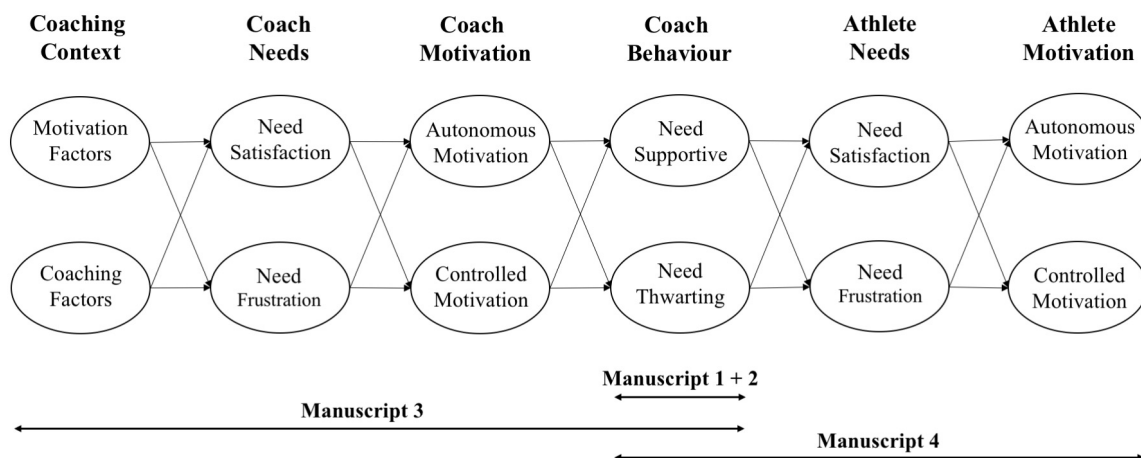
Current Research

The objective of this thesis is to explore how coaches' contexts, their psychological needs, and their motivation influence behaviour during interactions with athletes, and how these behaviours impact athletes' psychological needs and motivation for sport. This will be achieved by developing and testing a model that explores the relationship between coaches' contexts, their psychological needs, their motivation for coaching, and their resulting behaviour. Furthermore, the outcomes of this model will be explored in relation to athletes' perceptions of coaches' behaviours in order to examine how coaches' reports match how their behaviour is perceived by

their athletes, and confirm that coaches' need-supportive and need-thwarting behaviour predicts athletes' need satisfaction and motivation, as would be expected according to SDT.

Proposed Model

The following model is proposed in order to address the objectives of this research.



The sections below describe each of the components of this model that will be examined for the purposes of the present research.

Coaching Context. In this section, aspects of the coaching context that have an impact (either negative or positive) on coaches' psychological needs will be assessed. Previous research has already identified many potential contextual factors in both coaching and other domains, and they are discussed in the following section. These factors are divided into two groups: (1) **Motivation Factors:** factors that have already been examined through previous research in a coach setting, or in other similar settings, using the SDT framework; and (2) **Coaching Factors:** factors that have not been examined from an SDT or motivational framework research perspective, but are specific to the coaching context and have been shown to have some sort of impact on coaches.

Motivation research. The following contextual factors have been examined in a coaching context, or in other similar environments, using the SDT framework.

Administrative pressure. Rocchi and colleagues (2013) examined how administrative pressure was related to coach motivation. Administrative pressure was comprised of pressure coming from sport administrations and programming requirements, and these factors had a negative impact on coaches' motivation for coaching. In a different study, Allen and Shaw (2009) examined elite coaches and found that coaches who perceived their sport organizations as promoting a competitive environment felt additional pressure from their club administration to perform and be successful.

Job security. Job security has been shown to have a positive impact on employees' psychological health (Probst, 2003) and research with coaches has found that low job security is related to increased stress (Olusoga, Butt, Hays, & Maynard, 2009). Stebbings and colleagues (2012) examined whether job security directly impacted coaches' psychological need satisfaction and found that there was a positive relationship between coaches' rated job security and their need satisfaction, and that a lack of job security predicted need frustration.

Opportunities for professional development. Previous research has shown that formalized coach accreditation processes, mentoring initiatives, and training courses help coaches thrive (Allen & Shaw, 2009). Stebbings and colleagues (2012) examined whether these factors were related to coaches' reported psychological needs and found that opportunities for professional development were associated need satisfaction, while a lack of opportunities was related to need frustration.

Parents. Solstad, van Hoye, and Ommundsen (2015) looked at the direct impact of perceived parental pressure on coaches' reported use of autonomy-supportive coaching

behaviours. They did not find that perceptions of parents' pressure had any significant impact on coaches' use of autonomy-supportive behaviours, or their overall need satisfaction. In a separate study outside SDT, however, Gould, Lauer, Rolo, Jannes, and Pennisi (2008) examined the impact of parents on tennis coaches. For the most part, they reported that coaches found the influence of parents to be positive and appropriate for their coaching. This suggests that parental influence should also be examined from a positive standpoint.

Perceived athlete motivation. When someone in a position of authority believes that their subordinate is autonomously motivated, they are more likely to experience an increase in their own quality of motivation (Pelletier et al., 2002; Pelletier & Vallerand, 1996). The opposite is also true and perceptions of controlled motivation can lead to decreases in motivation quality (Reeve, 2009). Research has shown that this relationship holds in coaching and that coaches' perceptions of their athletes' motivation for their sport is related to their own motivation for coaching (Rocchi et al., 2013). The link between perceived athlete motivation and coach need satisfaction has not been examined; however, research in the teaching domain has found that teachers' perceptions of students' motivation is related to need satisfaction in teaching (Taylor et al., 2008) and it is anticipated that this same relationship will hold in coaching.

Performance evaluations. In a qualitative study with physical education teachers, Taylor, and colleagues (2009) demonstrated that the teachers found their own performance evaluations by their schools exerted pressure on them. They indicated that they did not use the same teaching methods when they knew they were being evaluated. They also indicated that these performance evaluations promoted controlled motivation strategies like the use of rewards or contingencies with their students. Performance evaluations may be relevant in the coaching context since

successful coaches are most often evaluated in terms of their competitive results, above and beyond any other qualities (Chaumeton & Duda, 1988).

Time constraints. Taylor and colleagues (2009) examined the impact of time constraints on physical education teachers and found they believed time constraints also promoted controlled motivational strategies. With limited time, teachers have no choice but to move on, even if some students have not mastered a concept. They also may not be able to cover the material or do the activities they had planned. Time constraints create a conflict between how teachers want to teach, and how they actually teach, essentially undermining their need for autonomy. In sport, regardless of the level, coaches are struggling to obtain results, with limited resources and time (Hjalm, Kentta, Hassmenan, & Gustafsson, 2007).

Work-life conflict. Some coaches find it difficult to manage the demands of their coaching life, in addition to their work and family lives. In a study examining how coaches balance the many demands of their lives, Anderson, Coffey, and Byerly (2002) found that coaches who do not experience a work-life conflict experience increased life satisfaction. Coaches who did have difficulties balancing the demands of the different facets of their lives experienced poor health and increased conflict, stress, and dropout. In a separate study, Dixon and Bruening (2007) found that a number of factors contributed to this conflict including: competitive drive, distance of family, travel, expectations in coaching, and home responsibilities. Stebbings and colleagues (2012) examined the relationship between work-life conflict and psychological need satisfaction and found that it was negatively related to coaches' rated need satisfaction.

Coaching Research. The following contextual factors have been examined through the coaching literature, but have not been explicitly linked to need satisfaction, coach motivation or SDT.

Compensation. Giges and colleagues (2004) examined the coaching environment from a career perspective. They found that coaches who wish to coach full-time experience very few opportunities for professional advancement, with minimal job security. Even if they are financially compensated for their time, most coaches work in contexts where long hours, dedication, and accomplishments are not adequately compensated.

Technology. Advances in sport sciences and technology have changed the expectations placed upon most coaches (Giges et al., 2004). With access to computers, video cameras, rehabilitation equipment, and online resources becoming more popular, coaches are not only required to keep up with the current trends in their sport, but in technology as well. Some coaches are finding it impossible to keep up with the demands placed upon them to acquire new skill sets that were previously unnecessary in their sport.

Volunteer realities. Since many coaches are volunteers (Trudel & Gilbert, 2006), concerns for volunteers have also been examined. In the case of volunteer coaches, research has found that the majority of coaches are satisfied with their volunteer experience (Australian Sports Commission, 2000). In the cases where the volunteers were not satisfied, it had to do with a lack of support from their organization for their volunteer work and concerns about the amount of time their volunteering required.

Coach Needs. According to SDT, the social context should not influence motivation directly; instead, its influence should be indirect through the satisfaction or frustration of the three psychological needs (Deci & Ryan, 2000; Vallerand, 2001). In this section, the extent to

which coaches' psychological needs are satisfied or frustrated through coaching will be measured. Specifically, whether coaches feel their needs for autonomy, competence, and relatedness are satisfied or frustrated. In coaching, a limited number of studies have explored the roles of need satisfaction and frustration for coaches (Stebbing et al., 2012; Stebbings et al., 2013). According to Sheldon (2011), need satisfaction and need frustration lead to different outcomes and, as such, it is essential to test both concurrently to explore how they both relate to different outcomes.

Coach Motivation. In order to understand coaches' behaviours, it is essential to understand the reasons why they are coaching (McLean et al., 2012). Measuring coaching motivation using the SDT framework will provide essential insight into the reasons why they are coaching. In this section, coaches will be assessed in terms of their autonomous (intrinsic, integrated, and introjected) reasons for coaching, as well as their controlled reasons (introjected, external, and amotivated). Autonomous and controlled motivation for coaches will be assessed independently as both types of motivation are expected to lead to different outcomes, according to SDT (Deci & Ryan, 2000; Sheldon, 2011).

Coach Behaviour. This section will focus on measuring coaches' behaviours when interacting with their athletes. Bartholomew, Ntoumanis and Thorgersen-Ntoumani (2009) stressed the importance of examining the use of need-supportive behaviours and need-thwarting behaviours concurrently. Therefore, both positive and negative coach interpersonal behaviours will be explored. These behaviours are discussed in depth below.

Autonomy-supportive and thwarting behaviours. Autonomy-supportive behaviours have received the most empirical attention by far (e.g., Gagne et al., 2003; Pelletier et al., 2001; Standage, Duda, & Ntoumanis, 2005). In sport, autonomy-supportive interpersonal behaviours

are described as providing choice to athletes, providing a rationale for tasks, acknowledging athletes' perspectives, giving opportunities for initiative, and promoting task involvement (Mageau & Vallerand, 2003). The opposite of an autonomy-supportive coaching style would be an autonomy-thwarting style. When coaches engage in autonomy-thwarting interpersonal behaviours with their athletes, they use rewards, incorporate intimidating feedback, make demands without providing a rationale, use conditional regard, and use excessive personal control (Bartholomew et al., 2009).

Competence-supportive and thwarting behaviours. Coach competence-supportive behaviours include using positive expectancies, encouraging learning with athletes, providing positive feedback, acknowledging improvements, believing athletes can meet their goals, and encouraging athletes to improve their skills (Sheldon & Filak, 2008; Taylor et al., 2008). The opposite would involve using a competence thwarting style and would include emphasizing athletes' faults, discouraging them from trying difficult tasks, focusing on what they do wrong, sending them the message that are inadequate, and doubting their capacity to improve (Sheldon & Filak, 2008).

Relatedness-supportive and thwarting behaviours. A coach engages in relatedness-supportive behaviour when they understand, support, and care for their athletes. They would do this by being warm towards their athletes, showing they are interested in what they do, that they relate to them, and show that they genuinely like them (Jones, Armour, & Potrac, 2004). A coach would not be supporting their athletes' need for relatedness if they were distant with their athletes, did not connect with them, did not include them in activities, did not listen, and were not available when they needed them (Sheldon & Filak, 2008).

Athlete Needs. According to SDT, coaches' use of need-supportive and need-thwarting interpersonal behaviours should influence athletes' need satisfaction and frustration in sport (Deci & Ryan, 2000; Vallerand, 2001). In this section, the extent to which athletes' psychological needs are satisfied or frustrated when they practice their sport will be assessed. Specifically, this will address whether their coaches' use of all six types of interpersonal behaviours either supports or thwarts their needs in sport. Since the context may influence need satisfaction and frustration differently (Sheldon, 2011), it is important to measure both concurrently. In the existing athlete research, a limited number of studies have explicitly measured both need satisfaction and frustration (i.e., Bartholomew, Ntoumanis, Ryan, Bosh, & Thogersen-Ntoumani, 2011; Curran, Hill, Hall, & Jowett, 2014).

Athlete Motivation. Finally, in order to understand how coaches' behaviours influence athletes' experiences in sport and the importance of the coaches' behaviour, it is necessary to understand the reasons why athletes are practicing their sport by assessing their motivation (Pelletier et al., 2001). For this section, similar to the coach motivation section, athletes will be assessed in terms of their autonomous, as well as their controlled reasons for playing their sport. Both autonomous and controlled motivation for athletes will be assessed as both types of motivation are expected to lead to different outcomes, according to SDT.

Research Objectives

The overall objective of this research is to examine the factors that influence coaches' interpersonal behaviours with their athletes, and explore how these interpersonal behaviours impact athletes' own experiences in sport. This will be achieved through a series of ten studies, divided into four manuscripts.

Manuscript #1 - Assessing Need-Supportive and Need-Thwarting Interpersonal Behaviors: The Interpersonal Behaviors Questionnaire (IBQ) (Chapter 2). The purpose of this manuscript is to validate a measure of perceived and reported interpersonal behaviours, using the six types of need-supportive and need-thwarting interpersonal behaviours, according to SDT, called the Interpersonal Behaviours Questionnaire (IBQ). Specifically, this first manuscript will develop, test, and validate a scale that measures autonomy-supportive, autonomy-thwarting, competence-supportive, competence-thwarting, relatedness-supportive, and relatedness-thwarting interpersonal behaviours. This scale will be designed so that it can be used to assess perceptions of others' behaviours (IBQ), or as a self-report of an individual's own behaviours (IBQ-Self). It will also be designed so that it can be used to explore interpersonal behaviours across a number of different social contexts.

This scale will be developed through a series of three studies. The purpose of the first study is to create the items and determine the structure of the scale, using students' perceptions of the people in their life (IBQ). The purpose of the Study 2 is to replicate the psychometric properties of the scale, using a new sample of students. In Study 3, the self-report version of the scale (IBQ-Self) will be validated using a student sample, reporting on their typical behaviours in social interactions that are important to them. Overall, it is anticipated that these analyses will yield a valid measure that can be used to assess perceived and self-reported interpersonal behaviours according to SDT.

Manuscript #2 – The Validity of the Interpersonal Behaviors Questionnaire (IBQ) in Sport (Chapter 3). For both coaches and athletes, no research to date has examined coaches' antecedents of all six types of need-supportive and need-thwarting interpersonal behaviours, or the influence of these six types of behaviours on athletes' sport experience. One of the reasons

this line of research has not been sufficiently explored is because there is currently no validated measure for assessing these constructs concurrently in any context, including sport. As such, the purpose of this second manuscript is to extend the validity of the IBQ to the sport context. Specifically, Study 1 will look at a sample of athletes and extend the validity of the scale to include athletes' perceptions of their coaches' interpersonal behaviours. Study 2 will extend the validity of the IBQ-Self to the coaching context by having coaches' report on their interpersonal behaviours with their athletes.

Manuscript #3 - Coaching Context, Needs, Motivation, and Coaching Behaviour (Chapter 4). Since existing research under the SDT framework has highlighted the impact of need-supportive and need-thwarting interpersonal behaviours, and how they subsequently impact athletes' experiences in sport, it is important to understand what factors predict these behaviours in coaches. The purpose of this manuscript is to move beyond the existing literature that has only focused on the antecedents of autonomy-supportive and autonomy-thwarting interpersonal behaviours by exploring the factors that influence competence and relatedness supportive and thwarting behaviours as well. Furthermore, this manuscript will attempt to consolidate the existing research examining the antecedents of coaches' interpersonal behaviours by looking at the full motivational sequence including psychological needs, motivation, and outcome behaviours. In relation, this research will also explore which outcomes are associated with which motivational orientations by assessing both need satisfaction and need frustration, as well as autonomous and controlled motivation in coaching. Finally, this manuscript will explore the potential contextual factors in terms of what is the most relevant to coaches and determine how their coaching environment is related to their psychological needs, motivation, and interpersonal behaviours.

These objectives will be met through three studies. In Study 1, a group of coaches from a variety of coaching backgrounds will be invited to reflect upon their coaching context. This will be used to determine which factors are the most important to coaches and whether coaches perceive that the factors have a positive or negative influence on them. Next, the purpose of Study 2 is to confirm that the proposed SDT sequence of psychological needs, motivation, and outcome behaviour is applicable to the coaching context. Specifically, it aims to establish that coaches' need satisfaction and frustration is related to their autonomous and controlled motivation for coaching, and that this predicts their reported use of all six interpersonal behaviours with their athletes. Finally, Study 3 will combine the findings from Study 1 and 2 to explore the influence of coaches' contexts on their psychological needs, motivation, and interpersonal behaviours. For this study, the most important contextual factors identified in Study 1 will be examined in relation to their influence on coaches' need satisfaction and frustration.

Overall, it is anticipated that the coaches will identify contextual factors that are relevant to them, that have not been previously examined within the coaching and SDT literature. Next, it is expected that there will be a relationship between coaches' psychological needs, motivation, and subsequent use of all six interpersonal behaviours. Finally, it is hypothesized that coaches' contexts will influence their psychological needs, which will predict their motivation, and use of interpersonal behaviours. Specifically, within these analyses, it is hypothesized that contextual factors that positively promote coach need satisfaction will lead to increased autonomous motivation for coaching, which will promote increased use of need-supportive interpersonal behaviours (autonomy, competence, and relatedness) and decreased use of need-thwarting interpersonal behaviours (autonomy, competence, and relatedness). Alternatively, it is hypothesized that contextual factors that thwart coaches' psychological needs will promote

increased need frustration, which will lead to controlled motivation, and increased use of need-thwarting interpersonal behaviours and decreased use of need-supportive interpersonal behaviours. These studies will help extend the existing understanding of how coaches' interaction with their contexts impact their interactions with their athletes.

Manuscript #4 – Exploring Coach-Athlete Relationships (Chapter 5). The purpose of the final manuscript is to focus on how coaches' reported interpersonal behaviours impact athletes. The first objective is to confirm that athletes' psychological needs in sport are influenced by all six types of their coaches' interpersonal behaviours. Related to this first objective, it will also confirm that psychological needs are related to motivation, as has been previously demonstrated in numerous other studies in SDT and sport. The next objective is to explore the relationship between coaches' self-reports of their interpersonal behaviours, and athletes' perceptions of these same behaviours in order to evaluate the validity of coaches' self-reports. Specifically, these analyses will determine whether coaches and athletes are in agreement, which would support the validity of coaches' self-reports, or disagreement, which suggests that coaches and athletes are not reporting and perceiving the same interpersonal behaviours. The next purpose is to explore whether having an agreement or disagreement between coaches and athletes has any impact on outcomes for athletes. These analyses will look closely at whether coaches and athletes are in agreement, and if they are not, whether the coach is higher than the athlete or the athlete is higher than the coach, to determine whether this has an impact on athletes' need satisfaction and need frustration in sport. Finally, this study will examine whether there are any coach characteristics that help explain whether coaches are in agreement or not with their athletes.

These objectives will be achieved through two studies. The first will examine a sample of multisport student athletes who will report on their perceptions of their coaches' use of interpersonal behaviours in their interactions with them, along with their psychological needs and motivation in sport. The purpose is to confirm that coaches' use of all six types of interpersonal behaviours impact athletes' psychological needs and motivation, as would be expected according to SDT.

Study 2 will examine a sample of basketball and skating coaches, along with their athletes. First, this study will aim to replicate the findings of Study 1 with a different sample in order to provide additional evidence supporting that all of the different types of interpersonal behaviours impact athletes. Then, the coaches will also report on their own use of interpersonal behaviours with each of their athletes who participated in the study, along with their psychological needs and motivation for coaching. The coaches' reports, along with the athletes' perceptions, will be used to determine how coaches' reported behaviours are in line with their athletes' perceptions. From there, the amount of agreement or disagreement between coaches and athletes will be explored to see if it leads to different outcomes for athletes, and whether coaches' own characteristics influence whether coaches will be in agreement or not with their athletes.

Overall, it is expected that these studies will extend the existing sport motivation research by demonstrating that athletes' perceptions of all six types of coach interpersonal behaviours are related to their need satisfaction and frustration, as well as autonomous and controlled motivation for sport, as would be expected according to SDT. Next, it is anticipated that this study will provide additional evidence of validity of coaches' self-reports since they will be in agreement with athletes' perceptions and this agreement will lead to more positive outcomes for athletes

(increased need satisfaction, decreased need frustration). However, since the measure does rely on perceptions, either of an individual's own behaviour or others' behaviours, and since coaches and athletes will be reporting on their typical interactions with each other, it is expected that there will be some level of disagreement between coaches and athletes. This disagreement could mean that the coach reports their behaviours higher than the athlete does, or vice-versa. Since previous research in SDT has stipulated that athletes' perceptions of need-supportive and need-thwarting interpersonal behaviours is more important than real-world need-supportive and need-thwarting interpersonal behaviours (Mageau & Vallerand, 2003), it is expected that as long as the athlete has a more favourable rating of their coach (i.e., higher on the supportive constructs and lower on the thwarting constructs), it will still lead to more need satisfaction and need frustration for athletes. Finally, it is hypothesized that the coaches' characteristics will help explain whether coaches are likely to be in agreement or disagreement with their athletes.

Anticipated Contributions

It is anticipated that this research will make a number of important contributions. First, it will address a methodological limitation within the current SDT research by developing and validating a measure of all six types of need-supportive and need-thwarting interpersonal behaviours. This tool will be validated as a measure of perceptions of interpersonal behaviours, as well a self-report of an individual's own behaviours, and will be designed with multiple social contexts in mind. Using this tool, researchers in sport, as well as other areas, can examine the role of need-supportive and need-thwarting interpersonal behaviours across multiple social relationships.

Next, this research will help identify the factors within the coaching context that influence coaches' reported behaviours with their athletes. Since coaches have a direct impact on

athletes' experiences, it is important to understand how coaches impact athletes. Having a better understanding of how the relationship between coaches' own contexts, their need satisfaction and frustration, as well as autonomous and controlled motivation impacts their behaviour with their athletes can only help further our understanding of coaching behaviour, and will ultimately help ensure athletes have a more positive experience in sport.

This research will also be the first to explore the dynamics of the coach-athlete relationship by evaluating the degree of agreement or disagreement in their perceptions, and examine how this impacts athletes. Specifically, this will extend the existing research by exploring the scenarios within which athletes experience positive or negative outcomes. This will help identify the ways in which coaches' interpersonal behaviours impact athletes. Related to this, this research will also be the first to explore how coaches' use of all six types of interpersonal behaviours impact athletes.

Finally, this thesis will provide evidence for how the top-down effects of the coaching context will not only promote or undermine coaches' experiences, but ultimately undermine athletes as the impacts of a need-supportive or need-thwarting coaching context influence coaches' interpersonal behaviours. This calls to attention the need to ensure that sport environments are not only conducive to athlete success, but to coach success as well. Furthermore, this will highlight the importance of providing training and resources for coaches and athletes to overcome need-thwarting contexts.

References

- Adie, J., Duda, J., & Ntoumanis, N. (2008). Autonomy support, basic need satisfaction, and the optimal functioning of adult male and female sport participants: a test of basic needs theory. *Motivation and Emotion*, 32, 189 -199. doi: 10.1007/s11031-008-9095-z
- Adie, J., Duda, J., Ntoumanis, N. (2012). Perceived coach-autonomy support, basic need satisfaction and the well- and ill-being of elite youth soccer players: A longitudinal investigation. *Psychology of Sport and Exercise*, 13, 51-59. doi: 10.1016/j.psychsport.2011.07.008
- Alcaraz, S., Torregrosa, M., Viladrich, C., Ramis, Y., & Cruz, J. (2014). From AGT to SDT, from athletes to coaches: refocusing the study of sport motivation. *European Journal of Human Movement*, 32, 125-144. Retrieved from: <http://www.eurjhm.com/index.php/eurjhm/article/view/322>
- Allen, J. & Hodge, K. (2006). Fostering a learning environment: Coaches and the motivational climate. *International Journal of Sports Science and Coaching*, 1, 261-277. doi: 10.1260/174795406778604564
- Allen, J. & Shaw, S. (2009). Women coaches' perceptions of their sport organizations' social environment: Supporting coaches' psychological needs? *The Sport Psychologist*, 23, 346-266. Retrieved from: <http://journals.humankinetics.com/tsp>
- Álvarez, M., Balaguer, I., Castillo, I., & Duda, J. (2009). Coach Autonomy Support and Quality of Sport Engagement in Young Soccer Players. *The Spanish Journal of Psychology*, 12, 138–148. doi: 10.1017/S1138741600001554
- Amorose, J. & Anderson-Butcher, D. (2007). Autonomy-Supportive coaching and self-determined motivation in high school and college athletes: A test of self-determination

- theory. *Psychology of Sport and Exercise*, 8, 654-670. doi: <http://dx.doi.org/10.1016/j.psychsport.2006.11.003>
- Anderson, S., Coffey, B., & Byerly, R. (2002). Formal organizational initiatives and informal workplace practices: Links to work–family conflict and job-related outcomes. *Journal of Management*, 28, 787-810. doi: 0.1177/014920630202800605
- Appleton, P., Hall, H., & Hill, A. (2011). Examining the influence of the parent-initiated coach-created motivational climates upon athletes' perfectionistic cognitions. *Journal of Sports Sciences*, 29, 661-671. doi: 10.1080/02640414.2010.551541
- Australian Sports Commission. (2000). Volunteer Management Program – Retaining Volunteers. Retrieved from: <http://www.ausport.gov.au/clubs/>
- Bandura, A. (1996). Failure in self-regulation: Energy depletion or selective disengagement? *Psychological Inquiry*, 7, 20-24. doi: 10.1207/s15327965pli0701_3
- Bartholomew, K., Ntoumanis, N., Ryan, R., Bosch, J., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, 37, 1459–1473. doi: 10.1177/0146167211413125
- Bartholomew, K., Ntoumanis, N., & Thorgenson-Ntoumani, C. (2009). A review of controlling motivational strategies from a self-determination theory perspective: implications for sports coaches. *International Review of Sport and Exercise Psychology*, 2, 215-233. doi: 10.1080/1750984X.2015.1132334
- Bartholomew, K., Ntoumanis, N., & Thorgenson-Ntoumani, C. (2010). The Controlling Interpersonal Style in a Coaching Context: Development and Initial Validation of a

- Psychometric Scale. *Journal of Sport & Exercise Psychology*, 32, 193-216. Retrieved from: <http://eprints.bham.ac.uk/406/>
- Bartholomew, K., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2011). Self-Determination theory and the darker side of athletic experience: The role of interpersonal control and need thwarting. *Sport & Exercise Psychology Review*, 7, 23-27. Retrieved from: <http://spex.bps.org.uk/spex/publications/sepr.cfm>
- Baumeister, R. & Vohs, K. (2007). Self-Regulation, Ego Depletion, and Motivation. *Social and Personality Psychology Compass*, 1, 115-128. doi: 10.1111/j.1751-9004.2007.00001.x
- Beaumeister, R., Vohs, K., & Funder, D. (2007). Psychology as the Science of Self-Reports and Finger Movements – Whatever Happened to Actual Behavior? *Perspectives on Psychological Science*, 2, 396 - 403. doi: <http://dx.doi.org/10.1111/j.1745-6916.2007.00051.x>
- Brière, N., Vallerand, R., Blais, M., & Pelletier, L. (1995). Développement et validation d'une mesure de motivation intrinsèque, extrinsèque et d'amotivation en contexte sportif : L'Echelle de Motivation dans les Sports (EMS). *International Journal of Sport Psychology*, 26, 465-489. doi: <http://psycnet.apa.org/psycinfo/1996-10999-001>
- Busser, J. & Carruthers, C. (2010). Youth Sport Volunteer Coach Motivation. *Managing Leisure*, 15, 128-139. doi: 10.1080/13606710903448210
- Butler, R. (1997). Sports psychology in performance. IN Adie, J., Duda, J., Ntoumanis, N. (2012). Perceived coach-autonomy support, basic need satisfaction and the well- and ill-being of elite youth soccer players: A longitudinal investigation. *Psychology of Sport and Exercise*, 13, 51-59. doi: 10.1016/j.psychsport.2011.07.008

- Chaumeton, N. & Duda, J. (1988). Is it how you play the game or whether you win or lose? The effect of competitive level and situation on coaching behaviors. *Journal of Sport Behavior*, 11, 157-174. doi: <http://psycnet.apa.org/psycinfo/1989-20434-001>
- Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., ... & Ryan, R. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion*, 39, 216-236. doi: 10.1007/s11031-014-9450-1
- Côté, J. (2006). The development of coaching knowledge. *International journal of sports science & coaching*, 1, 217-222. doi: 10.1260/174795406778604609
- Conroy, D. & Coatsworth, J. (2006) Coach training as a strategy for promoting youth social development. *The Sport Psychologist*, 20, 128–144. doi: 10.1016/j.psychsport.2006.12.001
- Conroy, D. & Coatsworth, J. (2007). Assessing autonomy-supportive coaching strategies in youth sport. *Psychology of Sport and Exercise*, 8, 671-684. doi: 10.1016/j.psychsport.2006.12.001
- Curran, T., Hill, A., Hall, H. & Jowett, G. (2014). Perceived coach behaviours and athletes' engagement and disaffection in youth sport: The mediating role of the psychological needs. *International Journal of Sport Psychology*, 45, 559-580. doi: 10.7352/IJSP2014
- Cushion, C. (2007). Modelling the Complexity of the Coaching Process. *International Journal of Sports Science and Coaching*, 2, 395-401. doi: 10.1260/174795407783359650
- Deci, E. & Ryan, R. (1985). Intrinsic motivation and self-determination in human behavior. New York: Plenum. IN Deci, E. & Ryan, R. (Eds.). *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.

- Deci, E. & Ryan, R. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self determination of behavior. *Psychological Inquiry*, 11, 227-268. doi: http://dx.doi.org/10.1207/S15327965PLI1104_01
- Deci, E. & Ryan, R. (2002). *Handbook of Self-Determination Research*. Rochester, NY: The University of Rochester Press.
- Deci, E. & Ryan, R. (2008). Self-Determination Theory: A macrotheory of human motivation, development, and health. *Canadian Psychology/Psychologie canadienne*, 49, 182-192. doi: 10.1037/a0012801
- Deci, E., Schwartz, A., Sheinman, L., & Ryan, R. (1981). An instrument to assess adults' orientations toward control versus autonomy with children: Reflections on intrinsic motivation and perceived competence. *Journal of Educational Psychology*, 73, 642-650. doi: <http://dx.doi.org/10.1037//0022-0663.73.5.642>
- Dixon, M. & Bruening, J. (2007). Work-Family Conflict in Coaching 1: A Top-Down Perspective. *Journal of Sport Management*, 21, 377 – 406. doi: <http://www.cabdirect.org/abstracts/20073214254.html>
- Duda, J. & Balaguer, I. (2007). Coach-created motivational climate. IN S. Jowett, & D. Lavalley (Eds.), *Social psychology in sport* (pp. 117-130). Champaign, IL: Human Kinetics.
- Feltz, D., Hepler, T., Roman, N., & Paiment, C. (2009). Coaching Efficacy and Volunteer Youth Sport Coaches. *The Sport Psychologist*, 23, 24 – 41. doi: <http://www.cabdirect.org/abstracts/20093129744.html>

- Gagne, M., Ryan, R., & Bargmann, K. (2003). Autonomy support and need satisfaction in the motivation and well-being of gymnasts. *Journal of Applied Sport Psychology, 15*, 372-390. doi: 0.1080/714044203
- Gaudreau, P., Morinville, A., Gareau, A., Verner-Filion, J., Green-Demers, I., & Franche, V. (2016). Autonomy support from parents and coaches: Synergistic or compensatory effects on sport-related outcomes of adolescent-athletes? *Psychology of Sport and Exercise, 25*, 89-99. doi: 10.1016/j.psychsport.2016.04.006
- Giges, B. (2000). Removing psychological barriers: Clearing the way. IN Giges, B., Petitpas, A., & Vernacchia, R. (2004). Helping coaches meet their own needs: Challenges for the sport psychology consultant. *The Sport Psychologist, 18*, 430–444. doi: <http://www.cabdirect.org/abstracts/20053046679.html>
- Giges, B., Petitpas, A., & Vernacchia, R. (2004). Helping coaches meet their own needs: Challenges for the sport psychology consultant. *The Sport Psychologist, 18*, 430–444. doi: <http://www.cabdirect.org/abstracts/20053046679.html>
- Gillet, N., Vallerand, R., Amoura, S., & Baldes, B. (2010). Coaches' autonomy support on athletes' motivation and sport performance: A test of the hierarchical model of intrinsic and extrinsic motivation. *Psychology of Sport and Exercise, 11*, 155 – 161. doi: <http://dx.doi.org/10.1016/j.psychsport.2009.10.004>
- Gould, D., Lauer, L., Rolo, C., Jannes, C., & Pennisi, N. (2008). The Role of Parents in Tennis Success: Focus Group Interviews with Junior Coaches. *The Sport Psychologist, 22*, 18-37. doi: <http://www.cabdirect.org/abstracts/20083157599.html>
- Hagger, M. & Chatzisarantis, N. (2007). *Intrinsic Motivation and Self-Determination in Exercise and Sport*. Leeds, England: Human Kinetics Europe Ltd.

- Hjalm, S., Kentta, G., Hassmenan, P., & Gustafsson, H. (2007). Burnout among elite soccer coaches. *Journal of sport behavior*, 30, 415-427. doi: <http://eprints.usq.edu.au/15628/>
- Horn, T. (2002). Coaching effectiveness in the sport domain. In T.S. Horn (Ed.), *Advances in sport psychology* (2nd ed., pp. 309–354). Champaign, IL: Human Kinetics.
- Jones, R., Armour, K. & Potrac, P. (2004). *Sports Coaching Cultures: From Practice to Theory*. Routledge, London, 2004.
- Jungert, T., Landry, R., Joussemet, M., Mageau, G., Gingras, I., & Koestner, R. (2015). Autonomous and controlled motivation for parenting: Associations with parent and child outcomes. *Journal of Child and Family Studies*, 24, 1932-1942. doi: 10.1007/s10826-014-9993-5
- Langan, E., Hodge, K., McGowan, S., Carney, S., Saunders, V., & Lonsdale, C. (2015). The influence of controlled motivation alongside autonomous motivation: Maladaptive, buffering, or additive effects? *International Journal of Sport and Exercise Psychology*, 1-15. doi: 10.1080/1612197X.2015.1016084
- Mageau, G. & Vallerand, R. (2003). The coach-athlete relationship: a motivational model. *Journal of Sports Sciences*, 21, 883-904. doi: <http://dx.doi.org/10.1080/0264041031000140374>
- Major, V., Klein, K., & Ehrhart, M. (2002). Work time, work interference, with family, and psychological distress. *Journal of Applied Psychology*, 87, 427-436. doi: 10.1037/0021-9010.87.3.427
- Mallett, C. (2005). Self-determination Theory: A case study of evidence-based coaching. *The Sport Psychologist*, 19, 417-429. Retrieved from: <http://espace.library.uq.edu.au/view/UQ:76675>

- McLean, K. (2010). Why do you coach? *Sport Coach – An online magazine for coaches*, 31, 1-2.
- McLean, K., Mallet, C., & Newcombe, P. (2012). Assessing Coach Motivation: The Development of the Coach Motivation Questionnaire (CMQ). *Journal of Sport & Exercise Psychology*, 34, 184-207. doi: <http://eprints.qut.edu.au/55847/>
- McLean, K. & Mallett, C. (2012). What motivates the motivators? An examination of sports coaches. *Physical Education & Sport Pedagogy*, 17, 21-35. doi: 10.1080/17408989.2010.535201
- Olusoga, P., Butt, J., Maynard, I., & Hays, K. (2010). Stress and coping: A study of world class coaches. *Journal of applied sport psychology*, 22, 274-293. doi: 10.1080/10413201003760968
- Pelletier, L., Fortier, M., Vallerand, R., & Briere, N. (2001). Associations between perceived autonomy support, forms of self-regulation, and persistence: a prospective study. *Motivation and Emotion*, 25, 279-306. doi: 10.1023/A:1014805132406
- Pelletier, L., Seguin-Levesque, C., & Legault, L. (2002). Pressure From Above and Pressure from Below as Determinants of Teachers' Motivation and Teaching Behaviours. *Journal of Educational Psychology*, 94, 186-196. doi: <http://dx.doi.org/10.1037//0022-0663.94.1.186>
- Pelletier, L. & Vallerand, R. (1996). Supervisors' beliefs and subordinates' intrinsic motivation: a behavioral confirmation analysis. *Journal of Personality and Social Psychology*, 71, 331-340. doi: <http://dx.doi.org/10.1037//0022-3514.71.2.331>
- Petitpas, A., Corneliuss, A., Van Raalte, J., & Jones, T. (2005). A Framework for Planning Youth Sport Programs That Foster Psychosocial Development. *The Sport Psychologist*, 19, 63-80. doi: <http://www.cabdirect.org/abstracts/20053082739.html>

- Pomerantz, E. Cheung, C., & Qin, L. (2012). Relatedness Between Children and Parents: Implications for Motivation. IN Ryan, R. (Ed.), (2012). *The Oxford Handbook of Motivation* (pp. 335-349). New York: Oxford University Press.
- Probst, T. (2003). Development and validation of the Job Security Index and the Job Security Satisfaction scale: A classical test theory and IRT approach. *Journal of Occupational and Organizational Psychology*, 76, 451–467. doi:10.1348/096317903322591587
- Reinboth, M., Duda, J., & Ntoumanis, N. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motivation and Emotion*, 29, 297–313. Retrieved from: <http://eprints.bham.ac.uk/430/>
- Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist*, 44, 159-175. doi: 10.1080/00461520903028990
- Rocchi, M., Pelletier, L., & Couture, A. (2013). Determinants of Coach Motivation and Autonomy Supportive Coaching Behaviours. *Psychology of Sport and Exercise*, 14, 852-859. doi: 10.1016/j.psychsport.2013.07.002
- Ryan, R. (1995). Psychological needs and the facilitation of integrative processes. *Journal of Personality*, 63, 397-427. doi: <http://dx.doi.org/10.1111/j.1467-6494.1995.tb00501.x>
- Salminen, S., & Liukkonen, J. (1996). Coach-player relationship and coaching behavior in training sessions. *International Journal of Sport Psychology*, 27, 59-67. doi: <http://www.cabdirect.org/abstracts/19961808948.html>
- Sheldon, K. (2011). Integrating Behavioral-Motive and Experiential-Requirement Perspectives on Psychological Needs: A Two Process Model. *Psychological Review*, 118, 552-569. doi: 10.1037/a0024758

- Sheldon, K. & Filak, V. (2008). Manipulating autonomy, competence, and relatedness support in a game-learning context: New evidence that all three needs matter. *British Journal of Social Psychology*, 47, 257-283. doi: 10.1348/014466607X238797
- Sheldon, K., & Gunz, A. (2009). Psychological needs as basic motives, not just experiential requirements. *Journal of Personality*, 77, 1467–1492. doi: 10.1111/j.1467-6494.2009.00589x.
- Skinner, E., Johnson, S., & Snyder, T. (2005). Six dimensions of parenting: A motivational model. *Parenting: Science and Practice*, 5, 175-235. doi: 10.1207/s15327922par0502_3.
- Smith, N., Tessier, D., Tzioumakis, Y., Fabra, P., Quested, E., Appleton, P., ... & Duda, J. (2016). The relationship between observed and perceived assessments of the coach-created motivational environment and links to athlete motivation. *Psychology of Sport and Exercise*, 23, 51-63. doi: 0.1016/j.psychsport.2015.11.001
- Smith, N., Tessier, D., Tzioumakis, Y., Quested, E., Appleton, P., Sarrazin, P., ... & Duda, J. L. (2015). Development and validation of the multidimensional motivational climate observation system. *Journal of sport & exercise psychology*, 37, 4-22.
- Smoll, F. & Smith, R. (2006). Enhancing coach-athlete relationships: Cognitive-behavioral principles and procedures. *The sport psychologist's handbook*, 19-37.
- Soenens, B., Sierens, E., Vansteenkiste, M., Dochy, F., & Goossens, L. (2012) Psychologically controlling teaching: Examining outcomes, antecedents, and mediators. *Journal of Educational Psychology*, 104, 108-120. doi: <http://dx.doi.org/10.1037/a0025742>
- Solstad, B., 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: 0.1016/j.psychsport.2015.05.001

- Standage, M., Duda, J. L., & Ntoumanis, N. (2005). A model of contextual motivation in physical education: Using constructs from self-determination and achievement goal theories to predict physical activity intentions. *Journal of Educational Psychology*, 95, 97–110. doi: 10.1037/0022-0663.95.1.97
- Standage, M. & Ryan, R. (2012). Self-determination theory and exercise motivation: facilitating self-regulatory processes to support and maintain health and well-being. In: Roberts, G. & Treasure, D., eds. *Advances in motivation in sport and exercise*, 3rd edition. Champaign, U. S. A.: Human Kinetics, pp. 233-270.
- Stebbing, J., Taylor, M., & Spray, C. (2011). Antecedents of Perceived Coach Autonomy Supportive and Controlling Behaviors: Coach Psychological Need Satisfaction and Well-Being. *Journal of Sport & Exercise Psychology*, 33, 255-272. Retrieved from: <http://journals.humankinetics.com/jsep>
- Stebbing, J., Taylor, M., Spray, C., & Ntoumanis, N. (2012). Antecedents of perceived coach interpersonal behaviors: The coaching environment and coach psychological well- and ill-being. *Journal of Sport & Exercise Psychology*, 34, 481-502. Retrieved from: <http://journals.humankinetics.com/jsep>
- Taylor, I. M., Ntoumanis, N., & Smith, B. (2009). The social context as a determinant of teacher motivational strategies in physical education. *Psychology of Sport and Exercise*, 10, 235-243. doi: <http://dx.doi.org/10.1016/j.psychsport.2008.09.002>
- Taylor, I. M., Ntoumanis, N., & Standage, M. (2008). A self-determination theory approach to understanding the antecedents of teachers' motivational strategies in physical education.

- Journal of Sport and Exercise Psychology*, 30, 75-94. doi:
<https://dspace.lboro.ac.uk/2134/15371>
- Trudel, P. & Gilbert, W. (2006). Coaching and coach education. IN Kirk, D., Macdonald, D., & O'Sullivan, M. (Eds.), (2006). *The handbook of physical education* (pp. 516-539). London: Sage.
- Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. IN M. P. Zanna (Ed.), *Advances in Experimental Social Psychology* (pp. 271-360). New York: Academic Press.
- Vallerand, R. (2000). Deci and Ryan's self-determination theory: A view from the hierarchical model of intrinsic and extrinsic motivation. *Psychological Inquiry*, 11, 312-318. doi:
<http://www.jstor.org/stable/1449629>
- Vallerand, R.J. (2001). A hierarchical model of intrinsic and extrinsic motivation in sport and exercise. In G.C. Roberts (Ed.), *Advances in motivation in sport and exercise* (pp. 263-319). Champaign, IL: Human Kinetics.
- Williams, N., Whipp, P., Jackson, B., & Dimmock, J. (2013). Relatedness support and the retention of young female golfers. *Journal of Applied Sport Psychology*, 25, 412-430. doi: 10.1080/10413200.2012.749311
- Yli-Piipari, S., Watt, A., Jaakkola, T., Liukkonen, J., & Nurmi, J. (2009). Relationships between physical education students' motivational profiles, enjoyment, state anxiety, and self-reported physical activity. *Journal of sports science & medicine*, 8, 327. Retrieved from:
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC37>

CHAPTER TWO**ASSESSING NEED-SUPPORTIVE AND NEED-THWARTING INTERPERSONAL BEHAVIOURS: THE INTERPERSONAL BEHAVIOURS QUESTIONNAIRE (IBQ)**

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Abstract

The objectives of the present studies were to design and validate the Interpersonal Behaviours Questionnaire (IBQ and IBQ-Self). The IBQ assesses perceptions of interpersonal behaviours of others according to Self-Determination Theory in the context of autonomy-supportive, competence-supportive, and relatedness-supportive behaviours, as well as autonomy-thwarting, competence-thwarting, and relatedness-thwarting behaviours, while the IBQ-Self assesses an individual's own report of these behaviours. In Study 1, participants reported on the interpersonal behaviours of people in their lives. Through a series of confirmatory factor analyses, a six-factor, 24-item scale structure was determined. Results supported the validity of the scale and correlation analyses suggested that the subscales were related to basic need satisfaction. In Study 2, the psychometric properties of the scale were re-evaluated and the scale was tested for gender invariance. The results suggested that the scale structure held and that it was invariant across genders. Finally, in Study 3, the psychometric properties of the IBQ-Self were evaluated using a student sample reporting on their behaviours when they interact with other people. The results supported that the IBQ-Self factor structure held and was invariant for men and women. Overall, the results of all three studies supported the validity of the IBQ and the IBQ-Self.

Keywords: self-determination theory, interpersonal behaviour, need support, need thwarting, scale development

Assessing Need-Supportive and Need-Thwarting Interpersonal Behaviours: The Interpersonal Behaviours Questionnaire (IBQ)

As social beings, humans continuously draw information from the people around them to help guide and interpret their own behaviours. These social interactions have a large impact on humans' motivation in different aspects of their life (Deci & Ryan, 1985). One factor that could explain how and why the people we interact with have such an impact on the quality of our psychosocial experiences is how they influence our psychological needs (Sheldon, 2011).

The present research examines how people influence psychological needs through the lens of Self-Determination Theory (SDT; Deci & Ryan, 1985). Specifically, we propose to design and validate a measurement tool that assesses the perception of three types of need-supportive and three types of need-thwarting interpersonal behaviours, matching the basic psychological needs proposed by SDT.

Self Determination Theory

As a leading theory of motivation, SDT (Deci & Ryan, 1985) provides insight into understanding the reasons humans choose to engage in behaviours, participate in activities, and enjoy what they do. SDT views the concept of motivation in terms of quality, and not quantity. According to SDT, there are three distinct types of motivation (amotivation, extrinsic motivation, and intrinsic motivation) that differ in their quality based on the degree to which the reasons for engaging in a specific behaviour have been internalized and integrated into the self. This process of internalization requires the support and satisfaction of the three basic psychological needs (autonomy, competence, and relatedness). These three needs are said to be innate, evident in all developmental periods, and universal across cultures (Deci & Ryan, 2002). The need for autonomy represents the need for individuals to act in line with their own interests and values.

The need for competence requires opportunities for increasing levels of challenge at an activity and developing greater levels of mastery. Finally, the need for relatedness refers to needing a caring, supportive social network with strong interpersonal connections.

Supporting Psychological Needs

The social environment, which includes the structure of the environment and the people within it, has an impact on the extent to which the psychological needs are met (Deci, Shwartz, Sheinman, & Ryan, 1981). According to SDT, other people's behaviour can have a positive or negative influence on psychological need satisfaction, which ultimately impacts the quality of motivation, and promotes either positive or negative well-being outcomes for individuals. Specifically, basic psychological needs will be satisfied and individuals will experience improved motivation quality and positive outcomes such as improved well-being (Milyavskaya & Koestner, 2011) and sleep quality (Campbell et al., 2015) when other people engage in need-supportive interpersonal behaviours (Deci & Ryan, 1985). In contrast, psychological needs can be frustrated when people within the social environment engage in, or are perceived to engage in, need-thwarting interpersonal behaviours (Sheldon & Filak, 2008) and this can lead to controlled motivation and negative outcomes such as burnout (DeFreese & Smith, 2014) or dropout (Joessar, Hein, & Hagger, 2011). Therefore, by acting in a way that either supports or thwarts others' psychological needs, an individual can act to promote or undermine the quality of motivation of other people, as well as the outcomes they experience.

According to SDT, there are six types of interpersonal behaviours that impact the satisfaction or dissatisfaction of basic needs. Individuals can act in ways that are autonomy-supportive (AS), autonomy-thwarting (AT; also called controlling), competence-supportive (CS), competence-thwarting (CT), relatedness-supportive (RS), and relatedness-thwarting (RT).

AS behaviours are described as providing choice, providing rationale for tasks, acknowledging others' perspectives, giving opportunities for initiative, and promoting task involvement (Mageau et al., 2015; Mageau & Vallerand, 2003). AT or controlling behaviours include using rewards, using intimidating language, making demands without providing a rationale, using conditional regard, and using excessive personal control (Bartholomew, Ntoumanis, & Thorgenson-Ntoumani, 2009). CS behaviours include using positive expectancies, encouraging learning, providing positive feedback, acknowledging improvements, believing others are capable of achieving their goals, and encouraging others to improve their skills (Sheldon & Filak, 2008). CT behaviours consist of emphasizing others' faults, discouraging people from trying difficult tasks, sending the message that someone is incompetent, and doubting their capacity to improve (Sheldon & Filak, 2008). RS behaviours include showing understanding, support, and care for others, being warm, having an interest in their activities, and showing a genuine liking for them as a person (Jones, Armour, & Potrac, 2004). Finally, RT behaviours include being distant with others, not connecting emotionally, excluding them, not listening, and not being available when needed (Sheldon & Filak, 2008).

It is important to note that although these constructs may appear to be counterparts where an individual is either high on supportive behaviours and low on thwarting behaviours, or vice-versa, they are distinct constructs (Sheldon, 2011). Specifically, emerging research suggests that these constructs are not opposites and that individuals can engage in both supportive and thwarting interpersonal behaviours concurrently (e.g. Chua, Wong, & Koestner, 2014; Vansteenkiste & Ryan, 2013). A significant amount of research in SDT has focused on examining the outcomes of need-supportive and need-thwarting interpersonal behaviour and results show that need-supportive interpersonal behaviours by teachers, coaches, or parents lead

to positive outcomes such as better performance (e.g., Assor, Vansteenkiste, & Kaplan, 2009) and persistence (Standage, Sebire, & Loney, 2008); while need-thwarting interpersonal behaviours lead to negative outcomes like increased depressive symptoms (Soenens et al., 2008) and anxiety (Yli-Piipari, Watt, Jaakola, Liukkonen, & Nurni, 2009). Since need-supportive and need-thwarting interpersonal behaviours promote distinctive outcomes, it is important to examine them as separate constructs.

Limitations of Past Research

Despite the large volume of research that supports SDT, there are some limitations. First, within the SDT literature, the vast majority of interpersonal behaviour research has focused on autonomy-support (e.g., Moreau & Mageau, 2013). SDT posits that all three types of interpersonal behaviours are essential (e.g., Pomerantz, Cheung, & Qin, 2012); therefore, the impact of competence and relatedness supporting behaviours also need to be examined. Furthermore, it is also important to measure all three types of needs at the same time in order to determine how each dimension of interpersonal behaviour is conceptually distinct from the others, and how each is associated with the different forms of motivation and outcomes.

Next, it is essential to measure both supportive and thwarting behaviours concurrently since the absence of autonomy-supportive behaviours cannot automatically imply the presence of AT (controlling) behaviour (Sheldon & Filak, 2008). AT behaviours have recently received more attention (Bartholomew et al., 2009) however, the other types of need satisfying and need thwarting behaviours should also be examined simultaneously.

Furthermore, among the studies that examined any or all of these dimensions, very few have used the same instrument or the same questions to assess dimensions of interpersonal behaviours. Conceptual problems can result from using different instruments to measure the

same theoretically based construct: it is difficult to maintain a consistent and meaningful definition of the various dimensions when studies in education, sport, and other domains label these dimensions differently, and use items that differ both in number and in quality.

Notably, two studies have examined all six dimensions using a single measure. First, a six-dimensional measure of parenting styles was created by Skinner, Johnson, and Snyder (2005). Although their measure of parenting styles includes all six dimensions, the measure itself was developed based on various theoretical foundations, including SDT, and past research on parenting styles. Second, an observational measure of need-supportive and need-thwarting teaching behaviours was created in the domain of physical education (Haerens et al., 2013; Van den Berghe et al., 2013). Observational measures allow for high ecological validity; however, they are limited to a specific domain. In addition, the measures focused on the frequency of actual interpersonal behaviours, by an independent evaluation, and do not take into account whether those behaviours are perceived to be supportive or thwarting by a given individual.

Finally, some studies have relied on adapted versions of need-satisfaction and/or need-dissatisfaction scales to measure perceptions of interpersonal behaviours (e.g., Chirkov & Ryan, 2001). This approach poses some issues since these measures may confound two very distinct constructs: (1) other people's behaviour and (2) how other people's behaviour makes you feel. Furthermore, those measures are designed to assess the extent to which psychological needs are satisfied or dissatisfied, and not the extent to which someone is behaving in a need-supportive or need-thwarting manner. When measuring interpersonal behaviours, the focus should be on the actual perceptions of the behaviours, and not any feelings attached to that behaviour or psychological need satisfaction and dissatisfaction. These limitations provide support for the

creation of a measure that assesses all six dimensions of interpersonal behaviours, focusing exclusively on behaviours and not feelings, that can be applied to multiple life domains.

Present Research

The purpose of the present series of studies is to develop a tool, the Interpersonal Behaviours Questionnaire (IBQ), which will serve as a parsimonious measure of the six dimensions of interpersonal behaviours across multiple social relationships. In Study 1, the structure of the IBQ is validated using a general stem (“The people in my life...”) to ensure that the scale items are not domain specific and can be applied across multiple relationships. In Study 2 the scale structure is validated using a new sample to confirm the structure remains stable. In Study 3, the self-report version of the scale (IBQ-Self) is validated with an undergraduate student sample, reporting on their own behaviour, using a general stem. In all three studies, the six subscales will be compared with other constructs that have been previously examined in SDT research to provide evidence supporting the construct validity of the scale.

Study 1

The objective of Study 1 was to create and evaluate the psychometric structure of a 24-item, six-factor scale (four items per subscale). Previous research in SDT has shown that perceptions of need-supportive interpersonal behaviours lead to an increase in reported general need satisfaction. Therefore, it was anticipated that reports of need-supportive interpersonal behaviours would have a positive relationship with need satisfaction, while need-thwarting interpersonal behaviours will have a negative relationship with need satisfaction. Furthermore, research examining perceptions of interpersonal behaviours and well-being has found that need-supportive interpersonal behaviours are related to increased well-being (Chirkov & Ryan, 2001). As such, when relating scores from the IBQ with these outcomes, it is anticipated that the need-

supportive subscales will have positive relationships with positive well-being indicators and a negative relationship with negative affect; while the opposite relationships are expected with the need-thwarting subscales, as shown in previous research (Vansteenkiste & Ryan, 2013).

Method

As a first step, a pool of items referring to various types of interpersonal behaviours were created and then evaluated through a focus group.

Item Development

This section highlights the procedures that were used for creating the IBQ sample items.

Item creation. The five authors are researchers with expert knowledge of SDT who generated an initial pool of items to assess interpersonal behaviours that support and thwart the needs of autonomy, competence, and relatedness. Conceptual and operational definitions of each construct were guided by previous literature examining need-supportive (e.g., Grolnick & Ryan, 1989; Haerens et al., 2013; Mouratidis, Vansteenkiste, Sideridis, & Lens, 2011) and need-thwarting behaviours (e.g., Bartholomew, Ntoumanis, Ryan, Bosch & Thogersen-Ntoumani, 2011). The following criteria were also used: (1) items had to refer to specific behaviours, and not feelings related to behaviours; (2) items needed to explicitly measure a single need and be exclusively representative of need support or need thwarting; (3) items needed to be relevant across multiple contexts and interpersonal relationships; and (4) items needed to be as parsimonious as possible in order to eliminate any possibility that the items would be bound to specific contexts. This process generated a pool of 99 items for assessment.

Item selection. The 99 items retained from the item creation phase were administered to 10 participants (5 males and 5 females) from a convenience sample that had thorough knowledge of SDT. Participants were asked to associate each item with the need they believed it was

assessing and to rate each item in terms of its quality (e.g., wording, face validity). Participants were also invited, where needed, to make adjustments to the wording of items to improve quality or clarity. To eliminate ambiguity, the items that did not achieve congruency in terms of item-need associations across all participants were eliminated. Furthermore, items that did not receive a minimum quality average across all participants of at least 6 on a 7-point scale were also eliminated. Through this process, 54 items were retained for Study 1 to measure each of the following subscales: AS (9), AT (10), CS (8), CT (10), RS (9), and RT (8).

Participants

The sample was composed of 534 full-time undergraduate students ($n_{\text{female}} = 422$, $n_{\text{male}} = 112$), aged 17 to 23 ($M = 19.12$, $SD = 1.32$) who were enrolled in first-year courses. The majority of students were in the 1st year of their program (72%) and were registered as full-time students (93%). Most students were registered in social science programs such as psychology (52%) or health science program such as nursing (30%). The students were selected from a research participation pool and received credit towards their final course grade for their participation. Participation was voluntary and participants gave their informed consent before participating.

Materials

All participants completed the following measures through an online questionnaire.

Interpersonal behaviours. 54 items were used to examine the extent participants generally perceived other people's interpersonal behaviours as being need-supportive and need-thwarting. In the instructions, the participants were reminded that they regularly interact with many people, but that they should focus on the people that have a greater influence on them. Using a 1 (*Do not agree at all*) to 7 (*Completely agree*) scale, the participants were asked to indicate to what extent they agreed that "The people in my life..." displayed these behaviours.

This general stem was purposely chosen in order to ensure that the items were not bound to a specific social context.

Need satisfaction. Participants completed the Need Satisfaction Scale (La Guardia, Ryan, Couchman, & Deci, 2000) to assess the extent their three basic psychological needs were met. The scale consists of three subscales measuring participants' autonomy, competence, and relatedness satisfaction. For this study, the stems were modified to ask participants about their need satisfaction in general, instead of a specific social relationship. Participants were asked to indicate, using a 7-point scale ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*), the extent to which they typically agreed with each statement. A confirmatory factor analysis using Mplus Version 6 (Muthen & Muthen, 2010) was conducted on the adapted version of the scale to confirm the structure. The fit indices suggest that the model has an acceptable fit on some indicators, but not others ($SB\chi^2_{(24)} = 109.56, p < .001$, RMSEA = .07 (95% CI [.05, .09]), SRMR = .05, CFI = .91, TLI = .86). Since the internal consistency estimates (Cronbach's alpha) for the modified need satisfaction scale were within acceptable range (autonomy $\alpha = .78$; competence $\alpha = .77$; relatedness $\alpha = .73$), the scale was used in its current form and a mean score was calculated for each subscale

Well-being. Participants completed the following measures of well-being: the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985), the Positive and Negative Affect subscales from the PANAS-X (Watson, & Clark, 1994), and the Subjective Vitality Scale (Ryan & Frederick, 1997). The life satisfaction measure consisted of five questions about how individuals currently perceive their lives. The positive and negative affect measures were comprised of 20 items that assessed specific emotional affective states. The subjective vitality measure included nine items that indicate feelings of aliveness and energy

available to individuals. For all three measures of well-being, participants were asked to indicate the extent to which they typically agreed with each statement on a 1 (*Do not agree at all*) to 7 (*Completely agree*) scale. A CFA analysis was run on the PANAS-X to confirm the positive and negative affect measures had an adequate factor structure and the results supported the model was good ($SB\chi^2_{(26)} = 60.72, p < .001$, RMSEA = .06 (95% CI [.04, .07]), SRMR = .03, CFI = .98, TLI = .97). The internal consistencies were calculated for all of the remaining scales. All measures had sufficient internal consistency ($\alpha > .87$) and a mean score was calculated for each subscale and used as indicators of well-being.

Analyses

The structure of the scale was determined through a series of sequential confirmatory factor analyses (CFA). A CFA approach is considered the most appropriate method for developing scales that are built within a strong theoretical framework (Hurley et al., 1997) and many scales have been developed using this method (e.g. Baldwin & Caldwell, 2003; Gaudreau & Blondin, 2002; Mullan, Markland, & Ingledew, 1997). Since the IBQ was developed to measure interpersonal behaviours within the framework of SDT and the items were expected to load onto pre-determined theoretical factors, a CFA approach was justified. Furthermore, unlike other contemporary methods of scale development such as Bayesian CFA, multidimensional scaling, or exploratory structural equation modeling, a CFA approach limits cross-loadings between subscales (i.e., Fong & Ho, 2013). One limitation of this approach, however, is that it does not allow for a lot of flexibility between subscales and promotes the retention of items that load very strongly onto their respective constructs, above other items. Since existing research in SDT has sometimes found strong correlations between the different types of interpersonal behaviours (i.e., Wilson, Gregson, & Mack, 2009), a CFA approach was selected despite those

limitations because it would promote the development of more distinct measures of each of the six types of interpersonal behaviours. As such, the scale structure was determined through 4 rounds of CFAs, following the procedures outlined by Gaudreau and Blondin (2002), using Mplus Version 6 with the maximum likelihood robust (MLR) estimator (Muthen & Muthen, 2010).

In the first round, the 6 subscales were tested individually to ensure that the items were appropriate measures of their latent factor. The factor loading, standardized residuals, and modification indices were examined for each item. Items that had a poor standard factor loading (< 0.40), a high standardized residual ($> \pm 1.5$), and/or a modification index that suggested that the residual should correlate with other items (> 15.00), were deleted. The fit of each model was assessed according to Hu and Bentler's (1999) recommendation of using the chi-square (χ^2) and the Standardized Root Mean Square Residual (SRMR) as absolute fit indices; the Tucker-Lewis Index (TLI) as a relative fit index; and finally, the Root Mean Square Error of Approximation (RMSEA) and the Comparative Fit Index (CFI) as noncentrality-based indices. Since MLR estimation was used in the analysis, the Satorra-Bentler (SB) scaled chi-square was calculated to compare the models (Muthen & Muthen, 2010). For the SRMR and RMSEA, values below .08 indicated adequate model fit and values below .06 indicated excellent fit; while for the CFI and TLI, values above .90 represent represented good fit and values above .95 indicated excellent fit (Barrett, 2007; Hooper, Coughlan, & Mullen, 2008).

Before proceeding with the remaining CFA analyses, item response theory (IRT) analyses were performed using IRTPro2.1 (Scientific Software International, 2011). A two-parameter model analysis was run to assess the threshold parameters, discrimination values, and item information functions for all remaining items in each subscale. Items were compared

against each other on several factors: (1) discrimination ability, (2) threshold parameters, (3) normal distribution of threshold parameters, and (4) level of information. Any item that demonstrated poor IRT results was eliminated at this stage.

Next, the second round of CFAs was performed and each subscale was paired with every other subscale. The latent constructs were allowed to correlate in order to determine if any items were cross-loading onto another factor. Again, the factor loadings, standardized residuals, and modification indices were examined using the same criteria as the first round. Problematic items were removed from the subsequent analyses. Furthermore, if the modification indices suggested that items should also load onto the other factor in the subscale paring, the item was removed. Model fit was assessed using the same criteria as Round 1. In the third round of CFAs, two models with three subscales each were tested: a model assessing need-support and a model for need-thwarting. In both models, latent constructs were free to correlate and the individual items were again analyzed using the same procedures in Round 1 and Round 2. Finally, in the fourth round, the models from Round 3 were combined to test the full 6-factor model.

Following the evaluation of the scale structure, alternative models using the same subscales identified in the first series of CFAs were estimated in order to confirm that the six-factor model was the best. Then, gender invariance tests were performed to confirm that the scale performs equally for both men and women. Finally, the composite reliabilities were estimated for each subscale and a mean score was calculated for each subscale and used to conduct the correlation analyses between each subscale, and the expected outcomes.

Results

Preliminary Analyses

First, the 54 IBQ items were examined. Four items were eliminated from subsequent analyses because the full range of responses (1 through 7) was not used. The scoring distributions of the remaining 50 items were then examined for univariate normality and results suggested that it had not been achieved (skewness range: -11.50 to 17.14; kurtosis range: -6.45 to 5.12). This was not unexpected since non-normal distributions occur frequently in social science data (Barnes, Cote, Cudeck, & Malthouse, 2001). However, since the models were tested using the MLR estimator, which is robust to non-normality, the CFA analyses were conducted as planned, without any adjustment to the variables (Muthen & Muthen, 2010).

Item Reduction

The following section highlights the results of each round of CFA and IRT analyses.

Round 1 – Individual Subscales. Six CFAs were conducted and items that displayed poor factor loadings, large standardized residuals, and potential correlations with other item residuals were eliminated. Table 1.1 highlights the results for each subscale's initial model fit, followed by the final fit after the removal of problematic items. A total of 17 items were removed at this stage. The final models for each subscale demonstrated strong fit and examination of the items loading onto each factor supported that the subscales were capturing multiple dimensions of each type of interpersonal behaviour, with the exception of the AS and RT subscales. First, although AS is a multidimensional construct (i.e., providing rationale for tasks, providing choice, acknowledging others' perspectives, giving opportunities for initiative, promoting task involvement, and giving opportunities for decision-making), the items that loaded onto the factor in round 1 focused entirely on opportunities to provide choice and decision-making. For the RT subscale, although there was a mix of items that touched upon the different dimensions of the construct (i.e., being distant with others, not connecting emotionally,

excluding them, not listening, not being available when needed) and the items were designed to include approach items (i.e., being distant) and avoidance items (i.e., not being available), the avoidance items loaded mostly strongly on the construct in round 1. To confirm that this was not an artefact of one or two strong items biasing the results for both subscales, the results were re-run without the strongest loading items (AS: “Give me the freedom to make my own choices” and “Support my decisions”; RT: “Does not care about me”) to see if this would lead to different items loading on the subscales in round 1. Even without these items, the new results did not support that the remaining items that captured other dimensions of AS or the approach aspects of RT loaded better onto their respective constructs. As a result, the original results were retained, even though the AS subscale only captured two dimensions of autonomy support and the RT subscale focused on avoidance items.

IRT. Based on the criteria outlined in the description of the analyses used, five items were eliminated from the overall scale. They were eliminated due to poor discrimination ability and inflated threshold parameters.

Round 2 – Subscale Comparisons. In this second phase, each of the 6 models from Round 1 were compared with each other, for a total of 15 models tested. When examining the individual items within each model, three items were identified for removal from the CT subscale. After the removal of problematic items, all 15 models demonstrated excellent model fit (RMSEAs and SRMRs < .06; and CFIs and TLIs > .95) (see Table 1.1 for the worst fitting model, and the best). Following this round of model testing, all of the subscales had four items, except for CT, which had five. In order to ensure balance across all subscales, the CT items were re-examined from an IRT perspective. Due to a noticeable redundancy in the wording between

two items, one item was chosen for elimination based on having slightly lower item information functions on theta levels -0.4 and below.

Round 3 – Support and Thwarting. In this phase, the need support items were combined into one model and the need thwarting items were examined in a separate model. Both 3-factor, 12-item models were tested using the same procedures as the first two rounds and the results are highlighted in Table 1.1.

Round 4 – Full model. For this final phase, the models from Round 3 were combined to create the full 6-factor, 24-item model measuring AS, AT, CS, CT, RS, and RT. The same analysis procedures were used as above and the full results are shown in Table 1.1, the model fits the data well. Table 1.2 shows an overview of the items retained in the final model, as well as their respective standardized factor loadings and standard errors.

Alternative Models

To confirm that the 6-factor model provides the best explanation of the data, a series of alternative models were tested using the final 24 items identified in the previous step. First, a 3-factor model with 8 items per factor measuring perceptions of autonomy, competence, and relatedness interpersonal behaviours was tested. The results supported that although the items did load significantly onto their appropriate factor, the overall fit of the model was not great ($SBX^2_{(249)} = 584.58, p < .001, CFI = .87, TLI = .85, RMSEA = .06 \text{ CI}_{95} [.06, .07], SRMR = .06$). A second alternative model was tested to confirm whether a 2-factor model measuring perceptions of supportive and thwarting behaviour with 12 items each as tested. Again, the variables loaded onto their respective factors as would be expected, except the model did not demonstrate acceptable fit ($SBX^2_{(251)} = 535.90, p < .001, CFI = .88, TLI = .87, RMSEA = .06$).

CI₉₅[.05, .06], SRMR = .05). As such, the six factor model assessing all six types of need-supportive and need-thwarting behaviour is the most appropriate.

Invariance Testing

A series of invariance tests were conducted to determine that the scale performed equally for both men ($n = 112$) and women ($n = 417$). In the first step, configural invariance was tested through examining a baseline CFA model for gender where no constraints were placed on the parameters. The results suggested that the factor structure of the IBQ was the same for men and women ($SBX^2_{(474)} = 603.37, p < .001, CFI = .96, TLI = .94, RMSEA = .04$ CI₉₅[.03, .05], SRMR = .04). Next, a model was tested where the loadings for men and women were constrained to confirm the scale had metric invariance. The results suggested that the constrained model also had a good fit ($SBX^2_{(492)} = 612.71, p < .001, CFI = .95, TLI = .94, RMSEA = .04$ CI₉₅[.03, .05], SRMR = .052). Since MLR estimation was used in the analysis, the Satorra-Bentler (SB) scaled chi-square was calculated to compare the models (Muthen & Muthen, 2010). In addition to examining the difference in chi-square values, Chen's (2007) guidelines were also applied to compare the fit of the models. According to these guidelines, if the CFI value decreased less than 0.01, the SRMR value did not increase more than 0.01, and the RMSEA value did not increase more than 0.015 when comparing models, model fit was preserved and the models were considered to be invariant. Since the change in chi-square between the constrained and unconstrained model, as well as the changes in other fit indices, were insignificant, the models were considered to be invariant ($SB\Delta X^2_{(18)} = 9.34, p > .05; \Delta CFI > .01; SRMR < .01; \Delta RMSEA < .015$).

Finally, scalar invariance was established by constraining the intercepts to be equal for both groups. Again, the results supported that the model had good fit ($SBX^2_{(510)} = 637.28, p <$

.001, CFI = .95, TLI = .94, RMSEA = .04 (95% CI [.03, .05]), SRMR = .05) and the chi-square difference and other fit indices suggested the model fit remained stable ($SB\Delta\chi^2_{(18)} = 24.57, p > .05$; $\Delta CFI > .01$; $SRMR < .01$; $\Delta RMSEA < .015$). These results support that men and women were invariant with regards to the factor structure and that composite variables can be created for both groups.

Validity, Reliability, and Outcome Comparisons

Next, the average variance extracted (AVE) and the average shared square variance (ASV) were examined to assess convergent and divergent validity on the scale. All subscales met the requirements for convergent validity as the AVEs were above .5 (Hair, Black, Babin, & Anderson, 2000). Next, discriminate validity was achieved since all ASV values were smaller than their respective AVEs (Hair et al., 2000). As shown in Table 1.3, the four items retained for each subscale demonstrated acceptable composite reliability (Kline, 2000). A mean score was calculated for each subscale and the intra correlations were calculated to examine the relationships between each subscale (see Table 1.3). The mean scores for the subscales of the IBQ were compared with expected outcomes to confirm that the subscales adequately relate to other pertinent constructs (see Table 1.4). As hypothesized, the relationships were in the expected directions.

Discussion

Overall, the results provide support for a 6-factor, 24-item scale, with four items per subscale, measuring interpersonal need supportive and thwarting behaviours according to the three needs highlighted by SDT. CFA results suggest that the model fits the data well. Additional analyses exploring the structure of other variations of the model (2 factors, 3 factors) provided additional support for the fact that the 6-factor structure provides the best explanation of the data.

The subsequent invariance tests supported that the scale performed equally for both men and women and the internal consistency and correlational analyses suggest that the items within each subscale have strong internal reliability and that the subscales relate to each other as expected. Moreover, outcome comparisons provided additional support for the validity of the scale by demonstrating that they are associated with expected outcomes. The items in each of the subscales represent the many dimensions of their respective constructs, with the exception of AS, which focuses on the two most basic forms of autonomy support: choice and opportunities to make decisions, and RT, which focuses on avoidance behaviours. One reason for this may be that some of the other dimensions of AS, such as providing a rationale or promoting task involvement, overlap with other interpersonal behaviours like competence support. Furthermore, the dimensions of RT that focus on supporting the approach behaviours such as “making someone feel insecure”, might have also overlapped with other dimensions like competence thwarting. Since the purpose of this study, however, was to develop a concise measure of all six interpersonal behaviours according to SDT, while minimizing the overlap of the constructs, this type of outcome is not totally unexpected given the limited number of items per subscale in the final version, and the CFA approach for determining the structure. Overall, the subscales still perform as expected and the results support that the IBQ is measuring six distinct constructs.

Study 2

The objective of Study 2 was to replicate the factor structure, reliability, and outcome correlations from Study 1 with a new sample.

Method

Participants

The sample for Study 2 consisted of 351 full-time undergraduate students ($n_{\text{female}} = 281$,

$n_{\text{male}} = 70$) who were recruited using the same method as Study 1. The students' ages ranged from 18 to 24 ($M = 19.83$ $SD = 1.20$) and similar to Study 1, the majority of students were in the 1st year of their program (65%) and were registered as full-time students (90%). The students were primarily from the social sciences (48%) or the health sciences (35%), while the remaining students came from the arts, natural sciences or engineering. In exchange for their participation, they received credit towards their course grade. Participation was voluntary and participants gave their informed consent before participating.

Materials

The following measures were completed through an online questionnaire.

Interpersonal behaviours. Participants completed the 24-item IBQ scale developed in Study 1, measuring perceived interpersonal behaviours of others in general.

Well-being. Like in the previous study, participants completed the Need Satisfaction Scale (La Guardia et al., 2000), the Satisfaction with Life Scale (Diener et al., 1985), the Positive and Negative Affect subscales from the PANAS-X (Watson, & Clark, 1994), and the Subjective Vitality Scale (Ryan & Frederick, 1997). Confirmatory factor analyses were conducted on the Need Satisfaction Scale ($SBX^2_{(24)} = 128.52$, $p < .001$, CFI = .89, TLI = .85, RMSEA = .08 $CI_{95} [.06, .09]$, SRMR = .06) and PANAS-X ($SBX^2_{(26)} = 38.31$, $p < .001$, CFI = .98, TLI = .97, RMSEA = .05 $CI_{95} [.03, .07]$, SRMR = .04) supported that the data fit the model well for the PANAS-X, but not as well for the Need Satisfaction Scale in this sample. Next, the subscale reliabilities were calculated and results demonstrated that they were strong (Need Satisfaction Scale $\alpha > .80$, Life Satisfaction Scale $\alpha = .88$, Positive and Negative Affect $\alpha > .84$, and Subjective Vitality $\alpha = .89$). Since the Need Satisfaction Scale demonstrated good internal consistency, the scale was used without modification. Finally, a mean score was calculated for

each subscale and was compared with the IBQ.

Results

First, data were cleaned and tested for univariate and multivariate normality. Then, a CFA was conducted on the IBQ to validate its structure and model fit. Invariance testing was also conducted to confirm that there was gender invariance on the scale. Then, the mean scores for each subscale were calculated for the IBQ, along with the other measures used in this study, to confirm the correlational relationships between the IBQ and its related constructs.

Preliminary Analyses

There were 21 participants who did not complete some sections of the questionnaire and were removed from the subsequent analyses. The descriptive statistics analyses for the 24-item IBQ revealed issues with normality (skew range: -6.52 to 10.26; kurtosis range: -2.98 to 5.12). The univariate and multivariate outlier analyses revealed three outlier cases who were removed from the subsequent analyses, reducing the overall sample size to 330.

Scale Structure

The structure of the scale was tested through a CFA using the same methods as Study 1. The results suggested that the model fit the data well ($SBX^2_{(237)} = 367.03$, $p < .001$, CFI = .94, TLI = .93, RMSEA = .04 CI₉₅[.04, .05], SRMR = .04). The standardized factor loadings and standard errors for each item are listed in Table 1.2. The AVEs and the ASVs were examined and supported that the scale met the requirements for both convergent and discriminate validity. Next, the composite reliability estimates were calculated for each subscale (See Table 1.3). Finally, correlation analyses supported the hypothesized relationships between the subscales. Since this sample did not have a sufficiently large sample of men ($n = 66$), invariance tests were not performed in this study (MacCallum, Widaman, Zhang, & Hong, 1999; Meade, 2005).

Alternative Models

Like in Study 1, two additional models were tested to determine whether the six-factor scale still provided the best explanation of the data. First, a 3-factor model was tested where each of the three psychological needs represented a factor, with 8 observed variables each. Overall, the results supported that the variables loaded onto their appropriate constructs; however, the model did not have great fit ($SBX^2_{(249)} = 1198.43$, $p < .001$, CFI = .63, TLI = .56, RMSEA = .11 $CI_{95} [.10, .12]$, SRMR = .12). Next, a 2-factor model where one of the factors represented the supportive interpersonal behaviours and the other represented the thwarting interpersonal behaviours was tested. Again, the indicators all loaded significantly onto their appropriate constructs, but the model did not have an adequate fit ($SBX^2_{(251)} = 478.90$, $p < .001$, CFI = .88, TLI = .87, RMSEA = .06 $CI_{95} [.06, .08]$, SRMR = .06). Overall, these results replicate the findings of Study 1 and support that the 6-factor structure is the best explanation of the data.

Outcome Correlations

All subscales were correlated with the measured outcomes in the expected direction. In Table 1.4, the factors from Study 1 were re-examined to confirm that the same relationships could be replicated in this new sample. The results support that the strength and direction of all relationships were consistent with the results from Study 1.

Discussion

The results of Study 2 provide additional support for the structure and validity of the IBQ as a 6-factor scale. The CFA results suggest that the model fits the data well, and the subsequent analyses (reliability and correlational) indicate that the subscales relate to each other as expected, and the subscales correlate to pertinent outcomes as expected.

Study 3

Since the IBQ was validated as a measure to report on other people's interpersonal behaviours, it is necessary to extend the validity of the measure so that it can be used to report someone's own use of need supportive and need thwarting behaviour. The purpose of Study 3 is to examine the psychometric properties of the IBQ when used as a self-report measure (IBQ-Self). Since the IBQ was first validated with a sample of undergraduate students using a general stem, the IBQ-Self will use a similar sample and a general stem. It is anticipated that the factor structure of this self-report measure will hold and that the need-support subscales will correlate positively with their general need satisfaction and the need-thwarting subscales will correlate positively with their general need dissatisfaction.

Method

Participants

The sample was composed of 607 undergraduate students ($n_{\text{male}} = 438$, $n_{\text{female}} = 169$) with an average age of 20.18 years ($SD = 1.36$; Range = 17 - 24) who were enrolled in first-year courses. The majority of students were in the 1st year of their program (65%) and were registered as full-time students (85%). Like in Study 1 and 2, these students were selected from a research participation pool and received credit towards their final course grade for their participation. Participation in this study involved completing an online questionnaire and the only eligibility criteria was that they had not already participated in Study 1 or 2. The students were informed that their participation was voluntary and they gave their informed consent before starting the study.

Materials

The following measures were completed through an online questionnaire.

My Interpersonal Behaviours. Participants completed the *Interpersonal Behaviours Questionnaire – Self* to assess the extent to which they believed they engaged in specific types of interpersonal behaviours according to SDT with the people in their lives. The participants responded to each item using a 7-point scale, ranging from 1 (*do not agree at all*) to 7 (*completely agree*) indicating the extent to which each statement applied to their own interactions with the people in their social lives using the stem “When I am with the people that are important to me, I...”.

Need Satisfaction and Dissatisfaction. Participants also completed the *Basic Need Satisfaction and Frustration Scale* to assess the extent their three basic psychological needs were met in general (Chen et al., 2015). The scale consists of six subscales measuring participants’ autonomy, competence, and relatedness satisfaction, as well as their autonomy, competence, and relatedness dissatisfaction. Participants used a 7-point scale ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*) to indicate their agreement with each of the statements. A confirmatory factor analysis using Mplus Version 6 (Muthen & Muthen, 2010) was conducted to confirm the underlying structure of the scale and the fit indices suggested that the model had an acceptable fit ($SB\chi^2_{(237)} = 261.43, p < .001$, RMSEA = .03 (95% CI [.02, .03]), SRMR = .03, CFI = .98, TLI = .97). The internal consistency estimates (Cronbach’s alpha) for the three subscales were above the acceptable range ($\alpha > .80$). For the purposes of the present study, a mean score was calculated for each of the six subscales.

Social Desirability. The participants also completed the short form of the *Marlowe-Crowne Social Desirability Scale* (Reynolds, 1982) to control for whether participants were responding to survey items based on providing favorable responses. The short form of this measure consist of 10 items where participants are asked to indicate whether these statements are

true or false for them. The responses that are considered to be socially desirable are given a weight of 1 and then the sum is calculated to provide an overall measure of social desirability.

Analyses

The same procedures were used as Study 1 and 2 in that the data was cleaned and then the scale structure was examined. Finally, outcome correlations were conducted to examine the relationship between psychological needs, while controlling for social desirability.

Results

Descriptive statistics analyses on the 24 IBQ-Self items suggested that the variables did not all have a normal distribution (skewness range: -8.30 to 6.20; kurtosis range: -9.01 to 5.36) like in Study 1 and 2. Again, no adjustments were made since the models were being tested using MLR estimation. Missing data patterns were examined and 39 participants (6%) were missing between 1 and 3 observations on the IBQ-Self questionnaire and since this represented less than 1% of the IBQ-Self data, the missing values were estimated using FIML. Finally, the univariate and multivariate outlier analyses revealed 9 multivariate outliers and these participants were removed from the subsequent analyses. Then, the composite scores were calculated for the students' reported use of interpersonal behaviours (see Table 1.3 for descriptive statistics), as well as for the students' need satisfaction, need dissatisfaction and social desirability (please see Table 1.6 for descriptive statistics).

Scale Structure

The structure of the IBQ-Self was tested through a CFA using the MRL estimator and the results supported that the factorial model had good fit ($SBX^2_{(237)} = 342.83, p < .001$, CFI = .96, TLI = .95, RMSEA = .03 CI₉₅[.03, .04], SRMR = .04). The standardized factor loadings for each subscale were larger than .54 (see Table 1.5) and the factor correlations, as well as the internal

reliabilities for each subscale (cronbach's alpha) are in Table 1.3. As anticipated, the factor correlations were in the expected direction. Across all comparisons, the strongest relationships were between the same need (i.e. autonomy supportive with autonomy thwarting); however, none of these were strong enough to suggest that they were measuring the same construct. This supports that the supportive and thwarting behaviours are distinct, even if they are helping satisfy or dissatisfy the same need.

Like in Study 1, a series of invariance tests were conducted to confirm that the scale structure held for both men ($n = 169$) and women ($n = 429$). First, both groups were tested at the same time without any constraints placed on the parameters and supported that the model had configural invariance ($SBX^2_{(474)} = 646.98, p < .001, CFI = .94, TLI = .93, RMSEA = .04$ CI₉₅[.04, .05], SRMR = .05). Next, a model was tested where the loadings for men and women were constrained to confirm the scale had metric invariance ($SBX^2_{(492)} = 661.94, p < .001, CFI = .94, TLI = .94, RMSEA = .04$ CI₉₅[.03, .05], SRMR = .05). The Satorra-Bentler (SB) scaled chi-square was calculated to compare the models (Muthen & Muthen, 2010), as well the change in CFI, SRMR, and RMSEA to evaluate the differences between the constrained and unconstrained models ($SB\Delta X^2_{(18)} = 14.96, p > .05; \Delta CFI > .01; SRMR < .01; \Delta RMSEA < .015$) and the results support that the differences were not significant. Finally, scalar invariance was established by constraining the intercepts to be equal for both groups ($SBX^2_{(510)} = 682.13, p < .001, CFI = .94, TLI = .94, RMSEA = .04$ (95% CI [.03, .05]), SRMR = .06) and the difference tests suggested the model fit remained stable ($SB\Delta X^2_{(18)} = 20.19, p > .05; \Delta CFI > .01; SRMR < .01; \Delta RMSEA < .015$). These results support that men and women were invariant with regards to the factor structure and that composite variables can be created for both groups.

Finally, the reliabilities were calculated and supported that each subscale had adequate internal consistency (see Table 1.3). The AVEs and ASVs were calculated to confirm that the scale met the thresholds for convergent and divergent validity. Results supported, like in Study 1, that the scale achieved both.

Outcome Correlations

The IBQ-Self subscales were correlated with need satisfaction and need dissatisfaction as predicted (see Table 1.6), while controlling for participants' reported social desirability. Specifically, the need-supportive subscales of the IBQ-Self correlated positively with need satisfaction and negatively with need dissatisfaction. The need-thwarting subscales of the IBQ-Self correlated positively with need dissatisfaction and either negatively or not at all with need satisfaction. Although these relationships were in the same direction as Study 1 and 2, they were slightly weaker. This is not unexpected since SDT postulates that the relationship between psychological needs and someone's reported behaviour should be mediated by their motivation for a particular activity (Deci & Ryan, 2002).

Discussion

The results of Study 3 support that the IBQ can be used as a self-report measure, in addition to a measure of perceptions of others', since the factorial structure of the IBQ-Self demonstrated strong results. Since people do not necessarily behave in the same way across all of their social interactions, it is important to confirm that the IBQ-Self can also be used to assess an individuals' reports of their own behaviours in specific contexts.

General Discussion

In general, the inter-correlations between the IBQ and IBQ-Self subscales, as well as the correlations between these subscales and other related factors provided support for the fit of the

scale within the existing SDT measures and literature. Specifically, we saw moderately high positive and negative correlations between the subscales. Since the three needs are related, these stronger correlations were not unexpected; however, since they were not very high, it supports that the subscales represent different constructs. Furthermore, the subscales correlated with need satisfaction, need dissatisfaction, and well-being indicators, in the directions that would be expected. In some cases, the outcomes had similar correlations with all three need-supportive behaviours and all three need-thwarting behaviours. Again, this is not surprising since previous research in SDT has consistently shown that the three needs are closely related (Sheldon, 2011).

Limitations

Although the results are encouraging, further assessment of the validity of the IBQ and IBQ-Self is necessary. First, the relationship between the IBQ and negative outcomes need to be examined more systematically. Specifically, in Study 1 and 2, the only negative outcome examined was negative affect, and Study 3 looked at need frustration only. The findings of all three studies suggested that thwarting interpersonal behaviours predicted these outcomes; however, in order to better understand how the IBQ relates to negative outcomes for individuals, it is important to examine them in more depth and concurrently with positive outcomes. Next, the validity of the scale should be examined with different populations since it was validated using a university sample. The external validity of the IBQ and IBQ-Self should be assessed with studies aiming to establish perception of interpersonal behaviours as a predictor, and not simply a correlate, of need satisfaction, need dissatisfaction, and motivation. Related to this, the IBQ and IBQ-Self could be used at different points in time to better understand the social circumstances in which an individual's need satisfaction or motivation could change positively or negatively. Finally, since the IBQ and IBQ-Self were validated using self-reports, they should

be triangulated by a third party (e.g., coding of interpersonal behaviours) to confirm that reports correspond to real world behaviours.

Future Directions

The IBQ and IBQ-Self represent important contributions in terms of promoting research in four areas. First, future research should aim to extend the validity of the scale by replicating the six-factor structure within the context of other social relationships (e.g., coaches, teachers,). Next, the new multidimensional scales could be used to assess more precisely the role of all six dimensions in the prediction of need satisfaction, need dissatisfaction, and motivation quality, as well as the outcome. Previous research that has attempted to do so only used one-dimensional measures of interpersonal behaviours (mostly autonomy support versus autonomy thwarting). The IBQ could also be useful for delineating the specific role of each perceived need on the maintenance of autonomous motivation and the integration of behaviours, as well as how the reported use of each type of behaviour is related to motivation. Following this, the IBQ could help determine whether social relationships in all life domains impact psychological need satisfaction, need dissatisfaction, and motivation in the same way. Related to this, a final area would involve examining how perceptions of interpersonal behaviours change throughout shorter periods of time. Reis and colleagues (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000) found that the satisfaction of the basic needs fluctuates on a daily basis. This suggests that the perceptions of interpersonal behaviours could also fluctuate across periods of time.

In sum, the IBQ and IBQ-Self represent new instruments that have the advantage of being versatile and interpretable in different life domains. It is hoped that the IBQ will promote research directed at assessing the behaviour of others, and how it impacts need satisfaction, need dissatisfaction, and motivation.

References

- Assor, A., Vansteenkiste, M., & Kaplan, A. (2009). Identified versus introjected approach and introjected avoidance motivations in school and in sports: The limited benefits of selfworth strivings. *Journal of Educational Psychology, 101*, 482-497. doi: 10.1037/a0014236
- Baldwin, C. & Caldwell, L. (2003). Development of the Free Time Motivation Scale for Adolescents. *Journal of Leisure Research, 35*, 129-151. Retrieved from: <http://www.questia.com/library/journal/1G1-102676827/development-of-the-free-time-motivation-scale-for>.
- Barnes, J., Cote, J., Cudeck, R., & Malthouse, E. (2001). Checking Assumptions of Normality before Conducting Factor Analyses. *Journal of Consumer Psychology, 10*, 79-81. Retrieved from: <http://www.jstor.org.ezproxy.lib.monash.edu.au/stable/pdfplus/1480486.pdf>
- Barrett, P. (2007). Structural equation modelling: Adjudging model fit. *Personality and Individual Differences, 42*(5), 815-824. doi: 10.1016/j.paid.2006.09.018
- Bartholomew, K., Ntoumanis, N., & Thorgenson-Ntoumani, C. (2010). The Controlling Interpersonal Style in a Coaching Context: Development and Initial Validation of a Psychometric Scale. *Journal of Sport & Exercise Psychology, 32*, 193-216. Retrieved from: <http://www.ncbi.nlm.nih.gov/pubmed/20479478>.
- Bartholomew, K., Ntoumanis, N., & Thorgenson-Ntoumani, C. (2009). A review of controlling motivational strategies from a self-determination theory perspective: implications for sports coaches. *International Review of Sport and Exercise Psychology, 2*, 215-233. doi: 10.1080/17509840903235330

- Campbell, R., Vansteenkiste, M., Delesie, L. M., Mariman, A. N., Soenens, B., Tobbach, E., ... & Vogelaers, D. P. (2015). Examining the role of psychological need satisfaction in sleep: A Self-Determination Theory perspective. *Personality and Individual Differences*, 77, 199-204. doi:10.1016/j.paid.2015.01.003
- Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., ... & Ryan, R. M. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion*, 39, 216-236. doi: 10.1007/s11031-014-9450-1
- Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling*, 14, 464–504. doi: 10.1177/0734282911406661
- Chirkov, V. & Ryan, R. (2001). Parent and teacher autonomy-support in Russian and U.S. adolescents: Common effects on well-being and academic motivation. *Journal of Cross-Cultural Psychology*, 32, 618–635. doi: 10.1177/0022022101032005006.
- Chua, S. N., Wong, N., & Koestner, R. (2014). Autonomy and controlling support are two sides of the same coin. *Personality and Individual Differences*, 68, 48-52. doi: 10.1016/j.paid.2014.04.008
- Deci, E. & Ryan, R. (1985). Intrinsic motivation and self-determination in human behaviour. New York: Plenum. In Deci, E. & Ryan, R. (Eds.). *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.
- Deci, E. & Ryan, R. (2002). *Handbook of Self-Determination Research*. Rochester, NY: The University of Rochester Press.
- Deci, E., Schwartz, A., Sheinman, L., & Ryan, R. (1981). An instrument to assess adults' orientations toward control versus autonomy with children: Reflections on intrinsic

- motivation and perceived competence. *Journal of Educational Psychology*, 73, 642-650.
doi: <http://dx.doi.org/10.1037//0022-0663.73.5.642>
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49, 71-75.
doi:http://dx.doi.org/10.1207/s15327752jpa4901_13
- DeFreese, J. & Smith, A. (2014). Athlete Social Support, Negative Social Interactions, and Psychological Health Across a Competitive Sport Season. *Journal of Sport & Exercise Psychology*, 36, 619-630. doi: 10.1123/jsep.2014-0040
- Fong, T. C. T., & Ho, R. T. H. (2013). Factor analyses of the Hospital Anxiety and Depression Scale: a Bayesian structural equation modeling approach. *Quality of Life Research*, 22(10), 2857-2863. doi: 10.1007/s11136-013-0429-2
- Gaudreau, P. & Blondin, J. (2002). Development of a questionnaire for the assessment of coping strategies employed by athletes in competitive sport settings. *Psychology of Sport and Exercise*, 3, 1-34. doi: 10.1016/S1469-0292(01)00017-6.
- Grolnick, W. S., & Ryan, R. M. (1989). Parent styles associated with children's self-regulation and competence in schools. *Journal of Educational Psychology*, 81, 143-154. doi: 10.1037/0022-0663.81.2.143.
- Haerens, L., Aelterman, N., Van den Berghe, L., De Meyer, J., Soenens, B., & Vansteenkiste, M. (2013). Observing physical education teachers' need-supportive interactions in classroom settings. *Journal of Sport and Exercise Psychology*, 3-17. Retrieved from:
<http://journals.humankinetics.com/jsep-back-issues/jsep-volume-35-issue-1-february/observing-physical-education-teachersrsquo-need-supportive-interactions-in-classroom-settings>

- Hair, J., Black, W., Babin, B., and Anderson, R. (2010). *Multivariate data analysis* (7th ed.): Prentice-Hall, Inc. Upper Saddle River, NJ, USA.
- Hooper, D., Coughlan, J. and Mullen, M. R. (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *The Electronic Journal of Business Research Methods*, 6, 53-60. Retrieved from: www.ejbrm.com/issue/download.html?idArticle=183.
- Hu, L. & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55. doi: 10.1080/10705519909540118.
- Hurley, A., Scandura, T., Schriesheim, C., Brannick, M., Seers, A., Vandenberg, R., & Williams, L. (1997). Exploratory and confirmatory factor analysis: Guidelines, issues, and alternatives. *Journal of organizational behaviour*, 18, 667-683. doi: 10.1348/0963179041752727
- Joesaar, H., Hein, V., & Hagger, M. (2011). Peer influence on youth athletes' need satisfaction, intrinsic motivation, and persistence in sport: A 12-month prospective study. *Psychology of Sport and Exercise*, 12, 500 – 508. doi: 10.1016/j.psychsport.2011.04.005
- Jones, R., Armour, K. & Potrac, P. (2004). *Sports Coaching Cultures: From Practice to Theory*. Routledge, London, 2004.
- Kline, P. (2000). *The handbook of psychological testing* (2nd ed.). London: Routledge.
- La Guardia, J., Ryan, R., Couchman, C., & Deci, E. (2000). Within-Person Variation in Security of Attachment : A Self-Determination Theory Persepctive on Attachment, Need Fulfillment, and Well-Being. *Journal of Personality and Social Psychology*, 79, 367-384. doi: 10.1037/0022-3514.79.3.367.

Mageau, G. A., Ranger, F., Joussemet, M., Koestner, R., Moreau, E., & Forest, J. (2015).

Validation of the Perceived Parental Autonomy Support Scale (P-PASS). *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement*, 47, 251-262. doi: 10.1037/a0039325

Mageau, G. & Vallerand, R. (2003). The coach-athlete relationship: a motivational model.

Journal of Sports Sciences, 21, 883-904. doi: <http://dx.doi.org/10.1080/0264041031000140374>

MacCallum, R., Widaman, K., Zhang, S., & Hong, S. (1999). Sample size in factor analysis.

Psychological Methods, 4, 84- 99. doi: 10.1037/1082-989X.4.1.84

Meade, A. W. (2005, April). *Sample Size and Tests of Measurement Invariance*. Paper presented

at the 20th Annual Conference of the Society for Industrial and Organizational

Psychology, Los Angeles, CA.

Milyavskaya, M., & Koestner, R. (2011). Psychological needs, motivation, and well-being: A

test of self-determination theory across multiple domains. *Personality and Individual Differences*, 50, 387-391. doi: 10.1016/j.paid.2010.10.029

Moreau, E. & Mageau, G. (2013). Consequences and correlates of autonomy support in various

life domains. *Psychologie française*, 58, 195-227. doi:

<http://dx.doi.org/10.1016/j.psfr.2013.03.003>

Mouratidis, A. A., Vansteenkiste, M., Sideridis, G., & Lens, W. (2011). Vitality and interest-

enjoyment as a function of class-to-class variation in need-supportive teaching and

pupils' autonomous motivation. *Journal of Educational Psychology*, 103, 353-366. doi :

10.1037/a0022773.

- Mullan, E., Markland, D., & Ingledew, D. K. (1997). A graded conceptualisation of self-determination in the regulation of exercise behaviour: Development of a measure using confirmatory factor analytic procedures. *Personality and Individual Differences*, 23(5), 745-752. doi:10.1016/S0191-8869(97)00107-4
- Muthen, L. K., & Muthen, B. O. (2010). Mplus user's guide: Statistical analysis with latent variables (6th ed.). Los Angeles, CA: Authors.
- Pomerantz, E. Cheung, C., & Qin, L. (2012). Relatedness Between Children and Parents: Implications for Motivation. In Ryan, R. (Ed.), (2012). *The Oxford Handbook of Motivation* (pp. 335-349). New York: Oxford University Press.
- Reynolds, W. (1982). Development of reliable and valid short forms of the Marlowe-Crowne Social Desirability Scale. *Journal of clinical psychology*, 38, 119-125. doi: 10.1002/1097-4679
- Reis, H., Sheldon, K., Gable, S., Roscoe, J., & Ryan, R. (2000). Daily well-being: the role of autonomy, competence and relatedness. *Personality and Social Psychology Bulletin*, 26, 419-435. doi: 10.1177/0146167200266002.
- Ryan, R. M., & Frederick, C. M. (1997). On energy, personality, and health: subjective vitality as a dynamic reflection of well-being. *Journal of Personality*, 65, 529-565. <http://dx.doi.org/10.1111/j.1467-6494.1997.tb00326.x>.
- Scientific Software International. (2011). IRTPRO Version 1.2. Retrieved from <http://www.ssicentral.com/irt/downloads.html>
- Sheldon, K. M. (2011). Integrating behavioural-motive and experiential-requirement perspectives on psychological needs: A two process model. *Psychological Review*, 118, 552-569. doi: 10.1037/a0024758.

- Sheldon, K. & Filak, V. (2008). Manipulating autonomy, competence, and relatedness support in a game-learning context: New evidence that all three needs matter. *British Journal of Social Psychology*, 47, 257-283. doi: 10.1348/014466607X238797.
- Standage, M., Sebire, S. J., & Loney, T. (2008). Does exercise motivation predict engagement in objectively assessed bouts of moderate-intensity exercise behavior? A self-determination theory perspective. *Journal of Sport & Exercise Psychology*, 30, 337-352.
- Soenens, B., Luyckx, K., Vansteenkiste, M., Luyten, P., Duriez, B., & Goossens, L. (2008). Maladaptive perfectionism as an intervening variable between psychological control and adolescent depressive symptoms: A three-wave longitudinal study. *Journal of Family Psychology*, 22, 465-474. doi: 10.1037/0893-3200.22.3.465
- Van den Berghe, L., Soenens, B., Vansteenkiste, M., Aelterman, N., Cardon, G., Tallir, I. B., & Haerens, L. (2013). Observed need-supportive and need-thwarting teaching behaviour in physical education: Do teachers' motivational orientations matter? *Psychology of Sport and Exercise*, 14, 650-661. doi: 10.1016/j.psychsport.2013.04.006
- Watson, D., & Clark, L. A. (1994). *The PANAS-X: Manual for the Positive and Negative Affect Schedule-Expanded Form*. Ames: The University of Iowa. doi: <http://dx.doi.org/10.13072/midss.438>
- Wilson P. M., Gregson J. P., Mack D. E. (2009). *The importance of interpersonal style in competitive sport: a self-determination theory approach*, in Handbook of Sport Psychology, ed Chang C. H., editor. (Hauppauge, NY: Nova Science), 259–276.
- Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, 23(3), 263. doi: <http://dx.doi.org/10.1037/a0032359>

Yli-Piipari, S., Watt, A., Jaakkola, T., Liukkonen, J., & Nurmi, J. (2009). Relationships between physical education students' motivational profiles, enjoyment, state anxiety, and self-reported physical activity. *Journal of sports science & medicine*, 8, 327. Retrieved from: <http://www.jssm.org/research.php?id=jssm-08-327.xml>

Table 1.1

Study 1: CFA results.

Subscales	SBX^2	$d.f.$	p	CFI	TLI	SRMR	RMSEA (CI ₉₅)
Round 1							
Autonomy Support (AS)							
Initial (9)	40.22	27	.000	.965	.953	.035	.045 (.028, .061)
Final (5)	7.56	9	.213	.995	.991	.019	.025 (.000, .058)
Autonomy Thwarting (AT)							
Initial (10)	65.56	45	.000	.948	.933	.037	.051 (.037, .065)
Final (5)	5.92	5	.195	.995	.990	.017	.030 (.000, .072)
Competence Support (CS)							
Initial (7)	21.67	14	.016	.980	.969	.026	.043 (.018, .066)
Final (5)	10.68	5	.056	.982	.964	.021	.053 (.016, .091)
Competence Thwarting (CT)							
Initial (10)	58.81	35	.000	.964	.953	.031	.049 (.035, .063)
Final (8)	19.22	20	.129	.991	.987	.022	.026 (.000, .048)
Relatedness Support (RS)							
Initial (6)	34.41	9	.000	.937	.921	.023	.075 (.051, .100)
Final (4)	1.78	2	.381	1.01	1.00	.009	.000 (.000, .085)
Relatedness Thwarting (RT)							
Initial (8)	23.14	20	.017	.983	.976	.026	.038 (.016, .058)
Final (6)	9.93	9	.095	.990	.983	.020	.035 (.000, .065)
Round 3							
Need Support	53.43	51	.010	.982	.977	.030	.031 (.016, .045)
Need Thwart	50.25	51	.082	.990	.987	.029	.023 (.000, .038)
Round 4							
Full Model	266.51	237	.001	.973	.969	.036	.028 (.021, .035)

Note. SBX^2 = SB Chi-square. $d.f.$ = degrees of freedom. p = probability. CFI = comparative fit index. TLI = Tucker-Lewis Index. $SRMR$ = Root Mean Square Residual. $RMSEA$ = Root Mean Square Error of Approximation. Round 1: () = number of items in model for round 1. Initial = the model with all items. Final = the model with the problematic items removed. Since 15 models were tested in round 2, they are not included in the table. All 15 models had acceptable fit, ranging from ($SBX^2_{(19)} = 53.20$, $p = .001$, $CFI = .963$, $TLI = .947$, $RMSEA = .054$ CI₉₅[.038, .071], $SRMR = .040$) to ($SBX^2_{(19)} = 15.20$, $p = .680$, $CFI = 1.00$, $TLI = 1.00$, $RMSEA = .000$ CI₉₅[.000, .030], $SRMR = .016$).

Table 1.2

Items	<i>Study 1</i>		<i>Study 2</i>	
	<i>FL</i>	<i>SE</i>	<i>FL</i>	<i>SE</i>
<i>STEM: The people in my life...</i>				
Autonomy Support (AS)				
Give me the freedom to make my own choices.	.673	.038	.681	.042
Support my decisions.	.741	.041	.739	.035
Support the choices that I make for myself.	.745	.030	.745	.039
Encourage me to make my own decisions.	.692	.034	.689	.041
Autonomy Thwarting (AT)				
Pressure me to do things their way.	.763	.032	.788	.034
Impose their opinions on me.	.580	.036	.680	.038
Pressure me to adopt certain behaviours.	.683	.035	.774	.026
Limit my choices.	.691	.043	.721	.040
Competence Support (CS)				
Encourage me to improve my skills.	.578	.035	.612	.051
Provide valuable feedback.	.659	.031	.768	.043
Acknowledge my ability to achieve my goals	.712	.039	.719	.050
Tell me that I can accomplish things.	.668	.044	.768	.039
Competence Thwarting (CT)				
Point out that I will likely fail.	.698	.039	.713	.053
Send me the message that I am incompetent.	.643	.034	.707	.050
Doubt my capacity to improve.	.722	.040	.713	.041
Question my ability to overcome challenges.	.649	.037	.680	.040
Relatedness Support (RS)				
Are interested in what I do.	.654	.035	.682	.052
Take the time to get to know me.	.727	.042	.758	.036
Honestly enjoy spending time with me.	.746	.033	.729	.035
Relate to me.	.653	.036	.687	.044
Relatedness Thwarting (RT)				
Do not comfort me when I am feeling low.	.747	.033	.688	.028
Are distant when we spend time together.	.655	.039	.614	.037
Do not connect with me.	.758	.035	.716	.036
Do not care about me.	.640	.033	.759	.044

Note. Study 1, $n = 534$. Study 2, $n = 330$.

Table 1.3

Study 1, 2 and 3: Subscale correlations, means, standard deviations, and composite reliability.

<i>Subscales</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>M</i>	<i>SD</i>	<i>R</i>
Study 1									
1. Autonomy Support (AS)							5.70	0.87	.98
2. Autonomy Thwarting (AT)	-.50**						2.92	1.20	.97
3. Competence Support (CS)	.68**	-.38**					5.61	0.84	.97
4. Competence Thwarting (CT)	-.54**	.59**	-.51**				2.12	1.01	.98
5. Relatedness Support (RS)	.62**	-.38**	.69**	-.49**			5.51	0.94	.98
6. Relatedness Thwarting (RT)	-.54**	.53**	-.56**	.62**	-.70**		2.12	1.04	.98
Study 2									
1. Autonomy Support (AS)							5.40	1.04	.97
2. Autonomy Thwarting (AT)	-.56**						2.89	1.34	.98
3. Competence Support (CS)	.75**	-.38**					5.38	1.00	.97
4. Competence Thwarting (CT)	-.50**	.69**	-.49**				2.31	1.21	.98
5. Relatedness Support (RS)	.74**	-.42**	.76**	-.45**			5.21	1.10	.98
6. Relatedness Thwarting (RT)	-.51**	.67**	-.53**	.78**	-.61**		2.37	1.28	.97
Study 3									
1. Autonomy Support (AS)							5.64	0.89	.98
2. Autonomy Thwarting (AT)	-.35**						2.65	1.24	.98
3. Competence Support (CS)	.67**	-.18**					5.49	0.92	.97
4. Competence Thwarting (CT)	-.40**	.64**	-.26**				2.38	1.23	.98
5. Relatedness Support (RS)	.63**	-.22**	.67**	-.34**			5.52	0.97	.98
6. Relatedness Thwarting (RT)	-.37**	.61**	-.36**	.70**	-.46**		2.34	1.20	.93

Note. Study 1, $n = 534$. Study 2, $n = 330$, Study 3, $n = 598$. ** = $p < .001$. R = composite reliability.

Table 1.4

Study 1 and 2: Descriptive Statistics and Correlations with Outcome Variables.

<i>Subscales</i>	<i>Need Satisfaction</i>			<i>Well-Being</i>			
	<i>NS (AU)</i>	<i>NS (CO)</i>	<i>NS (RE)</i>	<i>PA</i>	<i>NA</i>	<i>LS</i>	<i>VIT</i>
Study 1							
Autonomy Support (AS)	.53**	.38**	.45**	.47**	-.30**	.44**	.40**
Autonomy Thwarting (AT)	-.47**	-.34**	-.37**	-.31**	.41**	-.33**	-.37**
Competence Support (CS)	.42**	.32**	.50**	.45**	-.31**	.40**	.39**
Competence Thwarting (CT)	-.49**	-.38**	-.41**	-.38**	.42**	-.38**	-.37**
Relatedness Support (RS)	.46**	.43**	.59**	.54**	-.41**	.45**	.45**
Relatedness Thwarting (RT)	-.46**	-.39**	-.58**	-.46**	.45**	-.40**	-.46**
<i>Mean</i>	5.17	5.18	5.02	5.15	3.40	4.77	4.50
<i>Standard Deviation</i>	1.14	1.20	1.13	1.02	1.15	1.33	1.16
Study 2							
Autonomy Support (AS)	.57**	.44**	.54**	.41**	-.25**	.43**	.38**
Autonomy Thwarting (AT)	-.51**	-.37**	-.42**	-.22**	.39**	-.25*	-.26**
Competence Support (CS)	.48*	.40**	.57**	.42**	-.21**	.37**	.36**
Competence Thwarting (CT)	-.50**	-.40**	-.48**	-.27**	.35**	-.27**	-.28**
Relatedness Support (RS)	.58**	.53**	.69**	.53**	-.32**	.53**	.47**
Relatedness Thwarting (RT)	-.51**	-.45**	-.64**	-.33**	.41**	-.34**	-.34**
<i>Mean</i>	4.90	4.87	5.06	4.94	3.65	4.29	4.49
<i>Standard Deviation</i>	1.17	1.25	1.16	1.03	1.13	1.08	1.29

Note. Study 1, $n = 534$. Study 2, $n = 330$. * = $p < .05$. ** = $p < .001$. NS = Need Satisfaction, AU = Autonomy subscale, CO = Competence subscale, RE = Relatedness subscale, PA = Positive Affect, NA = Negative Affect, LS = Life Satisfaction, VIT = Vitality

Table 1.5

Study 3: Final items with standardized factor loadings (FL) and standard errors (SE).

Items	<i>Study 4</i>	
	<i>FL</i>	<i>SE</i>
<i>STEM: When I am with people who are important to me, I...</i>		
Autonomy Support (AS)		
Give them the freedom to make their own choices.	.717	.032
Support their decisions.	.762	.028
Support the choices that they make for themselves.	.723	.033
Encourage them to make their own decisions.	.653	.045
Autonomy Thwarting (AT)		
Pressure them to do things my way.	.794	.024
Impose my opinions on them.	.609	.032
Pressure them to adopt certain behaviours.	.745	.030
Limit their choices.	.786	.031
Competence Support (CS)		
Encourage them to improve their skills.	.625	.039
Provide valuable feedback.	.544	.042
Acknowledge their ability to achieve their goals	.715	.038
Tell them that they can accomplish things.	.724	.035
Competence Thwarting (CT)		
Point out that they will likely fail.	.808	.025
Send them the message that they are incompetent.	.751	.035
Doubt their capacity to improve.	.732	.030
Question their ability to overcome challenges.	.656	.035
Relatedness Support (RS)		
Am interested in what they do.	.695	.038
Take the time to get to know them.	.707	.030
Honestly enjoy spending time with them.	.723	.030
Relate to them.	.635	.037
Relatedness Thwarting (RT)		
Do not comfort them when they are feeling low.	.741	.036
Am distant when we spend time together.	.653	.034
Do not connect with them.	.684	.033
Do not care about them.	.832	.023

Note. $n = 598$.

Table 1.6

Study 3: Descriptive Statistics and Correlations with Outcome Variables for the IBQ-Self.

<i>IBQ Subscales</i>	<i>Need Satisfaction</i>			<i>Need Dissatisfaction</i>		
	<i>Aut</i>	<i>Comp</i>	<i>Rel</i>	<i>Aut</i>	<i>Comp</i>	<i>Rel</i>
Study 4						
Autonomy Support (AS)	.39**	.33**	.46**	-.18**	-.16**	-.29**
Autonomy Thwarting (AT)	-.05	-.06	-.18**	.35**	.29**	.42**
Competence Support (CS)	.47*	.43**	.50**	-.18**	-.19**	-.31**
Competence Thwarting (CT)	-.13**	-.12**	-.29**	.34**	.29**	.50**
Relatedness Support (RS)	.42**	.38**	.58**	-.20**	-.21**	-.37**
Relatedness Thwarting (RT)	-.20**	-.22**	-.39**	.37**	.35**	.57**
<i>Mean</i>	4.99	5.09	5.47	3.64	3.69	2.80
<i>Standard Deviation</i>	1.13	1.18	1.20	1.36	1.44	1.38

Note. Study 3 $n = 598$. * = $p < .05$. ** = $p < .001$. Correlations are while controlling for social desirability. Need satisfaction and dissatisfaction is in relation to life in general.

CHAPTER THREE**THE VALIDITY OF THE INTERPERSONAL BEHAVIOURS QUESTIONNAIRE (IBQ)
IN SPORT**

Authors: Meredith Rocchi, Luc Pelletier, and Phillip Desmarais

Abstract

According to Self-Determination Theory (SDT), basic psychological needs will be influenced by other individuals' interpersonal behaviours. The objective of the present research is to extend the validity of the Interpersonal Behaviours Questionnaire (IBQ and IBQ-Self) to the sport context. The measure was designed to assess perceptions of interpersonal behaviours of others (IBQ) or self-reports of interpersonal behaviours (IBQ-Self) in the context of SDT. This measure consists of 24 items and 6 subscales looking at autonomy-supportive, autonomy-thwarting (controlling), competence-supportive, competence-thwarting, relatedness-supportive, and relatedness-thwarting interpersonal behaviours. In Study 1, athletes were asked to report on their perceptions of their coaches' interpersonal behaviours (IBQ). In Study 2, coaches were asked to report on their interpersonal behaviours when they coach their athletes (IBQ-Self). The results supported that the scale had a strong factor structure, internal consistency, and validity. Overall, the results supported the IBQ and IBQ-Self are valid measures of interpersonal behaviours in sport.

Keywords: self-determination theory, interpersonal behaviour, sport, athlete, development

The Validity of the Interpersonal Behaviors Questionnaire (IBQ) in Sport

Over the years, sport research has moved beyond simply examining athletes' performances and has shifted focus to the psychological factors that determine whether athletes have a successful or unsuccessful experience in sport (e.g., Vallerand, 2001). One aspect of athletes' psychological experiences that have received a lot of empirical attention is their motivation for participating in their sport. Self-determination Theory (SDT; Deci & Ryan, 1985) is a leading motivation theory that has helped guide a significant amount of research in sport and has helped explain how the sport context and athletes' psychological experiences interact and influence the reasons athletes participate in sport and enjoy what they do (Hagger & Chatzisarantis, 2007).

SDT posits that coaches' interpersonal behaviour styles play an essential role in determining athletes' experiences in sport through the extent to which these behaviours either support or thwart their athletes' psychological needs (Deci & Ryan, 1985). As such, research has begun to examine athletes' perceptions of these behaviours (Mageau & Vallerand, 2003), as well as the factors that influence coaches' reported interpersonal behaviours when they coach (Rocchi, Pelletier, & Couture, 2013). One important limitation to this research is that there is currently no valid measure of perceptions of interpersonal behaviours, or self-reports of interpersonal behaviours, for all six interpersonal behaviour styles identified by SDT. Therefore, the objective of the present studies is to extend the validity of the Interpersonal Behaviours Questionnaire (IBQ; Rocchi, Pelletier, Cheung, Baxter, & Beaudry, 2016) to the sport context.

Self Determination Theory and Sport

According to SDT, motivation orientations for sport differ in their quality, based on the degree to which the reasons for practicing sport have been internalized and integrated into an

individual's sense of self. Previous research has supported that when the reasons for practicing their sport are more internalized, an individual experiences autonomous motivation where they participate because they value and/or enjoy it and this is shown to result in positive outcomes for athletes such as greater interest in sport, better concentration, more enjoyment, increased sport satisfaction, and improved competitive results (Mageau & Vallerand, 2003). When the reasons for practicing sport are less internalized, they experience controlled motivation towards their sport and participate because of external or internal pressures, which has been shown to lead to more negative outcomes like burnout, sport anxiety or dropout (Li, Wang, Pyun, & Kee, 2013).

In order to encourage this process of internalization, an individual requires the support and satisfaction of the three basic psychological needs (autonomy, competence, and relatedness) (Deci & Ryan, 2002). In sport, the need for autonomy represents the need for individuals to act in line with their own interests and values while practicing their sport. Competence requires opportunities for athletes to increase the level of challenge in their sport and to develop increased skill mastery. Finally, the need for relatedness refers to needing a supportive network and strong interpersonal connections with other people involved in sport (Vallerand, 2001). Research has shown that when these psychological needs are satisfied for athletes, it leads to an increase in sport motivation quality and they experience positive outcomes in sport; while, when these needs are frustrated, it leads to a decrease in sport motivation quality and promotes negative outcomes (i.e., Gould, Dieffenbach, & Moffett, 2002).

The sport context has an impact on the extent to which athletes' psychological needs are satisfied or frustrated (Deci, Shwartz, Sheinman, & Ryan, 1981). The context includes both the structure of the sport (i.e., level of competition), as well as the people within it (i.e., coaches). Focusing on the people only, SDT postulates that other people's behaviour either positively or

negatively influences athlete need satisfaction and frustration. Specifically, when people in the sport context engage in need-supportive interpersonal behaviours, it will promote the satisfaction of the basic psychological needs for athletes (Deci & Ryan, 1985). Alternatively, when people engage in (or are perceived to engage in) need-thwarting interpersonal behaviours, athletes will experience need frustration (Sheldon & Filak, 2008). As a result, depending on whether individuals within the sport context act in ways that support or thwart athletes' psychological needs, they can act to promote or undermine the quality of motivation of athletes.

Need Supportive and Need Thwarting Interpersonal Behaviours

SDT postulates that there are six different types of interpersonal behaviours: autonomy-supportive (AS), competence-supportive (CS), relatedness-supportive (RS), autonomy-thwarting (AT; also called controlling), competence-thwarting (CT), and relatedness-thwarting (RT) (e.g., Williams, Whip, Jackson, & Dimmok, 2013). Looking at the need-supportive behaviours first, AS behaviours include providing athletes with rationale, a choice, and acknowledging their perspectives (Mageau et al., 2015). CS behaviours include acknowledging athletes' improvements, believing they are capable of achieving their goals and success, and providing athletes with positive feedback (Sheldon & Filak, 2008). Lastly, RS behaviours include being warm with athletes, having an interest in their activities, showing a genuine liking for them, and providing them with support and care (Jones, Armour, & Potrac, 2004). As for the need-thwarting behaviours, AT behaviours include using intimidating language with athletes, making demands, and incorporating rewards (Bartholomew, Ntoumanis, & Thorgenson-Ntoumani, 2009). CT behaviours consist of discouraging athletes from trying difficult tasks, sending them the message that they are incompetent, doubting their capacity to improve within their sport, and emphasizing their faults (Sheldon & Filak, 2008). Finally, RT behaviours include being distant

with athletes, not listening to them, not being available, and excluding them from activities or opportunities (Sheldon & Filak, 2008).

Limitations of the Existing Research

Although significant research has been conducted to explore the role of interpersonal behaviours in understanding sport outcomes for athletes, there are some limitations. First, SDT stipulates that supporting all three psychological needs, beyond just autonomy, should lead to an increase in need satisfaction in athletes, and a subsequent increase in athletes' autonomous motivation for sport and other outcomes (e.g., Pomerantz, Cheung, & Qin, 2012). To date, however, most research has focused on autonomy exclusively (e.g., Moreau & Mageau, 2013) and only one study has examined the relationship between athletes' perceptions of their coaches' AS, CS, and RS interpersonal behaviours concurrently (Amorose & Anderson-Butcher, 2007). Related to this first limitation, it is also essential to measure both supportive and thwarting behaviours concurrently since the absence of supportive behaviours cannot automatically imply the presence of thwarting behaviour (Sheldon, 2011). When considering the role of need-thwarting behaviours in sport, recent research has begun exploring the influence of athletes' perceptions of AT behaviours (Bartholomew, Ntoumanis, Ryan, Bosch, & Thogersen Ntoumani, 2011); however, similar to the need-supportive behaviours, the role of autonomy has received most of the empirical attention so far. Overall, no studies have explored how a coach's use of all six types of interpersonal behaviours influence athletes' need satisfaction and frustration in sport.

Next, looking at coaches, research in coaching should focus on examining the factors that predict coaches' use of all three types of need-supportive and need-thwarting behaviours (i.e. all six interpersonal behaviours). No studies to date have examined the factors that predict coaches' AS behaviours, as well as CS and RS behaviours (e.g., Taylor, Ntoumanis, & Standage, 2008;

Pelletier, Séguin-Lévesque, & Legault, 2002). Additionally, since coaches may simultaneously engage in need-thwarting behaviours and the absence of need-support does not necessarily mean the coach is using need-thwarting styles (Sheldon & Filak, 2008), coaching research should also examine the factors that predict all three types of need-thwarting behaviour (Bartholomew, Ntoumanis, & Thogersen-Ntoumani, 2010). Again, similar to need-supportive behaviours, AT behaviours have received the most attention (Stebbing, Taylor, Spray, & Ntoumanis, 2012) and research also needs to examine the antecedents of CT and RT interpersonal behaviour in coaches.

One reason for these limitations in the existing research is that there is currently no validated measure available for examining perceptions or self-reports of all six types of interpersonal behaviours according to SDT in the sport context. There are existing measures that look at athletes' perceptions of some dimensions like AS (i.e., Conroy & Coatsworth, 2007) or AS, AT, and RS (Smith et al., 2015) or coaches' self-reports of some dimensions like AS, AT, and RS (Smith et al., 2016). There are, however, no measures assessing CS, CT, or RT behaviours and also no measures focusing on athletes' perceptions of all six need-supportive and need-thwarting interpersonal behaviours, or coaches' self-reports of their use of all six types of behaviours while coaching concurrently. Outside of sport, there is one measure, the IBQ (Rocchi et al., 2016), that has been validated as both a measure of perceptions of others' interpersonal behaviours (IBQ), and as a self-report of an individual's own behaviours (IBQ-Self), for all six types of interpersonal behaviours according to SDT. In order to address the limitations related to the lack of research in sport motivation, there is a need to develop and validate an instrument designed to assess both perceptions and self-reports, of all six types of need-supportive and need-thwarting interpersonal behaviours in the sport context.

Present Research

The purpose of the present studies is to validate the IBQ and IBQ-Self (Rocchi et al., 2016) in a sport setting. The original scale consists of 24 items, measuring six subscales that represent AS, AT, CS, CT, RS, and RT interpersonal behaviours. The structure of the scale was determined through three studies using undergraduate students. The purpose was to create a scale measuring perceptions of others' interpersonal behaviours, as well as a self-report of one's own behaviour, that could be used across multiple contexts. As such, the items were developed by a pool of experts with advanced knowledge of SDT, using a general stem ("The people in my life" – IBQ; "When I am with the people that are important to me, I" – IBQ Self) to ensure they were not bound to a specific interpersonal relationship or context. In Study 1 ($n = 572$), the structure of the IBQ was determined through a series of confirmatory factor analyses and the results supported that the scale had a strong factor structure, good internal consistency, strong convergent and divergent validity, and that the subscales correlated with other outcomes, as would be expected according to SDT. The results also supported that perceptions of need-supportive interpersonal behaviours were related to increases in reported general autonomy, competence, and relatedness satisfaction; while perceptions of need-thwarting interpersonal behaviours were related to decreases in the general satisfaction of all three needs. These results were replicated in Study 2 ($n = 372$) with a new sample, providing additional support for the validity of the IBQ. In Study 3 ($n = 736$), the factor structure of the IBQ-Self was tested and demonstrated that it also a strong structure, good internal consistency, acceptable validity and reliability, and that the subscales correlated with outcomes as would be expected. For the IBQ-Self, it was found that when individuals reported that they engaged in need-supportive behaviours, this was also associated with increased general need

satisfaction and decreased need frustration; while individuals who reported increased need-thwarting behaviours saw the opposite.

Since the items were developed with the intention to make the scale applicable to multiple social contexts and social relationships (i.e., education, workplace, sport, etc.), the objective of the present studies is to validate the scale as a measure of perceptions of interpersonal behaviours (IBQ), as well as a self-report of interpersonal behaviours (IBQ-Self) in sport. In Study 1, the IBQ will be validated with a sample of athletes, reporting on their perceptions of their coaches' interpersonal behaviours. In Study 2, the IBQ-Self will be validated with a sample of coaches, reporting on their own interpersonal behaviours in their interactions with their athletes. For both studies, the factor structure, validity, reliability, and correlations with outcomes will be examined. Overall, it is anticipated that these studies will extend the validity of both the IBQ and the IBQ-Self, and will demonstrate a strong fit in sport.

Study 1

The objective of this study was to extend the validity of the IBQ by confirming that the scale structure held in a sport context. Specifically, this study will explore whether the IBQ is an appropriate measure for assessing athletes' perceptions of their coaches' interpersonal behaviours. It is hypothesized that the structure of the scale will remain consistent and that the subscales will relate to the outcomes in the same ways as the original validation studies (Rocchi et al., 2016) for athletes when they report on their coaches' behaviours.

Method

Participants

The sample was composed of 239 full-time undergraduate student-athletes ($n_{\text{male}} = 130$, $n_{\text{female}} = 109$), with an average age of 20.15 years ($SD = 3.16$), who were enrolled in first-year

courses. These students had been competing in their sport for an average of 4.37 ($SD = 3.45$) years, had been working with their current coach for an average of 2.59 years ($SD = 3.08$), and trained an average of 8.67 hours per week ($SD = 3.28$) with them. The majority of the athletes played hockey ($n = 48$, 16%), soccer ($n = 39$, 13%), basketball ($n = 15$, 5%), volleyball ($n = 16$, 5%), or cross country running ($n = 12$, 4%). The remaining athletes ($n = 109$, 47%) came from a variety of sport backgrounds including: badminton, baseball, boxing, equestrianism, figure skating, football, golf, road cycling, rowing, rugby, swimming, tennis, and weightlifting.

Procedures

The athletes were selected from a research participation pool and received credit towards their final course grade for their participation and participated in an online survey about their sport experience. Participation was voluntary and participants gave their informed consent before beginning the study. To be eligible for this study, the participants had to be actively training in their sport at the time of data collection and have been working with their current coach for at least 1 year.

Materials

The following measures were completed through an online questionnaire.

Coach Interpersonal Behaviours. Participants completed the 24-item IBQ scale, measuring perceived interpersonal behaviours of their coach, using the stem “My coach...” (Rocchi et al., 2016). The athletes indicated their agreement with each statement, using a 7-point scale ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*). The scale consists of six subscales, assessing coaches’ use of AS, AT, CS, CT, RS, and RT interpersonal behaviours in their interactions. The original validation studies supported that the scale had sufficient internal reliability ($\alpha > .74$).

Need Satisfaction. Participants responded to the positive items from the *Basic Need Satisfaction at Work Scale* (Deci et al., 2001) to assess the extent their three basic psychological needs were met while practicing their sport. The scale consists of three subscales measuring participants' autonomy (3 items), competence (3 items), and relatedness satisfaction (4 items). A confirmatory factor analysis using Mplus Version 6 (Muthen & Muthen, 2010; this software was used for all analyses) was conducted on the scale to confirm the structure. The fit indices suggest that the model has an acceptable fit (Satorra-Bentler (SB) scaled $\chi^2_{(41)} = 64.50, p < .001$, RMSEA = .06 (95% CI [.04, .08]), SRMR = .05, CFI = .94, TLI = .92). The internal consistency estimates for the three subscales were within acceptable range (autonomy $\alpha = .72$; competence $\alpha = .70$; relatedness $\alpha = .83$), and a mean score was calculated for each subscale.

Need Frustration. To assess psychological need frustration in sport, participants also completed the *Psychological Need Thwarting Scale in Sport* (Bartholomew et al., 2010). The scale also consists of three subscales measuring participants' autonomy, competence, and relatedness frustration, with 4 items each. A confirmatory factor analysis was conducted to confirm the structure and the results supported that the model had an excellent fit (SB $\chi^2_{(32)} = 22.68, p < .001$, RMSEA = .00 (95% CI [.00, .05]), SRMR = .03, CFI = 1.00, TLI = 1.00). The internal consistency for the three subscales were within acceptable range ($\alpha > .76$), and a mean score was calculated for each subscale to represent participants' frustration of each need.

Athlete Motivation. Participants also completed the *Revised Sport Motivation Scale* (Pelletier, Rocchi, Vallerand, Deci, & Ryan, 2013) to assess their reasons for participating in sport. The six-factor scale is comprised of 18 items (3 per subscale) measuring sport motivation according to each of the six types of behavioural regulation, according to SDT. A confirmatory factor analysis supported that the model had a good fit (SB $\chi^2_{(120)} = 194.92, p < .001$, RMSEA =

.06 (95% CI [.04, .07]), SRMR = .03, CFI = .95, TLI = .93). The Cronbach's alpha was calculated for each subscale and revealed they were above the acceptable limit ($\alpha > .77$), except for the introjected subscale which had a lower internal consistency ($\alpha = .60$). A mean score was calculated for autonomous (mean of intrinsic, integrated, and identified regulation) and controlled motivation (mean of introjected, external, and amotivated regulation).

Analyses

First, the data was cleaned and screened for univariate and multivariate outliers. Next, a confirmatory factor analysis was performed on the IBQ to confirm the structure of the scale held for a sample of athletes, reporting on their coaches' behaviours. The model was estimated using maximum likelihood robust (MLR) estimator (Muthen & Muthen, 2010). The fit of the model was assessed according to Hu and Bentler's (1999) recommendation of using a-scaled chi-square (χ^2) and the Standardized Root Mean Square Residual (SRMR) as absolute fit indices; the Tucker-Lewis Index (TLI) as a relative fit index; and finally, the Root Mean Square Error of Approximation (RMSEA) and the Comparative Fit Index (CFI) as noncentrality-based indices. For the SRMR and RMSEA, values below .08 indicated adequate model fit and values below .06 indicated excellent fit; while for the CFI and TLI, values above .90 represent represented good fit and values above .95 indicated excellent fit (Hooper, Coughlan, & Mullen, 2008). Next, invariance tests were conducted to confirm that the scale performed equally for both male and female athletes. Then, internal consistency was examined using Cronbach's alpha for each subscale and the discriminant and convergent validity were examined using the average variance extracted (AVE) and the average shared square variance (ASV). Finally, a series of outcome correlation analyses were conducted to confirm that the subscales related to the outcomes as expected, according to SDT.

Results

First, the scoring distributions of the 24 IBQ items were examined for univariate normality and results suggested that, similar to the original validation studies (Rocchi et al., 2016), it had not been achieved for all variables (skewness range: -10.15 to 9.54; kurtosis range: -6.55 to 5.41). Next, missing data patterns were examined and it was revealed that 24 participants (11%) were missing between 1 and 3 observations on their reports of the IBQ. Since this represented less than 1% of the overall sample, the missing data was estimated using full information maximum likelihood (FIML). Then, the univariate and multivariate outlier analyses revealed 2 multivariate outliers and they were removed from the subsequent analyses. Finally, the composite scores were calculated for the coaches' interpersonal behaviours (see Table 2.1 for descriptive statistics), as well as for athletes' need satisfaction, need frustration, and sport motivation (see Table 2.2 for descriptive statistics).

Scale Structure

The structure of the IBQ was tested through a CFA using the MLR estimator. The results supported that the factorial model had excellent fit ($SBX^2_{(237)} = 296.23, p < .001$, CFI = .95, TLI = .95, RMSEA = .05 (95% CI [.04, .06]), SRMR = .05) and the standardized factor loadings for each subscale were larger than .60 (see Table 2.3). Next, since both groups achieved the minimum recommended sample size of 100, a series of invariance tests were conducted to determine that the scale performed equally for both men ($n = 105$) and women ($n = 131$) athletes (MacCallum, Widaman, Zhang, & Hong, 1999; Meade, 2005). In the first step, the baseline models were tested for each gender to confirm that the structure of the IBQ held for men ($SBX^2_{(237)} = 317.76, p < .001$, CFI = .90, TLI = .90, RMSEA = .07 (95% CI [.06, .08]), SRMR = .06) and women ($SBX^2_{(237)} = 334.95, p < .001$, CFI = .92, TLI = .91, RMSEA = .07 (95% CI [.06,

.08]), SRMR = .06). Then, configural invariance was established by testing a CFA model with both groups where no constraints were placed on the parameters. The results suggested that the factor structure of the IBQ was the same for men and women athletes ($SBX^2_{(474)} = 672.40, p < .001, CFI = .91, TLI = .90, RMSEA = .07$ (95% CI [.06, .08]), SRMR = .06). Next, metric invariance was established by constraining the factor indicators to be equal for groups and the results found that the data fit the model well ($SBX^2_{(492)} = 681.20, p < .001, CFI = .91, TLI = .90, RMSEA = .07$ (95% CI [.06, .08]), SRMR = .07) and the change in chi-square between the constrained and unconstrained model was not significant ($SB\Delta X^2_{(18)} = 11.99, p > .05$). Finally, scalar invariance was established by constraining the intercepts to be equal for both groups. Again, the results supported that the model had good fit ($SBX^2_{(510)} = 709.16, p < .001, CFI = .91, TLI = .90, RMSEA = .07$ (95% CI [.06, .08]), SRMR = .07) and the chi-square difference test found the model fit remained stable ($SB\Delta X^2_{(18)} = 27.61, p > .05$). Overall, these results support that men and women athletes were invariant with regards to the factor structure and that composite variables can be created for both groups.

Validity and Reliability

The average variance extracted (AVE) and average shared square variance (ASV) were examined to assess convergent and divergent validity (see Table 2.1). All subscales met the requirements for convergent validity as the AVEs were above 0.5 (Hair, Black, Babin, & Anderson, 2010). Discriminate validity was also achieved since all ASV values were smaller than their respective AVEs (Hair et al., 2010). The factor correlations and internal reliabilities for each subscale support that each subscale has achieved acceptable internal consistency (see Table 2.1).

Outcome Correlations

The IBQ subscales were correlated with need satisfaction in sport, need frustration in sport, and sport motivation as predicted (see Table 2.3). Specifically, the need supportive subscales of the IBQ correlated positively with need satisfaction and negatively with need frustration. The need-thwarting subscales of the IBQ correlated negatively with need satisfaction and positively with need frustration. Looking at athletes' motivation for sport, the need-supportive subscales correlated positively with autonomous motivation and the need-thwarting subscales correlated with controlled motivation. For CT, it was related to an increase in athletes' autonomous motivation and a decrease in their controlled motivation. For both perceptions of CT and RT coach behaviours, this was related to decreases in autonomous motivation for athletes, as well as an increase in controlled motivation.

Discussion

Overall, the results of Study 1 support the psychometric properties of the IBQ in a sample of athletes, reporting on their coaches' interpersonal behaviours and that the scale performed equally for male and female athletes. This is the first set of results to support that the IBQ can be used to assess perceptions of interpersonal behaviours in the sport context. In this sample, the structure of the scale held, as well as the reliabilities and outcome correlations, supporting that the scale performed as would be expected, similar to the original validation studies (Rocchi et al., 2016). Although there are relatively high relationships between the need-supportive and need-thwarting subscales that are in line with the results of the original validation studies, the relationships are not high enough to suggest that multicollinearity ($< .80$) may be an issue (Field, 2009). The results of this study support the validity of the IBQ to assess athletes' perceptions of coaches behaviours. Specifically, these results are in line with what would be expected according

to SDT as athletes who report that their coaches use need-supportive interpersonal behaviours reported increased need satisfaction and autonomous motivation in sport (Mageau & Vallerand, 2003); while athletes who reported their coaches use need-thwarting interpersonal behaviours reported need frustration and controlled motivation in sport (Bartholomew et al., 2009).

Study 2

The objective of Study 2 is to evaluate the psychometric properties of the self-report version of the IBQ within the sport context. Specifically, this will be validated using a sample of sport coaches who are reporting on their behaviours when they interact with their athletes. It is anticipated that the factor structure of the IBQ-Self will hold for this sample, in this context, and that it will correlate with outcomes as would be expected according to SDT.

Method

Participants

The sample was composed of 240 coaches ($n_{\text{male}} = 170$, $n_{\text{female}} = 66$, $n_{\text{missing}} = 4$), with an average age of 47.01 years ($SD = 10.31$). The large majority of the coaches had a college ($n = 53$, 22%) or university education ($n = 168$, 70%). They were either basketball ($n = 111$, 46%) or track and field coaches ($n = 129$, 54%) and they had an average of 17.50 years of coaching experience ($SD = 12.83$). The majority ($n = 122$, 51%) identified as a head coach or as an assistant coach ($n = 60$, 25%) and indicated that their athletes were very ($n = 94$, 39%) or extremely ($n = 61$, 25%) competitive compared to other athletes of their age.

Procedures

Coaches were recruited through their respective provincial sporting associations (basketball or athletics) to participate in an online survey. Each organization sent an email to all coaches inviting them to participate in an online study. The coaches' participation was voluntary

and they gave their informed consent before participating. To be eligible, the coaches had to be registered with provincial sport organization at the time of data collection and actively coaching.

Materials

The following measures were completed by the coaches through an online questionnaire.

My Interpersonal Behaviours. The coaches completed the *Interpersonal Behaviours Questionnaire – Self* to assess the extent to which they believed they engaged in AS, AT, CS, CT, RS, and RT interpersonal behaviours with their athletes (Rocchi et al., 2016). Coaches were presented each item using the stem “When I am with my athletes, I...”, and indicated their agreement with each statement, using a 7-point scale ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*). The original validation studies supported that the scale had sufficient internal reliability ($\alpha > .80$).

Need Satisfaction. The coaches responded to the positive items from the *Basic Need Satisfaction at Work Scale* adapted to the sport context (Deci et al., 2001) to assess the extent their three basic psychological needs were met while coaching. Like in *Study 1*, the stems were modified to ask the coaches about their need satisfaction while coaching, instead of at work. The fit indices suggest that the model has an acceptable fit, except for the TLI ($SB\chi^2_{(41)} = 38.36, p < .001$, RMSEA = .06 (95% CI [.03, .08]), SRMR = .05, CFI = .90, TLI = .89); however, since the other fit indices were acceptable, the scale was used. The internal consistency estimates were within acceptable range (autonomy $\alpha = .83$; competence $\alpha = .71$; relatedness $\alpha = .74$), and a mean score was calculated for each subscale.

Need Frustration. The coaches also completed the *Psychological Need Thwarting Scale in Sport* (Bartholomew et al., 2010) to assess the extent to which their needs were frustrated while coaching, like in *Study 1*. A confirmatory factor analysis confirm the structure of the scale

for coaches and the results supported that the model had an excellent fit ($SB\chi^2_{(32)} = 26.00, p < .001$, RMSEA = .04 (95% CI [.00, .07]), SRMR = .06, CFI = .96, TLI = .94). The internal consistency for the three subscales were above the minimum ($\alpha > .74$), and a mean score was calculated for each subscale to represent the coaches' frustration of each need.

Coach Motivation. The coaches completed the *Coach Motivation Questionnaire* (McLean, Mallet, & Newcombe, 2012) to assess their reasons for participating in sport. The CMQ is a six-factor scale comprised of 22 items measuring sport motivation according to each of the six types of behavioural regulation, according SDT. A confirmatory factor suggested the structure of the scale in this sample ($SB\chi^2_{(194)} = 336.57, p < .001$, RMSEA = .06 (95% CI [.04, .07]), SRMR = .07, CFI = .91, TLI = .90). The Cronbach's alphas were calculated for each subscale and revealed they were above the acceptable limit ($\alpha > .72$), except for the introjected subscale which had a lower internal consistency ($\alpha = .68$). Like in *Study 1*, a mean score was calculated for autonomous motivation and controlled motivation.

Social Desirability. Finally, the coaches also completed the short form of the *Marlowe-Crowne Social Desirability Scale* (Reynolds, 1982) to control for whether they were responding to survey items based on providing favourable responses. The short form of this measure consists of 10 items where participants are asked to indicate whether these statements are true or false for them. The sum of all of the responses that are considered to be socially desirable is calculated to provide an overall measure of social desirability.

Analyses

Using the same procedures as the first study, the data was cleaned and then the scale structure was examined. Then, the validity and reliability of the subscales were examined.

Finally, outcome correlations were conducted to examine the relationship between coach need satisfaction, frustration, and motivation, while controlling for social desirability.

Results

Similar to the first study, the descriptive statistics analyses on the 24 IBQ-Self items suggested that the variables did not all have a normal distribution (skewness range: -13.25 to 9.12; kurtosis range: -6.20 to 8.21). Data screening analyses did not reveal any multivariate outliers, as such the entire sample was retained for the full analyses. The missing data analyses suggested that 15 participants were missing 1 or 2 observations on the IBQ-Self; however, since these missing observations made up less than 5% of the total observations, the data was imputed using the same methods as *Study 1*. The composite scores for the coaches' reported use of need supportive and need thwarting behaviours, as well as their need satisfaction and frustration in coaching, their motivation towards coaching, and their likelihood of responding in socially desirable ways was calculated (see Tables 2.1 and 2.2 for the descriptive statistics).

Scale Structure

The results supported that the factorial model had good fit ($SBX^2_{(237)} = 303.04, p < .001$, CFI = .93, TLI = .92, RMSEA = .06 (95% CI [.03, .05]), SRMR = .04). The standardized factor loadings for each subscale were larger than .46 (see Table 2.1) and the factor correlations, as well as the internal reliabilities for each subscale (Cronbach's alpha) are in Table 2.1. Since there were only 66 female coaches in this sample, gender invariance tests were not performed in this study. Next, convergent and divergent validity was examined for each of the subscales (see Table 2.2) and the results supported that the scale met the thresholds for both, across all subscales, except for the relatedness thwarting subscale. Internal consistency analyses revealed that all of the alphas were over the minimum criteria, again, except for the relatedness thwarting subscale

($\alpha = .40$), which was nowhere near the baseline criteria. The internal consistency for that subscale was calculated using all of the potential combinations of items to see if one specific item was causing the issue and the results found that there was no combination of the four items that promoted a better internal consistency. As a result, the reliability for the four items was retained.

Outcome Correlations

The IBQ-Self subscales were correlated with need satisfaction, need frustration, autonomous, and controlled motivation, while controlling for social desirability (see Table 2.2) to confirm the relationships were in the expected directions. The results found that the support subscales of the IBQ-Self correlated moderately and positively with need satisfaction and autonomous motivation, while they had weak or negative relationships with need frustration and controlled motivation. The opposite was found with the need thwarting subscales where there were moderate positive relationships with need frustration and controlled motivation, and weak negative or no relationships with need satisfaction and autonomous motivation. Overall, the results were similar to those in Study 1, except that the strength of the relationships was weaker.

Discussion

The results of this study support the factor structure and validity of the IBQ-Self as a questionnaire for coaches about their use of interpersonal behaviours, according to SDT, in their interactions with their athletes. Unfortunately, the reliability for the relatedness-thwarting subscale was weak. Since some coaches and athletes may choose to engage in the relationship when they choose to participate in the sport (i.e., select athlete for a team) and others do not (i.e., everyone trains during the same session), it is not totally surprising that coaches care about their athletes and this made the results somewhat ambiguous. Perhaps, in another context where there

is either less control over being in a relationship with the other people, such as a family member or a supervisor at work, or more control like a best friend or partner, that subscale internal consistency would improve. Overall, these results support that coaches who report using more need-supportive behaviours also report higher need satisfaction and autonomous motivation for their coaching, while coaches who report more need-thwarting behaviours report more need frustration and controlled motivation for coaching, all after controlling for social desirability. The results of this study support that, generally, the IBQ-Self is a valid measure of coaches' own reports of their interpersonal behaviours when interacting with their athletes.

General Discussion

The purpose of these two studies were to extend the validity of the IBQ by testing the structure of the scale in a sport setting. The results of Study 1 supported that the IBQ scale factor structure holds in cases where athletes report on their perceptions of their coaches' interpersonal behaviours. The scale also demonstrated adequate validity and reliability and, overall, the inter-correlations between the IBQ subscales, as well as the correlations between the IBQ subscales and the other related factors, provided support for the fit of the scale within the existing SDT measures and literature. In terms of the relationships between the subscales of the IBQ, the results supported that there were moderately high positive and negative correlations between the subscales. Additionally, the subscales also correlated with need satisfaction, need frustration, and motivation in the directions that would be expected according to SDT. In the case of some relationships, the outcomes had similar correlations with all three need-supportive behaviours and all three need-thwarting behaviours, but this is not unexpected since the satisfaction or frustration of the three basic needs are often related (Deci & Ryan, 1985).

The results of Study 2 supported that the IBQ-Self structure held in a sample of coaches, reporting on their behaviours with their athletes. Similar to Study 1, the scale also demonstrated adequate validity and reliability. Overall, the inter-correlations between the IBQ-Self subscales and the correlations between the IBQ-Self subscales and other factors showed a similar pattern to Study 1, supporting that the scale relates to other factors as would be expected.

Limitations

These results support the applicability of the scale to a sport context; however, there are some limitations. First, the structure of the scales was tested using a student sample of athletes, as well as basketball and track and field coaches. The IBQ should be tested with a more varied sample of athletes to ensure that the scale is a valid measure of perceptions of coaches for other groups such as older athletes and recreational athletes. Furthermore, the IBQ-Self should be validated with coaches from a larger variety of sports. In this sample, coaches were coaching team (basketball) and individual sports (athletics); however, coaches can work with all sorts of different athletes, at varying levels of competition, and the scale's validity should be extended to include these coaches too. A second limitation is that the IBQ and IBQ-Self only focused on two people within the sport context: athletes and coaches. There are a number of different social agents in the sport context that impact athletes (or coaches) including the athletes' parents, the other athletes, sport administrators, etc., and the validity of the scale should also be tested to examine perceptions of their behaviours, or their own reports of their behaviours. Finally, since the IBQ and IBQ-Self were validated using coaches' and athletes' self-reports, their reports should be triangulated by a third party (e.g., video recording and coding of interpersonal behaviours) to confirm that reports on these measures correspond to their real world behaviours.

Future Directions

The IBQ and the IBQ-Self promote a number of initiatives for future research in sport motivation. First, research should continue to examine the psychometric properties of the IBQ. For example, athletes or coaches should be examined at multiple time points in order to establish the scale's test-retest reliability and coaches' scores should be corroborated with athletes' scores in order to provide support for the construct validity of the scale. Next, the IBQ can be used to explore the role of all six types of need-supportive and need-thwarting interpersonal behaviours in relation to how they impact athletes' psychological need satisfaction and frustration. This will help extend the existing research in sport to move beyond the influential role of AS and AT, and focus on CS, CT, RS, and RT interpersonal behaviours as well. Next, the IBQ-Self can be used to identify and understand the antecedents of all six types of interpersonal behaviours according to SDT. Specifically, the scale should be used to explore the factors that influence coaches' behaviours with their athletes. Finally, the IBQ and IBQ-Self should be used to explore how coaches' behaviours change over the course of a given season, and how this relates to athlete psychological needs and their motivation for sport.

Overall, the IBQ and IBQ-Self are new instruments for assessing perceptions, or self-reports, of all six types of need-supportive and need-thwarting interpersonal behaviours for coaches and athletes. It is hoped that the IBQ and the IBQ-Self will promote research directed at assessing the behaviour of others in sport, and how it impacts need satisfaction, need frustration, and motivation for athletes.

References

- Amorose, J. & Anderson-Butcher, D. (2007). Autonomy-Supportive coaching and self-determined motivation in high school and college athletes: A test of self-determination theory. *Psychology of Sport and Exercise*, 8, 654-670. doi :<http://dx.doi.org/10.1016/j.psychsport.2006.11.003>
- Baldwin, C. & Caldwell, L. (2003). Development of the Free Time Motivation Scale for Adolescents. *Journal of Leisure Research*, 35, 129-151. Retrieved from: <http://www.questia.com/library/journal/1G1-102676827/development-of-the-free-time-motivation-scale-for>.
- Bartholomew, K., Ntoumanis, N., Ryan, R., Bosch, J., & Thorgersen Ntoumani, C. (2011). Self Determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, 37, 1459. doi: 10.1177/0146167211413125
- Bartholomew, K., Ntoumanis, N., & Thorgenson-Ntoumani, C. (2009). A review of controlling motivational strategies from a self-determination theory perspective: implications for sports coaches. *International Review of Sport and Exercise Psychology*, 2, 215-233. doi: 10.1080/17509840903235330
- Bartholomew, K., Ntoumanis, N., & Thorgenson-Ntoumani, C. (2010). The Controlling Interpersonal Style in a Coaching Context: Development and Initial Validation of a Psychometric Scale. *Journal of Sport & Exercise Psychology*, 32, 193-216. Retrieved from: <http://www.ncbi.nlm.nih.gov/pubmed/20479478>.
- Conroy, D. & Coatsworth, J. (2007). Assessing autonomy-supportive coaching strategies in youth sport. *Psychology of sport and exercise*, 8, 671-684. doi:

10.1016/j.psychsport.2006.12.001

Deci, E. & Ryan, R. (1985). Intrinsic motivation and self-determination in human behaviour.

New York: Plenum. In Deci, E. & Ryan, R. (Eds.). *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.

Deci, E. & Ryan, R. (2002). *Handbook of Self-Determination Research*. Rochester, NY: The University of Rochester Press.

Deci, E., Ryan, R., Gagné, M., Leone, D., Usunov, J., & Kornazheva, B. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former eastern bloc country: A cross-cultural study of self-determination. *Personality and Social Psychology Bulletin*, 27, 930-942. doi: 10.1177/0146167201278002

Deci, E., Schwartz, A., Sheinman, L., & Ryan, R. (1981). An instrument to assess adults' orientations toward control versus autonomy with children: Reflections on intrinsic motivation and perceived competence. *Journal of Educational Psychology*, 73, 642-650. doi: <http://dx.doi.org/10.1037//0022-0663.73.5.642>

Field, A. (2009). *Discovering Statistics using SPSS*. Sage publications.

Gould, D., Dieffenbach, K., & Moffett, A. (2002). Psychological Characteristics and Their Development in Olympic Champions. *Journal of Applied Sports Psychology*, 14, 172–204. doi: 10.1080/10413200290103482

Hagger, M. & Chatzisarantis, N. (2007). *Intrinsic Motivation and Self-Determination in Exercise and Sport*. Leeds, England: Human Kinetics Europe Ltd.

Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate data analysis* (7th ed.): Prentice-Hall, Inc. Upper Saddle River, NJ, USA.

Hooper, D., Coughlan, J., & Mullen, M. R. (2008). *Structural Equation Modelling: Guidelines*

- for Determining Model Fit. *The Electronic Journal of Business Research Methods*, 6, 53-60. Retrieved from: www.ejbrm.com/issue/download.html?idArticle=183.
- Hu, L. & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55. doi: 10.1080/10705519909540118.
- Jones, R., Armour, K. & Potrac, P. (2004). *Sports Coaching Cultures: From Practice to Theory*. Routledge, London, 2004.
- Li, C., Wang, C., Pyun, D., & Kee, Y. (2013). Burnout and its relations with basic psychological needs and motivation among athletes: A systematic review and meta-analysis. *Psychology of Sport and Exercise*, 14, 692-700. doi: <http://dx.doi.org/10.1016/j.psychsport.2013.04.009>
- Mageau, G., Ranger, F., Joussemet, M., Koestner, R., Moreau, E., & Forest, J. (2015). Validation of the Perceived Parental Autonomy Support Scale (P-PASS). *Canadian Journal of Behavioural Science*, 47, 251-262. <http://dx.doi.org/10.1037/a0039325>
- Mageau, G. & Vallerand, R. (2003). The coach-athlete relationship: a motivational model. *Journal of Sports Sciences*, 21, 883-904. doi: <http://dx.doi.org/10.1080/0264041031000140374>
- Meade, A. W. (2005, April). *Sample Size and Tests of Measurement Invariance*. Paper presented at the 20th Annual Conference of the Society for Industrial and Organizational Psychology, Los Angeles, CA.
- MacCallum, R., Widaman, K., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods*, 4, 84- 99. doi: 10.1037/1082-989X.4.1.84

- McLean, K., Mallet, C., & Newcombe, P. (2012). Assessing Coach Motivation: The Development of the Coach Motivation Questionnaire (CMQ). *Journal of Sport & Exercise Psychology*, 34, 184-207.
- Moreau, E. & Mageau, G. (2013). Consequences and correlates of autonomy support in various life domains. *Psychologie française*, 58, 195-227. doi: <http://dx.doi.org/10.1016/j.psfr.2013.03.003>
- Muthen, L. & Muthen, B. (2010). *Mplus user's guide: Statistical analysis with latent variables (6th ed.)*. Los Angeles, CA: Authors.
- Pelletier, L., Séguin-Lévesque, C., & Legault, L. (2002). Pressure from above and pressure from below as determinants of teachers' motivation and teaching behaviors. *Journal of educational psychology*, 94, 186. doi: 10.1037/0022-0663.94.1.186
- Pelletier, L., Rocchi, M., Vallerand, R., Deci, E., & Ryan, R. (2013). The Revised Sport Motivation Scale. *Psychology of Sport and Exercise*, 14, 329-341. doi: <http://dx.doi.org/10.1016/j.psychsport.2012.12.002>
- Pomerantz, E. Cheung, C., & Qin, L. (2012). Relatedness Between Children and Parents: Implications for Motivation. IN Ryan, R. (Ed.), (2012). *The Oxford Handbook of Motivation* (pp. 335-349). New York: Oxford University Press.
- Reynolds, W. (1982). Development of reliable and valid short forms of the Marlowe-Crowne Social Desirability Scale. *Journal of clinical psychology*, 38, 119-125. doi: 10.1002/1097-4679
- Rocchi, M., Pelletier, L., & Cheung, S., Baxter, D., & Beaudry, S. (2016). The Validation of the Interpersonal Behaviours Scale (IBQ). *Manuscript under review*.

- Rocchi, M., Pelletier, L., & Couture, A. (2013). Determinants of Coach Motivation and Autonomy Supportive Coaching Behaviours. *Psychology of Sport and Exercise*, 14, 852-859. doi: 10.1016/j.psychsport.2013.07.002
- Sheldon, K. (2011). Integrating behavioural-motive and experiential-requirement perspectives on psychological needs: A two process model. *Psychological Review*, 118, 552-569. doi: 10.1037/a0024758.
- Sheldon, K. & Filak, V. (2008). Manipulating autonomy, competence, and relatedness support in a game-learning context: New evidence that all three needs matter. *British Journal of Social Psychology*, 47, 257-283. doi: 10.1348/014466607X238797.
- Smith, N., Tessier, D., Tzioumakis, Y., Quested, E., Appleton, P., Sarrazin, P., ... & Duda, J. L. (2015). Development and validation of the multidimensional motivational climate observation system. *Journal of sport & exercise psychology*, 37, 4-22. doi: 10.1123/jsep.2014-0059
- Stebbing, J., Taylor, M., Spray, C., & Ntoumanis, N. (2012). Antecedents of perceived coach interpersonal behaviors: The coaching environment and coach psychological well- and ill-being. *Journal of Sport & Exercise Psychology*, 34, 481-502. Retrieved from: <http://journals.humankinetics.com/jsep>
- Taylor, I., Ntoumanis, N., & Standage, M. (2008). A self-determination theory approach to understanding the antecedents of teachers' motivational strategies in physical education. *Journal of Sport and Exercise Psychology*, 30, 75-94. doi: <https://dspace.lboro.ac.uk/2134/15371>
- Vallerand, R. (2001). A hierarchical model of intrinsic and extrinsic motivation in sport and exercise. In G.C. Roberts (Ed.), *Advances in motivation in sport and exercise* (pp. 263-

319). Champaign, IL: Human Kinetics.

Williams, N., Whipp, P., Jackson, B., & Dimmock, J. (2013). Relatedness support and the retention of young female golfers. *Journal of Applied Sport Psychology*, 25, 412-430. doi: 10.1080/10413200.2012.749311

Table 2.1

Study 1 and 2: Final items with standardized factor loadings (FL) and standard errors (SE).

Items	<i>Study 1</i>		<i>Study 2</i>	
	<i>FL</i>	<i>SE</i>	<i>FL</i>	<i>SE</i>
<i>STEM: My coach... (Study 1) When I am with my athletes... (Study 2)</i>				
Autonomy Support (AS)				
Gives me the freedom to make my own choices.	.791	.043	.712	.041
Supports my decisions.	.872	.032	.722	.036
Supports the choices that I make for myself.	.828	.045	.681	.031
Encourages me to make my own decisions.	.813	.045	.731	.035
Autonomy Thwarting (AT)				
Pressures me to do things their way.	.699	.051	.722	.030
Imposes their opinions on me.	.794	.045	.741	.029
Pressures me to adopt certain behaviours.	.756	.048	.693	.039
Limits my choices.	.756	.051	.687	.103
Competence Support (CS)				
Encourages me to improve my skills.	.693	.066	.658	.045
Provides valuable feedback.	.739	.052	.720	.041
Acknowledges my ability to achieve my goals	.811	.043	.765	.032
Tells me that I can accomplish things.	.859	.035	.748	.033
Competence Thwarting (CT)				
Points out that I will likely fail.	.739	.054	.761	.024
Sends me the message that I am incompetent.	.830	.039	.652	.044
Doubts my capacity to improve.	.741	.051	.674	.030
Questions my ability to overcome challenges.	.819	.049	.748	.037
Relatedness Support (RS)				
Is interested in what I do.	.804	.054	.715	.050
Takes the time to get to know me.	.830	.039	.755	.032
Honestly enjoy spending time with me.	.741	.051	.734	.045
Relates to me.	.819	.049	.633	.033
Relatedness Thwarting (RT)				
Does not comfort me when I am feeling low.	.804	.054	.443	.028
Is distant when we spend time together.	.862	.028	.529	.031
Does not connect with me.	.832	.031	.656	.046
Does not care about me.	.855	.027	.618	.055

Note. Study 1 $n = 237$. Study 2 $n = 240$. The verb tenses and pronouns of the items were modified in the IBQ-Self to reflect the new stem. For example: “**Give them** the freedom to make **their** own choices” instead of “**Gives me** the freedom to make **my** own choices” or “**Do not** comfort **them** when **they are** feeling low” instead of “**Does not** comfort **me** when **I am** feeling low”

Table 2.2

Study 1 and 2: Factor correlations, variance, means, standard deviations, and internal consistency.

<i>Subscales</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>AVE</i>	<i>ASV</i>	<i>M</i>	<i>SD</i>
Study 1 (IBQ – Athlete reporting on coach)										
1. Autonomy Support (AS)	(.89)						.68	.28	5.03	1.39
2. Autonomy Thwarting (AT)	-.39**	(.84)					.57	.15	3.23	1.49
3. Competence Support (CS)	.70**	-.30**	(.87)				.61	.18	5.54	1.28
4. Competence Thwarting (CT)	-.34**	.69**	-.47**	(.87)			.62	.18	1.37	1.37
5. Relatedness Support (RS)	.71**	-.32**	.74**	-.36**	(.90)		.64	.19	4.98	1.44
6. Relatedness Thwarting (RT)	-.40**	.60**	-.37**	.68**	-.50**	(.87)	.70	.17	2.41	1.41
Study 2 (IBQ-Self – Coach reporting on behaviour with athlete)										
1. Autonomy Support (AS)	(.71)						.51	.07	6.01	0.83
2. Autonomy Thwarting (AT)	-.36**	(.70)					.51	.05	2.11	2.11
3. Competence Support (CS)	.40**	-.14**	(.73)				.53	.09	5.66	0.59
4. Competence Thwarting (CT)	-.13	.42**	.04	(.75)			.52	.05	1.40	0.76
5. Relatedness Support (RS)	.44**	-.18**	.65**	-.05	(.72)		.50	.11	6.00	0.65
6. Relatedness Thwarting (RT)	-.17**	.16**	-.27**	.11	-.27**	(.40)	.33	.03	1.41	0.73

Note. Study 1 $n = 237$. Study 2 $n = 240$. α = diagonals. AVE = average variance extracted. ASV = average shared square variance.

Table 2.3

Study 1 and 2: Descriptive Statistics and Correlations with Outcome Variables for the IBQ (Study1) and the IBQ-Self (Study 2).

IBQ Subscales	Need Satisfaction			Need Frustration			Motivation		Soc Des
	Aut	Comp	Rel	Aut	Comp	Rel	Aut	Ctl	
Study 1									
Autonomy Support (AS)	.58**	.48**	.46**	-.28**	-.32**	-.24**	.40**	-.08	-
Autonomy Thwarting (AT)	-.33**	-.20**	-.27**	.63**	.56**	.54**	-.08	.45**	-
Competence Support (CS)	.43**	.52**	.48**	-.30**	-.40**	-.34**	.39**	-.17*	-
Competence Thwarting (CT)	-.30**	-.23**	-.33**	.64**	.66**	.63**	-.14*	.51**	-
Relatedness Support (RS)	.52**	.50**	.49**	-.26**	-.32**	-.25**	.37**	-.06	-
Relatedness Thwarting (RT)	-.44**	-.29**	-.39**	.62**	.58**	.64**	-.25**	.41**	-
Mean	5.19	5.70	5.82	3.04	2.86	2.54	5.50	3.26	-
Standard Deviation	1.14	1.04	1.03	1.14	1.54	1.03	1.16	1.12	-
Study 2									
Autonomy Support (AS)	.20**	.23**	.23**	-.02	-.02	-.01	.25**	.02	.10
Autonomy Thwarting (AT)	-.11	.05	.02	.23**	.30**	.24**	.11	.36**	.06
Competence Support (CS)	.31**	.48**	.34**	-.18*	-.11	-.06	.28**	-.01	.10
Competence Thwarting (CT)	.01	.06	-.03	.07	.28**	.26**	.06	-.30**	.08
Relatedness Support (RS)	.36**	.53**	.37**	-.16*	-.12	-.12	.29**	.05	.06
Relatedness Thwarting (RT)	-.04	-.06	-.02	.01	.22*	.35**	.12	-.19*	.11
Mean	6.11	5.04	1.32	1.73	1.60	1.67	5.05	2.29	4.53
Standard Deviation	0.92	0.79	0.88	1.06	1.00	0.78	1.20	0.97	2.57

Note. Study 1 n = 237. Study 2 n = 240. * = $p < .05$. ** = $p < .001$. Soc Des = social desirability. For Study 2, correlations are while controlling for social desirability, except for the correlations between the subscales of the IBQ and social desirability. Need satisfaction and frustration are related to sport or coaching. Motivation is for participating in sport or coaching

CHAPTER FOUR**COACHING CONTEXT, NEEDS, MOTIVATION, AND COACHING BEHAVIOUR**

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Abstract

In the context of three studies, we examined the contextual variables that lead coaches to engage in need-supportive and need-thwarting interpersonal behaviours. Study 1 looked at the coaching context for 56 multi-sport coaches in order to identify the contextual factors that had the largest impact on coaches. In Study 2, basketball coaches ($N = 310$) reported their psychological needs and motivation for coaching, along with their reported use of autonomy-supportive, autonomy-thwarting, competence-supportive, competence-thwarting, relatedness-supportive, and relatedness-thwarting interpersonal behaviours. In Study 3, multi-sport coaches ($N = 225$) completed the same measures as well as measures of the extent to which they perceived their administration to be supportive, their athletes to be motivated, their colleagues to be supportive, and whether they perceived time constraints while coaching. The analysis showed that the factors within the coaching environment either supported or thwarted their psychological needs. In turn, coaches' need satisfaction predicted increased autonomous motivation for coaching, while coaches' need frustration predicted increased controlled motivation for coaching. Then, coaches' autonomous motivation positively predicted coaches' reported use of the three types of supportive interpersonal behaviours, and negatively predicted use of the three types of thwarting interpersonal behaviours, and the opposite effects were found for controlled motivation. Overall, the results of these three studies provided additional support for understanding how the coaching context, coaches' psychological needs, and their motivation for coaching influence their behaviours with their athletes.

Introduction

Sport coaches play an essential role in athletes' sport experience and are responsible for teaching athletes the fundamental skills of their sport, strategies for playing the game, and to work cohesively with others through sportpersonship (Feltz, Hepler, Roman, & Paiement, 2009). Depending on the scenario, coaches are also required to be psychologists, motivators, teachers, leaders, administrators, planners, managers, performers, and negotiators (Giges, Petitpas, Vernacchia, 2004). Extensive research in sport psychology has examined how coaches promote the best outcomes for their athletes and the general consensus is that coaches influence athletes through the sport context they create with their interpersonal behaviours and coaching styles (e.g., Mageau & Vallerand, 2003).

Unfortunately, most of this research on coaches has not taken into consideration how coaches' personal challenges or psychological factors impact their ability to coach effectively (McLean & Mallet, 2012). Since coaches play such an instrumental role in promoting athlete success, sport psychology research should examine more closely coaches' needs and experiences in their own right, in addition to how their behaviour impacts their athletes (Giges et al., 2004). This is especially important for promoting positive outcomes in athletes since any efforts to educate coaches about how to improve their coaching behaviours for the sake of improving athlete outcomes could be wasted without the understanding, and possibly the modification, of the factors that lead coaches to behave in the way that they do. Self-Determination Theory (SDT; Deci & Ryan, 1985), a leading motivational theory, provides a framework for examining the factors acting on coaches while also taking into consideration how their experiences impact their athletes (Hagger & Chatzisarantis, 2007).

Self-Determination Theory

SDT is a theory of motivation, built on the assumption that humans have innate tendencies to grow and to integrate on-going life experiences (Deci & Ryan, 1985). SDT postulates that motivation quality for a given activity is the result of contextual factors related to the specific life domain, as well the extent to which the three basic psychological needs are satisfied in that domain. The contextual factors include both the structure of the environment, and the people within it; while psychological needs refer to the basic needs for autonomy, competence, and relatedness. These three needs are said to be innate, universal across cultures, and evident in all development periods (Deci & Ryan, 2002). Autonomy occurs when an individual can act in line with their own interests and values. Competence happens when they have the opportunity to seek challenges, express their capacities, and develop their confidence. Finally, relatedness occurs when someone feels a sense of belonging with others (Deci & Ryan, 2000, 2002).

According to SDT, if an individual's context promotes the support of their basic psychological needs, they are more likely to experience need satisfaction, which leads to autonomous motivation for an activity. When someone has autonomous motivation for an activity, they engage in that activity out of interest or curiosity, or because it is in line with their goals and objectives (Deci & Ryan, 1985). Autonomous motivation is considered optimal since it has been found to lead to positive outcomes such as better learning, interest, effort, performance, self-esteem, life satisfaction, persistence, and health (Mageau & Vallerand, 2003). Alternatively, if an individual's context thwarts their basic psychological needs, they are more likely to experience need frustration and develop a controlled motivation for an activity. When someone engages in a behaviour for controlled reasons, they do the behaviour in order to achieve an award, please someone else, or to avoid feeling guilt or shame. Controlled motivation is

considered to be less optimal because it promotes negative outcomes such as burnout, exhaustion, and decreased health, vitality, persistence, and success (Deci & Ryan, 2000).

Since coaches' and athletes' environments are intertwined, and the ultimate goal of the coach is to promote the success and well-being of their athletes, it is important to study coaches within the context of their interactions with their athletes. Specifically, SDT posits that an athletes' own psychological needs and motivation in sport are going to be directly influenced by the extent to which their coach's interpersonal behaviours either support or thwart their psychological needs in sport (Mageau & Vallerand, 2003). A number of studies examining athletes' perceptions of their coaches' use of need-supportive interpersonal behaviours found that athletes who perceived this type of support from their coaches reported an increase in need satisfaction and subsequent motivation (e.g., Conroy & Coatsworth, 2007; Smith et al., 2016), which led to better performances, persistence, and learning (e.g., Allen & Hodge, 2006; Amorose & Anderson-Butcher, 2007; Gillet, Vallerand, Amoura, & Baldes, 2010). Alternatively, when athletes perceive their coach as using need-thwarting interpersonal behaviours in their interactions, they experience an increase in need frustration, which promotes controlled motivation and leads to negative outcomes in sport (Bartholomew, Ntoumanis, Thøgersen-Ntoumani, 2011; Smith et al., 2016).

Coaches' Interpersonal Behaviours

Since coaches' need-supportive and need-thwarting interpersonal behaviours play an essential role in understanding the ways in which coaches influence athletes, it is important to examine these coaching behaviours more closely. According to SDT, coaches can help support athletes' psychological needs when they engage in autonomy-supportive (AS), competence-supportive (CS), and relatedness-supportive (RS) behaviours with their athletes. AS interpersonal

behaviours involve providing choice to players, providing a rationale for tasks, giving opportunities for initiative, and acknowledging players' perspectives (Mageau & Vallerand, 2003). CS interpersonal behaviours involve providing positive feedback, acknowledging improvements, and encouraging their athletes to improve their skills (Sheldon & Filak, 2008). Finally, RS behaviours involve demonstrating understanding, support and care for athletes (Jones, Armour, & Potrac, 2004). SDT also postulates that when coaches engage in autonomy-thwarting (AT; also called controlling), competence-thwarting (CT), and relatedness-thwarting (RT) interpersonal behaviours, it dissatisfies their athletes' psychological needs in sport. Coaches use AT interpersonal behaviours when they use rewards, make demands without providing a rationale, and use excessive personal control (Bartholomew, Ntoumanis, & Thorgensen-Ntoumani, 2009). A coach demonstrates CT interpersonal behaviours when they emphasize athletes' faults, doubt their capacity to improve, and send them the message that are inadequate (Sheldon & Filak, 2008). Finally, a coach is RT when they are distant with their athletes, do not connect with them, and are not available when they needed them (Sheldon & Filak, 2008).

Determinants of Coaches' Interpersonal Behaviours

Exploring the determinants of interpersonal behaviours under the SDT framework started in the education context when researchers were interested in examining teachers' behaviours in the classroom (e.g., Pelletier, Séguin-Lévesque & Legault, 2002; Taylor, Ntoumanis, & Standage, 2008). Using this line of research, it can be hypothesized that coaches' use of need-supportive and need-thwarting interpersonal behaviours can be predicted by their own motivation for coaching. Specifically, if a coach is in a context that supports their psychological needs for coaching, they are more likely to experience need satisfaction and autonomous motivation while coaching, which should lead to increased use of need-supportive interpersonal

coaching behaviours. If a coach is in a context that thwarts their needs, they will experience need frustration and controlled motivation towards coaching, which makes them susceptible to using need-thwarting interpersonal behaviours in their interactions with their athletes. Some aspects of this model have already been examined within the coaching context.

In the first study to examine the antecedents of coaches' reported interpersonal behaviours, Stebbings, Taylor, and Spray (2011) found that the coaches' perception of the satisfaction of the three basic psychological needs predicted an increase in well-being, which subsequently predicted AS coaching behaviours. In the same study, they found that the frustration of the three psychological needs was associated with ill-being and predicted AT behaviours with athletes. In a separate study, Stebbings and colleagues (Stebbing, Taylor, Spray, & Ntoumanis, 2012) examined how contextual factors, like job security, work-life conflict, and professional development opportunities, were related to coaches' need satisfaction or need frustration, well-being or ill-being, and subsequent use of AS or AT behaviours. They found that the contextual factors that lead to increased need satisfaction for coaches promoted coach well-being and subsequent use of AS coaching behaviours. Looking at the negative pathway, they found that contexts that lead to increased need frustration promoted ill-being in coaches, which lead to increased reports of AT coaching styles. Furthermore, Rocchi, Pelletier, and Couture (2013) examined basketball coaches and found that perceptions of administrative pressure and athletes' motivation were related to coach motivation and the use of AS coaching behaviours with their athletes. Specifically, they found that positive perceptions of athletes' motivation increased coaches' motivation quality for coaching, while perceptions of administrative pressure diminished coach motivation. Coaches' motivation quality was associated with increased reports of AS coaching behaviours.

Limitations

Although there have been significant advances in coach research using the SDT framework, there are some important limitations. The first limitation is that the full motivational sequence proposed by SDT has not been tested with a coaching population. Specifically, Stebbings and colleagues (2012) examined the relationship between contextual factors, coach need satisfaction or frustration, and AS or AT coaching behaviours; while Rocchi and colleagues (2013) examined contextual factors, coach motivation, and AS coaching behaviours. In line with SDT, to understand motivation within a specific domain, contextual factors, psychological needs, motivation, and an outcome behaviour should all be considered simultaneously. Testing this model in a coaching context would consolidate the existing findings in the literature on coaches' interpersonal behaviour and create a parsimonious model, built within a strong theoretical framework, for understanding the coaching context, while considering coaches' interactions with their athletes.

Next, the contextual factors that have been examined specifically in coaching in relation to coaches' psychological needs or motivation have been inspired from other fields like teaching or work. For example, work-life conflict was examined in relation to coach need satisfaction since the organizational psychology literature suggested that it had a negative impact on need satisfaction (Major, Klein, & Ehrhart, 2002). To date, job security, work-life conflict, professional development opportunities, athlete motivation, and administrative pressure have been examined in relation to need satisfaction and motivation, and have been shown to have a significant impact on coaches (Stebbing et al., 2012; Rocchi et al., 2013). There are other factors that have been tested in other domains, such as performance evaluation, time constraints, and emotional exhaustion, that may also be relevant to coaches and should be examined

(Soenens, Sierens, Vansteekiste, Dochy, & Goossens, 2012; Taylor, Ntoumanis, & Smith, 2009).

Finally, there are many factors that are unique to the coaching context that should also be considered. For example, in coaching, parents play an instrumental role in the sport context and have a direct impact on coaches (Appleton, Hill, & Hall, 2011). Coaching research needs to determine which contextual factors are the most relevant to coaches and explore how those factors either support or thwart coaches' psychological needs.

Lastly, coaching research should focus on examining the factors that predict all three types of need-supportive and need-thwarting behaviours (i.e. all six types of interpersonal behaviours). To date, no studies have examined the factors that predict AS behaviours, as well as CS and RS behaviours (e.g., Taylor et al., 2008; Appleton et al., 2011). SDT stipulates that supporting all three psychological needs, beyond just autonomy, should lead to an increase in need satisfaction in athletes, and a subsequent increase in athletes' autonomous motivation for sport, which leads to positive outcomes (e.g., Pomerantz, Cheung, & Qin, 2012). Amorose and Anderson-Butcher (2007) examined the relationship between athletes' perceived AS, CS, and RS from their coaches and found it was related to athlete motivation quality. Additionally, since coaches may also engage in need-thwarting behaviours and the absence of need-support does not necessarily mean the coach is using need-thwarting styles (Sheldon & Filak, 2008), coaching research should also examine the factors that predict all three types of need-thwarting behaviour (Bartholomew, Ntoumanis, & Thogersen-Ntoumani, 2010). Again, when considering need-thwarting, AT behaviours have received the most attention (Stebbing et al., 2012) and new research should also examine the antecedents of CT and RT interpersonal behaviour in coaches.

Present Research

The main objective of this research is to address the existing limitations in the coaching research by testing a model that examines the influence of contextual factors on coaches' need satisfaction and frustration in sport, which influences their reported autonomous and controlled motivation for coaching, and then their subsequent reported need-supportive and need-thwarting interpersonal behaviours. For a visual of this model, see Figure 3.1.

In Study 1, the objective will be to identify the coaching context factors that are the most important to coaches so that they can be tested in the final model in Study 3. To do this, coaches will be presented with a series of contextual factors that have been identified in either the SDT and sport, the SDT and other domains, or the coaching literature. The specific purposes of this exercise are to explore whether these factors have positive or negative influences on coaches, identify any factors that have been missed by previous research in any domain, and determine which factors are the most important to coaches. It is anticipated that this exercise will provide important insight about which contextual factors should be examined when exploring coaches' experiences while coaching.

The specific objective of Study 2 is to test the back end of the model and confirm the relationship between coaches' needs, motivation, and their reported use of all six types of interpersonal behaviours in their coaching, but without exploring any contextual factors. Specifically, this model will test the influence of coach need satisfaction and frustration on coach autonomous and controlled motivation, and then the influence of both types of motivation on reported AS, AT, CS, CT, RS, and RT interpersonal behaviours. It is anticipated that this study will discover the relationship between coaches' psychological needs in coaching and their motivation for coaching is as expected, according to SDT. It is also anticipated that this study

will demonstrate that coaches' autonomous and controlled motivation are significant predictors of reports of all six types of interpersonal behaviours.

Finally, the objective of Study 3 is to test the full motivational sequence, according to SDT, within a coaching context. This study will examine the influence of the factors identified in Study 1 on coaches' psychological need satisfaction and frustration, and then this influence on their autonomous and controlled motivation for coaching, and finally the relationship between their motivation orientation and use of need-supportive and need-thwarting interpersonal behaviours. Overall, it is anticipated that examining the full sequence will provide additional insight into the conditions that lead to when coaches engage in need-supportive, versus need-thwarting, interpersonal behaviours in their coaching.

Study 1

The objective of Study 1 was to identify the contextual factors that are most relevant to coaches so that they can be tested in the full model sequence in Study 3. Specifically, this study looked at the existing coach research to identify the contextual factors that have already been examined in relation to coaches, or may be relevant to coaches. The first purpose was to determine whether these factors have a positive or negative impact on their coaching, and the second was to identify which ones are the most important to coaches. An additional goal of this study is to identify any additional environmental factors that have not been previously examined in coaching research.

Method

Participants

A sample of 56 coaches ($n_{\text{male}} = 33$, $n_{\text{female}} = 23$) aged 19 through 67 ($M = 37.38$, $SD = 10.40$) participated in this study. They coached a variety of sports (i.e. baseball, basketball, figure

skating, gymnastics, hockey, kayaking, soccer, speed skating, swimming, track and field, volleyball, and weightlifting) and had an average of 10.84 years of experience ($SD = 7.06$). The majority ($n = 30$, 54%) started coaching because they had participated in their sport as an athlete and wanted to stay involved. Many coaches indicated that they were the head coach ($n = 29$, 53%) or part of a group of coaches ($n = 13$, 24%). In terms of compensation, 21 (38%) indicated that they were paid for almost all of their coaching responsibilities, 15 (27%) reported that they were paid for some of their coaching, and the rest ($n = 20$, 36%) said they were not paid. When asked what level of athletes they currently coached primarily, 10 (18%) reported working with recreational athletes, 25 (46%) were working with developmental athletes, and the rest ($n = 21$, 37%) were currently working with elite athletes. The coaches reported working with an average of 31.15 athletes per season ($SD = 43.30$), aged 11 through 17.

Procedures

Coaches were recruited to participate in an online personal inventory about their coaching context through the Coaching Association of Canada's Facebook and Twitter feeds. A short description of the study, as well as a link to the survey, were included in the social media post. If the coaches were interested in participating in the study, they could follow the link to read more about the details of the study, read about the inclusion criteria, and provide their informed consent. In order to participate in this study, coaches had to be at least 18 years of age and actively coaching at the time of the study season.

Coaching Context Literature Review. In order to determine which factors should be included in this inventory, as part of this study, the existing research that has already identified many potential contextual factors in both coaching and other domains was reviewed. These factors are divided into two groups: (1) Motivation Research: factors that have already been

examined in a coach setting, or in other similar settings, using the SDT framework; and (2) Coaching Research: factors that have not been examined from an SDT or motivational framework, but are specific to the coaching context and have been shown to have some sort of impact on coaches. An overview of the factors found in this review of the literature is listed below.

Motivation research. The following contextual factors have been examined in a coaching context, or in other similar environments (i.e., education context), using the SDT framework.

Administration: Allen and Shaw (2009) examined elite coaches and found they felt pressure when their club administration promoted a competitive environment. In another study, Rocchi and colleagues (2013) found that administrations had a negative impact on coaches' motivation for coaching. *Job Security:* Job security has been shown to have a positive impact on employees' psychological health (Probst, 2003) and Stebbings and colleagues (2012) found there was a positive relationship between coaches' perceptions of job security and need satisfaction, and a lack of job security predicted need frustration. *Opportunities for Professional Development:* Previous research has shown that formalized coach accreditation processes, mentoring initiatives, and training courses help coaches thrive (Allen & Shaw, 2009) and Stebbings and colleagues (2012) found that these opportunities were associated with need satisfaction and a lack of opportunities was related to need frustration. *Parents:* Solstad, van Hove, and Ommundsen (2015) looked at the impact of perceived parental pressure on coaches' AS coaching behaviours and did not find that it had a significant impact. A separate study outside of SDT, however, found that coaches rated the influence of parents to be positive and appropriate for their coaching (Gould, Lauer, Rolo, Jannes, & Pennisi, 2008). *Perceived Athlete Motivation:* Previous research supports that coaches' perceptions of their athletes' motivation for their sport is positively related

to their own motivation for coaching (Rocchi et al., 2013); however, the link between perceived athlete motivation and coach psychological needs still has to be examined. *Performance*

Evaluations: Taylor and colleagues (2009) examined teachers and found performance evaluations by their schools exerted pressure on them. Performance evaluations may be relevant in the coaching context since successful coaches are most often evaluated in terms of their competitive results, above and beyond any other qualities (Chaumeton & Duda, 1988). *Time*

Constraints: Taylor and colleagues (2009) examined the impact of time constraints on physical education teachers and found they believed time constraints also promoted controlled motivational strategies. Time constraints create a conflict between how teachers want to teach, and how they actually teach, essentially undermining their need for autonomy. In sport, regardless of the level, coaches are struggling to obtain results, with limited resources and time (Hjalm, Kentta, Hassmenan, & Gustafsson, 2007). *Work-Life Conflict:* Some coaches, especially women coaches, find it difficult to manage the demands of their coaching life, in addition to their work and family lives. Stebbings and colleagues (2012) examined the relationship between work-life conflict and psychological need satisfaction and found that it was negatively related to coaches' rated need satisfaction.

Coaching research. The following contextual factors have been examined through the coaching literature, but have not been explicitly linked to need satisfaction, coach motivation or SDT. *Compensation:* Giges and colleagues (2004) examined the coaching environment from a career perspective and found that coaches who wished to coach full-time experienced very few opportunities for professional advancement, with minimal job security. *Technology:* Advances in sport sciences and technology have changed the expectations placed upon most coaches (Giges et al., 2004). Coaches are not only required to keep up with the current trends in their sport, but

in technology as well. *Volunteer Realities*: Since many coaches are volunteers (Trudel & Gilbert, 2006), concerns for volunteers have also been examined to ensure that coaches perceive that their volunteer position is not too demanding and they feel supported.

Measures

The coaches completed a series of demographic and coaching background questions, as well as the following as part of the online personal inventory about their coaching context.

Coaching context personal inventory. The coaches completed a series of exercises in order to better understand their coaching context and the factors that are relevant to their experience as a coach (see Appendix N).

Step 1. First, the coaches were given a list of factors that were identified in previous research. Specifically, they were presented with each of the following descriptions: (1) Administration (club administration, the sport administration, or anyone who is involved in the planning and organizing of your athletes or resources); (2) Athletes (motivation, behaviour, and attitude); (3) Compensation (monetary or another format); (4) Evaluations (evaluations from administrations, parents, athletes, or other sources); (5) Job security (extent to which coaching position is guaranteed); (6) Parents (behaviours, attitudes, and motivation); (7) Professional development (opportunities for professional development or training); (8) Technology (email, video recording, electronic scorekeeping); (9) Time (amount of time you spend with your athletes and the amount of time you spend doing your coaching duties); and (10) Work-life balance (managing coaching demands, as well as your other aspects of life). For each factor, they were asked to respond using a 7-point scale, ranging from 1 (*Never*) to 7 (*Always*), to two questions: (a) Does “name of the factor” have a positive impact on your coaching experience? and (b) Does “name of the factor” have a negative impact on your coaching experience?

Step 2. Next, the coaches were asked to list any additional factors that were not covered in Step 1, but that were relevant to their coaching experience. For this portion, the coaches were not given any instructions about how many factors to list and could proceed without completing this step.

Step 3. In this stage, the coaches were provided the list of the original 10 factors they had reviewed as part of Step 1, plus the addition of any factors they added in Step 2. They were then asked to consider all factors listed and to rank order their top 5.

Step 4. Finally, the coaches were invited to add comments about their participation in the study. They were also encouraged to speak more about their context and the factors that influenced them if they felt that the exercises did not provide them with the opportunity to communicate everything they wanted to share about their experience.

Analyses

First, the demographic and coaching background variables were analyzed to confirm the sample consisted of a heterogeneous group of coaches, from various backgrounds and different amounts of experience. Next, the coaches' reports of the relative positive and negative impact of each factor was analyzed. The list of additional potential factors was examined to determine whether there were any popular responses that could be extended to the majority of coaches' contexts. Finally, the rank-order of contextual factors was explored to determine which factors had the greatest influence on coaches, regardless of whether this was positive or negative.

Results

The data was cleaned and screened for impossible and out of range values. Since this was an exploratory study, no formal data cleaning procedures were followed. Descriptive statistics on the participants' demographic and coaching background variables (summarized in the

“participant” section of *Study 1*) supported that the sample consisted of a variety of coaches of different ages, from different sports, with varying amounts of experience, levels of athlete, and commitments to coaching. Although this sample is not representative of all coaches in Canada, the variety within the sample will help ensure that many perspectives are taken into consideration for these analyses.

The descriptive statistics were calculated for each of the 10 factors based on the extent to which the coaches reported the factor had a positive impact on their coaching experience, as well as a negative impact on their coaching experience. The results of this analysis are in Table 3.1. Paired samples t-tests were conducted to explore whether there were any differences in the positive or negative ratings for each of the ten factors. The results supported that for all of the factors except administration and work-life balance, the coaches rated them as having a more positive influence, compared to a negative influence ($t_{(54)} > 2.07, p < .05$) on their coaching experience. For both administration and work-life balance, there was no difference between the two ratings, suggesting that they had both a positive and negative influence on coaches. In terms of which factors were rated as having the highest positive influence, visual inspection of the data suggests that coaches rated athletes ($M = 6.27, SD = 0.68$) and opportunities for professional development ($M = 6.15, SD = 1.14$), followed by technology ($M = 5.82, SD = 1.14$) and time ($M = 5.40, SD = 1.54$) as the highest. In terms of the negative factors, work-life balance ($M = 4.36, SD = 1.56$) and administration ($M = 4.02, SD = 1.65$) were rated the highest, along with time ($M = 3.91, SD = 1.54$) and parents ($M = 3.83, SD = 1.36$).

Next, the additional factors that were suggested by the coaches were examined. Overall, 40 additional factors were suggested by 29 of the 56 coaches. Most of these coaches only suggested 1 additional factor; however, some listed up to three. Of these suggestions, the

majority were sport-specific and included things such as cost, ice time availability, costume designers, officiating, suitability of the terrain, and weather. A number of additional suggestions were perceived to already fall under one of the 10 factors provided as part of the exercise. These included: sport politics (administration), opportunities to develop (professional development), additional classes (professional development), being a new parent (work-life conflict), recognition (evaluations), and the atmosphere of the club (administration). The remaining responses fell under the most popular suggestion, which was the influence of coaching colleagues. Nearly 25% of the additional suggestions (9 of 40) were about “colleagues”, “other coaches”, or their “co-coaches”. Overall, this portion of the exercise identified colleagues as a potential additional factor that should be considered when exploring the coaching environment.

In the final step, the coaches were asked to rank the 5 factors that were the most relevant to their coaching experience (using the original list of 10, plus any of their own suggestions if applicable), regardless of whether they perceived the factor to have a positive or negative influence on them. The frequencies were calculated by factor for each ranking (1st, 2nd, etc.) and then the overall percentage of top 5 rankings were calculated for each factor (see Table 3.2 for the full results). The factors that received the highest proportion of the top 5 rankings were athletes (18%), work-life balance (13%), administration (13%), professional development (12%), time (10%), and parents (8%). A closer inspection of the “other” rankings revealed that every participant who had listed their colleagues as an important factor to their coaching experience had also ranked it in their top 5. These results suggested that colleagues may be one of the most important influences in a coaches’ environment. Finally, technology, compensation, evaluations, and job security were all given lower rankings in terms of their overall importance to coaches (less than 5%).

Discussion

The purpose of Study 1 was to determine which coaching contextual factors should be examined as part of the full model sequence in Study 3. The coaches participated in an online exercise with the objective of having them reflect on their coaching context and determine which factors had the biggest influence on them while they coached. Overall, this study achieved its objective as it clearly identified which factors should be examined more closely in their relation to coaches' psychological needs and motivation. Based on the results of this study, Study 3 should examine coaches' perceptions of their athletes, work-life balance or conflict, their administration, opportunities for professional development, time constraints, athletes' parents, and coaching colleagues.

Study 2

The objective of Study 2 was to address the gaps in the existing literature on coaches and their motivation, according to SDT. Specifically, this study aims to confirm that the full SDT sequence (needs, motivation, and outcome behaviour) applies to coaches in the coaching context. This study will also examine the relationships between the negative aspects of need satisfaction and motivation (i.e. need frustration and controlled motivation) as distinct constructs. Finally, this study will explore the relationship between coaches' motivation and all six types of need-supportive interpersonal behaviours. It is hypothesized that the model will fit the data well and that coaches' need satisfaction will positively predict autonomous motivation for coaching, while negatively predicting controlled motivation, and the opposite relationships are expected for coach need frustration. Finally, autonomous motivation for coaching will promote increased reported use of need-supportive interpersonal behaviours (autonomy, competence, and

relatedness) and decreased reported use of need-thwarting interpersonal behaviours, and again, the opposite is expected for controlled motivation.

Method

Participants

A sample of 310 basketball coaches ($n_{\text{male}} = 254$, $n_{\text{female}} = 46$, $n_{\text{missing}} = 3$) participated in this study. They had an average age of 46.20 years ($SD = 9.81$) and the large majority had a college ($n = 71$, 23%) or university education ($n = 270$, 87%). They had an average of 16.80 years of coaching experience ($SD = 14.29$) and the majority ($n = 207$, 67%) identified as a head coach or as an assistant coach ($n = 69$, 22%). When asked how competitive their athletes were compared to all athletes in their age-group, they indicated that their athletes were very ($n = 116$, 38%) or extremely ($n = 40$, 13%) competitive.

Procedures

Coaches were recruited to participate in an online study about their feelings when they coach, their motivation, and their relationship with their athletes, through their provincial basketball association. Coaches received an invitation to participate in the study, along with the link to the survey through e-mail. In order to participate in this study, coaches had to be at least 18 years of age, an active member of their association at the time of the recruitment (i.e., their membership dues were paid), and they had to be actively coaching that season. Before participating, the coaches were informed about their rights and provided their informed consent.

Measures

All coaches completed the following measures.

Need satisfaction. To assess the extent coaches' basic psychological needs for autonomy, competence, and relatedness were met while coaching, the coaches completed the

positive items from the *Basic Need Satisfaction at Work Scale* that were adapted to the sport context (Appendix K; Deci, Ryan, Gagné, Leone, Usunov, & Kornazheva, 2001). The stems were modified from the original version to ask the coaches about their need satisfaction while coaching, instead of at work. Participants were asked to indicate, using a 7-point scale ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*), the extent to which they typically agreed with each statement. To confirm the factor structure of this scale using a sport context, a confirmatory factor analysis using Mplus Version 6 (Muthen & Muthen, 2010) was conducted. The fit indices suggest that the model has an acceptable fit, except for the TLI ($SB\chi^2_{(41)} = 72.19$, $p < .001$, RMSEA = .06 (95% CI [.04, .08]), SRMR = .05, CFI = .91, TLI = .89). The internal consistency was evaluated for each subscale and the results suggested that the subscales did not all meet the minimum requirements (autonomy $\alpha = .66$; competence $\alpha = .59$; relatedness $\alpha = .72$). Closer inspection of the factor loadings in the CFA, as well as the relative contribution of each item to the internal consistency levels did not indicate that one particular item was causing a miss-fit in the model or negatively impacting the internal consistency. Since this scale has commonly been used in a number of studies to assess need satisfaction in a variety of contexts including sport (i.e., Reinboth, Duda, & Ntoumanis, 2004), the scale was used in its current format. For the purposes of the model testing, a mean score was calculated for each subscale (autonomy, competence, and relatedness) and these were used as indicator variables for the latent construct of need satisfaction.

Need frustration. To assess coaches' need frustration while coaching, they completed the *Psychological Need Thwarting Scale in Sport* (Appendix L; Bartholomew et al., 2010). The scale assesses the extent to which the three basic psychological needs according to SDT are met within a given context and participants responded using a 7-point scale ranging from 1 (*Do not*

agree at all) to 7 (*Completely agree*). A confirmatory factor analysis using Mplus Version 6 (Muthen & Muthen, 2010) was conducted to confirm the structure of the scale for coaches and the results supported that the model had an excellent fit ($SB\chi^2_{(32)} = 49.75, p < .001$, RMSEA = .05 (95% CI [.03, .07]) SRMR = .06, CFI = .96, TLI = .95). The internal consistency for the three subscales were slightly lower than the minimum ($\alpha > .66$), although since the factor structure of the scale was supported, the scale was used in its original format. A mean score was calculated for each subscale to represent the coaches' frustration of each need and these three scores were used as observed variables in the model, representing the latent construct of need frustration.

Coach Motivation. To assess the coaches' motivation for coaching, they completed the *Coach Motivation Questionnaire* (CMQ; Appendix M; McLean, Mallet, & Newcombe, 2012). The CMQ is a six-factor scale measuring sport motivation according to each of the types of behavioural regulation, according SDT. The coaches responded to each of the 22 statements about the reasons why they coach using a 7-point scale, ranging from 1 (*Does not correspond at all*) to 7 (*Corresponds completely*). To confirm the structure of the scale for this sample, a confirmatory factor analysis using Mplus Version 6 (Muthen & Muthen, 2010) was conducted ($SB\chi^2_{(194)} = 378.79, p < .001$, RMSEA = .06 (95% CI [.05, .06]), SRMR = .07, CFI = .90, TLI = .90). The Cronbach's alphas were calculated for each subscales and revealed they were above the acceptable limit ($\alpha > .71$). Parceling was used to create three indicator variables representing autonomous motivation from the intrinsic, integrated, and identified subscales items, as well as three indicator variables presenting controlled motivation from the introjected and external subscales (Russell, Kahn, Spoth, & Altmaier, 1998). High scores on the autonomous indicator variables indicated high quality coach motivation and high scores on the controlled indicator variables indicated low quality coach motivation.

Interpersonal behaviors. The coaches also completed the *Interpersonal Behaviours Questionnaire - Self* (IBQ; see Chapters 2 and 3; Rocchi, Pelletier, Cheung, Baxter, & Beaudry, 2016; Rocchi, Pelletier, & Desmarais, 2016) to assess the extent to which they believed they engaged in specific types of interpersonal behaviours according to SDT with their athletes. The scale consists of 24 items measuring AS, AT, CS, CT, RS, and RT interpersonal behaviours. The coaches responded to each item using a 7-point scale, ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*) indicating the extent to which each statement applied to their own interactions with their athletes using the stem “When I am with my athletes, I...”. To confirm the structure of the scale for this sample, a confirmatory factor analysis using Mplus Version 6 (Muthen & Muthen, 2010) was conducted ($SB\chi^2_{(215)} = 308.65, p < .001$, RMSEA = .04 (95% CI [.03, .05]), SRMR = .04, CFI = .93, TLI = .92). The Cronbach’s alphas were calculated for each subscales and revealed they were above the acceptable limit ($\alpha > .74$). For the current model, each item was used as an indicator variable to create the six latent constructs associated with AS, AT, CS, CT, RS, and RT coach interpersonal behaviours.

Social desirability. Finally, the participants also completed the short form of the *Marlowe-Crowne Social Desirability Scale* (Appendix G; Reynolds, 1982) to control for whether participants were responding to survey items, mainly their reported interpersonal behaviours, based on providing favourable responses. Participants were asked to indicate whether 10 statements are true or false for them. The participants’ responses that are considered to be socially desirable are given a weight of 1 and then the sum is calculated to provide an overall measure of social desirability.

Analyses

First, the data was cleaned and the model variables were prepared for the analyses as required. Next descriptive statistics were calculated, the model variables were explored for outliers, and the distributions of the model variables were examined for normality. Then, preliminary correlational analyses were conducted to confirm that the participants' reported interpersonal behaviours with their athletes were not related to measures of social desirability. In the next step, the 10-factor measurement model exploring the factor structure of coaches' need satisfaction, need frustration, autonomous motivation, controlled motivation, and reported use of interpersonal behaviours (AS, AT, CS, CT, RS, and RT) was estimated in Mplus Version 6 with the maximum likelihood robust (MLR) estimator (Muthen & Muthen, 2010). The fit of this model was assessed using the Satorra-Bentler (SB) scaled chi-square and the Standardized Root Mean Square Residual (SRMR) as absolute fit indices; the Tucker-Lewis Index (TLI) as a relative fit index; and finally, the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA) as noncentrality-based indices. For the SRMR and RMSEA, values below .08 indicated adequate model fit; while for the CFI and TLI, values above .90 represent adequate fit (Hooper, Coughlan, & Mullen, 2008). Finally, the structural model exploring the sequence for coaches according to SDT (needs on motivation on interpersonal behaviours) was tested and assessed using the same fit indices as the measurement model.

Results

Preliminary Analyses

Before testing the measurement and structural models, the data was cleaned and screened for out-of-range values, outliers, and sample distribution normality. All raw data values for the model variables were within their expected theoretical ranges and were screened for univariate outliers. The data was standardized and scores with values below -3.29 and above 3.29 were

considered to be outliers and recoded to the most extreme, but within normal range, values for the particular variable (Tabachnick & Fidell, 2001). The scoring distributions of the model variables were examined for normality. The results suggested that univariate normality had not been achieved (skewness range: -14.16 to 18.63; kurtosis range: -3.97 to 17.75); however, this was not unexpected since non-normal distributions occur frequently in social science data (Barnes, Cote, Cudeck, & Malthouse, 2001). Since the models were tested using the MLR estimator, which is robust to non-normality, the analyses were conducted as planned, without any adjustment to the distributions of the variables (Muthen & Muthen, 2010). For the descriptive statistics of the model variables, see Table 3.3.

As a final preliminary analysis, all of the model variables (i.e., need satisfaction, need frustration, motivation, and dimensions of interpersonal behaviours) were correlated with social desirability to confirm that participants' responses were not biased by social desirability. The results indicated that none of the relationships were significant ($r_s > .125$, $p_s > .05$) except for two items in coaches' reported CT interpersonal behaviours. Specifically, the items "Question their ability to overcome challenges" ($r = .15$, $p = .024$) and "Suggest they are incompetent" ($r = .15$, $p = .022$) demonstrated significant, but weak relationships with social desirability. Since these relationships were not strong, they were correlated with negative items that would not normally be expected to correlate with social desirability, and was only present on 2 of the 35 observed variables in the model, no adjustments were made and all variables were carried forward to the model testing phase.

Measurement Model

The ten-factor model was estimated using the maximum likelihood robust (MLR) estimator to confirm that the indices were measuring the appropriate latent constructs. The

factors were: (1) coach need satisfaction (three indicators: autonomy, competence, and relatedness); (2) coach need frustration (autonomy, competence, and relatedness); (3) coach autonomous motivation (three indicators of coaches' autonomous motivation for coaching); (4) coach controlled motivation (three indicators of coaches' autonomous motivation for coaching), and six factors representing coaches' reported interpersonal behaviours (5 - AS, 6 - AT, 7 - CS, 8 - CT, 9 - RS, and 10 - RT) with 4 factors indicators each. The measurement model was tested using Mplus Version 6 (Muthen & Muthen, 2010) and all the latent constructs were allowed to correlate. The measurement model showed adequate fit ($SB\chi^2_{(450)} = 646.18, p < .001, RMSEA = .04$ (95% CI [.03, .05]), SRMR = .05, CFI = .93, TLI = .92). Examination of the pattern coefficients revealed that they were all significant and loading on the appropriate factors ($\beta_s > .53$; see Table 3.4).

Structural Model

The structural model predicting coaches' use of need-supportive and need-thwarting interpersonal behaviours was examined. The results suggested that this model had a good fit ($SB\chi^2_{(463)} = 714.39, p < .001, RMSEA = .04$ (95% CI [.04, .05]), SRMR = .06, CFI = .92, TLI = .91). In this model, all regression coefficients were significant except for the relationship between coaches' need satisfaction and coaches' controlled motivation, as well as coaches' autonomous motivation and reported use of AT behaviours. All relationships were in the expected direction, except for the regression coefficient predicting autonomous motivation from need frustration, which was positive instead of negative ($\beta = .24, p < .001$). Since the zero order correlation between need frustration and autonomous motivation from the measurement model

testing phase was not significant ($r = .03$, ns), these results suggest the presence of a suppression effect.¹

From a theoretical perspective, a significant amount of previous research in SDT supports that need frustration should negatively predict autonomous motivation (e.g., Sheldon, 2011; Sheldon & Filak, 2008). Based on the results of previous research, as well as the zero-order correlations in this study, it is estimated that this significant positive relationship between need frustration and coaches' autonomous motivation is a suppression effect due to a statistical artefact, and not due to any unique characteristics of this sample. As such, the model was re-run without this path (as well as the path between need satisfaction and controlled motivation because it was not found to be significant) to see if the model still fit the data well. The results of this second model estimation suggested that this version of the model also fit the data well ($SB\chi^2_{(465)} = 722.78$, $p < .001$, $RMSEA = .04$ (95% CI [.04, .05]), $SRMR = .06$, $CFI = .91$, $TLI = .91$). A chi-square difference test was performed to confirm whether constraining the paths between need satisfaction and controlled motivation, as well as need frustration and autonomous motivation significantly improved the overall fit of the model. The results supported that the chi-square difference test was not significant ($\Delta SB\chi^2_{(2)} = 8.39$, ns), which supports that the more parsimonious model (the model without the suppression effect) provides a better explanation of the data. Overall, this model accounted for approximately 20% of variance in each reported interpersonal behaviour within the coaching context (See Figure 3.2 for the full model with the standardized regression coefficients).

Discussion

¹ In regression, if an additional variable is added to a model, it should reduce the magnitude of the relationship between the existing variables. A suppression effect occurs when a new variable increases the strength of a predictor by its inclusion in the regression equation (MacKinnon, Krull, & Lockwood, 2000), instead of reducing it.

The results of Study 2 found evidence for the full motivational sequence in SDT is appropriate for exploring the relationships between coaches' psychological needs, motivation, and outcome behaviours. Specifically, this model found support for the relationship between coaches' need satisfaction and frustration, their autonomous and controlled motivation for sport, and their reported use of AS, AT, CS, CT, RS, and RT interpersonal behaviours. This study was the first to explore the relationship between coaches' needs, motivation, and an outcome; and the first to explore coaches' reported use of all six types of interpersonal behaviours according to SDT. Specifically, coaches' need satisfaction predicted an increase in autonomous motivation for coaching, which predicted increases in reported use of need-supportive interpersonal behaviours (autonomy, competence, and relatedness) and a decrease in reports of need-thwarting interpersonal behaviours (competence and relatedness only). Alternatively, coaches who report that their needs are frustrated in their coaching experience report increased controlled motivation for coaching which, in turn, predicted increased use of need thwarting interpersonal behaviours (all three types) and decreased use of need-supportive interpersonal behaviours (all three types).

Study 3

The objective of Study 3 was to extend the findings of Study 2 by exploring the influence of contextual antecedents on coaches' psychological needs, motivation, and reported use of interpersonal behaviours. Specifically, this study will look at how the most important coaching environmental factors identified in Study 1 influence coaches' need satisfaction.

Method

Participants

A sample of 225 coaches ($n_{\text{male}} = 140$, $n_{\text{female}} = 76$, $n_{\text{missing}} = 9$) aged 20 through 67 ($M = 39.63$, $SD = 9.97$) participated in this study. These coaches came from a variety of sport

backgrounds including crossfit, basketball, boxing, cross country skiing, diving, figure skating, football, gymnastics, hockey, mountain biking, road cycling, rowing, rugby, skiing, soccer, squash, swimming, tennis, track and field, volleyball, weightlifting, and wrestling. They had an average of 12.63 years of experience ($SD = 8.78$) and the majority ($n = 124$, 55%) started coaching because they had participated in their sport as an athlete and wanted to stay involved. The majority of coaches reported that they were the head coach ($n = 129$, 60%) and coached an average of 29.13 athletes per season ($SD = 16.45$) aged 11 through 22. When asked what level of athletes they currently coached primarily, 52 (23%) reported working with recreational athletes, 126 (56%) were working with developmental athletes, and the rest ($n = 47$, 21%) were currently working with elite athletes.

Procedures

Coaches were recruited for this online study through Provincial Sport Organizations' e-mail distribution lists of coaches (i.e., Skate Ontario, Baseball Ontario), as well as the Coaching Association of Canada's Facebook and Twitter feed. Participants were informed that the study was about their coaching background, their coaching context, their reasons for coaching, and their relationships with their athletes. If the coaches were interested in participating, they could follow the link to the survey website for more information. The only inclusion criteria for this study was that coaches had to be at least 18 years of age and actively coaching at the time of recruitment.

Measures

All coaches completed the following measures in an online survey.

Needs, motivation, and interpersonal behaviours. To assess coaches' psychological needs, motivation towards coaching, and use of interpersonal behaviours with their athletes, they

completed the same measures as Study 2. Specifically, coaches completed the *Basic Need Satisfaction at Work Scale* adapted to the sport context (Appendix K; Deci et al., 2001) and both the CFA analysis ($SB\chi^2_{(41)} = 36.25, p < .001$, RMSEA = .05 (95% CI [.02, .07]), SRMR = .05, CFI = .95, TLI = .94) and internal reliabilities ($\alpha > .67$) supported the scale was appropriate for this sample. The same results were found for the *Psychological Need Thwarting Scale in Sport* (Appendix L; Bartholomew et al., 2010) in terms of model fit ($SB\chi^2_{(41)} = 35.11, p < .001$, RMSEA = .04 (95% CI [.00, .07]), SRMR = .05, CFI = .97, TLI = .96) and subscale reliability ($\alpha > .77$). The *Coach Motivation Questionnaire* (Appendix M; McLean et al., 2012) also demonstrated a strong factor structure ($SB\chi^2_{(194)} = 338.39, p < .001$, RMSEA = .06 (95% CI [.05, .07]), SRMR = .07, CFI = .91, TLI = .91) and adequate internal reliabilities ($\alpha > .70$). Finally, the same support was found for the *Interpersonal Behaviours Questionnaire* (See Chapter 2 and 3; Rocchi et al., 2016; Rocchi et al., 2016) ($SB\chi^2_{(215)} = 376.31, p < .001$, RMSEA = .06 (95% CI [.05, .07]), SRMR = .06, CFI = .91, TLI = .89, $\alpha > .77$). All of the model indicator variables were calculated using the same procedures as Study 2, except for the interpersonal behaviours. For this analysis, since the purpose of the study was to explore the predictive end of the model and the sample size did not permit the examination of a very complex model, a mean score was calculated for each of the six subscales of the *Interpersonal Behaviours Questionnaire*. The mean scores for AS, CS, and RS were used as observed variables of the latent construct “Need-Supportive Interpersonal Behaviours”; while the mean scores for AT, CT, and RT were used as observed variables for the “Need-Thwarting Interpersonal Behaviours” latent construct.

Administration. To assess coaches’ perceptions of their sport administration, they completed the program support, decision-making, and job benefits subscales of the *College Coach and Athletic Administrative Support Scale* (Appendix O; Pastore, Goldfine, & Riemer,

1996). The program support subscale includes items like “Provides enough resources”, the decision-making subscale includes “Allows autonomy in scheduling”, and the job benefits subscale “Allows adequate funding for coaches”. The coaches responded to each item, using a 7-point scale ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*), the extent to which they typically agreed with each statement about their sport administration. To confirm the factor structure of this scale with the current sample, a confirmatory factor analysis using Mplus Version 6 (Muthen & Muthen, 2010) and the internal consistencies were calculated. The fit indices suggest that the model has an acceptable fit ($SB\chi^2_{(24)} = 78.18, p < .001, RMSEA = .06$ (95% CI [.05, .07]), SRMR = .06, CFI = .91, TLI = .90) and the Cronbach’s alphas were above the acceptable limit ($\alpha > .77$). For the purposes of the proposed model, a mean score was calculated for each subscale (program support, decision-making, and job benefits) and these were used as indicator variables for the latent construct of administration support.

Athletes. To assess coaches’ perspectives of their athletes, they completed the *Revised Sport Motivation Scale* (Appendix S; Pelletier, Rocchi, Vallerand, Deci, & Ryan, 2013) to assess their perceptions of athletes’ reasons for participating in their sport. The SMS-II is a six-factor scale comprised of 18 items measuring sport motivation according to each of the six types of behavioural regulation, according to SDT (Deci & Ryan, 1985). The item stems were modified and coaches were asked to indicate the reasons they believed their athletes played their sport, using a 7-point scale, ranging from 1 (*Does not correspond at all*) to 7 (*Corresponds completely*). A confirmatory factor analysis using Mplus Version 6 (Muthen & Muthen, 2010) and the internal consistencies were calculated. The fit indices suggest that the model has an acceptable fit ($SB\chi^2_{(120)} = 194.92, p < .001, RMSEA = .06$ (95% CI [.04, .07]), SRMR = .07, CFI = .95, TLI = .93) and the Cronbach’s alphas were above the acceptable limit ($\alpha > .71$). Three

index scores were calculated using the Relative-Autonomy Index (RAI; Blais, Sabourin, Boucher, & Vallerand 1990), where one item from each of the six subscales were weighted according to their level of autonomy and control. Specifically, to create the indicator variables, the *Intrinsic* subscale items were given a weight of 3, the *Integrated* subscale a weight of 2, and the *Identified* subscale a weight of 1, then the *Introjected*, *External*, and *Amotivated* subscales were given a weight of -1, -2, and -3, respectively, and were subtracted. High scores represented greater perceptions of athlete motivation quality.

Colleagues and parents. To assess the extent to which the coaches' colleagues and the athletes' parents were supportive, the coaches completed a *Social Support Scale* (Appendix P; Frese, 1999), adapted for coaching. This measure consists of 5 items about the extent to which other people are supportive of any personal issues, help get the job done, and easy to talk to. A sample item includes: "This person is helpful in getting your job done" and the coaches completed the scale once about their coaching colleagues, and a second time about the parents of their athletes. The coaches responded to each of the 5 items, using a 7-point scale ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*), indicating the extent to which the statements apply to their situation. The internal consistencies were calculated for both scales and demonstrated acceptable reliability (colleagues $\alpha = .86$, parents $\alpha = .90$). For the purposes of the present model, the observed variables for colleague and parent support were calculated using the same procedures. Specifically, a mean score was taken of the two items that assessed the extent the others were supportive of personal problems, a mean score was also taken of the two items that looked at how helpful they were at getting the job done, and, finally, the item about easiness to talk to was left on its own. These three variables (2 means, 1 observed variable) were used as the observed variables for colleague support and parental support, where higher scores represented

increased perceptions of support.

Professional development opportunities. Next, coaches responded to the items about opportunities for professional development from the *Constraints at Work Scale* (Appendix Q; Pelletier et al., 2002) to assess whether coaches had access to continued education. Coaches responded to the three items (i.e., “My club offers courses or seminars”), using a 7-point scale ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*). The items demonstrated adequate internal reliability (colleagues $\alpha = .64$) and each item was used as an observed variable for the latent construct of professional development opportunities in the model. Higher scores represented increased perceptions of opportunities.

Time constraints and work-life conflict. Finally, the coaches completed an adapted version of the *Time Pressure Scale* (Appendix R; Roxburgh, 2006) to assess whether coaches perceived that they had enough time to do their coaching duties, and whether they felt that they had enough time to complete their coaching duties, compared to their other life commitments. The scale consists of two subscales with 3 items each measuring time constraints related to an activity (i.e., “I have enough time for my coaching duties”) and work-life balance (i.e., “I have time to enjoy my family”). They responded to the three items using a 7-point scale ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*). A confirmatory factor analysis using Mplus Version 6 (Muthen & Muthen, 2010) and the internal consistencies were calculated. The fit indices suggested that the model has an acceptable fit ($SB\chi^2_{(8)} = 22.38, p < .001$, RMSEA = .07 (95% CI [.06, .08]), SRMR = .04, CFI = .96, TLI = .93) and the Cronbach’s alphas were above the acceptable limit (time $\alpha = .65$, work-life conflict $\alpha = .89$). For the purposes of the model testing, the individual items were used as the observed variables pointing to the latent variables of time constraints and work-life conflict.

Analyses

As a first step, the data was cleaned and the model variables were prepared for the analyses as required. Next, descriptive statistics were calculated, the model variables were explored for outliers, and the distributions of the model variables were examined for normality. The model testing was achieved through testing a series of incremental models using the same estimation and fit indices as Study 2. The first model tested the relationship between psychological needs, motivation, and reported interpersonal behaviours to confirm a simplified version of the model tested in Study 2 holds for this sample. The second model explored contextual factors and found that all latent constructs are adequate. Next, the third model looked at the influence of the contextual factors on coaches' need satisfaction and need frustration. Finally, the fourth model estimated the full SDT sequence using the contextual factors that had a significant relationship with need satisfaction and need frustration from the third model.

Results

Preliminary Analyses

Before testing the measurement and structural models, the data was cleaned and screened using the same procedures as Study 2. Like in Study 2, many of the variables had a non-normal distribution (skewness range: -12.17 to 19.23; kurtosis range: -2.13 to 15.73); however, again, since the models were tested using the MLR estimator, no adjustments were made to the distributions of the variables (Muthen & Muthen, 2010). For the descriptive statistics of the model variables, see Table 3.5.

Model Testing

The following section outlines the results of the series of models that were tested.

Model 1 – needs, motivation, and interpersonal behaviours. As a first step, a simplified version of the model from Study 2 was tested to confirm it was replicated in this sample. Specifically, this model looked at the influence of need satisfaction (3 indicators representing autonomy, competence, and relatedness) and need frustration (3 indicators representing autonomy, competence, and relatedness) on autonomous motivation (3 indexed scores as indicators) and controlled motivation (3 indexed scores as indicators), on reported use of need supportive interpersonal behaviours (3 indicators representing autonomy, competence, and relatedness) and need thwarting interpersonal behaviours (3 indicators representing autonomy, competence, and relatedness). The measurement model was tested using the same estimation methods as Study 2 and the results supported that the data fit the model well ($SB\chi^2_{(121)} = 168.63, p < .001, RMSEA = .05$ (95% CI [.03, .06]), $SRMR = .04, CFI = .97, TLI = .97$), and all of the observed variables loaded onto their appropriate latent construct (for the factor correlations, see Table 3.6). Next, the structural model was estimated and again, the results supported that the data fit the model well ($SB\chi^2_{(125)} = 208.22, p < .001, RMSEA = .06$ (95% CI [.05, .07]), $SRMR = .06, CFI = .96, TLI = .95$). The standardized regression coefficients were all in the expected direction, except for the relationships between coaches' reported need frustration and their autonomous motivation, as well as need satisfaction and controlled motivation, which were positive and significant. Similar to Study 2, the zero-order correlations of these relationships were significant, but in the opposite direction, suggesting the presence of a suppression effect. The model was re-run without those links and it still achieved a good fit ($SB\chi^2_{(121)} = 219.94, p < .001, RMSEA = .06$ (95% CI [.05, .08]), $SRMR = .07, CFI = .95, TLI = .95$). A chi-square difference test was conducted to see if the constrained model was just as good of a model as the non-constrained. The results supported that the chi-square difference test was

not significant ($\Delta SB\chi^2_{(4)} = 11.72, ns$), which supports that the more parsimonious model provides an equivalent, and therefore preferable, explanation of the data, like in Study 2.

Model 2 – environmental factors. In the second step, a confirmatory factor analysis was conducted on the 7 environmental factors: (1) administration support (3 indicators representing program support, decision-making, and job benefits); (2) athlete motivation (3 indexed scores as indicators); (3) colleague support (3 indicators representing personal support, helpfulness, and easiness to talk to); (4) parent support (3 indicators representing the same constructs as colleague support); (5) professional development opportunities (3 indicator variables); (6) time constraints (3 indicator variables); and (7) work-life conflict (3 indicator variables) to confirm that each factor loaded onto its appropriate construct. The results suggested that the model did not have good fit ($SB\chi^2_{(168)} = 412.62, p < .001$, RMSEA = .09 (95% CI [.08, .100]), SRMR = .08, CFI = .89, TLI = .87). Closer inspection of the factor loadings for each of the latent factors suggested that the professional development opportunities and work-life balance indicator variables did not load onto their appropriate latent constructs ($\beta s < .42$). For both constructs, a number of configurations were explored to see if it improved the overall model fit (including removing the lowest loading indicator variables) and, even with these adjustments, the fit indices were still not above the minimum criteria. In the end, both constructs were removed and the remaining 5 factors were tested. The results supported that the 5-factor model did fit the data well ($SB\chi^2_{(125)} = 210.13, p < .001$, RMSEA = .07 (95% CI [.05, .08]), SRMR = .05, CFI = .94, TLI = .92) and these five factors were carried forward to the third model (see Table 3.7 for the correlations between these factors).

Model 3 – environmental factors and psychological needs. In this third step, a structural model was tested where the five environmental factors identified in Model 2 were

regressed onto coaches' reported need satisfaction and need frustration. The purpose was to confirm which environmental factors had a significant impact on coaches' reported need satisfaction and frustration, before testing the full sequence in Model 4. First, the measurement model was tested to confirm that the indicator variables were appropriate in this 7-factor model (5 environmental factors, need satisfaction, and need frustration). Since these latent factors were already tested separately in Model 1 and Model 2, and demonstrated good fit, it was not unexpected that the measurement model for Model 3 had good fit as well ($SB\chi^2_{(168)} = 348.25, p < .001$, RMSEA = .07 (95% CI [.06, .08]), SRMR = .05, CFI = .94, TLI = .92). Finally, the structural model also demonstrated good fit ($SB\chi^2_{(168)} = 349.25, p < .001$, RMSEA = .07 (95% CI [.06, .08]), SRMR = .05, CFI = .94, TLI = .92). The results supported that perceptions of athlete motivation ($\beta = .24, p < .001$), colleague support ($\beta = .24, p < .001$), and administrative support ($\beta = .27, p < .001$) had significant positive impacts on coaches' reported need satisfaction. Alternatively, perceptions of athlete motivation ($\beta = -.39, p < .001$) and colleague support ($\beta = -.20, p < .001$) had significant negative impacts, while perceptions of time constraints ($\beta = .25, p < .001$) had a significant positive impact on coach need frustration. Parent support, did not have a significant influence on either of coaches' need satisfaction ($\beta = .11, p = .114$) or frustration ($\beta = -.03, p = .709$), even though the zero-order correlations suggested these relationships were significant (see the factor correlations in Table 3.8). Since parent support did not have a significant relationship with coach need satisfaction and need frustration once the influence of the other factors was controlled for, it was not carried forward to the test the full sequence in Model 4.

Model 4 – environmental factors and psychological needs. In the final step, the final versions of Model 1 and Model 3 were combined to test the full motivational sequence as

proposed by SDT in the context of coaching. This model looked at the influence of administration support, athlete motivation, colleague support, and time constraints on coaches' reported need satisfaction and frustration. Then, the influence of need satisfaction on coaches' autonomous motivation, and the influence of need frustration on coaches' controlled motivation. Finally, the influence of coaches' autonomous motivation and controlled motivation on both reported use need-supportive and need-thwarting interpersonal behaviours with their athletes. First, the measurement model was tested and demonstrated good fit ($SB\chi^2_{(360)} = 613.58, p < .001$, RMSEA = .06 (95% CI [.05, .07]), SRMR = .05, CFI = .94, TLI = .92, see Table 3.9 for the factor correlations). Then, the structural model was estimated and also demonstrated adequate fit ($SB\chi^2_{(384)} = 720.47, p < .001$, RMSEA = .07 (95% CI [.06, .07]), SRMR = .07, CFI = .92, TLI = .91). The full model, along with the standardized regression coefficients can be viewed in Figure 3.3a.

Since SDT stipulates that contextual factors influence motivation for a particular activity through the extent to which the basic psychological needs are met, the indirect effects of contextual factors on coach motivation were also explored in order to confirm this mediation, as proposed by SDT. The indirect effects of the four contextual factors on coaches' autonomous and controlled motivation were calculated (see Table 3.10 for the indirect effects estimated from the partially mediated model). The results suggested that all of the indirect relationships were significant and in the expected direction, except for the indirect effect of time constraints on coaches' autonomous motivation, and administration support on coaches' controlled motivation. To confirm the fully mediated model provides the best fit of the data, an alternative partially mediated model was also explored, using the same estimation procedures. In this version of the model, the direct links between the 4 contextual factors and autonomous and controlled

motivation were added, for a total of 8 new paths. This partially mediated model demonstrated acceptable fit ($SB\chi^2_{(376)} = 709.32$, $p < .001$, RMSEA = .07 (95% CI [.06, .07]), SRMR = .07, CFI = .92, TLI = .91) and closer inspection of the regression coefficients revealed that the direction and strength of the relationships found in the first model remained constant. The new direct relationships between contextual factors and autonomous and controlled motivation, however, were not significant except for the relationships between time constraints and athlete motivation with controlled motivation (see Figure 3.3b). To confirm which of the two models provided the best fit of the data, a chi-square difference test was conducted to compare the two models and the results suggested that the new partially mediated model did not yield a better fit ($\Delta SB\chi^2_{(8)} = 11.15$, ns), as such the first model was retained, supporting that psychological needs fully mediate the relationship between contextual factors and coaches' motivation.

Overall, the results supported that athlete motivation and colleague support both had a positive influence on coaches' need satisfaction, and a negative influence on their need frustration. Administrative support had a significant positive influence on need satisfaction only, and time constraints had a significant negative impact on need frustration. The tail end the of the model mostly replicated the findings of Study 1, where need satisfaction positively predicted coaches' autonomous motivation, which lead to increased reports of need supportive interpersonal behaviours. Coaches' need frustration positively predicted controlled motivation for coaching, which negatively predicted reports of need-supportive interpersonal behaviours, and positively predicted need-thwarting behaviours. Overall, this model accounted for 31% of the variance in coaches' reported need-supportive interpersonal behaviours, and 15% of their reported need-thwarting interpersonal behaviours.

Discussion

The results of Study 3 suggest that coaches' environments influence their psychological needs, then motivation, and their reported interpersonal behaviours with their athletes. The seven contextual factors identified in Study 2 were examined in relation to coaches' motivational processes and these analyses identified 4 contextual factors that influence coaches. Specifically, these were coaches' perceptions of administrative support, athlete motivation, colleague support, and time constraints. Parent support, although it had a significant relationship with both need satisfaction and need frustration when the zero-order correlations were examined, once the other factors were taken into consideration, these relationships were no longer significant. Unfortunately, the measures used for assessing professional development and coaches' perceptions of work-life balance would not load onto meaningful constructs and, therefore, could not be included in the analyses. Since these factors were identified in Study 2 as being relevant to coaches, and have been included in previous coaching research (i.e., Allen & Shaw, 2009; Stebbings et al., 2012), it would be important to ensure that future research examines these constructs along with the constructs that were examined in the final model of this study.

General Discussion

The objectives of these studies were to consolidate and extend the existing coaching literature under the SDT framework by exploring the full sequence of contextual factors, psychological needs, motivation, and interpersonal behaviours. An additional objective was to explore the coaching context and identify factors that have not previously been examined within the SDT coaching literature in order to better understand how these factors influence coaches' psychological needs and motivation. The third objective was to explore the antecedents of coaches' interpersonal behaviours that included all six variations of behaviour under the SDT

framework. Finally, the last objective was to explore whether need frustration and controlled motivation had different impacts and led to different outcome behaviours for coaches.

Overall, the results of these three studies achieved these objectives. Specifically, Study 1 explored the coaching context and identified the factors that were the most important to coaches. In Study 2, the relationship between psychological needs, motivation, and interpersonal behaviours was explored for the first time in coaches, under the SDT framework. The results supported the general tenets of SDT and found that coaches' need satisfaction predicted their autonomous motivation for coaching, while their need frustration predicted their controlled motivation coaching. Coaches' autonomous motivation for coaching positively predicted their reported use of AS, CS, and RS behaviours, while negatively predicting their reported use of CT and RT behaviours. Controlled motivation, on the other hand, negatively predicted coaches' use of need-supportive behaviours, while positively predicting their use of need-thwarting behaviours. These results supported that coaches' motivation orientations are significant predictors of their interpersonal behaviours beyond AS and AT. Finally, in Study 3, the influence of the coaching context on coaches' needs, motivation, and interpersonal behaviours was examined. In this study, the influence of 4 factors (athlete motivation, colleague support, administrative support, and time constraints) on coaches' need satisfaction and frustration in coaching was examined. The findings found that athlete motivation, colleague support, and administrative support helped promote need satisfaction, whereas time constraints promoted need frustration. When coaches' needs were satisfied, it led to increased autonomous motivation for coaching, which lead to increased use of need-supportive interpersonal behaviours, while when coaches' needs were frustrated, it led to increased controlled motivation for coaching, which promoted increased need-thwarting behaviours and decreased need-supportive behaviours.

These findings also found additional support for Sheldon's (2011) proposal that individuals can experience both need satisfaction and frustration at the same time, and that these lead to distinctly different motivational and behavioural outcomes (e.g., Sheldon & Gunz, 2009). Furthermore, these studies helped demonstrate the importance of evaluating coaches' contexts in order to understand their behaviour when they interact with their athletes. That is, to best understand why a coach is using certain interpersonal behaviour styles, it is important to examine why they are coaching (their motivation), how they feel when they are coaching (their needs), and the coaching context they are working within. Interestingly, the results of these studies highlighted the important role other people within the coaching context play in influencing coaches' need satisfaction or need frustration. Specifically, the results suggested that being surrounded by supportive colleagues and highly motivated athletes can increase coaches' need satisfaction and simultaneously decrease their need frustration, while administrative support only served to increase need satisfaction and time constraints only served to increase need frustration. These findings imply that if coaches can surround themselves with other supportive people, it will have a positive impact on their overall psychological needs, which will lead to better motivational outcomes and more productive and successful coaching behaviours. Having a better understanding of the relationship between these factors will help explain more variations in coaches' behaviours and, ultimately, help better understand why coaches sometimes behave in ways that support their athletes' needs, and other times behave in ways that thwart their needs.

Limitations

Although these studies did help advance the existing coaching literature under the SDT framework, they do have a few limitations. The first is that these studies relied exclusively on coaches' self-reports of their interpersonal behaviours in a cross-sectional design. Although self-

report plays an important role in understanding and predicting individuals' behaviour in the social sciences, it is important to corroborate the self-reports with measures of real-world behaviours or at least perceptions of these behaviours. Related to this last limitation, the design of the study makes testing a mediation not optimal. As such, those results should be interpreted with caution and future research should look at examining coaches' contexts, psychological needs, motivation, and behaviours throughout the coaching season to better test the mediation effect of psychological needs.

A second limitation is that this research was not able to explore the impact of all of the important contextual factors on coaches' psychological need satisfaction and frustration due to issues with measurement. Specifically, the measures used to assess coaches' perceptions of opportunities for professional development and work-life conflict did not perform as expected and, unfortunately, were not able to be used in any format. Fortunately, previous research by Stebbings and colleagues (2012) had already examined the impact of these two factors on coaches' psychological needs and found that opportunities for professional development lead to increased need satisfaction and decreased need frustration, while work-life conflict had the opposite impact on psychological needs. As such, although, it was not possible to evaluate the impacts of these two factors, while also taking into consideration other important factors that have been identified by coaches, previous research at least has already identified their impact for coaches.

Finally, a last limitation is that there is no concrete explanation for the suppression effect that was present in Study 2, as well as Model 1 in Study 3. For both the measures of psychological needs and coach motivation, the measures used have been validated in the sport, as well as coaching contexts (i.e., Bartholomew et al., 2010; McLean et al., 2012). Extensive

previous research under the SDT framework from other domains supports that need satisfaction should lead to decreased controlled motivation, and that need frustration should lead to decreased autonomous motivation (Sheldon, 2011); however, none of this previous research reports the presence of a suppression effect. The present studies were the first to explore the relationship between psychological needs and motivation for coaches, as such, future research should continue to monitor this relationship as it may be unique to the coaching context.

Conclusions

This research provides an excellent framework for beginning to understand the factors that lead to positive and negative coaching behaviours. This was the first series of studies to explore the full motivational sequence for coaches, as well as explore the determinants of all six types of need-supportive and need-thwarting interpersonal behaviours. Future research should continue to examine these factors and identify strategies that sport organizations can use that would either promote healthy motivational contexts for athletes through coaches' behaviours, or help eliminate contexts that would promote non-healthy motivational outcomes for athletes. Additionally, since coaches of different levels such as recreational and elite coaches have very different realities (i.e., Werthner & Trudel, 2009), coaching contexts, needs, motivation, and interpersonal behaviours should be examined within these specific coaching levels in order to further understand the impact of the coaching context on coaches. Finally, since the training phase (e.g., pre-competition or competition) within a given sport season can change the reality of the sport context (O, Munroe-Chandler, Hall, & Hall, 2014), it is important to explore how the influence of the sport context changes throughout the sport season, and how these changes impact coaches need satisfaction and frustration in sport.

References

- Allen, J. & Hodge, K. (2006). Fostering a learning environment: Coaches and the motivational climate. *International Journal of Sports Science and Coaching*, 1, 261-277. doi: 10.1260/174795406778604564
- Allen, J. & Shaw, S. (2009). Women coaches' perceptions of their sport organizations' social environment: Supporting coaches' psychological needs? *The Sport Psychologist*, 23, 346-266. Retrieved from: <http://journals.humankinetics.com/tsp>
- Amorose, J. & Anderson-Butcher, D. (2007). Autonomy-Supportive coaching and self-determined motivation in high school and college athletes: A test of self-determination theory. *Psychology of Sport and Exercise*, 8, 654-670. doi: <http://dx.doi.org/10.1016/j.psychsport.2006.11.003>
- Appleton, P., Hall, H., & Hill, A. (2011). Examining the influence of the parent-initiated coach-created motivational climates upon athletes' perfectionistic cognitions. *Journal of Sports Sciences*, 29, 661-671. doi: 10.1080/02640414.2010.551541
- Barnes, J., Cote, J., Cudeck, R., & Malthouse, E. (2001). Checking Assumptions of Normality before Conducting Factor Analyses. *Journal of Consumer Psychology*, 10, 79-81. Retrieved from: <http://www.jstor.org.ezproxy.lib.monash.edu.au/stable/pdfplus/1480486.pdf>
- Bartholomew, K., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2011). Self-Determination theory and the darker side of athletic experience: The role of interpersonal control and need thwarting. *Sport & Exercise Psychology Review*, 7, 23-27. Retrieved from: <http://spex.bps.org.uk/spex/publications/sepr.cfm>

- Bartholomew, K., Ntoumanis, N., & Thorgenson-Ntoumani, C. (2010). The Controlling Interpersonal Style in a Coaching Context: Development and Initial Validation of a Psychometric Scale. *Journal of Sport & Exercise Psychology*, 32, 193-216.
- Bartholomew, K., Ntoumanis, N., & Thorgenson-Ntoumani, C. (2009). A review of controlling motivational strategies from a self-determination theory perspective: implications for sports coaches. *International Review of Sport and Exercise Psychology*, 2, 215-233. doi: 10.1080/1750984X.2015.1132334
- Blais, M., Sabourin, S., Boucher, C., & Vallerand, R. (1990). Toward a motivational model of couple happiness. *Journal of Personality and Social Psychology*, 59, 1021-1031. doi: <http://dx.doi.org/10.1037/0022-3514.59.5.1021>
- Chaumeton, N. & Duda, J. (1988). Is it how you play the game or whether you win or lose? The effect of competitive level and situation on coaching behaviors. *Journal of Sport Behavior*, 11, 157-174.
- Conroy, D. & Coatsworth, J. (2007). Assessing autonomy-supportive coaching strategies in youth sport. *Psychology of Sport and Exercise*, 8, 671-684. doi: 10.1016/j.psychsport.2006.12.001
- Deci, E. & Ryan, R. (1985). Intrinsic motivation and self-determination in human behavior. New York: Plenum. In Deci, E. & Ryan, R. (Eds.). *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.
- Deci, E. & Ryan, R. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227-268. doi: http://dx.doi.org/10.1207/S15327965PLI1104_01

- Deci, E. & Ryan, R. (2002). *Handbook of Self-Determination Research*. Rochester, NY: The University of Rochester Press.
- Deci, E., Ryan, R., Gagné, M., Leone, D., Usunov, J., & Kornazheva, B. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former Eastern Bloc country. *Personality and Social Psychology Bulletin*, 27, 930-942. doi: 10.1177/0146167201278002
- Feltz, D., Hepler, T., Roman, N., & Paiment, C. (2009). Coaching Efficacy and Volunteer Youth Sport Coaches. *The Sport Psychologist*, 23, 24-41.
- Frese, M. (1999). Social Support as a Moderator of the Relationship Between Work Stressors and Psychological Dysfunctioning: A longitudinal Study with Objective Measures. *Journal of Occupational Health Psychology*, 4, 179-192. doi: 10.1037/1076-8998.4.3.179
- Giges, B., Petitpas, A., & Vernacchia, R. (2004). Helping coaches meet their own needs: Challenges for the sport psychology consultant. *The Sport Psychologist*, 18, 430-444.
- Gillet, N., Vallerand, R., Amoura, S., & Baldes, B. (2010). Coaches' autonomy support on athletes' motivation and sport performance: A test of the hierarchical model of intrinsic and extrinsic motivation. *Psychology of Sport and Exercise*, 11, 155-161. doi: <http://dx.doi.org/10.1016/j.psychsport.2009.10.004>
- Gould, D., Lauer, L., Rolo, C., Jannes, C., & Pennisi, N. (2008). The Role of Parents in Tennis Success: Focus Group Interviews with Junior Coaches. *The Sport Psychologist*, 22, 18-37.
- Hagger, M. & Chatzisarantis, N. (2007). *Intrinsic Motivation and Self-Determination in Exercise and Sport*. Leeds, England: Human Kinetics Europe Ltd.

- Hjälml, S., Kenttä, G., Hassménan, P., & Gustafsson, H. (2007). Burnout among elite soccer coaches. *Journal of sport behavior*, 30, 415 – 429. doi: <http://eprints.usq.edu.au/id/eprint/15628>
- Hooper, D., Coughlan, J. & Mullen, M. (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *The Electronic Journal of Business Research Methods*, 6, 53-60. Retrieved from: www.ejbrm.com/issue/download.html?idArticle=183.
- Jones, R., Armour, K. & Potrac, P. (2004). *Sports Coaching Cultures: From Practice to Theory*. Routledge, London, 2004.
- MacKinnon, D., Krull, J., & Lockwood, C. (2000). Equivalence of the mediation, confounding and suppression effect. *Prevention science*, 1, 173-181. doi: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2819361/>
- Mageau, G. & Vallerand, R. (2003). The coach-athlete relationship: a motivational model. *Journal of Sports Sciences*, 21, 883-904. doi: <http://dx.doi.org/10.1080/0264041031000140374>
- Major, V., Klein, K., & Ehrhart, M. (2002). Work time, work interference, with family, and psychological distress. *Journal of Applied Psychology*, 87, 427-436. doi: 10.1037/0021-9010.87.3.427
- McLean, K. & Mallett, C. (2012). What motivates the motivators? An examination of sports coaches. *Physical Education & Sport Pedagogy*, 17, 21-35. doi: 10.1080/17408989.2010.535201
- McLean, K., Mallet, C., & Newcombe, P. (2012). Assessing Coach Motivation: The Development of the Coach Motivation Questionnaire (CMQ). *Journal of Sport & Exercise Psychology*, 34, 184-207. doi: <http://eprints.qut.edu.au/55847/>

- Muthen, L. & Muthen, B. (2010). Mplus user's guide: Statistical analysis with latent variables (6th ed.). Los Angeles, CA: Authors.
- O, J., Munroe-Chandler, K., Hall, C., & Hall, N. (2014). Using Motivational General-Mastery Imagery to Improve the Self-Efficacy of Youth Squash Players. *Journal of Applied Sport Psychology*, 26, 66-81. doi: 10.1080/10413200.2013.778914
- Pastore, D., Goldfine, B., & Riemer, H. (1996). NCAA College Coaches and Athletic Administrative Support. *Journal of Sport Management*, 10, 373-387. doi: <http://www.cabdirect.org/abstracts/19971802276.html>
- Pelletier, L., Seguin-Levesque, C., & Legault, L. (2002). Pressure From Above and Pressure from Below as Determinants of Teachers' Motivation and Teaching Behaviours. *Journal of Educational Psychology*, 94, 186-196. doi: <http://dx.doi.org/10.1037//0022-0663.94.1.186>
- Pelletier, L., Rocchi, M., Vallerand, R., Deci, E., & Ryan, R. (2013). Validation of the revised sport motivation scale (SMS-II). *Psychology of Sport and Exercise*, 14, 329-341. doi: <http://dx.doi.org/10.1016/j.psychsport.2012.12.002>
- Pelletier, L., Seguin-Levesque, C., & Legault, L. (2002). Pressure From Above and Pressure from Below as Determinants of Teachers' Motivation and Teaching Behaviours. *Journal of Educational Psychology*, 94, 186-196. doi: <http://dx.doi.org/10.1037//0022-0663.94.1.186>
- Pomerantz, E., Cheung, C., & Qin, L. (2012). Relatedness Between Children and Parents: Implications for Motivation. In Ryan, R. (Ed.), (2012). *The Oxford Handbook of Motivation* (pp. 335-349). New York: Oxford University Press.

- Probst, T. (2003). Development and validation of the Job Security Index and the Job Security Satisfaction scale: A classical test theory and IRT approach. *Journal of Occupational and Organizational Psychology*, 76, 451–467. doi:10.1348/096317903322591587
- Reinboth, M., Duda, J., & Ntoumanis, N. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motivation and emotion*, 28, 297–313. doi: 0000040156.81924.b8
- Reynolds, W. (1982). Development of reliable and valid short forms of the Marlowe-Crowne Social Desirability Scale. *Journal of clinical psychology*, 38, 119–125. doi: 10.1002/1097-4679
- Rocchi, M., Pelletier, L., Cheung, S., Baxter, D., & Beaudry, S. (2016). Assessing Need-Supportive and Need-Thwarting Interpersonal Behaviours: The Interpersonal Behaviours Questionnaire (IBQ). *Manuscript submitted for publication*.
- Rocchi, M., Pelletier, L., & Couture, A. (2013). Determinants of Coach Motivation and Autonomy Supportive Coaching Behaviours. *Psychology of Sport and Exercise*, 14, 852–859. doi: 10.1016/j.psychsport.2013.07.002
- Rocchi, M., Pelletier, L., & Desmarais, P. (2016). The Validity of the Interpersonal Behaviours Questionnaire (IBQ) in Sport. *Manuscript submitted for publication*.
- Russell, D., Kahn, J., Spoth, R., & Altmaier, E. (1998). Analyzing data from experimental studies: A latent variable structural equation modeling approach. *Journal of Counseling Psychology*, 45, 18–29. doi: 10.7202/1036329
- Roxburgh, S. (2006). “I Wish we had More Time to Spend Together...”: The Distribution and Predictors of Perceived Family Time Pressures Among Married Men and Women in the Paid Labor Force. *Journal of Family Issues*, 27, 529. doi: 10.1177/0192513X05284008

- Sheldon, K. (2011). Integrating Behavioral-Motive and Experiential-Requirement Perspectives on Psychological Needs: A Two Process Model. *Psychological Review*, 118, 552-569. doi: 10.1037/a0024758
- Sheldon, K. & Filak, V. (2008). Manipulating autonomy, competence, and relatedness support in a game-learning context: New evidence that all three needs matter. *British Journal of Social Psychology*, 47, 257-283. doi: 10.1348/014466607X238797
- Sheldon, K. & Gunz, A. (2009). Psychological needs as basic motives, not just experiential requirements. *Journal of personality*, 77, 1467-1492. doi: 10.1111/j.1467-6494.2009.00589.x
- Smith, N., Tessier, D., Tzioumakis, Y., Fabra, P., Quested, E., Appleton, P., ... & Duda, J. (2016). The relationship between observed and perceived assessments of the coach-created motivational environment and links to athlete motivation. *Psychology of Sport and Exercise*, 23, 51-63. doi: 0.1016/j.psychsport.2015.11.001
- Soenens, B., Sierens, E., Vansteenkiste, M., Dochy, F., & Goossens, L. (2012) Psychologically controlling teaching: Examining outcomes, antecedents, and mediators. *Journal of Educational Psychology*, 104, 108-120. doi: <http://dx.doi.org/10.1037/a0025742>
- Solstad, B., 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: 0.1016/j.psychsport.2015.05.001
- Stebbing, J., Taylor, M., & Spray, C. (2011). Antecedents of Perceived Coach Autonomy Supportive and Controlling Behaviors: Coach Psychological Need Satisfaction and Well-Being. *Journal of Sport & Exercise Psychology*, 33, 255-272. Retrieved from:

<http://journals.humankinetics.com/jsep>

Stebbing, J., Taylor, M., Spray, C., & Ntoumanis, N. (2012). Antecedents of perceived coach interpersonal behaviors: The coaching environment and coach psychological well- and ill-being. *Journal of Sport & Exercise Psychology*, 34, 481-502. Retrieved from:

<http://journals.humankinetics.com/jsep>

Tabachnick, B. & Fidell, L. (2001). *Using Multivariate Statistics (4th edition)*. New York: Allyn and Bacon.

Taylor, I., Ntoumanis, N., & Smith, B. (2009). The social context as a determinant of teacher motivational strategies in physical education. *Psychology of Sport and Exercise*, 10, 235-243. doi: <http://dx.doi.org/10.1016/j.psychsport.2008.09.002>

Taylor, I., Ntoumanis, N., & Standage, M. (2008). A self-determination theory approach to understanding the antecedents of teachers' motivational strategies in physical education. *Journal of Sport and Exercise Psychology*, 30, 75-94. doi: <https://dspace.lboro.ac.uk/2134/15371>

Trudel, P. & Gilbert, W. (2006). Coaching and coach education. In Kirk, D., Macdonald, D., & O'Sullivan, M. (Eds.), (2006). *The handbook of physical education* (pp. 516-539). London: Sage.

Werthner, P., & Trudel, P. (2009). Investigating the idiosyncratic learning paths of elite Canadian coaches. *International Journal of Sports Science and Coaching*, 4(3), 433-449. doi: <http://dx.doi.org/10.1260/174795409789623946>

Table 3.1

Study 1: Descriptive Statistics for Contextual Factor Variables

Factor	Mean	Standard Deviation	Range
(1) Administration			
Positive Impact	4.67	1.75	1.00 – 7.00
Negative Impact	4.02	1.65	1.00 – 7.00
(2) Athletes			
Positive Impact	6.27	0.68	4.00 – 7.00
Negative Impact	2.93	1.32	1.00 – 6.00
(3) Compensation			
Positive Impact	4.30	2.08	1.00 – 7.00
Negative Impact	2.64	1.46	1.00 – 6.00
(4) Evaluations			
Positive Impact	5.02	1.77	1.00 – 7.00
Negative Impact	3.00	1.40	1.00 – 6.00
(5) Job Security			
Positive Impact	3.97	2.35	1.00 – 7.00
Negative Impact	2.87	2.05	1.00 – 7.00
(6) Parents			
Positive Impact	5.16	1.35	1.00 – 7.00
Negative Impact	3.83	1.36	1.00 – 7.00
(7) Opportunities for Professional Development			
Positive Impact	6.15	1.14	2.00 – 7.00
Negative Impact	1.79	1.07	1.00 – 5.00
(8) Technology			
Positive Impact	5.82	1.14	3.00 – 7.00
Negative Impact	2.22	1.25	1.00 – 5.00
(9) Time			
Positive Impact	5.40	1.54	1.00 – 7.00
Negative Impact	3.91	1.54	1.00 – 7.00
(10) Work-Life Balance			
Positive Impact	4.67	1.48	1.00 – 7.00
Negative Impact	4.36	1.56	1.00 – 7.00

Note. n = 56.

Table 3.2

Study 1: Top 5 Importance Rankings

Factor	Frequencies per Rank					Total	
	1 st	2 nd	3 rd	4 th	5 th	<i>n</i>	%
(1) Athletes	34	4	5	1	6	50	17.86
(2) Work-Life Balance	7	8	8	8	5	36	12.86
(3) Administration	3	6	6	11	10	36	12.86
(4) Professional Development	3	10	8	5	8	34	12.14
(5) Time	2	5	10	10	2	29	10.36
(6) Parents	0	6	3	6	8	23	8.21
(7) Compensation	3	3	4	3	2	15	5.36
(8) Technology	0	1	2	2	6	11	3.93
(9) Evaluations	0	3	1	4	3	11	3.93
(10) Job Security	1	2	3	0	1	7	2.50
Other	3	8	6	6	5	28	10.00

Table 3.3

Study 2: Descriptive Statistics for Model Variables

Measure	Mean	Standard Deviation	Range
Need Satisfaction			
1. Autonomy	5.85	0.82	1.67 – 7.00
2. Competence	6.11	0.78	1.33 – 7.00
3. Relatedness	6.09	0.78	1.67 – 7.00
Need Frustration			
1. Autonomy	1.82	1.01	1.00 – 7.00
2. Competence	1.98	1.07	1.00 – 7.00
3. Relatedness	1.89	1.03	1.00 – 7.00
Autonomous Motivation			
1. Parceled Score 1	5.35	1.23	1.00 – 7.00
2. Parceled Score 2	4.90	1.21	1.00 – 7.00
3. Parceled Score 3	5.61	1.08	1.00 – 7.00
Controlled Motivation			
1. Parceled Score 1	2.01	1.02	1.00 – 7.00
2. Parceled Score 2	3.12	1.05	1.00 – 7.00
3. Parceled Score 3	3.06	1.05	1.00 – 7.00
Autonomy Support			
1. Give freedom to make choices	5.34	1.23	1.00 – 7.00
2. Support their decisions	5.79	0.95	2.00 – 7.00
3. Support their choices	5.64	1.08	1.00 – 7.00
4. Encourage them to make own choices	5.81	1.09	1.00 – 7.00
Autonomy Thwarting			
1. Pressure them to do things my way	2.93	1.54	1.00 – 7.00
2. Impose my opinions	2.66	1.53	1.00 – 7.00
3. Pressure them to adopt behaviours	3.23	1.69	1.00 – 7.00
4. Limit their choices	2.24	1.24	1.00 – 6.00
Competence Support			
1. Encourage them to improve skills	6.77	0.48	3.00 – 7.00
2. Provide valuable feedback	6.36	0.66	3.00 – 7.00
3. Acknowledge their abilities	6.38	0.76	1.00 – 7.00
4. Tell them they can accomplish things	6.60	0.60	1.00 – 7.00
Competence Thwarting			
1. Point out they will fail	1.32	0.66	1.00 – 7.00
2. Suggest they are incompetent	1.15	0.39	1.00 – 5.00
3. Doubt their capacity to improve	1.39	0.81	1.00 – 7.00
4. Question ability to overcome challenges	2.11	1.53	1.00 – 7.00
Relatedness Support			
1. Are interested in what they do	6.29	0.82	1.00 – 7.00
2. Take the time to get to know them	6.21	0.90	1.00 – 5.00

3. Enjoy spending time with them	6.54	0.64	1.00 – 7.00
4. Relate to them	5.86	1.04	1.00 – 7.00
Relatedness Thwarting			
1. Do not comfort them	1.62	1.03	1.00 – 4.00
2. Distant when we spend time together	1.80	1.30	1.00 – 5.00
3. Do not connect with them	1.46	0.90	1.00 – 4.00
4. Do not care about them	1.38	0.40	1.00 – 4.00

Note. n = 310.

Table 3.4

Study 2: Factor Correlations

<i>Subscales</i>	1	2	3	4	5	6	7	8	9	10
1. Need Satisfaction	-									
2. Need Frustration	-.34*	-								
3. Autonomous Motivation	.65*	.03	-							
4. Controlled Motivation	-.08	.72*	-.19*	-						
5. Autonomy Support	.57*	-.19*	.36*	.46*	-					
6. Autonomy Thwarting	-.19*	.45*	-.06	-.25*	-.51*	-				
7. Competence Support	.69*	-.26*	.41*	.59*	.50*	-.20*	-			
8. Competence Thwarting	-.36*	.59*	-.13	-.17*	-.25*	.62*	-.47*	-		
9. Relatedness Support	.75*	-.18*	.45*	.49*	.65*	-.28*	.81*	-.49*	-	
10. Relatedness Thwarting	-.37*	.50*	-.20*	.13	-.45*	.54*	-.54*	.79*	-.73*	-

Note. * = relationships are significant at the $p < .05$ level.

Table 3.5

Study 3: Descriptive Statistics for Model Variables

Measure	Mean	Standard Deviation	Range
Need Satisfaction			
1. Autonomy	5.89	0.76	3.00 – 7.00
2. Competence	6.08	0.73	3.33 – 7.00
3. Relatedness	6.13	0.71	3.00 – 7.00
Need Frustration			
1. Autonomy	2.12	0.99	1.00 – 5.33
2. Competence	2.20	1.00	1.00 – 5.33
3. Relatedness	2.11	0.96	1.00 – 5.33
Autonomous Motivation			
1. Parceled Score 1	5.48	1.21	1.00 – 7.00
2. Parceled Score 2	5.01	1.30	1.00 – 7.00
3. Parceled Score 3	5.14	1.22	1.00 – 7.00
Controlled Motivation			
1. Parceled Score 1	2.22	1.08	1.00 – 7.00
2. Parceled Score 2	3.34	1.05	1.00 – 7.00
3. Parceled Score 3	3.19	0.99	1.00 – 7.00
Need Supportive Interpersonal Behaviours			
1. Autonomy	5.09	0.63	3.57 – 7.00
2. Competence	5.04	0.70	3.33 – 7.00
3. Relatedness	5.14	0.64	3.67 – 7.00
Need Thwarting Interpersonal Behaviours			
1. Autonomy	2.09	0.82	1.00 – 5.00
2. Competence	2.13	0.92	1.00 – 5.00
3. Relatedness	2.04	0.83	1.00 – 5.00
Administration Support			
1. Program support	4.60	1.32	2.00 – 7.00
2. Decision-making	4.63	1.20	2.00 – 7.00
3. Job benefits	4.56	1.15	2.00 – 7.00
Athlete Motivation			
1. Indexed Score 1	16.46	7.97	0.00 – 34.00
2. Indexed Score 2	18.79	7.30	3.00 – 34.00
3. Indexed Score 3	22.25	7.47	6.00 – 36.00
Colleague Support			
1. Personal support	5.87	1.28	3.00 – 7.00
2. Helpfulness	5.26	1.29	3.62 – 7.00
3. Easiness to talk to	5.82	1.04	2.67 – 7.00
Parent Support			
1. Personal support	4.93	1.56	1.97 – 7.00
2. Helpfulness	4.45	1.86	1.00 – 7.00

3. Easiness to talk to	5.09	1.51	1.00 – 7.00
Professional Development Opportunities			
1. Item 1	3.16	1.63	1.00 – 6.00
2. Item 2	5.72	1.30	2.00 – 7.00
3. Item 3	4.90	1.40	2.00 – 7.00
Time Constraints			
1. Item 1	3.61	1.68	1.00 – 7.00
2. Item 2	3.82	1.60	1.00 – 7.00
3. Item 3	4.16	1.63	1.00 – 7.00
Work-Life Conflict			
1. Item 1	2.97	1.54	1.00 – 6.00
2. Item 2	3.43	1.78	1.00 – 7.00
3. Item 3	3.36	1.75	1.00 – 6.00

Note. n = 225.

Table 3.6

Study 3: Factor Correlations for Model 1

<i>Subscales</i>	1	2	3	4	5	6
1. Need Satisfaction	-					
2. Need Frustration	-.26*	-				
3. Autonomous Motivation	.48*	.17	-			
4. Controlled Motivation	-.25*	.54*	.11	-		
5. Need Supportive Interpersonal Behaviours	.63*	-.14	.46*	-.19*	-	
6. Need Thwarting Interpersonal Behaviours	-.20*	.24*	-.05	.36*	-.48*	-

Note. * = relationships are significant at the $p < .05$ level.

Table 3.7

Study 3: Factor Correlations for Model 2

<i>Subscales</i>	1	2	3	4	5
1. Administrative Support	-				
2. Athlete Motivation	.18*	-			
3. Colleague Support	.49*	.25*	-		
4. Parent Support	.20*	.32*	.22*	-	
5. Time Constraints	-.11	-.11	.01	-.18*	-

Note. * = relationships are significant at the $p < .05$ level.

Table 3.8

Study 3: Factor Correlations for Model 3

<i>Subscales</i>	1	2	3	4	5	6	7
1. Administrative Support	-						
2. Athlete Motivation	.18*	-					
3. Colleague Support	.49*	.25*	-				
4. Parent Support	.20*	.32*	.22*	-			
5. Time Constraints	.06	-.11	.02	-.17*	-		
6. Need Satisfaction	.46*	.38*	.46*	.29*	.02	-	
7. Need Frustration	-.09	-.47*	-.27*	-.23*	.30*	-.26*	-

Note. * = relationships are significant at the $p < .05$ level.

Table 3.9

Study 3: Factor Correlations for Model 4

<i>Subscales</i>	1	2	3	4	5	6	7	8	9	10
1. Administrative Support	-									
2. Athlete Motivation	.17*	-								
3. Colleague Support	.49*	.25*	-							
4. Time Constraints	.06	-.11	.02	-						
5. Need Satisfaction	.46*	.38*	.46*	.02	-					
6. Need Frustration	-.09	-.47*	-.27*	.30*	-.26*	-				
7. Autonomous Motivation	.22*	.21*	.27*	.14*	.48*	.10	-			
8. Controlled Motivation	-.06	-.36*	-.13	.28*	-.25*	.55*	.11	-		
9. Need Supportive Interpersonal Behaviours	.29*	.54*	.34*	.03	.62*	-.14	.46*	-.19*	-	
10. Need Thwarting Interpersonal Behaviours	-.16*	-.42*	-.08	.17	-.20*	.24*	-.05	.36*	-.48*	-

Note. * = relationships are significant at the $p < .05$ level.

Table 3.10

Study 3: Indirect Effects of Contextual Factors on Coach Motivation

Parameter	Indirect Effect		
	β	SE	p
Athlete Motivation → Coach Autonomous Motivation	.139	.039	.000
Time Constraints → Coach Autonomous Motivation	.021	.031	.511
Colleague Support → Coach Autonomous Motivation	.126	.044	.005
Administration Support → Coach Autonomous Motivation	.143	.041	.001
Athlete Motivation → Coach Controlled Motivation	-.175	.047	.000
Time Constraints → Coach Controlled Motivation	.110	.035	.002
Colleague Support → Coach Controlled Motivation	-.086	.036	.017
Administration Support → Coach Controlled Motivation	.028	.031	.369

Note. β = standardized regression coefficient. SE = standard error. p = probability.

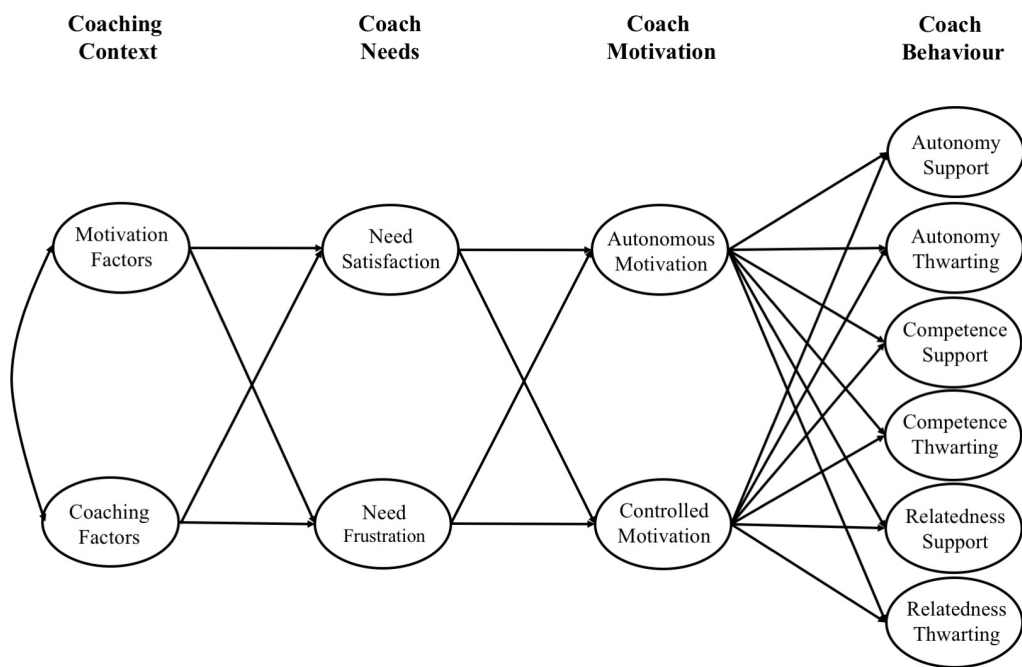
Figure 3.1. Proposed Model*Figure 3.1.*

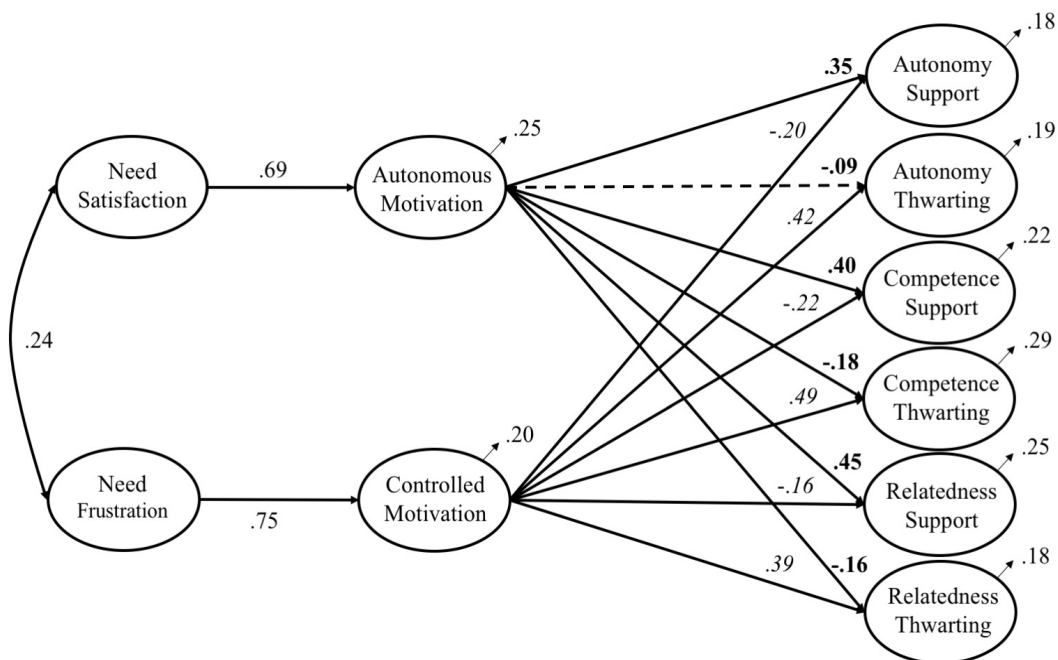
Figure 3.2. Study 2: Final Model with Standardized Regression Coefficients

Figure 3.2. Solid lines = $p < .01$. Dotted lines = ns . For the standardized regression coefficients predicting coaches' reported interpersonal behaviours from motivation, the **bolded** values represent the relationship between autonomous motivation and the interpersonal behaviour, while the *italicized* values represent the relationship between controlled motivation and the interpersonal behaviour. Values adjacent to latent constructs represent the standardized residuals.

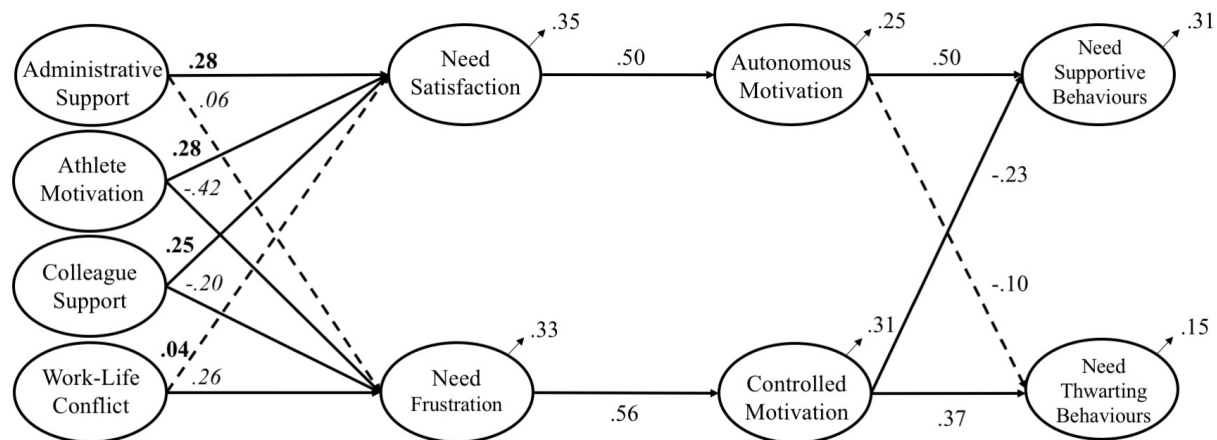
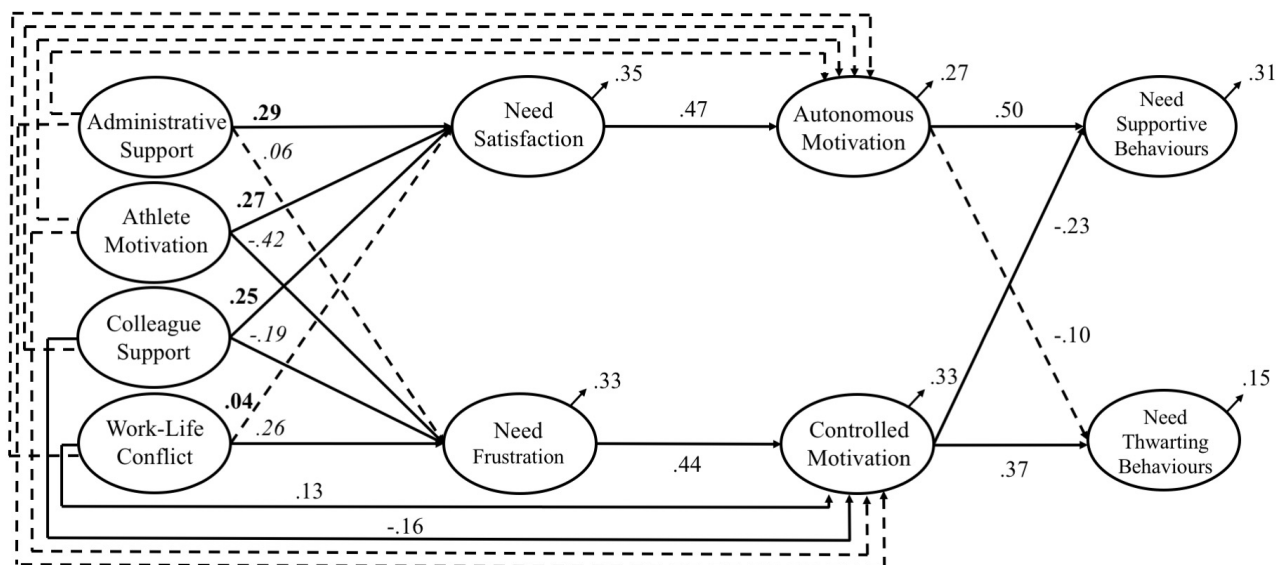
Figure 3.3. Study 3: Model Results with Standardized Regression Coefficients*Figure 3.3a. Fully Mediated Model**Figure 3.3b. Partially Mediated Model*

Figure 3.3. Solid lines = $p < .01$. Dotted lines = ns . For the standardized regression coefficients predicting coaches' need satisfaction and frustration from environmental factors, the **bolded** values represent the relationship between environmental factors and need satisfaction, while the *italicized* values represent the relationship between environmental factors and need frustration. Values adjacent to latent constructs represent the standardized residuals.

CHAPTER FIVE**EXPLORING COACH-ATHLETE RELATIONSHIPS**

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Abstract

The purpose of this research was to explore the coach-athlete relationship through the lens of Self-Determination Theory (SDT). Specifically, Study 1 looked at a sample of 180 athletes and explored the relationship between their perceptions of their coaches' autonomy-supportive, autonomy-thwarting, competence-supportive, competence-thwarting, relatedness-supportive, and relatedness-thwarting interpersonal behaviours, their need satisfaction and need frustration in sport, and their autonomous and controlled motivation in sport. Overall, the results found that perceptions of coaches' need-supportive behaviours predicted increased need satisfaction which predicted autonomous motivation for sport, while perceptions of need-thwarting behaviours predicted increased need frustration, and controlled motivation for sport. Study 2 replicated the findings of Study 1 with a sample of 278 athletes and their coaches ($N = 53$). Next, the findings were extended by looking at the relationship between coaches' self-reports of their behaviour with their athletes and athletes' perceptions of these same behaviours, using polynomial regression analysis with surface testing. The results found that both coaches and athletes reported increased need-supportive interpersonal behaviours, this lead to increased need satisfaction and decreased need frustration for athletes. In the event there was a discrepancy between coaches and athletes, as long as the athletes had a more favourable view than their coach, this also predicted increased need satisfaction. Need-thwarting interpersonal behaviours had the opposite effect on need satisfaction and need frustration in sport.

Introduction

Athletes' sport experiences are heavily influenced by the context their coaches create. Coaches can, through their interactions with their athletes, create sport contexts that promote the optimal functioning for athletes (Duda & Balaguer, 2007; Smoll & Smith, 2006), increased satisfaction (Salminen & Liukkoken, 1996), better performances (Butler, 1997), and increased engagement (Alvarez, Balaguer, Castillo, & Duda, 2009). Coaches can also create contexts that undermine positive outcomes for athletes and lead to negative sport experiences (Bartholomew, Ntoumanis, & Thorgeron-Ntoumani, 2011). Motivational psychology provides insight into how the coach-created sport context, as well as athletes' interactions with their coaches, either positively or negatively influence athletes' motivation for their sport. One theory that has been used extensively to study the dynamics of coaches and athletes in a sport context is self-determination theory (SDT; Deci & Ryan, 2000).

Self-Determination Theory Overview

SDT is a theory of motivation, built on the assumption that humans have innate tendencies to grow and to integrate on-going life experiences (Deci & Ryan, 2000; 2002). When considering individuals' motivation for specific activities, such as sport, SDT posits that the reasons people participate in sport is the result of contextual factors related to the sport and the extent to which their psychological needs are satisfied while participating (Deci & Ryan, 2002; Vallerand, 1997). Contextual factors include both the structure of the environment (i.e., culture of the sport) and the behaviour of the people within it (i.e., coaches). Psychological needs refer to the innate and universal needs for autonomy (to act in line with your own interests and values), competence (the opportunity to seek challenges and express capacities), and relatedness (to feel a sense of belonging with others) (Deci & Ryan, 2002). According to SDT, if the structure of the

sport context promotes the satisfaction of the three basic psychological needs, an athlete will experience an increase in autonomous motivation for their sport. Autonomous motivation is associated with a number of positive outcomes for athletes such as better learning, interest, effort, performance, self-esteem, life satisfaction, persistence, and health (Mageau & Vallerand, 2003). Research has also shown that the context can also have a detrimental impact on need satisfaction. Specifically, if the context, or people within it, undermines an individual's psychological needs, it leads to need frustration and, subsequently, more controlled motivation for the activity (Sheldon & Filak, 2008). Traditionally, this area of research has received less attention than the positive impacts of need satisfaction (Bartholomew et al., 2011); however, controlled motivation is associated with low quality outcomes such as decreased health, vitality, persistence, success, and increased exhaustion (Deci & Ryan, 2000).

Coach-Athlete Relationships

Research exploring the coach-athlete relationship under the SDT framework has focused on the coach-created sport context, and how it influences athletes' motivation for sport (Mageau & Vallerand, 2003). According to SDT, coaches do not impact their athletes' motivation directly, instead their influence is indirect through the extent to which the coaches' interpersonal behaviours impact their athletes' basic psychological needs. That is, how coaches' interpersonal behaviours either support or thwart their athletes' needs for autonomy, competence, and relatedness (Deci & Ryan, 2000; Deci, Shwartz, Sheinman, & Ryan, 1981; Vallerand, 2000). According to existing research in SDT (e.g., Mageau & Vallerand, 2003; Taylor, Ntoumanis, & Standage, 2008), there is support for a sequence where coaches' interpersonal behaviour styles are influenced by the extent to which their own needs are met in sport, as well as the quality of the motivation they experience towards their coaching. Specifically, coaches are more likely to

engage in need-supportive interpersonal behaviours when their needs are satisfied and they experience autonomous motivation for coaching. When coaches' needs are frustrated, they are more likely to experience controlled motivation for coaching and are more likely to engage in need-thwarting interpersonal behaviours with their athletes. Through their use of interpersonal behaviours, coaches set the sport context for the athletes and, depending on athletes' perceptions of their coaches' interpersonal behaviour style, their needs will either be satisfied or frustrated in sport, which impacts their overall motivation quality for sport (Mageau & Vallerand, 2003).

Coach interpersonal behaviours

In agreement with SDT, coaches can engage in six types of interpersonal behaviours when interacting with their athletes: autonomy-supportive (AS), autonomy-thwarting (AT), competence-supportive (CS), competence-thwarting (CT), relatedness-supportive (RS), and relatedness-thwarting (RT). In sport, AS interpersonal behaviours are described as providing choice to players, providing a rationale for tasks, acknowledging players' perspectives, giving opportunities for initiative, and promoting task involvement (Mageau & Vallerand, 2003). When coaches engage in AT interpersonal behaviours with their athletes, they use rewards, incorporate intimidating feedback, make demands without providing a rationale, use conditional regard, and use excessive personal control (Bartholomew, Ntoumanis, & Thorgenson-Ntoumani, 2009). Coach CS behaviours include using positive expectancies, encouraging learning with athletes, providing positive feedback, acknowledging improvements, believing athletes can meet their goals, and encouraging athletes to improve their skills (Sheldon & Filak, 2008; Taylor et al., 2008). A CT style would include emphasizing athletes' faults, discouraging them from trying difficult tasks, focusing on what they do wrong, sending them the message that they are inadequate, and doubting their capacity to improve (Sheldon & Filak, 2008). Finally, RS

behaviour involves showing understanding, support and care for athletes (Jones, Armour, & Potrac, 2004); while a coach would be thwarting their athletes' needs for relatedness if they were distant with their athletes, did not connect with them, did not include them in activities, did not listen, and were not available when they needed them (Sheldon & Filak, 2008).

Although interpersonal need-supportive and need-thwarting behaviours can be described in terms of each of the three basic psychological needs, the majority of current research has focused on AS behaviours (e.g., Gagne, Ryan, & Bargmann, 2003; Pelletier, Fortier, Vallerand, & Briere, 2001; Standage, Duda, & Ntoumanis, 2005). For example, research examining the antecedents of coaches' own reports of their interpersonal behaviours with their athletes has focused exclusively on how coaches' need satisfaction and motivation predict their use of AS (Rocchi, Pelletier, & Couture, 2013; Stebbings, Taylor, & Spray, 2011) or AT interpersonal behaviours (Stebbing, Taylor, Spray, & Ntoumanis, 2012). Looking at athletes perceptions of their coaches' AS behaviours, numerous studies have found that athletes who perceived their coaches as being more AS also experienced an increase in need satisfaction and increased autonomous motivation towards their sport, which promoted a number of positive outcomes such as increased well-being, long-term autonomous motivation, persistence, and retention in sport (e.g., Conroy & Coatsworth, 2007; Gagne et al., 2003; Jõesaar, Hein, & Hagger, 2012; Pelletier et al., 2001; Stenling, Lindwall, & Hassmén, 2015; Williams, Whipp, Jackson, & Dimmock, 2013). More recently, research has begun to explore the influence of AT behaviours (e.g. Bartholomew et al., 2011; Matosic & Cox, 2014; Smith et al., 2016), as well as RS behaviours (i.e., Smith et al., 2016; Williams et al., 2013). Overall, the results suggested that coaches' interpersonal behaviours play an important role in creating the sport context. When athletes perceive their coach as engaging in need-supportive interpersonal behaviours, it promotes need

satisfaction and autonomous motivation, while the opposite is true for perceived need-thwarting interpersonal behaviours. Further advancing the investigation of coaches' interpersonal behaviours will continue to provide important insight into coaches' and athletes' sport experiences.

Limitations

Despite a significant amount of research examining the coach-athlete relationship through the SDT framework, there are some limitations. First, to date, no coaching, coach-athlete, or athlete research has explored all six types of interpersonal behaviours according to SDT at the same time. From a theoretical standpoint, perceptions of AS, CS, and RS interpersonal behaviours are expected to have a different impact on athletes' subsequent need satisfaction or need frustration (e.g., Pomerantz, Cheung, & Qin, 2012). Related to this, it is essential to measure both supportive and thwarting behaviors concurrently since the absence of supportive behaviours cannot automatically imply the presence of thwarting behaviour (Sheldon & Filak, 2008). Next, the majority of the current research examining coach interpersonal behaviours has relied on self-report measures by coaches (e.g., Stebbings et al., 2012), or perceptions from athletes (e.g., Stenling et al., 2015), without cross-referencing or triangulating these observations to determine if the interpersonal behaviours coaches report are in line with what athletes perceive. This is problematic because coaches may have a tendency of being more positive when reporting on their own behaviour (Ntoumanis, 2012). Finally, whether or not there is a discrepancy between coaches' self-reports and athletes' perceptions, SDT research generally accepts that as long as the athletes' perceptions of their environments remain positive, athletes will still experience the positive outcomes associated with need satisfaction, regardless of what

their coach reports (Horn, 2002). This notion supports that a discrepancy between coaches and athletes may exist, as long as the athletes' perceptions remains somewhat positive.

A recent major study by Smith and colleagues (Smith et al., 2016) was the first to address some of these limitations within the SDT coaching literature. First, they extended the existing findings by looking at three types of interpersonal behaviours, that is AS, AT, and RT coaching behaviours. Next, they triangulated self-reports from coaches with observer and athlete assessments. Finally, they looked at the differences in the relationship between coaches' reports and athletes' motivation, as well as athletes' perceptions and their motivation. Overall, they found support for moderate coherence between coaches' reported AT interpersonal behaviours, and athletes' perceptions of these behaviours. The results were less clear when looking at the relationship between coaches' reports of their AS and RS behaviours, and athletes' perceptions of these behaviours. The researchers attributed these ambiguous results to the possibility that the coaches were overly positive about their own behaviours since the coaches had higher ratings on all of the positive measures compared to the athletes. This study also explored the direct relationships between athletes' perceptions of coaches' interpersonal behaviours and athletes' motivation, as well as coaches' reported behaviours and athletes' motivation. The results supported that the relationship between athletes' perceptions and their motivation replicated the existing research in SDT and sport (Standage et al., 2005). Overall, this study represents an excellent starting point for addressing the current limitations within the SDT sport literature; however, there are a few outstanding issues that will be addressed in the present research.

Present Research

The first objective of the present research is to examine athletes' perceptions of their coaches' interpersonal behaviours, for all six types according to SDT, and confirm that they lead

to the psychological need and motivational outcomes that would be expected according to SDT. The second objective is to explore the relationship between coaches' self-reports of their own interpersonal behaviours while coaching, and athletes' perceptions of these same behaviours. From there, the level of agreement or discrepancy between coaches' self-reports and athletes' perceptions will be examined to evaluate the extent to which coaches' reports of their interpersonal behaviours reflect their perceptions of their behaviour in real-life settings (i.e., explore the extent to which coaches are overly positive about their behavior or not). Finally, the impact of the degree of agreement or discrepancy between coaches' reports and athletes' perceptions will be examined to determine whether it is related to motivational outcomes, as would be expected by SDT, for each of the types of interpersonal behaviours.

These objectives will be achieved through 2 studies. In Study 1, a group of student athletes will be asked to report on their perceptions of their coaches' interpersonal behaviours, their need satisfaction and need frustration in sport, as well as their autonomous and controlled motivation for practicing their sport. Then, a model will be tested to confirm that perceptions of their coaches' behaviours, for all six types of interpersonal behaviours, predict psychological needs and motivation, as would be expected, according to SDT.

Study 2 will explore a group of competitive athletes and their coaches to explore the relationship between coaches' self-reports and athletes' perceptions of these behaviours. Specifically, this study will start by replicating the model that was tested in Study 1 to confirm that the relationships found between athletes' perceptions of their coaches' behaviours and psychological need and motivational outcomes for athletes are in line with what would be expected according to SDT. Next, the study will explore the degree of agreement and discrepancy between coaches' self-reports of their behaviours with each of their athletes and

athletes' perceptions of these same behaviours. In the case of a discrepancy, it will also explore the direction of the relationship (i.e., coach high/athlete low or coach low/athlete high of need-support versus need-thwarting). Then, it will explore whether the presence of a discrepancy or not (as well as the direction) predicts any differences in motivational outcomes for athletes, using polynomial regression, for all types of need-supportive and need-thwarting interpersonal behaviours. Finally, this study will explore characteristics of the coaches to determine whether any coach factors predict their likelihood of having an agreement or discrepancy with their athletes, with the objective of understanding whether certain coaches are more likely to be overly positive about their behaviour.

Overall, it is anticipated that these studies will help extend the existing knowledge in the fields of SDT and sport by further examining the coach-athlete relationship. Specifically, it will help identify the role of all six types of interpersonal behaviours, it will explore the relationship between coaches' self-reports and athletes' perceptions, and it will examine whether the nature of this relationship impacts athletes' motivational outcomes.

Study 1

The objective of Study 1 is to confirm that athletes' perceptions of their coaches' interpersonal behaviours predict their psychological needs and motivation for sport, as would be expected according to SDT. Specifically, it is anticipated that when athletes perceive their coaches to be AS, CS, and RS, this will lead to increased need satisfaction and decreased need frustration in sport. When athletes perceive their coaches to be AT, CT, and RT, this will predict increased need frustration and decreased need satisfaction. Finally, athletes' need satisfaction will promote increased autonomous motivation for sport and decreased controlled motivation, while the opposite is expected for athletes' need frustration.

Methods

Participants

The sample was composed of 180 full-time undergraduate student-athletes ($n_{\text{male}} = 88$, $n_{\text{female}} = 92$), with an average age of 20.51 years ($SD = 2.71$), who were enrolled in first-year courses. These students had been competing in their sport for an average of 9.91 ($SD = 4.39$) years and the athletes came from a variety of sport backgrounds including: alpine skiing, badminton, baseball, basketball, boxing, cheerleading, competitive dance, curling, distance running, equestrianism, figure skating, football, golf, gymnastics, hockey, lacrosse, ringette, road cycling, rowing, running, rugby, soccer, swimming, tennis, track and field, triathlon, volleyball, and weightlifting.

Procedures

The students were recruited online through social media and sport club list serves. Participation was voluntary and athletes gave their informed consent before beginning the study. To be eligible for this study, the participants had to be actively training in their sport at the time of data collection, have participated in a competitive event in their sport within the previous 12 months, and have been working with their current coach for at least 1 year.

Materials

The athletes completed the following measures through an online questionnaire.

Coach Interpersonal Behaviors. The athletes completed the *Interpersonal Behaviours Questionnaire* (IBQ; See Chapter 2 or 3; Rocchi, Pelletier, Cheung, Baxter & Beaudry, 2016; Rocchi, Pelletier, & Desmarais, 2016) to assess the extent to which they perceived that their coach engaged in interpersonal behaviours according to SDT. The scale consists of 24 items, measuring the six subscales that represent the different interpersonal behaviours according to

SDT. The athletes responded to each item using a 7-point scale, ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*) indicating the extent to which each statement applied to their own interactions with their coach. The internal consistency for the six subscales were above the minimum ($\alpha > .83$), and a mean score was calculated for each subscale to represent the athletes' perceptions of their coaches' AS, AT, CS, CT, RS, and RT interpersonal behaviours. These mean scores were used as observed variables in the model.

Need satisfaction. Participants also responded to the positive items from the *Basic Need Satisfaction at Work Scale* adapted to the sport context (Appendix H; Deci et al., 2001) to assess the extent that their three basic psychological needs were met while practicing their sport. The scale consists of three subscales measuring participants' autonomy, competence, and relatedness satisfaction. For this study, the stems were modified to ask participants about their need satisfaction in sport, instead of at work. Athletes were asked to indicate, using a 7-point scale ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*), the extent to which they typically agreed with each statement. The internal consistency estimates (Cronbach's alpha) for the three subscales were above the acceptable limit (autonomy $\alpha = .80$; competence $\alpha = .81$; relatedness $\alpha = .84$). For the purposes of the present model, an overall mean score was calculated to represent athletes' need satisfaction in sport.

Need frustration. To assess psychological need frustration in sport, participants also completed the *Psychological Need Thwarting Scale in Sport* (Appendix I; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010). The scale also consists of three subscales measuring participants' autonomy, competence, and relatedness frustration. Participants were asked to indicate their agreement with each statement, using a 7-point scale ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*). The internal consistency for the three subscales were above the

acceptable range ($\alpha > .84$), and a mean score was calculated for all need frustration items to represent athletes' need frustration in sport.

Athlete Motivation. Participants also completed the *Revised Sport Motivation Scale* (SMS-II; Appendix J; Pelletier, Rocchi, Vallerand, Deci, & Ryan, 2013) to assess their reasons for participating in sport. The SMS-II is a six-factor scale comprised of 18 items measuring sport motivation according to each of the six types of behavioural regulation, according to SDT (Deci & Ryan, 1985). Athletes responded to each item using a 7-point scale, ranging from 1 (*Does not correspond at all*) to 7 (*Corresponds completely*) indicating the extent to which each statement applied to their experience in sport. The Cronbach's alphas were calculated for each subscale and revealed they were above the acceptable limit ($\alpha > .84$), except for the introjected subscale which had a lower internal consistency ($\alpha = .67$). Despite the lower reliability for the introjected subscale, a mean score was calculated for autonomous motivation (combination of intrinsic, integrated, and identified regulation items) and controlled motivation (combination of introjected, external, and amotivated regulation items). These two composite variables represented athletes' autonomous and controlled motivation for their sport.

Analyses

First, the data was cleaned and screened for normality and outliers. Next, a path analysis was conducted to test the influence of athletes' perceptions of their coaches' behaviours on their need satisfaction and need frustration, and the influence of this on their subsequent autonomous and controlled motivation in sport. Path analysis was selected for the present analysis since the sample size of the study was not large enough to examine the relationship between the 10 variables (6 types of interpersonal behaviours, need satisfaction, need frustration, autonomous, and controlled motivation) using latent constructs (Tabachnick & Fidell, 2001).

The model was estimated using the maximum likelihood robust (MLR) estimator in Mplus Version 6 (Muthen & Muthen, 2010). The fit of each model was assessed according to Hu and Bentler's (1999) recommendation of using the chi-square (χ^2) and the Standardized Root Mean Square Residual (SRMR) as absolute fit indices; the Tucker-Lewis Index (TLI) as a relative fit index; and finally, the Root Mean Square Error of Approximation (RMSEA) and the Comparative Fit Index (CFI) as noncentrality-based indices. Since MLR estimation was used in the analysis, the Satorra-Bentler (SB) scaled chi-square was reported (Muthen & Muthen, 2010). For the SRMR and RMSEA, values below .08 indicated adequate model fit and values below .06 indicated excellent fit; while for the CFI and TLI, values above .90 represent represented good fit and values above .95 indicated excellent fit (Hooper, Coughlan, & Mullen, 2008).

Results

First, the data was cleaned and screened for impossible values and univariate outliers. The univariate outlier scores were recoded to the closest, within range value. The mahalanobis distances were calculated to screen for multivariate outliers and none were identified in this sample. Next, the missing data analyses suggested that 25 athletes were missing between 1 and 8 observations on the study variables. Since this study relied mainly on composite scores, no adjustments were made for estimating missing data and the composite scores were calculated using the data that was available. See Table 4.1 for the descriptive statistics of all the composite scores used in this study and Table 4.2 for the correlations coefficients between all of the study variables.

Model Testing

The 10-factor path model estimating the influence of athletes' perceptions of all six types of coach interpersonal behaviours on athletes' need satisfaction and need frustration, and

subsequent autonomous and controlled motivation was tested. Overall, the results supported that the model fit the data well ($SB\chi^2_{(13)} = 33.25, p < .001$, RMSEA = .07 (95% CI [.06, .08]), SRMR = .04, CFI = .94, TLI = .90). Consult Figure 4.1 for an overview of the standardized regression coefficients. The results found that when athletes perceive their coaches to be AS, CS, or RS, it was associated with an increase in need satisfaction, while perceptions of CT interpersonal behaviours is associated with a decrease in need satisfaction. Altogether, these perceptions accounted for 33% of variation in need satisfaction. Looking at perceptions of thwarting behaviours, the results supported that when athletes perceived their coaches to be AT or CT, this predicted an increase in need frustration, which accounted for 30% of variation in need frustration for athletes. Need satisfaction positively predicted autonomous motivation for sport, and need frustration predicted decreased autonomous motivation and increased controlled motivation, as would be expected according to SDT. Overall, this model explained 18% and 29% of the reported variance in athletes' reported autonomous and controlled motivation for sport. Interestingly, perceptions of RT interpersonal behaviours did not impact athletes' need satisfaction or need frustration.

Discussion

This study was the first to explore the impact of athletes' perceptions of all six types of interpersonal behaviours according to SDT, on athlete motivational outcomes in sport. Overall, Study 1 achieved its objective of exploring how athletes' perceptions of their coaches' interpersonal behaviours predict their psychological needs and motivation for sport. With the exception of RT behavior perceptions, the five other types of interpersonal behaviours predicted psychological need satisfaction or frustration as would be expected according to SDT, and athletes' psychological needs predicted both their autonomous and controlled motivation for

sport. Although the relationships between the constructs were in the expected directions, some of the relationships were weaker than would be expected (i.e., only the AS standardized regression coefficient was larger than .2) or not significant at all (i.e., relationships RT). One reason for this may be the design of the study. Athletes were recruited online and were given the opportunity to report on any of their coaches' interpersonal behaviours. Since athletes were far removed from their sport context while answering the survey and athletes often work with more than one coach, it is possible that the design of the study did not promote an opportunity for the athletes to reflect upon their relationship with their coach in a directed or concise way. This limitation will be addressed in Study 2.

Study 2

The first objective of Study 2 is to extend the findings of Study 1 by replicating the model and finding additional support for the fact that the relationships between athletes' perceptions of their coaches' behaviours influence psychological needs and motivational outcomes for the athletes, as would be expected according to SDT. It is anticipated that the results of this study will replicate the findings of *Study 1*, but find stronger relationships between athletes' perceptions of their coaches' interpersonal behaviours and their need satisfaction/ and frustration in sport. Since athletes will be told which coach to report on, as well as given a time-frame to reflect upon, and will be participating in the study at the same time as their coach, it is anticipated that this design will yield stronger relationships between the constructs.

The second objective is to explore the degree of agreement and discrepancy between coaches' self-reports of their behaviours with each of their athletes, and the athletes' perceptions of these same behaviour in order to examine the extent to which coaches' self-reports of their behaviours are in line with athletes' perceptions of these same behaviours. In the case of a

discrepancy, this study will also explore the direction of the discrepancy (i.e., coach high/athlete low or coach low/athlete high). Since previous research supports that there is often little agreement between coaches and athletes (Smith et al., 2016), it is expected that many pairs of coach-athletes will not report the same behaviours and perceptions.

The third objective is to determine whether the presence of an agreement or discrepancy (and the direction) predicts any differences in psychological need and motivational outcomes for athletes, for all six types of need-supportive and need-thwarting interpersonal behaviours. Previous research in SDT stipulates that athletes' perceptions are more important than real behaviours when understanding outcomes for athletes (Mageau & Vallerand, 2003). Since this has not been tested in a sport setting, polynomial regression analysis with surface methodology will be used to explore the influence of the level of discrepancy and agreement in the coach-athlete relationship on need satisfaction and need frustration for athletes. This analysis approach was selected as it allows researchers to examine the effect of the absolute agreement between coaches and athletes on an outcome, as well as the degree of agreement between the two. Additionally, it also allows researchers to explore the direction of the agreement and its influence on an outcome, as well as the effects of the degree of this agreement. It is anticipated that an absolute agreement, as well as cases where the athlete perceives the interpersonal behaviours more positively than their coach reported (i.e., more support and less thwarting behaviours) will experience increased need satisfaction and decreased need frustration.

The final objective of this study is to explore characteristics of the coaches to determine whether any coach factors predict their likelihood of having an agreement or discrepancy between how they report their own behaviours. Since this study is ultimately examining coaches' behaviours while interacting with athletes, it is anticipated that certain background characteristics

(e.g., years of experience) and psychological characteristics (e.g., need satisfaction and autonomous motivation for coaching) will predict whether coaches and athletes are in disagreement.

Method

Participants

The sample was composed of 53 coaches (26 figure skating coaches and 27 basketball coaches), along with their 278 athletes (122 skaters and 156 basketball players). Looking at the coaches, they had an average age of 41.36 years ($SD = 12.07$) and the majority of the coaches were female ($n_{\text{male}} = 21$, $n_{\text{female}} = 32$). The large majority had a college ($n = 10$, 20%) or university education ($n = 34$, 64%). They had an average of 12.62 years of coaching experience ($SD = 9.38$). The majority ($n = 30$, 59%) identified as a head coach or as an assistant coach ($n = 12$, 24%) and indicated that they began coaching because they used to be involved in their sport as an athlete ($n = 40$, 75%).

The athletes had an average age of 18.05 years ($SD = 5.90$) and were primarily female ($n_{\text{male}} = 28$, $n_{\text{female}} = 268$, $n_{\text{missing}} = 10$). They had been competing in their sport for an average of 6.84 ($SD = 3.82$) years and the majority indicated that they were definitely ($n = 114$, 40%) or probably ($n = 92$, 33%) going to continue participating in their sport next year

Procedures

Basketball coaches were recruited as part of the Ontario Basketball Provincial Championships, while skating coaches were recruited either at the Skate Canada Synchronized Skating National Championships or from local clubs in the Ottawa area (Canada). For all coaches, they were sent an email inviting them and their athletes to participate in a study about coach-athlete relationships. For the coaches and athletes recruited at the Ontario Basketball

championships and Skate Canada synchronized skating championships, they were informed they could participate in the study during a break at the event, while the local coaches and their athletes were given the option to schedule their participation before or after a regular practice session. The coaches' and athletes' participation was voluntary and they gave their informed consent before participating. To be eligible for this study, the coaches had to be an active member of their sport organization at the time of data collection (Ontario Basketball or Skate Canada), be actively coaching, and have athletes over the age of 15 that also wanted to participate in the study. For athletes to be eligible for this study, they had to be at least 15 years of age and have a coach that also participated.

First, the athletes completed measures of their sport background, their coaches' interpersonal behaviours, their psychological needs in sport, and their motivation for sport. The athletes completed their section of the study before their coaches in order to ensure that all athletes were taken into consideration when the coaches completed their section. The coaches then completed measures of their coaching background, their psychological needs in sport, and their motivation for coaching. Additionally, for each of their athletes that participated in the study ($M = 5.24$, $SD = 2.06$, $Range = 1$ to 10 athletes), the coaches reported on their interpersonal behaviours with that athlete specifically.

Materials

The following measures were completed by the coaches.

My Interpersonal Behaviors. The coaches completed the *Interpersonal Behaviours Questionnaire – Self* (IBQ-Self; See Chapters 2 and 3; Rocchi et al., 2016; Rocchi et al., 2016) to assess the extent to which they believed they engaged in specific types of interpersonal behaviours according to SDT with each of their athletes that participated in the study. The

participants responded to each item using a 7-point scale, ranging from 1 (*Do not agree at all*) to 7 (*Completely agree*) indicating the extent to which each statement applied to their own interactions with each of their athletes participating in the study using the stem “When I am with (Athlete Name), I...”. The internal consistency for the six subscales were above the minimum ($\alpha > .80$) and a mean score was calculated for each subscale to represent the coaches’ reported use of autonomy-supportive, autonomy-thwarting, competence-supportive, competence-thwarting, relatedness-supportive, and relatedness-thwarting interpersonal behaviours with each of their athletes.

Need satisfaction and Need frustration. The coaches also responded to the same items from the *Basic Need Satisfaction at Work Scale* (Appendix K; Deci et al., 2001) and the *Psychological Need Thwarting Scale in Sport* (Appendix L; Bartholomew et al., 2010) to assess the extent their three basic psychological needs were satisfied or not while coaching. The internal consistency estimates were within acceptable range ($\alpha s > .79$). For the purposes of the present study, a mean score was calculated for all scale items to represent coaches’ need satisfaction and a separate mean score was calculated for the need frustration items.

Coach Motivation. The coaches completed the *Coach Motivation Questionnaire* (CMQ; Appendix M; McLean, Mallet, & Newcombe, 2012) to assess their reasons for participating in sport. The CMQ is a six-factor scale comprised of 22 items measuring sport motivation according to each of the six types of behavioural regulation, according SDT. The coaches responded to each item using a 7-point scale, ranging from 1 (*Does not correspond at all*) to 7 (*Corresponds completely*) indicating the extent to which each statement applied to the reasons why they coach. The Cronbach’s alphas were calculated for each subscale and revealed they were above the acceptable limit ($\alpha > .80$), except for the introjected subscale which had a lower

internal consistency ($\alpha = .65$). For the present analyses, a mean score was calculated for autonomous motivation (combination of intrinsic, integrated, and identified regulation items) and controlled motivation (combination of introjected, external, and amotivated regulation items) and these were used to represent coaches' autonomous and controlled motivation for coaching.

The following measures were completed by the athletes.

Coach Interpersonal Behaviors, Psychological Needs and Motivation. The athletes completed the same measures as *Study 1*. Specifically, they completed the *Interpersonal Behaviours Questionnaire* (IBQ; See Chapter 2 and 3; Rocchi et al., 2016; Rocchi et al., 2016), the positive items from the *Basic Need Satisfaction at Work Scale* adapted to the sport context (Appendix H; Deci et al., 2001), the *Psychological Need Thwarting Scale in Sport* (Appendix I; Bartholomew et al., 2010), and the *Revised Sport Motivation Scale* (SMS-II; Appendix J; Pelletier et al., 2013) to assess their perceptions of their coaches' interpersonal behaviours, their psychological need satisfaction, their psychological need frustration, their autonomous, and their controlled motivation for sport. All subscales demonstrated acceptable internal consistency ($\alpha s > .71$). For the purposes of the present study, mean scores were calculated using the measures to represent overall need satisfaction, need frustration, autonomous motivation, and controlled motivation for each athlete, as well as their perceptions of their coaches' AS, AT, CS, CT, RS, and RT behaviours.

Analyses

First, the data was cleaned and screened for distribution normality and outliers. Next, since the design of this study involves multiple levels (multiple athletes per coach), interclass correlations were conducted on the key study variables to determine whether the analyses should proceed as multi-level. Then, the same path analysis as Study 1 was conducted to confirm the

relationship between coach interpersonal behaviours, athlete psychological needs, and athlete motivation replicated with a different sample. Following this, the level of agreement between coaches' self-reports of their interpersonal behaviours, and athletes' perceptions of these behaviours was calculated to determine what percentage of coach-athlete pairs demonstrated agreement, and which percentages demonstrated a discrepancy, and the direction of this discrepancy (either: coach > athlete, or coach < athlete). Then, using these discrepancy and agreement scores, polynomial regressions with response surface methodology analyses were conducted to determine whether the presence of an agreement or discrepancy between coaches and athletes on reported and perceived interpersonal behaviours, as well as the direction of the discrepancy, predicted any changes in athletes' psychological need satisfaction and need frustration. Finally, multiple regression analyses were conducted in order to determine whether any coaching characteristics predicted whether coaches were likely to have a discrepancy.

Results

First, the data was cleaned and screened for impossible values and univariate outliers. The outlier scores were recoded to the closest, within range, value. Next, the missing data analyses suggested that 10 coaches and 37 athletes were missing between 1 and 4 observations on the study measures. Since composite mean scores were used for all study variables, no methods for estimating missing data were applied since these participants would no longer have any missing data once the composite scores were calculated. As such, the composite scores for the coaches' reported use of need-supportive and need-thwarting behaviours, as well as their need satisfaction and need frustration in coaching, and their autonomous and controlled motivation towards coaching were calculated. The same composite scores were created for athletes. See Table 4.1 for the descriptive statistics for all study variables.

Multi-Level Measurement

For this study, the athletes' data was nested within their respective coaches' data. Since the analyses planned for this study assume statistical independence, the intraclass correlation (ICC) was calculated for athletes' perceptions of their coaches' interpersonal behaviours. The purpose was to confirm that the variance in athletes' reports was due to the specifics of the athlete's relationship with their coaches, and not due to any specific characteristics of the coach or team. The results found that overall, most of the variance in athletes' reports of their coaches' interpersonal behaviours was at the athlete level, and not the team/coach level (ICC AS = .11, ICC AT = .15, ICC CS = .10, ICC CT = .05, ICC RS = .16, and ICC RT = .11). As such, the subsequent analyses in this study were conducted assuming the athletes were independent, without taking into account athletes' coach association.

Model Testing

The path model that was tested in Study 1 was replicated to confirm the relationships between athletes' perceptions of coaches' interpersonal behaviours and their psychological needs and motivation in sport remained consistent. The model was estimated using the same procedures as Study 1 and the fit was evaluated using the same indices. The results suggested that the data fit the model well ($SB\chi^2_{(13)} = 38.74, p < .001$, RMSEA = .07 (95% CI [.06, .08]), SRMR = .04, CFI = .94, TLI = .90), which supported that athletes' perceptions of their coaches' behaviours predicted athletes' psychological needs and motivation, as would be expected according to SDT. See Figure 4.2 for the standardized regression coefficients and Table 4.2 for the correlations between the model variables. Overall, these results demonstrated similar trends to the results of the model developed in Study 1; however, the strength of the relationships were greater, and the model explained more of the variance in athletes' reported need satisfaction and

need frustration, as well as their autonomous and controlled motivation for coaching. In this model, athletes' perceptions of their coaches' AS, CS, and RS behaviours increased their need satisfaction, while their perceptions of AS and RS decreased their need frustration in sport. In terms of the thwarting behaviours, perceptions of AT, CT, and RT behaviours increased need frustration. These findings provide additional support for that athletes' perceptions of all six types of interpersonal behaviours in their coaches impact their psychological needs and subsequent motivation in sport, as would be expected.

Degree of Agreement or Discrepancy

Although athletes' perceptions of their coaches' behaviours relate to outcomes as would be expected, it is important to explore when these perceptions translate to coaches' reports of their behaviours. To do this, the level of agreement and discrepancy (as well as the direction of the discrepancy) were calculated for all coach-athlete pairs, for all six types of interpersonal behaviours, using the procedures outlined by Fleenor and colleagues (1997). First, coaches' scores on the self-reports of their interpersonal behaviours and athletes' perceptions of these same behaviours were standardized. Then, the athlete scores were subtracted from the coach scores and any difference larger or smaller than one half standard deviation was considered to be discrepant. From there, the percentages of coach-athlete pairs that were in agreement, discrepant with the coach scoring higher, or discrepant with the athlete scoring higher were calculated for AS, AT, CS, CT, RS, and RT interpersonal behaviours. See Table 3 for the full results. Overall, the results support there is a fairly even split between the three groups where about one third of athletes and coaches share the same perceptions, and then the remaining cases are split evenly between cases where coaches rate higher than athletes, and cases where athletes rate higher than coaches. In other words, these results indicate that athletes' perceptions correspond to coaches'

report in approximately 30% of cases. Given that there are discrepancies within the data, however, it is possible to explore how the presence of an agreement or discrepancy impact athletes' need satisfaction and need frustration in sport.

Polynomial Regression

A series of polynomial regressions with response surface analysis were conducted to determine whether the level of agreement and discrepancy between coaches' self-reports of their own interpersonal behaviours and athletes' perceptions of these same behaviours had any influence on athletes' reported need satisfaction and need frustration in sport. These analyses were conducted according to the procedures outlined by Shanock, Baran, Gentry, Pattison and Heggstad (2010). The following procedures were run 12 times in order to estimate the relationship between coach and athletes' ratings for each of the six types of interpersonal behaviours, on both athletes' need satisfaction and need frustration. Using the procedures associated with analysis #1 (AS interpersonal behaviours on athlete need satisfaction) as an example, five predictor variables were calculated for each polynomial regression analysis. First, coaches' self-reports of their AS behaviours (x_1) and athletes' perceptions of their coaches' AS behaviours (x_2) were centered to reduce any potential issues related to multicollinearity (Aiken & West, 1991), and used to test the linear relationships between each variable and athletes' need satisfaction. Next, both centered variables were squared (x_1^2 and x_2^2) in order to test the non-linear relationship between coaches' self-reports and athletes' perceptions, and athletes' need satisfaction. Finally, the product of the two centered variables ($x_1 \times x_2$) was calculated in order to assess the interactive relationship between both variables and its influence on athlete need satisfaction. These five variables (x_1 , x_2 , x_1^2 , x_2^2 , and $x_1 \times x_2$) were used as predictors in the polynomial regression analysis.

Next, the unstandardized regression coefficients from the polynomial regression ($x_1 = bx_1$, $x_2 = bx_2$, $x_1^2 = bx_3$, $x_2^2 = bx_4$, and $x_1 \times x_2 = bx_5$) analyses were used to estimate 4 surface values (a_1 , a_2 , a_3 , and a_4). The first ($a_1 = bx_1 + bx_2$) reflected the linear relationship between the degree of agreement between coaches' reports of their AS behaviours, and athletes' perceptions of these behaviours, and athletes' need satisfaction. A significant positive value indicates that as the degree of agreement between coaches' and athletes' reports increase, so does athletes' need satisfaction, whereas a significant negative value indicates that as the degree of agreement between coaches and athletes' increases, athlete's need satisfaction decreases. The second surface value ($a_2 = bx_3 + bx_4 + bx_5$) represented the non-linear relationship between the degree of agreement between coaches' reports and athletes' perceptions, and athletes' need satisfaction. A positive significant value indicates that the effect of agreement between coaches and athletes becomes more pronounced at the higher levels of agreement, while a significant negative value indicates that the effect becomes less pronounced at higher levels of agreement. The third ($a_3 = bx_1 - bx_2$) estimates how much the direction of the disagreement between coaches' reported AS and athletes' perceptions is related to athletes' need satisfaction. A significant positive value indicates that when coaches report higher levels of AS than athletes perceive, it is associated with an increase in need satisfaction for athletes, while a significant negative value indicates that when the athletes report higher levels of AS compared to their coaches, this is associated with increased need satisfaction for athletes. Finally, the fourth surface value ($a_4 = bx_3 - bx_4 + bx_5$) reflects how the degree of differentiation between coaches' reports and athlete's perceptions is related to athletes' need satisfaction. A significant positive value indicates that when there is a greater positive disagreement (coaches' self-reports are significantly higher than athletes), it is associated with higher scores of need satisfaction for athletes. A significant negative value

indicates that when there is a greater negative disagreement (coaches' self-reports are significantly lower than athletes), it is associated with lower need satisfaction.

The full results for all 12 analyses are listed below and accompanying surface test analysis results can be seen in Table 4.4 and Figure 4.3. The interpretation of each of the analyses are discussed below.

(1) Autonomy-support on need satisfaction. The regression model was significant ($F_{(5,262)} = 25.54, p < .001, r^2 = .57$) and this analysis supported that as coaches and athletes' reports of AS interpersonal behaviours increase, athletes' need satisfaction increases. Furthermore, athletes' need satisfaction will also increase when their reports of perceived autonomy-supportive behaviours is higher than coaches' reports of their AS behaviours.

(2) Autonomy-thwarting on need satisfaction. The regression model was also significant ($F_{(5,262)} = 3.09, p = .01, r^2 = .24$) and the analysis found that athletes' need satisfaction increased when athletes perceived lower AT interpersonal behaviours, compared to what the coaches reported.

(3) Competence-support on need satisfaction. Similar to analysis #1, the regression model was also significant ($F_{(5,262)} = 13.08, p < .001, r^2 = .45$) and these results supported that as coaches and athletes' reports of CS interpersonal behaviours increases, athletes' need satisfaction increases and when athletes' perceptions of CS are higher than what the coaches reported, it also predicts increased need satisfaction for athletes.

(4) Competence-thwarting on need satisfaction. Like in analysis #2, the model was significant ($F_{(5,262)} = 4.00, p = .002, r^2 = .27$) and this analysis found that athletes' need satisfaction increased when they perceived lower CT interpersonal behaviours compared to what their coaches reported.

(5) Relatedness-support on need satisfaction. Again, this model was significant ($F_{(5,262)} = 21.47, p < .001, r^2 = .54$) and similar to the other supportive-interpersonal behaviours, when coaches and athletes' reports of RS interpersonal behaviours increases, athletes' need satisfaction increases and when athletes' perceptions of RS are higher than what the coaches reported, this also predicts increased need satisfaction for athletes.

(6) Relatedness-thwarting on need satisfaction. This analysis found that the regression model was significant ($F_{(5,262)} = 4.82, p < .001, r^2 = .29$) and as both coaches' reports and athletes' perceptions of RT behaviours decrease, athletes' need satisfaction increases. It also found that athletes' need satisfaction increased when they perceived lower RT interpersonal behaviours compared to what their coaches reported.

(7) Autonomy-support on need frustration. The results from this analysis supported that the model was significant ($F_{(5,262)} = 7.24, p < .001, r^2 = .35$) and that athletes' need frustration increases when coaches' reports and athletes' perceptions of AS decrease. It also found support for the fact that athletes' need frustration increased when athletes perceived less AS than what coaches reported.

(8) Autonomy-thwarting on need frustration. These results found support for a significant regression model ($F_{(5,262)} = 14.20, p < .001, r^2 = .46$) and that as coaches and athletes' reports of AT interpersonal behaviours increases, athletes' need frustration also increases and when athletes' perceptions of AT behaviours are higher than what the coaches reported, it also predicts increased need frustration for athletes.

(9) Competence-support on need frustration. These results found that the model was significant ($F_{(5,262)} = 3.36, p = .006, r^2 = .25$) and as both coaches' and athletes' reports of CS decreased, athletes' need frustration increased.

(10) Competence-thwarting on need frustration. These results found support for the model ($F_{(5,262)} = 8.44, p < .001, r^2 = .37$) and that as coaches and athletes' reports of CT interpersonal behaviours increases, athletes' need frustration also increases. Since this analysis also found support for a negative non-linear relationship between coaches and athletes' reports, the effect of this agreement between coaches and athletes becomes less pronounced at higher levels of agreement. Finally, this analysis also found that athletes' perceptions of CT behaviours are higher than what the coaches reported, it also predicts increased need frustration for athletes.

(11) Relatedness-support on need frustration. Similar to the results from analysis #7, the model fit the data well ($F_{(5,262)} = 7.06, p < .001, r^2 = .34$) and athletes' need frustration increases when coaches' reports and athletes' perceptions of RS decrease. It also found support for the fact that athletes' need frustration increased when athletes perceived less RS than what coaches' reported.

(12) Relatedness-thwarting on need frustration. Finally, the results support the model fit ($F_{(5,262)} = 14.47, p < .001, r^2 = .47$) and found that as coaches and athletes' reports of RT interpersonal behaviours increases, athletes' need frustration also increases and when athletes' perceptions of RT behaviours are higher than what the coaches reported, it also predicts increased need frustration for athletes.

Overall, these results suggested that an interplay between coaches' reports of their own behaviours and athletes' perceptions of these behaviours influences their psychological need satisfaction and need frustration in sport. Generally, when both coaches and athletes reported increased need-supportive interpersonal behaviours, this lead to increased need satisfaction and decreased need frustration. Similarly, when coaches and athletes reported low need-supportive behaviours, this lead to low need satisfaction and higher need frustration. In the event there was a

discrepancy between coaches and athletes, as long as the athletes had a more favourable view (i.e., rated their coaches' need-supportive behaviours more positively), this also predicted increased need satisfaction. The opposite trends were found for the need-thwarting interpersonal behaviours and their influence on need satisfaction and need frustration in sport.

Coach Characteristics and Coach-Athlete Agreement

The degree of agreement and discrepancy analyses found that the coach-athlete pairs were split fairly equally between the agreement group, as well as both discrepancy groups, for all 6 types of coach interpersonal behaviours, suggesting that approximately one third of the sample fell into each group. The 12 previous polynomial regression analyses revealed that, generally, when coaches and athletes were in agreement, as the scores increased for the supportive constructs, it was related to an increase in athlete need satisfaction, while as the scores decreased for the thwarting constructs, it was related to a decrease in need satisfaction, which is what would be expected according to SDT. Alternatively, if there was a discrepancy between coaches' self-reports and athletes' perceptions, as long as the athlete had a more favourable view than the coach did, this still lead to more favourable outcomes for athletes. Specifically, if the athlete perceived their coach to be more autonomy, competence, or relatedness-supportive than the coach rated themselves to be, this still predicted an increase in athletes' need satisfaction and a decrease in their need frustration. Looking at the thwarting constructs, if athletes rated their coaches as less autonomy, competence, or relatedness-thwarting than their coach rated themselves, this still predicted less need frustration and more need satisfaction. Overall, this supports that in approximately 60% of the coach-athlete relationships, coaches' self-reports and athletes' perceptions lead to positive outcomes for athletes. These results, however, suggest that in the cases of a discrepancy between coaches and athletes, that there is a group of coaches who

tend to be overly positive about their behaviours and fall into the less favourable group that over-report their need-supportive behaviours, and under-report their need-thwarting behaviour.

To explore whether any coaching characteristics predict whether coaches are overly positive about their behaviours, a series of multiple regressions analyses were performed. To do this, first, for all six interpersonal behaviours, if the coach-athlete relationship fell into the less favourable discrepancy group, the coaches were given a score of 1, and 0 if they were in the agreement group or the favourable discrepancy group. This was done for all six interpersonal behaviours and then the sum of all six was calculated. High scores (closer to a value of 6) were indicative of coaches who tended to positively inflate their reported behaviour across the six behaviours, with that athlete. Then, a mean score was calculated for each coach to represent the extent to which they had the tendency to inflate their behavior with all of their athletes that participated in the study, as in the extent to which they had a negative discrepancy.

As a first step, a multiple regression analysis was conducted to determine whether coaches' years of experience and the number of athletes they work with in a given season predicted their mean discrepancy reporting score. The results suggested that these were not good indicators of coaches' degree of negative discrepancies ($F_{(2,23)} = 1.57, p = .232, r^2 = .13$). Next, coach psychological characteristics were explored. First, coaches' overall psychological need satisfaction and need frustration were used as predictors of negative discrepancy and again, the results found that these were not good indicators ($F_{(2,50)} = 1.30, p = .282, r^2 = .05$). Finally, coaches' autonomous motivation and controlled motivation for coaching were used as predictors and in this case, the results supported that the model did predict the outcome ($F_{(2,50)} = 3.48, p = .039, r^2 = .12$). Specifically, the results found that coaches' autonomous motivation negatively predicted their negative discrepancy ($\beta = -.390, t = -2.63, p = .011$), while controlled motivation

had no significant impact ($\beta = .195, t = 1.31, p = .196$). These results suggest that coaches who had an autonomous motivation for coaching were less likely to be overly positive about their coaching behaviour by having a negative discrepancy.

Discussion

First, Study 2 found additional evidence supporting that athletes' perceptions of all six types of need-supportive and need-thwarting interpersonal behaviours predicted athletes' need satisfaction and need frustration, as would be expected according to SDT. The strength of the relationships between perceptions of behaviours and psychological needs were stronger in this study, compared to Study 1. This is not unexpected given that the design of this study required coaches and athletes to participate at the same time, and athletes were instructed to respond on behalf of a specific coach.

Next, this study found that coaches and athletes' were in agreement on coaches' reported behaviours and athletes' perceptions of these behaviours, approximately 30% of the time, for all six interpersonal behaviours. The remaining cases were split evenly between discrepancy cases where coaches' self-reports were higher than athletes' perceptions, or cases where coaches' self-reports were lower than athletes' perceptions. The polynomial regression analyses found, for the most part, that when coaches and athletes were in agreement on the support factors, this led to increased need satisfaction and decreased need frustration, and the opposite was found for agreement on the thwarting factors. In the cases of a discrepancy, if the athletes rated their coach more positively than their coach rated themselves (i.e., higher on the support factors and lower on the thwarting factors), then it still led to more positive outcomes for athletes. Overall, these results suggested that an agreement was positive for athletes, and that in half of the cases with a discrepancy, that it was still positive for athletes.

As a final step, coaching demographic and psychological characteristics were used as predictors in order to explore whether any factors could help explain which coaches were most likely to over report their supportive behaviours, and under report their negative behaviours. Although these results should be interpreted with caution given their exploratory nature, the results did find support for the fact that coaches' autonomous motivation for coaching negatively predicted the extent to which they were likely to belong to that group. These results provide preliminary support for the fact that coaches who experience an autonomous motivation for coaching are less likely to inflate the quality of their behaviours with their athletes.

General Discussion

Overall, these two studies helped achieve the objectives of this research. First, they helped extend the existing research in SDT and sport by exploring the influence of all six types of interpersonal behaviours, according to SDT, on athletes. Both studies found support for the fact that coaches' competence and relatedness supportive and thwarting behaviours play a role in predicting athletes' need satisfaction and need frustration in sport, above and beyond what is explained by AS and AT behaviours. In both studies, however, the impact of AS and AT behaviours was by far the largest, compared to the other needs. These findings support that sport research under the framework of SDT should continue to examine all six variations of coaches' interpersonal behaviours in hopes of better understanding athletes' experiences. One interesting difference between the two studies was the change in the effect sizes between Study 1 and Study 2 for the relationships between perceived coaches' behaviours and athletes' psychological needs. In Study 2, there was an increase in the effect sizes, as well as the variance explained in need satisfaction and need frustration, when the athletes were asked to report on a specific coach's behaviours. These results suggest that the saliency and importance of the relationship between

coaches' interpersonal behaviours and athletes' perceptions of these behaviours may diminish over time.

Next, Study 2 helped extend the existing research exploring coach-athlete relationships by evaluating the extent to which coaches' self-reported behaviours are perceived by their athletes and whether the relationship between what coaches say they do and athletes perceive they do have any impact on athletes' psychological needs. To date, no other studies have explored the level of consistency between coaches' self-report and athletes' perceptions of coaches interpersonal behaviours. Overall, the results found that coaches and athletes were only in agreement in about one third of the scenarios and this agreement predicted positive outcomes for athletes. The discrepancy results, however, supported the existing research in that athletes' perceptions play an important role and will have a greater influence on their psychological need satisfaction and need frustration than coaches' own behaviours (i.e., Mageau & Vallerand, 2003).

Furthermore, similar to previous research, there was evidence that certain coaches had a tendency to positively inflate their behaviours in their interactions with their athletes. Unlike other studies where these coaches would bias the results (i.e., Smith et al., 2016); the present study was able to explore the dynamics of the coach-athlete relationship without this bias, as these coaches were isolated for the analyses. Study 2 was the first to explore the characteristics of coaches who may have a tendency to be overly positive about their behaviour with their athletes.

Related to this, no studies have tried to identify the factors that explain why some coaches may inflate their reported behavior, while some others may have a realistic view or even a modest view of their interpersonal behaviours. Previous research looking at sport coaches have found that coaches' inclination to be overly positive about their behaviour has skewed or biased

results (i.e., Ntoumanis, 2012; Smith et al., 2016). The results of this study found that coaches' autonomous motivation for coaching reduced their inclination to inflate their reported behaviour with their athletes; whereas the role of coaches' controlled motivation was less clear as the results were not significant. These findings are in line with previous research in SDT that examined the role of motivation quality in predicting use of impression management strategies. Specifically, autonomous motivation has been associated with taking greater responsibility for actions (Hodgins & Liebeskind, 2003) and with reduced self-presentation and impression management strategies (Lewis & Neighbors, 2005), as well as reduced self-serving bias (Knee & Zuckerman, 1996; 1998). It is hypothesized that this occurs because individuals who have more autonomous motivation orientation have a more stable sense of self and are less likely to be influenced by the impressions of others. Taken together, these results suggest that coaches who are autonomously motivated towards their coaching do not need to exaggerate or positively inflate their reported coaching behaviours, because they do not need the approval from others in order to feel successful or competent.

Overall, these results suggest that when it comes to reporting interpersonal behaviours for coaches, their reports are in line with their athletes' perceptions, or less positive than their athletes, in approximately 65% of cases. In terms of explaining the remaining coaches, accounting for coaches' motivation, as well as social desirability or impression management strategies, could help explain why some coaches positively inflate their behaviours with their athletes.

Limitations

Although these studies did help address some of the existing limitations within the SDT and sport literature, it did have some limitations of its own. The first limitation is related to the

gender of the athletes in Study 2. Although Study 1 had an approximately equal distribution of male and female athletes, the sample in Study 2 was comprised almost entirely of female athletes. It would be important to explore the relationships between the constructs examined in these studies with more balanced samples. Related to this limitation, the sample size, along with the gender distribution of both the coaches and the athletes, did not permit for the examination of gender differences between coaches and athletes (i.e., female coach with female athlete, versus male coach with female athlete), and how this relates to outcomes for athletes.

A second limitation is that although the ICCs were low and multi-level analyses was not conducted in the present studies, some of the values (i.e., 15%) were still high enough that team membership could be explaining some of the variance in the dependent variable. As such, it would be important to investigate the multi-level nature of the coach-athlete dyad in future studies.

A third limitation is that although this study looked at coaches' and athletes' years of experience in their sport, there was no control for how long the athletes had been working with their existing coach. Future research should examine the moderating effect of the length of time a coach has been working with their athlete when exploring the coach-athlete relationship as this has potential to be a confound.

A final limitation of these studies is the cross-sectional design. In both cases, autonomy had the largest impact on need satisfaction and need frustration for athletes; however, this represented the average across the coach-athlete relationship. In order to understand the role competence and relatedness supportive and thwarting behaviours play, it would be important to use longitudinal designs and explore the coach-athlete relationship throughout a sport season. Since the data in Study 2 was collected near the end of the season, it is also possible that the

impact of competence and relatedness, which may have been more important earlier in the season, was not adequately captured.

Future Directions

The results of these studies have set the stage for continued research in this domain. Specifically, future research should triangulate coaches' and athletes' observations with parents or another observer who is familiar with the coach and athletes in order to gain a better understanding of how coaches interact with their athletes. Reports from an outside source who knows both the coaches and athletes will help provide better understanding of how coaches behave with their athletes, without the bias of self-report.

Future research should continue to examine how coaches' motivation orientations are related to coaches' tendencies to be overly positive when reporting their own behaviours. Understanding the factors that lead coaches to be somewhat dishonest has important implications for future research since currently, this bias confounds coaching research that relies on self-reported coaching behaviours. This would help identify which coaches are most likely to be positively inflating their behaviour and will help provide a better understanding how these coaches influence research results.

Finally, future research should examine how the outcomes of impression management impact coaches' views of their own coaching, and how this influences their behaviour with their athletes. In the current study, autonomous motivation for coaching predicted that coaches were less likely to be overly positive in their reports of their behaviours with their athletes, but the role of controlled motivation and how it impacted athletes was less clear. Since controlled motivation has been associated with a number of negative outcomes in sport for athletes (i.e., Bartholomew

et al., 2009), it would be important to continue exploring the darker outcomes associated with coaches' controlled motivation for coaching.

References

- Aiken, L., West, S., & Reno, R. (1991). *Multiple regression: Testing and interpreting interactions*. Sage.
- Álvarez, M., Balaguer, I., Castillo, I., & Duda, J. (2009). Coach Autonomy Support and Quality of Sport Engagement in Young Soccer Players, *The Spanish Journal of Psychology*, 12, 138–148. doi: 10.1017/S1138741600001554
- Bartholomew, K., Ntoumanis, N., & Thorgenson-Ntoumani, C. (2009). A review of controlling motivational strategies from a self-determination theory perspective: implications for sports coaches. *International Review of Sport and Exercise Psychology*, 2, 215-233. doi: 10.1080/1750984X.2015.1132334
- Bartholomew, K., Ntoumanis, N., & Thorgenson-Ntoumani, C. (2010). The Controlling Interpersonal Style in a Coaching Context: Development and Initial Validation of a Psychometric Scale. *Journal of Sport & Exercise Psychology*, 32, 193-216. Retrieved from: <http://www.ncbi.nlm.nih.gov/pubmed/20479478>.
- Bartholomew, K., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2011). Self-Determination theory and the darker side of athletic experience: The role of interpersonal control and need thwarting. *Sport & Exercise Psychology Review*, 7, 23-27. Retrieved from: <http://spex.bps.org.uk/spex/publications/sepr.cfm>
- Butler, R. (1997). Sports psychology in performance. IN Adie, J., Duda, J., Ntoumanis, N. (2012). Perceived coach-autonomy support, basic need satisfaction and the well- and ill-being of elite youth soccer players: A longitudinal investigation. *Psychology of Sport and Exercise*, 13, 51-59. doi: 10.1016/j.psychsport.2011.07.008

- Conroy, D. & Coatsworth, J. (2007). Assessing autonomy-supportive coaching strategies in youth sport. *Psychology of Sport and Exercise*, 8, 671-684. doi: 10.1016/j.psychsport.2006.12.001
- Deci, E. & Ryan, R. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self determination of behavior. *Psychological Inquiry*, 11, 227-268. doi: http://dx.doi.org/10.1207/S15327965PLI1104_01
- Deci, E. & Ryan, R. (2002). *Handbook of Self-Determination Research*. Rochester, NY: The University of Rochester Press.
- Deci, E., Ryan, R., Gagné, M., Leone, D., Usunov, J., & Kornazheva, B. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former Eastern Bloc country. *Personality and Social Psychology Bulletin*, 27, 930-942. doi: 10.1177/0146167201278002
- Deci, E., Schwartz, A., Sheinman, L., & Ryan, R. (1981). An instrument to assess adults' orientations toward control versus autonomy with children: Reflections on intrinsic motivation and perceived competence. *Journal of Educational Psychology*, 73, 642-650. doi: <http://dx.doi.org/10.1037//0022-0663.73.5.642>
- Duda, J. & Balaguer, I. (2007). Coach-created motivational climate. IN S. Jowett, & D. Lavallee (Eds.), *Social psychology in sport* (pp. 117-130). Champaign, IL: Human Kinetics.
- Fleenor, J., McCauley, C., & Brutus, S. (1997). Self-other rating agreement and leader effectiveness. *The Leadership Quarterly*, 7, 487-506. doi: 10.1016/S1048-0843(96)90003-X

- Gagne, M., Ryan, R., & Bargmann, K. (2003). Autonomy support and need satisfaction in the motivation and well-being of gymnasts. *Journal of Applied Sport Psychology, 15*, 372-390. doi: 0.1080/714044203
- Hodgins, H. & Liebeskind, E. (2003). Apology versus defense: Antecedents and consequences. *Journal of Experimental Social Psychology, 39*, 297-236. doi: 10.1016/S0022-1031(03)00024-6
- Hooper, D., Coughlan, J. & Mullen, M. (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *The Electronic Journal of Business Research Methods, 6*, 53-60. Retrieved from: www.ejbrm.com/issue/download.html?idArticle=183.
- Horn, T. (2002). Coaching effectiveness in the sport domain. IN T.S. Horn (Ed.), *Advances in sport psychology* (2nd ed., pp. 309–354). Champaign, IL: Human Kinetics.
- Hu, L. & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55. doi: 10.1080/10705519909540118.
- Jõesaar, H., Hein, V., & Hagger, M. (2012). Youth athletes' perception of autonomy support from the coach, peer motivational climate and intrinsic motivation in sport setting: One-year effects. *Psychology of Sport and Exercise, 13*, 257-262. doi: 10.1016/j.psychsport.2011.12.001
- Jones, R., Armour, K. & Potrac, P. (2004). *Sports Coaching Cultures: From Practice to Theory*. Routledge, London, 2004.
- Knee, R. & Zuckerman, M. (1996). Causality orientations and the disappearance of the self-serving bias. *Journal of Research and Personality, 30*, 76-87. doi: 10.1006/jrpe.1996.0005
- Knee, R. & Zuckerman, M. (1998). A nondefensive personality: Autonomy and controlled as

- moderators of defensive coping and self-handicapping. *Journal of Research and Personality*, 32, 115-130. doi: 0.1006/jrpe.1997.2207
- Lewis, M. & Neighbors, C. (2005). Self-determination and the use of self-presentation strategies. *The Journal of Social Psychology*, 145, 469-490. doi: 10.3200/SOCP.145.4.469-490
- Mageau, G. & Vallerand, R. (2003). The coach-athlete relationship: a motivational model. *Journal of Sports Sciences*, 21, 883-904. doi: <http://dx.doi.org/10.1080/0264041031000140374>
- Matosic, D. & Cox, A. (2014). Athletes' motivation regulations and need satisfaction across combinations of perceived coaching behaviors. *Journal of Applied Sport Psychology*, 26, 302-317. doi: 10.1080/10413200.2013.879963
- McLean, K., Mallet, C., & Newcombe, P. (2012). Assessing Coach Motivation: The Development of the Coach Motivation Questionnaire (CMQ). *Journal of Sport & Exercise Psychology*, 34, 184-207. doi: <http://eprints.qut.edu.au/55847/>
- Muthen, L. K., & Muthen, B. O. (2010). Mplus user's guide: Statistical analysis with latent variables (6th ed.). Los Angeles, CA: Authors.
- Ntoumanis, N. (2012). A self-determination theory perspective on motivation in sport and physical education: Current trends and possible future research directions. *Motivation in sport and exercise*, 3, 91-128.
- Pelletier, L., Fortier, M., Vallerand, R., & Briere, N. (2001). Associations between perceived autonomy support, forms of self-regulation, and persistence: a prospective study. *Motivation and Emotion*, 25, 279-306. doi: 10.1023/A:1014805132406

- Pelletier, L., Rocchi, M., Vallerand, R., Deci, E., & Ryan, R. (2013). Validation of the revised sport motivation scale (SMS-II). *Psychology of Sport and Exercise, 14*, 329-341. doi: <http://dx.doi.org/10.1016/j.psychsport.2012.12.002>
- Pomerantz, E. Cheung, C., & Qin, L. (2012). Relatedness Between Children and Parents: Implications for Motivation. In Ryan, R. (Ed.), (2012). *The Oxford Handbook of Motivation* (pp. 335-349). New York: Oxford University Press.
- Rocchi, M., Pelletier, L., Cheung, S., Baxter, D., & Beaudry, S. (2016). Assessing Need-Supportive and Need-Thwarting Interpersonal Behaviours: The Interpersonal Behaviours Questionnaire (IBQ). *Manuscript submitted for publication*.
- Rocchi, M., Pelletier, L., & Couture, A. (2013). Determinants of Coach Motivation and Autonomy Supportive Coaching Behaviours. *Psychology of Sport and Exercise, 14*, 852-859. doi: 10.1016/j.psychsport.2013.07.002
- Rocchi, M., Pelletier, L., & Desmarais, P. (2016). The Validity of the Interpersonal Behaviours Questionnaire (IBQ) in Sport. *Manuscript submitted for publication*.
- Salminen, S. & Liukkonen, J. (1996). Coach-player relationship and coaching behavior in training sessions. *International Journal of Sport Psychology, 27*, 59-67. doi: <http://www.cabdirect.org/abstracts/19961808948.html>
- Shanock, L., Baran, B., Gentry, W., Pattison, S., & Heggstad, E. (2010). Polynomial regression with response surface analysis: A powerful approach for examining moderation and overcoming limitations of difference scores. *Journal of Business and Psychology, 25*, 543-554. doi: 10.1007/s10869-010-9183-4

- Sheldon, K. & Filak, V. (2008). Manipulating autonomy, competence, and relatedness support in a game-learning context: New evidence that all three needs matter. *British Journal of Social Psychology*, 47, 257-283. doi: 10.1348/014466607X238797
- Smith, N., Tessier, D., Tzioumakis, Y., Fabra, P., Quested, E., Appleton, P., ... & Duda, J. (2016). The relationship between observed and perceived assessments of the coach-created motivational environment and links to athlete motivation. *Psychology of Sport and Exercise*, 23, 51-63. doi: 0.1016/j.psychsport.2015.11.001
- Smoll, F. & Smith, R. (2006). Enhancing coach-athlete relationships: Cognitive-behavioral principles and procedures. *The sport psychologist's handbook*, 19-37.
- Standage, M., Duda, J., & Ntoumanis, N. (2005). A model of contextual motivation in physical education: Using constructs from self-determination and achievement goal theories to predict physical activity intentions. *Journal of Educational Psychology*, 95, 97–110. doi: 10.1037/0022-0663.95.1.97
- Stebbing, J., Taylor, M., & Spray, C. (2011). Antecedents of Perceived Coach Autonomy Supportive and Controlling Behaviors: Coach Psychological Need Satisfaction and Well- Being. *Journal of Sport & Exercise Psychology*, 33, 255-272. Retrieved from: <http://journals.humankinetics.com/jsep>
- Stebbing, J., Taylor, M., Spray, C., & Ntoumanis, N. (2012). Antecedents of perceived coach interpersonal behaviors: The coaching environment and coach psychological well- and ill-being. *Journal of Sport & Exercise Psychology*, 34, 481-502. Retrieved from: <http://journals.humankinetics.com/jsep>

- Stenling, A., Lindwall, M., & Hassmén, P. (2015). Changes in perceived autonomy support, need satisfaction, motivation, and well-being in young elite athletes. *Sport, Exercise, and Performance Psychology, 4*, 50-55.
- Tabachnick, B., & Fidell, L. (2001). *Using Multivariate Statistics (4th edition)*. New York: Allyn and Bacon.
- Taylor, I., Ntoumanis, N., & Standage, M. (2008). A self-determination theory approach to understanding the antecedents of teachers' motivational strategies in physical education. *Journal of Sport and Exercise Psychology, 30*, 75-94. doi: <https://dspace.lboro.ac.uk/2134/15371>
- Vallerand, R. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology* (pp. 271-360). New York: Academic Press.
- Vallerand, R. (2000). Deci and Ryan's self-determination theory: A view from the hierarchical model of intrinsic and extrinsic motivation. *Psychological Inquiry, 11*, 312-318. doi: <http://www.jstor.org/stable/1449629>
- Williams, N., Whipp, P., Jackson, B., & Dimmock, J. (2013). Relatedness support and the retention of young female golfers. *Journal of Applied Sport Psychology, 25*, 412-430. doi: 10.1080/10413200.2012.749311
- Williams, N., Whipp, P., Jackson, B., & Dimmock, J. (2013). Relatedness support and the retention of young female golfers. *Journal of Applied Sport Psychology, 25*, 412-430. doi: 10.1080/10413200.2012.749311

Table 4.1

Descriptive Statistics for Study 1 and 2 Variables.

Study Variables	Athletes (Study 1)			Athletes (Study 2)			Coaches (Study 2)		
	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
Autonomy Supportive	5.26	1.14	1 – 7	5.53	0.94	1 – 7	5.59	0.76	1 – 7
Autonomy Thwarting	3.57	1.35	1 – 7	3.81	1.24	1 – 7	3.34	1.03	1 – 7
Competence Supportive	6.08	0.84	1 – 7	5.89	0.71	1 – 7	6.24	0.70	1 – 7
Competence Thwarting	1.77	1.06	1 – 7	3.10	1.70	1 – 7	2.19	1.11	1 – 7
Relatedness Supportive	5.24	1.27	1 – 7	5.28	1.07	1 – 7	5.86	1.16	1 – 7
Relatedness Thwarting	2.20	1.27	1 – 7	2.39	0.88	1 – 7	1.93	0.92	1 – 7
Need Satisfaction	5.16	1.05	1 – 7	5.32	0.83	1 – 7	5.59	1.71	1 – 7
Need Frustration	2.77	1.15	1 – 7	3.28	1.12	1 – 7	2.96	1.69	1 – 7
Autonomous Motivation	5.26	1.14	1 – 7	5.44	1.07	1 – 7	5.24	1.64	1 – 7
Controlled Motivation	3.57	1.35	1 – 7	3.69	1.12	1 – 7	3.32	1.89	1 – 7

Note. Study 1 $n = 180$ athletes. Study 2 $n = 278$ athletes, $n = 53$ coaches.

Table 4.2.

Study 1 and 2: Correlations between model variables.

Variables	1	2	3	4	5	6	7	8	9	10
1. Autonomy Supportive		-.10	.48*	-.11	.46*	-.15*	.55*	-.34*	.26*	.00
2. Autonomy Thwarting	-.46*		-.04	.52*	-.19*	.57*	-.19*	.48*	-.19*	.12
3. Competence Supportive	.54*	-.17*		-.40*	.42*	-.29*	.47*	-.14*	.23*	.12*
4. Competence Thwarting	-.36*	.52*	-.39*		-.15*	.55*	-.27*	-.38*	-.08	.08
5. Relatedness Supportive	.71*	-.33*	.61*	-.34*		-.37*	.48*	-.34*	.34*	.12*
6. Relatedness Thwarting	-.51*	.46*	-.53*	.59*	-.61*		-.30*	.52*	-.18*	.08
7. Need Satisfaction	.54*	-.16*	.38*	-.10	.48*	-.30*		-.42*	.61*	.19*
8. Need Frustration	-.25*	.48*	-.22*	.42*	-.20*	.33*	-.08		-.24*	.38*
9. Autonomous Motivation	.28*	-.03	.29*	-.04	.28*	-.18*	.42*	-.05		.27*
10. Controlled Motivation	-.11	.32*	-.11	.39*	-.06	.24*	.09	.51*	.02	

Note. Below Diagonal = Study 1. Above Diagonal = Study 2. Study 1 $n = 180$ athletes. * = $p < .05$ t.

Table 4.3

Study 2: Frequencies of athlete interpersonal behaviours over, under, and in agreement with coaches' self-reports.

Groups	%	Mean Coach	Mean Athlete
Autonomy Supportive			
Coach > Athlete	26	6.13	4.77
Coach = Athlete	25	5.62	5.61
Coach < Athlete	39	5.08	6.15
Autonomy Thwarting			
Coach > Athlete	33	4.14	2.93
Coach = Athlete	29	3.28	3.28
Coach < Athlete	37	2.68	4.66
Competence Support			
Coach > Athlete	33	6.67	5.20
Coach = Athlete	32	6.43	6.11
Coach < Athlete	35	5.70	6.36
Competence Thwarting			
Coach > Athlete	20	3.22	2.61
Coach = Athlete	56	1.98	2.69
Coach < Athlete	24	1.80	4.48
Relatedness Support			
Coach > Athlete	32	6.80	4.24
Coach = Athlete	30	5.90	5.33
Coach < Athlete	38	5.07	6.13
Relatedness Thwarting			
Coach > Athlete	36	2.35	1.78
Coach = Athlete	31	1.95	2.43
Coach < Athlete	33	1.46	3.00

Note. $n = 278$

Table 4.4

Study 2: Results of the polynomial regression analyses predicting athletes' need satisfaction and frustration.

	Unstandardized Regression Coefficients					Surface Values			
	Coach Self- Report (bx ₁)	Athlete Perception (bx ₂)	Coach Self- Report Squared (bx ₃)	Athlete Perception Squared (bx ₄)	Coach x Athlete (bx ₅)	<i>a</i> ₁	<i>a</i> ₂	<i>a</i> ₃	<i>a</i> ₄
Athlete Need Satisfaction									
(1) Autonomy Support	-0.36 (.05) [-0.13, -0.06]	0.47 (.05)* [0.37, 0.56]	-0.02 (.03) [-0.12, 0.08]	0.01 (.03) [-0.06, 0.08]	-0.02 (.05) [-0.08, 0.04]	0.43*	-0.03	-0.50*	0.01
(2) Autonomy Thwarting	0.04 (.04) [-0.04, 0.11]	-0.14 (.04)* [-0.22, -0.06]	-0.02 (.03) [-0.07, 0.07]	0.02 (.03) [-0.03, 0.08]	-0.02 (.04) [-0.05, 0.09]	-0.10	0.02	0.18*	-0.02
3) Competence Support	0.02 (.04) [-0.05, 0.09]	0.52 (.08)* [0.36, 0.67]	-0.02 (.03) [-0.07, 0.04]	0.04 (.06) [-0.07, 0.16]	-0.03 (.05) [-0.13, 0.07]	0.54*	0.00	-0.49*	0.06
4) Competence Thwarting	0.17 (.08)* [0.03, 0.32]	-0.22 (.07)* [-0.38, -0.08]	-0.02 (.03) [-0.04, 0.35]	0.16 (.10) [-0.15, 0.11]	0.06 (.04) [-0.28, 0.14]	-0.05	0.19	0.40*	-0.12
(5) Relatedness Support	-0.09 (.03)* [-0.14, -0.03]	0.28 (.04)* [0.21, 0.36]	0.03 (.03) [-0.01, 0.11]	0.05 (.03) [-0.01, 0.01]	0.30 (.03) [-0.02, 0.08]	0.19	0.08	-0.37*	-0.02
(6) Relatedness Thwarting	-0.04 (.04) [-0.11, 0.04]	-0.22 (.07)* [-0.35, -0.09]	-0.07 (.04) [-0.05, 0.15]	0.05 (.05) [-0.14, 0.01]	-0.02 (.05) [-0.11, 0.08]	-0.26*	-0.03	0.19*	-0.13
Athlete Need Frustration									
(7) Autonomy Support	0.06 (.07) [-0.07, 0.20]	-0.35 (.07)* [-0.49, -0.22]	0.02 (.04) [-0.13, 0.16]	0.02 (.07) [-0.06, 0.10]	-0.02 (.05) [-0.11, 0.08]	-0.29*	0.03	0.42*	-0.01
(8) Autonomy Thwarting	-0.05 (.04) [-0.14, 0.03]	0.36 (.04)* [0.27, 0.45]	-0.07 (.03) [-0.08, 0.08]	0.00 (.04) [-0.06, 0.05]	-0.03 (.03) [-0.07, 0.06]	0.31*	0.06	-0.41*	-0.01
9) Competence Support	-0.12 (.05)* [-0.22, -0.03]	-0.29 (.10)* [-0.50, -0.08]	-0.04 (.04) [-0.22, 0.05]	-0.09 (.07) [-0.08, 0.08]	-0.11 (.08) [-0.27, 0.05]	-0.41*	-0.21	0.17	-0.03
10) Competence Thwarting	0.10 (.09) [-0.08, 0.27]	0.54 (.09)* [0.37, 0.72]	-0.05 (.08) [-0.42, 0.05]	-0.19 (.11) [-0.21, 0.11]	-0.15 (.05)* [-0.25, -0.05]	0.64*	-0.39*	-0.45*	-0.01

11) Relatedness	-0.02 (.04)	-0.29 (.05)*	0.00 (.01)	0.01 (.04)	0.02 (.03)	-0.31*	0.02	0.27*	0.00
Support	[-0.09, 0.06]	[-0.39, -0.19]	[-0.07, 0.09]	[-0.01, 0.01]	[-0.06, 0.08]				
12) Relatedness	0.03 (.05)	0.54 (.08)*	0.09 (.04)	0.17 (.06)*	-0.05 (.05)	0.56*	0.06	-0.51*	0.02
Thwarting	[-0.06, 0.12]	[0.38, 0.68]	[-0.10, 0.13]	[0.04, 0.17]	[-0.15, 0.06]				

* $p < .05$

Figure 4.1. Study 1: Athlete Perception Path Model with Standardized Regression Coefficients

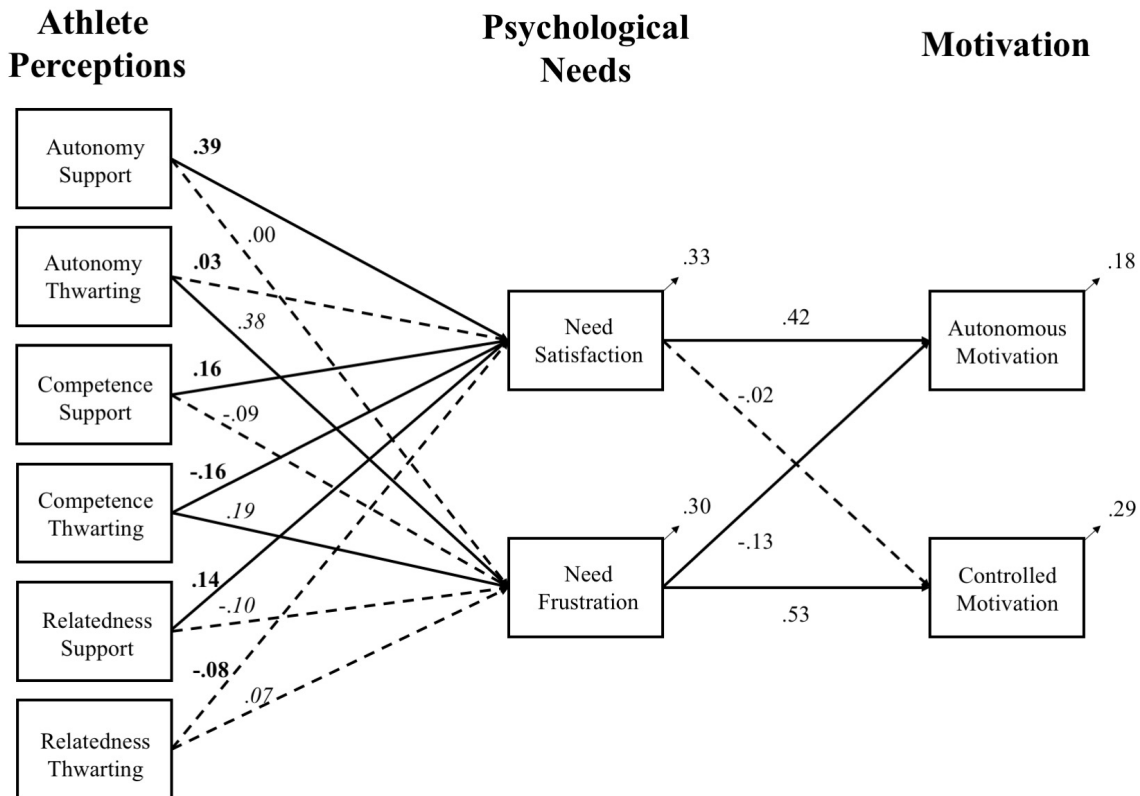


Figure 1. Solid lines = $p < .01$. Dotted lines = ns . For the standardized regression coefficients predicting athletes' need satisfaction and frustration from perceptions of coaches' interpersonal behaviours, the **bolded** values represent the relationship between interpersonal behaviours need satisfaction, while the *italicized* values represent the relationship between interpersonal behaviours and need frustration. Values adjacent to latent constructs represent the standardized residuals.

Figure 4.2. Study 2 Athlete Perception Path Model with Standardized Regression Coefficients

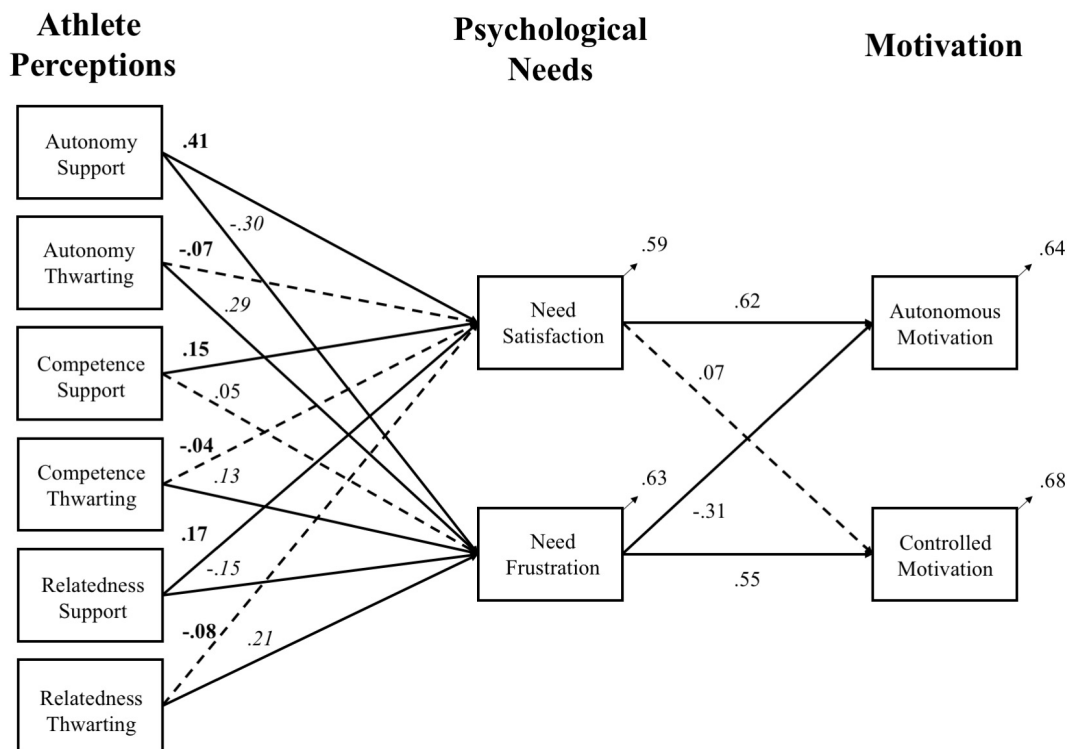


Figure 2. Solid lines = $p < .01$. Dotted lines = ns . For the standardized regression coefficients predicting coaches' need satisfaction and frustration from environmental factors, the **bolded** values represent the relationship between environmental factors and need satisfaction, while the *italicized* values represent the relationship between environmental factors and need frustration. Values adjacent to latent constructs represent the standardized residuals.

Figure 4.3. Athlete Need Satisfaction and Need Frustration as Predicted by Coach Self-Reports and Athlete Perception of Interpersonal Behaviours Discrepancy

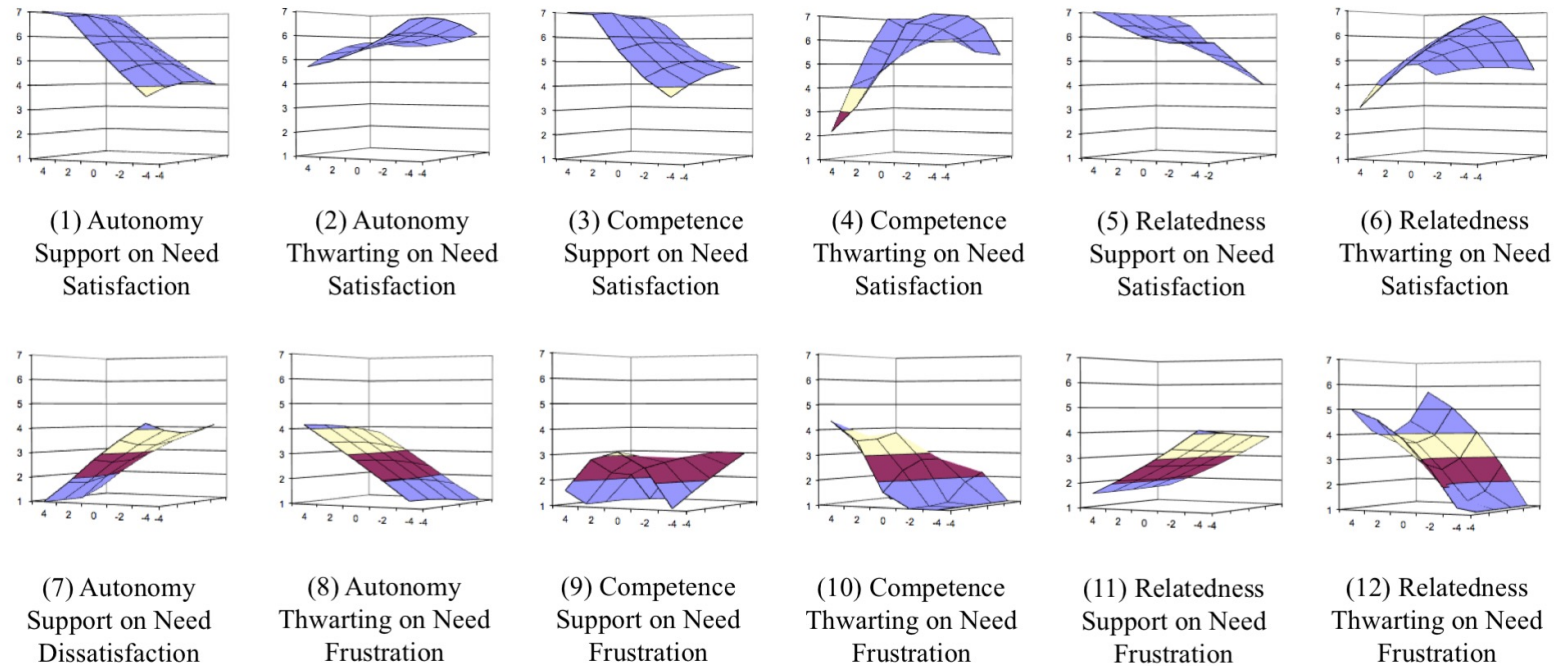


Figure 3. Z axis = Athlete Need Satisfaction (1 – 6) or Athlete Need Frustration (7 – 12). X axis = Coach's Self-Reported Score of interpersonal behaviours (centered). Y axis = Athlete perceptions of coach's interpersonal behaviours (centered). Please note, the colours have no significance.

CHAPTER SIX

GENERAL DISCUSSION

Summary of Thesis Objectives

The overall objective of this thesis was to explore how the coaching context, coach psychological needs, and coach motivation influence coaches' interpersonal behaviours when they interact with their athletes, and how these interpersonal behaviours impact athletes' psychological needs and motivation in sport.

This objective was achieved through a series of 10 studies, divided into four manuscripts. Before exploring the antecedents (coaches' contexts, psychological needs, and motivation) or the outcomes (athlete psychological needs, and athlete motivation) of all six types of coaches' interpersonal behaviours according to SDT, it was essential to create a valid measure of these behaviours that was applicable to the sport context. Specifically, there was a need to create a measure that captured both perceptions of others' interpersonal behaviours, as well as self-reports of an individual's own interpersonal behaviours that could be used by athletes and coaches within the sport context, for all six types of need-supportive and need-thwarting behaviours according to SDT. As such, the Interpersonal Behaviours Questionnaire was created and validated as a general measure of perceptions of other people's interpersonal behaviours (IBQ) and as a self-report of interpersonal behaviours (IBQ-Self) with people that were important in Manuscript #1 (Chapter 2). Then, the validity of the scale was extended to the sport context in Manuscript #2 (Chapter 3), where the IBQ was used with a sample of athletes reporting on their perceptions of their coaches' interpersonal behaviours and the IBQ-Self was validated with a sample of coaches reporting on their own behaviours while coaching.

Once the measure was validated, Manuscript #3 (Chapter 4) explored the antecedents of coaches' interpersonal behaviours. Specifically, the manuscript looked at how coaches' psychological needs, motivation, and reported interpersonal behaviours were related. Next, it explored the contextual factors that were important to coaches and examined how they influenced coaches' psychological needs, motivation, and reported interpersonal behaviours. Finally, Manuscript #4 (Chapter 5) explored the outcomes of coaches' interpersonal behaviours by examining how athletes' perceptions of their coaches' behaviours predicted their psychological needs and motivation in sport. It also explored the relationship between coaches' self-reports of their interpersonal behaviours and athletes' perceptions of these same behaviours, to determine how the degree of agreement or discrepancy between coaches and athletes impacted athletes' psychological needs and motivation.

Through achieving the overall objective, this thesis also addressed some specific limitations within the coach motivation research. To start, this thesis was the first to examine the full motivational sequence (coaching context, coach needs, coach motivation, and coaching behaviours). Next, it identified contextual factors that have not been previously examined in relation to psychological needs and coach motivation. From there, it explored the antecedents of all six types of need-supportive and need-thwarting coach interpersonal behaviours. Then, it moved beyond coaches' self-reports of their behaviours by comparing their reports to athletes' perceptions. Finally, it explored how all six types of need-supportive and need-thwarting interpersonal behaviours impacted athletes.

Key Findings

The following section highlights the key findings from each of the studies of this thesis, in the context of their respective manuscripts.

Manuscript #1 - Assessing Need-Supportive and Need-Thwarting Interpersonal Behaviors: The Interpersonal Behaviors Questionnaire (IBQ) (Chapter 2). The purpose of this manuscript was to validate a measure of perceived and reported interpersonal behaviours, using the six types of need-supportive and need-thwarting interpersonal behaviours, according to SDT, called the Interpersonal Behaviours Questionnaire (IBQ).

In Study 1, the 6-factor, 24-item scale, with 4 items per subscale measuring perceptions of others' autonomy-supportive, autonomy-thwarting, competence-supportive, competence-thwarting, relatedness-supportive, and relatedness-thwarting interpersonal behaviours was both developed and validated using a sample of undergraduate students ($N = 534$). The internal consistency and correlational analyses results suggested that the items within each subscale have strong internal reliability and that the different types of interpersonal behaviours relate to each other as expected. Specifically, the supportive subscales correlated more strongly with measures of need satisfaction, while the thwarting subscales correlated more strongly with need frustration. In Study 2, the validity of the IBQ was extended by replicating the factor structure and results of Study 1, with a separate sample of undergraduate students ($N = 351$). Like in Study 1, the subscales related to each other, as well as outcomes, as would be expected. Finally, in Study 3, the self-report version of the scale, the IBQ-Self, was validated using a sample of undergraduate students ($N = 607$) reporting on their interpersonal behaviours when interacting with the people that were important to them. The IBQ-Self also demonstrated a strong factor structure and the subscales also correlated to outcomes as would be expected according to SDT.

Overall, these results supported that the IBQ and IBQ-Self are valid measures of general perceptions and self-reports of the six types of interpersonal behaviours according to SDT. The development of this scale permits researchers to extend the existing research in SDT by

exploring the antecedents and outcomes of all six types of interpersonal behaviours.

Manuscript #2 – The Validity of the Interpersonal Behaviors Questionnaire (IBQ) in Sport (Chapter 3). The purpose of this second manuscript was to extend the validity of the IBQ to the sport context. Specifically, this manuscript aimed to validate the 6-factor, 24-item scale with a sample of athletes reporting on their perceptions of their coaches' interpersonal behaviours (IBQ), as well as with a sample of coaches reporting on their behaviours when they interact with their athletes (IBQ-Self).

In Study 1, the factor structure of the scale (IBQ) was tested on a sample of multisport athletes ($N = 239$). The results supported that the scale structure held and that the subscales demonstrated adequate internal consistency and validity. The correlational analyses suggested that the subscales related to each other and outcomes as would be expected. The need-supportive subscales were associated with increased satisfaction of the basic psychological needs, as well as autonomous motivation; while the need-thwarting subscales were associated with increased need frustration and controlled motivation. Study 2 looked at the factor structure of the IBQ-Self with a sample of coaches ($n = 240$) reporting on their behaviours with their athletes. Overall, the results found support for the structure of the scale in this sample. It demonstrated adequate internal consistency and the subscales correlated with outcomes as would be expected according to SDT, while controlling for social desirability.

Overall, the results of both studies provide additional evidence that the IBQ and IBQ-Self are reliable and valid instruments that can be used to assess perceptions and self-reports of coaches' interpersonal behaviours in a sport setting. The validation of this measure in a sport context will allow future research to explore how all six types of need-supportive and need-thwarting interpersonal behaviours interact and impact outcomes in the sport context.

Manuscript #3 - Coaching Context, Needs, Motivation, and Coaching Behaviour

(Chapter 4). The objective of this third manuscript was to explore the antecedents of coaches' interpersonal behaviours. Specifically, this manuscript aimed to extend the existing research in this domain by exploring the antecedents of all six types of need-supportive and need-thwarting interpersonal behaviours, instead of only autonomy-supportive and autonomy-thwarting behaviour. Next, it aimed to explore the full sequence of psychological needs impacting motivation, impacting interpersonal behaviours, instead of needs directly predicting behaviour (Stebbing, Taylor, Spray, & Ntoumanis, 2012), or motivation only predicting behaviour (Rocchi, Pelletier, & Couture, 2013). Finally, it aimed to identify the contextual factors that were the most important to coaches and determine which ones had the greatest impact on coaches' need satisfaction and need frustration.

In Study 1, a group of multi-sport coaches ($N = 56$) were invited to reflect on their coaching context and identify the factors that were the most relevant to their coaching. This exercise demonstrated that coaches perceived administrative support, athlete motivation, colleague support, parent support, professional development opportunities, time constraints, and work-life conflict as having the largest impact on them and their coaching.

In Study 2, a model testing the sequence of psychological need satisfaction predicting coaches' autonomous motivation, and psychological need frustration predicting coaches' controlled motivation, and then motivation predicting their subsequent use of all six types of need-supportive and need-thwarting interpersonal behaviours was tested with a sample of basketball and athletics coaches ($N = 310$). The results found that coaches' need satisfaction positively predicted their autonomous motivation for coaching, and that autonomous motivation for coaching predicted increased use of all three types of need-supportive interpersonal

behaviours and decreased use of need-thwarting interpersonal behaviours (except for autonomy thwarting). On the negative side, the results supported that coach need frustration positively predicted coach controlled motivation, which positively predicted coaches' use of reported need-thwarting interpersonal behaviours, and negatively predicted their use of need-supportive interpersonal behaviours.

Finally, Study 3 examined a group of multi-sport coaches ($N = 225$) to determine how the contextual factors identified in Study 1 impacted coaches' psychological needs, motivation, and reported use of interpersonal behaviours. Overall, the results found that perceptions of administration support and colleague support positively impacted need satisfaction, athlete motivation positively predicted need satisfaction, and negatively predicted need frustration, and work-life conflict positively predicted need frustration. Interestingly, parental support had no impact on coaches once the other factors were considered. The influence of the contextual factors on coaches' motivation was fully mediated by psychological needs, as would be expected according to SDT. Psychological needs and motivation predicted coaches' reported need-supportive and need-thwarting behaviours, in the same way as Study 2. It should be noted that it was not possible to examine the influence of professional development opportunities and work-life conflict due to measurement error. Fortunately, previous research in SDT and coaching (Stebbing et al., 2012) supported that these factors do have an impact on coaches' need satisfaction and need frustration.

These results suggested that SDT provides an appropriate framework for examining how the coaching context influences coaches' psychological need satisfaction and frustration, and how this is related to the reasons why they coach (their motivation), and their behaviour when they interact with their athletes. Generally, coaches who are in a supportive environment are

more likely to experience need satisfaction, autonomous motivation, and to engage in more need-supportive interpersonal behaviours, and less need-thwarting interpersonal behaviours. Coaches who are in a thwarting environment are more likely to experience need frustration, controlled motivation, and engage in need-thwarting interpersonal behaviours and less need-supportive behaviours.

Manuscript #4 – Exploring Coach-Athlete Relationships (Chapter 5). The purpose of the final manuscript was to determine how coaches' reported interpersonal behaviours impacted athletes. The first objective was to extend to existing research in sport that has explored the role of some types of need-supportive and need-thwarting interpersonal behaviours and confirm that athletes' psychological needs in sport were influenced by all six types of their coaches' interpersonal behaviours. Related to this first objective, the objective was also to confirm that psychological needs are related to motivation, as has been previously demonstrated in numerous other studies in SDT and sport. The next objective was to explore the relationship between coaches' self-reports of their interpersonal behaviours, and athletes' perceptions of these same behaviours. Specifically, these analyses determined whether coaches and athletes were in agreement or disagreement and explore whether having an agreement or disagreement between coaches and athletes had any impact on athletes' need satisfaction and frustration. Finally, this study examined whether there are any coach characteristics that help explain whether coaches are in agreement or not with their athletes.

In Study 1, a group of multisport athletes ($N = 180$) reported on their coaches' use of need-supportive and need-thwarting interpersonal behaviours. The results found that athletes' perceptions of their coaches' behaviours predicted their need satisfaction and frustration in sport, with the exception of perceptions of relatedness-thwarting behaviours. Generally, the results

found that when athletes' perceived their coaches to be either autonomy, competence, or relatedness-supportive, this was associated with an increase in need satisfaction, which predicted an increase in autonomous motivation for sport and a decrease in controlled motivation. When athletes perceived their coaches to be autonomy-supportive or competence-supportive, this predicted an increase in need frustration, which promoted controlled motivation for sport. Overall, these results supported that coaches' interpersonal behaviours beyond autonomy (support and thwarting) predicted athletes' psychological needs and motivation for sport.

In Study 2 the results were replicated from Study 1 using a sample of skaters and basketball players ($N = 278$) and their coaches ($N = 53$). The results found that the direction of the relationships found in Study 1 remained constant, but that the strength of these relationships increased. This was not unexpected given that the design of this study required coaches and athletes to participate at the same time, and athletes were instructed to respond on behalf of a specific coach, unlike in Study 1 where athletes were simply asked to reflect on their coaches. Next, the study looked at the degree of agreement between coaches' self-reports and athletes' perceptions. It found support for a match in nearly 1/3 of the cases, supporting that for those pairs of coaches and athletes, the athlete perceives what the coach reports they do. In the cases where there was a match, or where the athlete rated the coach more favourably than the coach rated themselves, this was associated with increased need satisfaction on the need-supportive factors, and decreased need frustration for the need-thwarting factors. In the instances where coaches rated themselves more positively than their athletes reported them (i.e., more need-supportive and less need-thwarting than perceived by the athletes), there was no impact on athletes' need satisfaction and frustration. In exploring the factors that lead coaches to inflate

their positive behaviour, the results found that only coaches' autonomous motivation for coaching predicted that they were less likely to positively inflate their behaviours.

Taken together, these studies supported that coaches' need-supportive behaviours have an impact on athletes and that the direction of a discrepancy between coach self-reports and athletes' perceptions can influence athletes' psychological needs. These studies also found that coaches' characteristics, other than autonomous motivation, did not predict whether coaches were likely to positively inflate their responses. The results of these studies can help bridge the gap between coaches' behaviours and athletes' perceptions, but also start to identify the conditions within which coaches may over-report their behaviours, which subsequently sabotages results.

Collective Implications Across Studies

Although the findings of each manuscript are presented independently, many of the findings are complimentary and can be discussed in the context of the thesis as a whole. These include (1) Support for the IBQ as a valid measurement tool; (2) Understanding the full motivational sequence in sport; and (3) Antecedents of coach impression management. Each of these are discussed in more detail below.

Support for the IBQ as a Valid Measurement Tool. The IBQ and IBQ-Self were incorporated into the studies of this thesis and consistently demonstrated strong support for the structure of the scale. Overall, in the context of this thesis, 1343 participants (885 students and 458 athletes) completed the IBQ and 1470 participants (607 students and 833 coaches) completed the IBQ-Self. These participants were recruited through different means including: participant pools, sporting events, sport organizations, and social media. They were asked to complete the scale on behalf of different people in their lives including specific athletes, athletes

in general, a specific coach, a coach of their choice, the people in their lives, and the people that are important to them. For the participants in the sport context, they were of different ages and represented a variety of different sports and athletic backgrounds. Overall, regardless of the sample and recruitment strategy, the IBQ and IBQ-Self demonstrated strong factor structures, strong validity and internal consistency, and the subscales correlated with each other and other outcomes, as would be expected according to SDT. The scale also demonstrated strong construct validity since it was able to serve as an outcome where expected, as well as a predictor in other circumstances. The subscales can be used separately to examine the independent contribution of all six types of need-supportive or need-thwarting behaviour, or they can be combined to create indicators of overall indicators of need-supportive interpersonal behaviours and need-thwarting interpersonal behaviours.

Finally, when self-reports of interpersonal behaviours (using the IBQ-Self) were cross-referenced with perceptions of interpersonal behaviours (using the IBQ), the results supported that there was a match between “what coaches said they did” and “what athletes perceived their coaches did” in approximately 30% of the cases. In another 30% of cases, athletes rated their coaches more positively than the coaches rated themselves in terms of their use of interpersonal behaviours in their coaching (i.e., athletes rated their coaches as more need supportive, and less need thwarting than the coaches rated), leaving only approximately 30% of cases where the IBQ-Self does not correspond to actual perceptions of these behaviours in a meaningful way. This additional step provides support for the predictive validity of the IBQ.

Overall, the results found that the IBQ and IBQ-Self are valid measures of need-supportive and need-thwarting interpersonal behaviours. The scale has been validated in a general context, but designed to be used within specific social contexts as well. The sport context

was examined and the results supported, consistently, that the scale was appropriate for measuring athletes' perceptions of their coaches' behaviours, as well as coaches' reports of their own behaviours.

Understanding the Full Motivational Sequence in Sport. In this thesis, the coach context was explored in depth in order to understand the determinants of interpersonal behaviours for coaches. Specifically, factors that had been previously identified within the SDT literature and coaching literature were explored in order to determine what was actually important to coaches. This represented an important step in the context of sport as previous research in SDT (Rocchi et al., 2013; Stebbings et al., 2012) used research from other fields such as education to determine which factors to examine in the context of coaching. This approach also allowed coaches to identify factors that may have been overlooked in the past and ensured they were also included in the model testing. Overall, the results found support for two sets of outcomes, depending on whether the coaches' needs were satisfied or frustrated, which supports Sheldon's (2011) hypothesis that need satisfaction and frustration are not opposites, but distinct constructs. If a coach is supported by their context (i.e., perceives their athletes to be motivated, is supported by their colleagues, and their administration), they experience an increase in need satisfaction, which promotes autonomous motivation for coaching. Autonomously motivated coaches are more likely to engage in autonomy, competence, and relatedness-supportive behaviours, and less likely to engage in autonomy, competence, and relatedness-thwarting behaviours. Then, if their athletes perceive that they are supporting their needs, they will experience need satisfaction in sport, which leads to autonomous motivation in sport for athletes. When coaches are in a non-supportive context (i.e., they perceive that they have a work-life conflict, that they do not have support from their colleagues, and that their athletes are not

motivated), they experience an increase in need frustration, which promotes controlled motivation for coaching. When coaches have a controlled motivation, they are more likely to engage in need-thwarting behaviours (autonomy, competence, and relatedness), and less likely to engage in need-supportive behaviours (autonomy, competence, and relatedness) with their athletes. When athletes perceive these need-thwarting behaviours, it promotes need frustration and controlled motivation towards sport for athletes. Overall, these findings suggest that in order to fully understand athletes' experiences in sport, it is essential to examine the coaching context and how it impacts coaches.

The role of the athletes in this model is particular since athletes' motivation quality is a determinant of coaches' interpersonal behaviours, but it is also an outcome. This suggests that there is evidence of a continuous loop where coaches influence athletes and athletes influence coaches. Previous research in SDT looking at supervisor-subordinate relationships found evidence of behavioural confirmation tendencies in supervisors, depending on their perceptions of their subordinates. Specifically, Pelletier and Vallerand (1996) found that when supervisors believed the subordinate was more autonomously motivated, they were more likely to engage in behaviours that were need-supportive. Whereas when the supervisors believed their subordinate had a controlled motivation, they were more likely to engage in need-thwarting interpersonal behaviours in their supervisory style. These results were extended to the physical education domain where Sarrazin and colleagues (Sarrazin, Tessier, Pelletier, Trouilloud, & Chanal, 2006) found that teachers were much more need-thwarting with students that they believed had a controlled motivation, regardless of the students' actual motivation orientation. The results of these studies, as well as the present thesis suggest that there is evidence of the same pattern in coach-athlete relationships. Specifically, focusing on the darker side, coaches who perceive that

their athletes have a controlled motivation for sport are likely to report that their needs are frustrated and experience a controlled motivation towards their coaching. In turn, this leads them to engage in need-thwarting interpersonal behaviours, which are then perceived by their athletes, and contribute to their need frustration, and controlled motivation. Overall, this creates a self-fulfilling prophecy where coaches engage in behaviours that lead to the outcomes they already expected for their athletes.

Antecedents of Coach Impression Management. The findings of this thesis supported that coaches can report their need-supportive and need-thwarting interpersonal behaviours in the same way as they are perceived by their athletes, in which case there is a match between coaches and athletes and they are in agreement. Alternatively, they can report their behaviour more conservatively than their athletes perceive. If this occurs, there is a disagreement between coaches and athletes since coaches report their need-supportive behaviours lower, and their need-thwarting behaviours higher than their athletes rate them. In the third scenario, the coaches are also in disagreement with the athletes, but this time, they positively inflate their behaviours. This means that they rate their need-supportive behaviours higher and their need-thwarting behaviours lower than their athletes perceive. Previous research examining coaches has estimated that the fact some coaches positively inflate their self-reported behaviour is biasing the results (e.g., Ntoumanis, 2012; Smith et al., 2016); however, no existing research in coaching has been able to estimate what percentage of coaches are positively inflating their behaviours or determine what factors explain whether or not they are likely to positively inflate their behaviour. In this thesis, it was estimated that approximately 30% of coaches are positively inflating their behaviours at any given time, and that coaches with autonomous motivation for coaching are less likely to do this.

These results were not completely unexpected since previous research examining

impression management, which includes positively inflating reports of your own behaviours, has found that autonomous motivation is associated with taking greater responsibility for one's actions (Hodgins & Liebeskind, 2003), and reduced use of self-presentation strategies (Knee & Zuckerman, 1996). The implications of these findings, combined with the existing research in this field, imply that the coaching context plays a role in determining whether a coach is likely to positively inflate their reports of their own behaviours since a coach's autonomous motivation is predicted by their need satisfaction in coaching and the extent to which their context is supportive of their needs. Specifically, this suggests that unlike coaches who experience chronic need frustration and need to engage in specific compensatory behaviours in order to restore their needs (Radel, Pelletier, Baxter, Fournier, & Sarrazin, 2014; Sheldon, 2011), coaches who are in a supportive context do not need to exaggerate their behaviour because their needs are already satisfied. Essentially, these coaches already feel competent in their abilities and do not experience the same pressure to impress those around them or exaggerate their behaviours in order to fulfill expectations that are set-forth by others. Overall, these findings helped isolate and identify some of the characteristics of coaches who positively inflate their coaching behaviours.

Limitations and Directions for Future Research

Although this thesis addressed some important existing limitations within the coaching literature and has helped advance our understanding of how coaches interact with their contexts and their athletes, it does have its limitations. Each of these limitations, as well as opportunities for future research, are discussed below.

Coaching Context. Although this thesis was careful to identify and explore the factors that were the most important and relevant to coaches, it was not possible to examine all of these factors properly due to issues surrounding measurement. Specifically, the measures used to

assess coaches' perceptions of opportunities for professional development and work-life conflict did not perform as expected and, unfortunately, were not included in the analyses. Since the results of the present studies supported that these constructs were important to coaches, and previous research (Stebbins et al., 2012) had already found that these two factors had an impact on coaches' psychological need satisfaction and frustration, it would be important to examine them concurrently with the other main factors. These additional analyses would help explain the relative impact of each factor on coaches' need satisfaction and frustration.

Self-Report Data. Given the breadth of the research covered in this thesis and the exploratory nature of the research questions, it was essential to rely on self-report data in order to build the models and test the main hypothesis. The validity of some of the findings were extended as coaches' self-reports of their behaviours were cross-referenced with their athletes' perceptions. Despite this additional step, the majority of the findings and conclusions are drawn from coaches' and athletes' impressions of behaviour, without tying this back to actual observations of coaches' interpersonal behaviours. Newer research in coaching has begun to link coaches' own reports of some aspects of their interpersonal behavioural styles with athletes' perceptions of these behaviours, as well as independent coders' ratings of the behaviours through independent observations (Smith et al., 2016). In order to fully understand the role of all six types of need-supportive and need-thwarting interpersonal behaviours according to SDT, it is important to triangulate coaches' self-reports and athletes' perceptions with an independent observer.

Cross-Sectional Design. Another limitation of this research is that the methodology also relied on cross-sectional designs, where data was only collected at one time-point within a sport season and this time point varied for many of the coaches. In order to fully understand how the

coaching context influences coaches' psychological needs, it would be important to explore how the coaching context changes throughout a season, or across multiple seasons. For example, the contextual factors that influence coaches may change depending on whether the coach and athletes are working in the general preparation phase and are focused on skill development, compared to the competition phase where they are actively competing in the sport (Bompa & Haff, 2009). Collecting data across multiple time-points and controlling for the time of the sport season will help further identify the ways in which the coaching context influences coaches' psychological need satisfaction and dissatisfaction.

Coaching Level. Traditionally, coaching research has focused almost exclusively on elite coaches who are working with university, national, and international-level competitors (e.g., Cushion & Jones, 2006). More recently, it has been suggested that the majority of coaches are actually working at the recreational (introductory levels that emphasize participation, basic skill development, and positive experiences) or developmental (begun specializing and actively competing in their sport) levels and that research should also examine their realities (Trudel & Gilbert, 2006). The research in this thesis was not bound to one level, as coaches from all backgrounds were invited to participate in the studies. Unfortunately, however, there were not sufficient sample sizes to run any meaningful analyses between groups, based on coaches' levels. Since different coaching levels present different realities for coaches (e.g., Werthner & Trudel, 2009), the influence of coaching contexts, as well as coaches' behaviours, should be examined while controlling for the level they coach at.

Determinants of Impression Management. The results of this thesis identified the role of autonomous motivation for coaching in predicting coaches' likelihood of engaging in impression management and positively inflating their reports of their behaviours with their

athletes. Since the inflation of self-reported behaviours has already been identified as a potential confound in previous research (e.g., Ntoumanis, 2012) and has potential to continue biasing future research, it is essential to continue examining this phenomenon. One limitation of the present research is that the role of controlled motivation for coaching was not clear. Previous research in impression management suggests that individuals with a controlled motivation should be more likely to engage in impression management (e.g., Lewis & Neighbors, 2005), but that was not replicated in this research. One reason for this may be that impression management has more to do with managing behaviours in public settings, when other people are watching. Since this research was conducted in private and coaches' responses were kept confidential, it is possible that some coaches with a controlled motivation behaved more like coaches with an autonomous motivation when it came to reporting their behaviour. Another potential explanation is that the current research did not control for other factors that are related to controlled motivation and impression management. Specifically, previous research has tied impression management to perfectionistic tendencies (Hewitt et al., 2003) and perfectionistic tendencies have been linked to controlled motivation (Gaudreau & Antl, 2008). As such, future research should continue to explore the role of controlled motivation in understanding other determinants of impression management for coaches, but also explore additional factors that are also related to both controlled motivation and impression management.

General Psychological Needs and Motivation. When considering coaches' psychological needs and motivation for coaching, SDT hypothesizes, through the hierarchical model of intrinsic and extrinsic motivation, that coaches' motivation for coaching is the result of their general need satisfaction or frustration and motivation orientation, in addition to the contextual factors related to their coaching and psychological needs related specifically to

coaching (Deci & Ryan, 2002; Vallerand, 1997). In the present thesis, coaches were only examined through the lens of their contextual need satisfaction and need frustration (i.e., needs while coaching) and their motivation for coaching, without taking into consideration the extent to which their needs are satisfied versus frustrated generally, as well as their general motivation orientations. Since psychological needs and motivation at the general level will interact with and impact psychological needs and motivation within a given context (Vallerand, 1997), it is essential to examine both concurrently. For example, a coach who is experiencing need frustration in coaching, but need satisfaction in other domains may be drawing on those other domains in order to restore their needs (Radel et al., 2014; Sheldon, 2011), which ultimately helps them overcome the negative impacts of a need-thwarting coaching context. Alternatively, a coach who is experiencing chronic need frustration at the general level may not have the required resilience or resources to overcome a need-thwarting coaching environment, leading them to engage in autonomy-thwarting interpersonal behaviours to an extreme and encouraging athletes to win at all costs, including incorporating strategies that encourage the use of performance enhancing drugs (Hodge, Hargreaves, Gerrard, & Lonsdale, 2013). As such, in order to fully understand coaches and how they interact with their coaching context, it is essential to examine their psychological needs and motivation at the general level, in addition to the contextual level.

Other Outcomes of Coach Motivation. Since coaches' behaviours have such a profound impact on the athlete experience and the coaches' and athletes' experiences are interconnected (Amorose & Anderson-Butcher, 2007), coaching research has mainly examined coaches within the context of their interactions with their athletes. This thesis focused on exploring the motivational antecedents of coaches' interpersonal behaviours and explored how the coaching context influenced coaches' psychological needs, their motivation, and their

subsequent interpersonal behaviours with their athletes. Recently, research in coaching has begun to move away from only examining coaches in the context of their behaviours and interactions with their athletes, but begun focusing on coaches' affective, behavioural, and cognitive outcomes in their own right. For example, recent research has looked at how the coaching context influenced psychological needs, motivation, and promoted burnout in coaches (Bentzen, Lemyre, & Kentta, 2016a), as well as exhaustion (Bentzen, Lemyre, & Kentta, 2016b). Future research examining coaches' motivation should continue to not only explore how motivation impacts coaches' behaviours with their athletes, but also concurrently explore how this relates to their own psychological well-being.

Implications for Coach Training

The findings of this thesis have important implications for coach training. Overall, the results of this thesis support that coaches who are in a supportive context will experience need satisfaction towards coaching, which promotes autonomous motivation towards coaching, and leads coaches to behave in ways that support their athletes' psychological needs, promoting quality motivation in athletes. Alternatively, coaches in a thwarting context will experience need frustration and controlled motivation towards coaching, which leads them to be more need-thwarting in their interactions with their athletes, leading to athlete need frustration and controlled sport motivation for athletes.

First, since the impact of need-supportive coaching behaviours (especially autonomy) and need-thwarting coaching behaviours (mainly autonomy) on athletes have been well explored and documented within the SDT literature, one opportunity for coach training is to teach coaches to incorporate these behaviours into their coaching. Research from other domains such as the workplace (Hadre & Reeve, 2009) and physical education (Cheon, Reeve, & Moon, 2012) have

shown that interventions designed to show managers and teachers the importance of being autonomy-supportive and how to do it in their interactions with their workers or students have been successful. The workers and students of the managers and teachers who received this training subsequently reported increased need satisfaction and autonomous motivation over an extended period of time. Based on these findings, a similar intervention program designed to teach coaches to be more need-supportive in their coaching could help promote even better coaching styles and improved outcomes for athletes.

Next, although a training program designed to teach coaches about the importance of being need-supportive should have a positive impact, it is possible that this training will be useless if coaches are working in a context that constantly thwarts their psychological needs. As such, training should also be geared towards sport administrations, club volunteers, and other agents within the coaches' environment about the importance of creating a sport context that not only supports and promotes athletes' success, but coaches as well. By ensuring that coaches' needs are actively supported while they are coaching, this will help provide them with the necessary resilience to overcome any challenges they are faced and maintain autonomous motivation towards their coaching, regardless of whether these challenges come from within their organization, or are related to external factors. Furthermore, since the extent to which coaches feel supported within their environment is tied to their behaviours with their athletes, supporting coaches' needs also concurrently supports athletes' needs in sport.

Additionally, another opportunity for training includes providing coaches with opportunities and strategies for monitoring their context and identifying the ways in which it is either supporting or thwarting their psychological needs. From there, coaches could be trained in how to actively and positively compensate for a need-thwarting environment by engaging in

proactive behaviours that restore their psychological needs. For example, since the findings of this thesis showed that coaching colleagues served as a source of need support, coaches could be trained and encouraged to seek the help of their colleagues in order to restore their needs and support their own quality motivation towards their coaching. Furthermore, coaches could also be trained in how to create opportunities to ensure the ongoing support of their basic needs in coaching. For example, they could be reminded about the importance of giving themselves opportunities to take direction and be creative about certain aspects of their coaching (autonomy), they could be shown about how to set appropriate goals and overcome challenges (competence), and reminded to make sure they are continuously surrounded by people who support them (relatedness).

Finally, coaches should be given training about how the coach-athlete relationship and how their behaviours are not only related to outcomes in their athletes, but how their athletes' behaviours are related to outcomes for coaches through a feedback loop. The coaches in the present research recognized that their athletes play the most important role in their coaching context. As such, coaches should receive training about how their own expectations and assumptions about their athletes' abilities, motivation, and goals can influence their behaviours with these athletes, leading them as coaches to engage in ways that promote the outcomes the coaches expected. Since this relationship has the potential to be detrimental to an athlete's experience, it is important that coaches understand how their perceptions of their athletes ultimately impact their behaviour and learn how to break the loop in cases where a coach perceives an athlete to have a controlled motivation towards sport, and then engages in behaviours that thwart their needs and promote controlled motivation for that athlete. This type of training will provide coaches with the tools to self-reflect on their own behaviour and

recognize instances where an athlete's low quality motivation towards sport is actually the result of coaches' impressions and subsequent behaviours.

Overall, these training opportunities would have the potential to improve coaches' experiences, which would lead to better quality coaching and interactions with athletes, and would promote better sport outcomes for athletes.

New Lines of Inquiry

The findings of this thesis inspire new lines of inquiry that future programs of research in motivational sport psychology may choose to investigate.

First, moving beyond the coaching context to the bigger picture, what factors determine whether Provincial and National sport organizations will promote need-supportive or need-thwarting contexts within their organizational structures? In Canada, most sports have a structure where local clubs are nested within regions, which report to the main sport organization. In practice, some sport organizations promote competence, autonomy, and relatedness within their club structures by designing good resources, allowing clubs to implement them in their own way, and being available when needed. Unfortunately, other organizations have heavy administrative requirements with strict implementation guidelines, no opportunities for adapting delivery to suit the specific needs of the clubs, and no desire to understand or empathize with the operations specific to one club. As the results of the present research have shown, the administration has a top-down influence coaches, therefore, understanding the factors that lead sport organizations to create contexts that support needs at the club level could have major implications for coaches within these sport clubs. Given the impact administrations can have on coaches, and how this subsequently impacts athletes, identifying the antecedents of these factors and finding ways to promote positive results is essential in order to maximize both coaches' and athletes' positive

experiences in sport.

Next, now that there is growing evidence supporting that the darker side of the motivational experiences in sport (i.e., need thwarting, need frustration, and controlled motivation) leads to different outcomes compared to the positive motivational experiences, there is a need to thoroughly examine the role of the dark side over a longer period of time. Specifically, what are the long-term outcomes of controlled motivation for coaches and athletes? Are there situations in sport where controlled motivation orientations lead to positive outcomes? When it comes to introjected and external reasons for participating in sport, could coaches' or athletes' tendencies to use approach techniques, versus avoidance, lead to different outcomes? For example, if a coach or an athlete are involved in their sport in order to make others proud (approach – introjected) or win (approach – extrinsic), does this promote different outcomes compared to someone who is avoiding disappointing others (avoidance – introjected) or trying not to lose (avoidance – extrinsic)? Related to this last point, how does a domain, like sport, reconcile the need to promote need satisfaction and autonomous motivation among coaches and athletes, with the fact that the ultimate goal and measure of success in sport is to win and be better than other people? If an individual's needs are chronically frustrated in sport, how far are they willing to go in order to restore their needs and meet their goals? Research in sport needs to continue examining the role of need satisfaction and need frustration in sport, but also needs to simultaneously examine the role of goal content in order to understand how these factors interact to predict coaches' and athletes' long-term experiences in sport.

Finally, what role does a coach play in creating an integrated athlete (i.e., the healthy person)? An integrated athlete not only practices their sport, but also engages in all of the other proactive behaviours that promote the success and well-being of the athlete such as proper

nutrition, quality sleep, adequate cross-training, etc. Additionally, and most importantly, an integrated athlete never stops participating in sport. As they get older and are no longer able to practice at the same level, they find other ways to remain involved and continue living in line with their values of being an active and healthy individual. This may happen through transitioning to recreational sport leagues or regular exercise, or by staying involved in their sport through other means such as a coach, official, or administrator. What role do coaches play in this process? How does coaching behaviour help athletes to not only meet their needs within their sport, but in other domains as well, so that they can integrate these experiences and not only become successful in their sport, but become someone who values fitness, athleticism, and health across all domains of their life?

Conclusion

In summary, the ten studies presented in this thesis significantly contribute to the field of sport motivation. These studies have helped advance understanding of all six interpersonal behaviours according to SDT in the sport context by developing a new way to measure them, identifying the antecedents of these behaviours in coaches, and extending the understanding of the outcomes for athletes. Overall, these findings suggest that an athletes' experience in sport is heavily influenced by the quality of their interactions with their coaches. Coaches' behaviours with their athletes are directly tied to their motivation quality for coaching, which is influenced by the context they are working in. These findings also support that a coach will only be as great as the context they are coaching in and the key to understanding sport motivation is to not only explore the athletes, but their coaches and contexts as well.

References

- Amorose, J. & Anderson-Butcher, D. (2007). Autonomy-Supportive coaching and self-determined motivation in high school and college athletes: A test of self-determination theory. *Psychology of Sport and Exercise*, 8, 654-670. doi: <http://dx.doi.org/10.1016/j.psychsport.2006.11.003>
- Bentzen, M., Lemyre, P., & Kenttä, G. (2016a). Changes in Motivation and Burnout Indices in High-Performance Coaches Over the Course of a Competitive Season. *Journal of Applied Sport Psychology*, 28, 28-48. doi: 10.1080/10413200.2015.1053160
- Bentzen, M., Lemyre, P., & Kenttä, G. (2016b). Development of exhaustion for high-performance coaches in association with workload and motivation: A person-centered approach. *Psychology of Sport and Exercise*, 22, 10-19. doi: 10.1016/j.psychsport.2015.06.004
- Bompa, T. & Haff, G. (2009). *Periodization: Theory and methodology of training*. Human Kinetics.
- Cheon, S., Reeve, J., & Moon, I. (2012). Experimentally based, longitudinally designed, teacher-focused intervention to help physical education teachers be more autonomy supportive toward their students. *Journal of Sport & Exercise Psychology*, 34, 365-396. doi: <http://europepmc.org/abstract/med/22691399>
- Cushion, C. & Jones, R. L. (2006). Power, discourse, and symbolic violence in professional youth soccer: The case of Albion Football Club. *Sociology of sport journal*, 23, 142-161. doi: <https://dialnet.unirioja.es/servlet/articulo?codigo=2247445>
- Deci, E. & Ryan, R. (2002). *Handbook of Self-Determination Research*. Rochester, NY: The University of Rochester Press.

- Gaudreau, P. & Antl, S. (2008). Athletes' broad dimensions of dispositional perfectionism: Examining changes in life satisfaction and the mediating role of sport-related motivation and coping. *Journal of sport & exercise psychology*, 30, 356. doi: <http://www.ncbi.nlm.nih.gov/pubmed/18648110>
- Hardré, P. & Reeve, J. (2009). Training corporate managers to adopt a more autonomy-supportive motivating style toward employees: an intervention study. *International Journal of Training and Development*, 13(3), 165-184. doi: 10.1111/j.1468-2419.2009.00325.x
- Hewitt, P., Flett, G., Sherry, S., Habke, M., Parkin, M., Lam, R., ... & Stein, M. (2003). The interpersonal expression of perfection: perfectionistic self-presentation and psychological distress. *Journal of personality and social psychology*, 84, 1303. doi: <http://dx.doi.org/10.1037/0022-3514.84.6.1303>
- Hodge, K., Hargreaves, A., Gerrard, D., & Lonsdale, C. (2013). Psychological mechanisms underlying doping attitudes in sport: motivation and moral disengagement. *Journal of Sport & Exercise Psychology*, 35, 419–432.
- Hodgins, H. & Liebeskind, E. (2003). Apology versus defense: Antecedents and consequences. *Journal of Experimental Social Psychology*, 39, 297-316. doi: <http://cat.inist.fr/?aModele=afficheN&cpsidt=14979193>
- Knee, R. & Zuckerman, M. (1998). A nondefensive personality: Autonomy and controlled as moderators of defensive coping and self-handicapping. *Journal of Research and Personality*, 32, 115-130. doi: 0.1006/jrpe.1997.2207
- Lewis, M. & Neighbors, C. (2005). Self-determination and the use of self-presentation strategies. *The Journal of Social Psychology*, 145, 469-490. doi:

10.3200/SOCP.145.4.469-490

- Ntoumanis, N. (2012). A self-determination theory perspective on motivation in sport and physical education: Current trends and possible future research directions. *Motivation in sport and exercise*, 3, 91-128.
- Pelletier, L. & Vallerand, R. (1996). Supervisors' beliefs and subordinates' intrinsic motivation: a behavioral confirmation analysis. *Journal of Personality and Social Psychology*, 71, 331-340. doi: <http://dx.doi.org/10.1037//0022-3514.71.2.331>
- Radel, R., Pelletier, L., Baxter, D., Fournier, M., & Sarrazin, P. (2014). The paradoxical effect of controlling context on intrinsic motivation in another activity. *Learning and Instruction*, 29, 95-102. doi:10.1016/j.learninstruc.2013.09.004
- Rocchi, M., Pelletier, L., & Couture, A. (2013). Determinants of Coach Motivation and Autonomy Supportive Coaching Behaviours. *Psychology of Sport and Exercise*, 14, 852-859. doi: 10.1016/j.psychsport.2013.07.002
- Sarrazin, P., Tessier, D., Pelletier, L., Trouilloud, D., & Chanal, J. (2006). The effects of teachers' expectations about students' motivation on teachers' autonomy-supportive and controlling behaviors. *International Journal of Sport and Exercise Psychology*, 4, 283-301. doi: 10.1080/1612197X.2006.9671799
- Sheldon, K. (2011). Integrating Behavioral-Motive and Experiential-Requirement Perspectives on Psychological Needs: A Two Process Model. *Psychological Review*, 118, 552-569. doi: 10.1037/a0024758
- Smith, N., Tessier, D., Tzioumakis, Y., Fabra, P., Quested, E., Appleton, P., ... & Duda, J. (2016). The relationship between observed and perceived assessments of the coach-

created motivational environment and links to athlete motivation. *Psychology of Sport and Exercise*, 23, 51-63. doi: 0.1016/j.psychsport.2015.11.001

Stebbing, J., Taylor, M., Spray, C., & Ntoumanis, N. (2012). Antecedents of perceived coach interpersonal behaviors: The coaching environment and coach psychological well- and ill-being. *Journal of Sport & Exercise Psychology*, 34, 481-502. Retrieved from: <http://journals.humankinetics.com/jsep>

Trudel, P. & Gilbert, W. (2006). Coaching and coach education. In Kirk, D., Macdonald, D., & O'Sullivan, M. (Eds.), (2006). *The handbook of physical education* (pp. 516-539). London: Sage.

Vallerand, R. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology* (pp. 271-360). New York: Academic Press.

Werthner, P., & Trudel, P. (2009). Investigating the idiosyncratic learning paths of elite Canadian coaches. *International Journal of Sports Science and Coaching*, 4(3), 433-449. doi: <http://dx.doi.org/10.1260/174795409789623946>

APPENDIX A

Interpersonal Behaviour Questionnaire – Item Development

- AS Give me the freedom to make my own choices.
- AS Support my decisions.
- AS Encourage me to do things on my own.
- AS Explain things to me when I am asked to do something.
- AS Support my own way of doing things.
- AS Provide me with a reason when asking me to do something.
- AS Support the choices that I make for myself.
- AS Let me come up with my own solutions when facing a problem.
- AS Encourage me to make my own decisions.
- AT Require I follow instructions.
- AT Use rewards to get me to do things.
- AT Do not allow me to make decisions.
- AT Watch my behavior.
- AT Pressure me to do things their way.
- AT Use threats in order to get me to do things for them.
- AT Impose their opinions on me.
- AT Pressure me to adopt certain behaviours.
- AT Limit my choices.
- AT Make decisions for me.
- CS Trust my capacities to complete tasks.
- CS Provide positive feedback.
- CS Encourage me to improve my skills.
- CS Provide valuable feedback.
- CS Give me feedback that focuses on my strengths.
- CS Acknowledge my ability to achieve my goals.
- CS Tell me that I can accomplish things.
- CS Acknowledge my improvements.
- CT Emphasize my faults.
- CT Expect me to fail.
- CT Discourage me from trying hard activities.
- CT Focus on what I do wrong.
- CT Point out that I will likely fail.
- CT Discourage me from trying when I face a challenge.
- CT Tell me that I do not have the necessary skills to complete difficult tasks.
- CT Send me the message that I am incompetent.
- CT Doubt my capacity to improve.
- CT Question my ability to overcome challenges.
- RS Are warm towards me.
- RS Show me that I matter.
- RS Are interested in what I do.

- RS** Take the time to get to know me.
- RS** Are warm towards me when we spend time together.
- RS** Show me that they care about me.
- RS** Honestly enjoy spending time with me.
- RS** Relate to me.
- RS** Show me that they genuinely like me.
- RT** Do not care about the things I do.
- RT** Do not comfort me when I am feeling low.
- RT** Are distant when we spend time together.
- RT** Are not available when I need them.
- RT** Do not connect with me.
- RT** Do not give me the impression they are listening.
- RT** Do not include me in their activities.
- RT** Do not care about me.

APPENDIX B

Need Satisfaction Scale

For this section, consider how you typically feel and rate the extent to which each of the statements are true using the scale below.

Strongly Disagree	Neither Agree or Disagree					Strongly Agree	Not Applicable					
1	2	3	4	5	6	7	n/a					
I feel free to be who I am.					1	2	3	4	5	6	7	n/a
I feel like a competent person.					1	2	3	4	5	6	7	n/a
I feel loved and cared about.					1	2	3	4	5	6	7	n/a
I often feel inadequate or incompetent.					1	2	3	4	5	6	7	n/a
I have a say in what happens and can voice my opinion.					1	2	3	4	5	6	7	n/a
I often feel a lot of distance.					1	2	3	4	5	6	7	n/a
I feel very capable and effective.					1	2	3	4	5	6	7	n/a
I feel a lot of closeness and intimacy.					1	2	3	4	5	6	7	n/a
I feel controlled and pressured to be certain ways.					1	2	3	4	5	6	7	n/a

La Guardia, J., Ryan, R., Couchman, C., & Deci, E. (2000). Within-Person Variation in Security of Attachment : A Self-Determination Theory Perspective on Attachment, Need Fulfillment, and Well-Being. *Journal of Personality and Social Psychology*, 79, 367-384. doi: 10.1037/0022-3514.79.3.367.

APPENDIX C

Satisfaction with Life Scale

For this section, consider how you typically feel and rate the extent to which each of the statements are true using the scale below.

Strongly Disagree				Neither Agree or Disagree			Strongly Agree	Not Applicable
1	2	3	4	5	6	7	n/a	
So far I have gotten the important things I want in life.						1	2	3
I feel depleted.						4	5	6
In most ways my life is close to my ideal.						7	n/a	
I am satisfied with my life.						1	2	3
The conditions of my life are excellent.						4	5	6
						7	n/a	

Diener, E., Emmons, R., Larsen, R., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49, 71-75.
doi:http://dx.doi.org/10.1207/s15327752jpa4901_13

APPENDIX D

PANAS-X

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt this way during the past week. Use the following scale to record your answers:

Not at all 1	2	3	Moderately 4	5	6	Extremely 7	Not Applicable n/a
Sad.					1	2 3 4 5 6 7	n/a
Calm.					1	2 3 4 5 6 7	n/a
Afraid.					1	2 3 4 5 6 7	n/a
Tired.					1	2 3 4 5 6 7	n/a
Active.					1	2 3 4 5 6 7	n/a
Guilty.					1	2 3 4 5 6 7	n/a
Joyful.					1	2 3 4 5 6 7	n/a
Nervous.					1	2 3 4 5 6 7	n/a
Angry at self.					1	2 3 4 5 6 7	n/a
Enthusiastic.					1	2 3 4 5 6 7	n/a
Downhearted.					1	2 3 4 5 6 7	n/a

Watson, D. & Clark, L. (1994). *The PANAS-X: Manual for the Positive and Negative Affect Schedule-Expanded Form*. Ames: The University of Iowa. doi: <http://dx.doi.org/10.13072/midss.438>

APPENDIX D

Subjective Vitality Scale

For this section, consider how you typically feel and rate the extent to which each of the statements are true using the scale below.

Strongly Disagree				Neither Agree or Disagree				Strongly Agree	Not Applicable			
1	2	3	4	5	6	7	n/a					
Sometimes I feel so alive I just want to burst.					1	2	3	4	5	6	7	n/a
I feel drained.					1	2	3	4	5	6	7	n/a
If I could live my life over, I would change almost nothing.					1	2	3	4	5	6	7	n/a
I have energy and spirit.					1	2	3	4	5	6	7	n/a
I feel energized.					1	2	3	4	5	6	7	n/a
I look forward to each new day.					1	2	3	4	5	6	7	n/a
I feel alive and vital.					1	2	3	4	5	6	7	n/a
I don't feel very energetic.					1	2	3	4	5	6	7	n/a
I nearly always feel alert and awake.					1	2	3	4	5	6	7	n/a

Ryan, R. & Frederick, C. (1997). On energy, personality, and health: subjective vitality as a dynamic reflection of well-being. *Journal of Personality*, 65, 529-565. <http://dx.doi.org/10.1111/j.1467-6494.1997.tb00326.x>.

APPENDIX F

Basic Need Satisfaction and Frustration Scale

For this section, *consider your coaching environment over the past month* and rate the extent to which each of the statements are true using the scale below.

Strongly Disagree	Neither Agree or Disagree				Strongly Agree	Not Applicable						
1	2	3	4	5	6	7	n/a					
I feel a sense of choice and freedom in the things I undertake.					1	2	3	4	5	6	7	n/a
I feel that my decisions reflect what I really want.					1	2	3	4	5	6	7	n/a
I feel my choices express who I really am.					1	2	3	4	5	6	7	n/a
I feel I have been doing what really interests me.					1	2	3	4	5	6	7	n/a
Most of the things I do feel like I have to.					1	2	3	4	5	6	7	n/a
I feel forced to do many things I wouldn't choose to do.					1	2	3	4	5	6	7	n/a
I feel pressured to do many things.					1	2	3	4	5	6	7	n/a
My daily activities feel like a chain of obligations.					1	2	3	4	5	6	7	n/a
I feel that the people I care about also care about me.					1	2	3	4	5	6	7	n/a
I feel connected with people who are for me, and for whom I care.					1	2	3	4	5	6	7	n/a
I feel close and connected with other people who are important to me.					1	2	3	4	5	6	7	n/a
I experience a warm feeling with the people I spend time with.					1	2	3	4	5	6	7	n/a
I feel excluded from the group I want to belong to.					1	2	3	4	5	6	7	n/a
I feel that people who are important to me are cold and distant.					1	2	3	4	5	6	7	n/a
I have the impression that people I spend time with dislike me.					1	2	3	4	5	6	7	n/a
I feel the relationships I have are superficial.					1	2	3	4	5	6	7	n/a
I feel confident that I can do things well.					1	2	3	4	5	6	7	n/a
I feel competent to achieve my goals.					1	2	3	4	5	6	7	n/a
I have serious doubts about whether I can do things well.					1	2	3	4	5	6	7	n/a
I feel disappointed with many of my performances.					1	2	3	4	5	6	7	n/a
I feel insecure about my abilities.					1	2	3	4	5	6	7	n/a

APPENDIX G

Marlowe-Crowne Social Desirability Scale

For this section, *consider your coaching environment over the past month* and rate the extent to which each of the statements are true using the scale below.

I never hesitate to go out of my way to help someone in trouble.	T	F
It is sometimes hard for me to go on with my work if I am not encouraged.	T	F
I have never intensely disliked anyone.	T	F
No matter who I'm talking to, I'm always a good listener.	T	F
There have been occasions when I have taken advantage of someone.	T	F
I'm always willing to admit it when I make a mistake.	T	F
I don't find it particularly difficult to get along with loudmouthed, obnoxious people.	T	F
At times I have really insisted on having things my own way.	T	F
I never resent being asked to return a favor.	T	F
I sometimes think when people have a misfortune they only got what they deserved.	T	F

Reynolds, W. (1982). Development of reliable and valid short forms of the Marlowe-Crowne Social Desirability Scale. *Journal of clinical psychology*, 38, 119-125. doi: 10.1002/1097-4679

APPENDIX H

Basic Need Satisfaction at Work Scale for Athletes

For this section, consider how you generally feel when training for your sport and try to answer to the best of your knowledge.

Not at all True 1	2	3	Somewhat True 4	5	6	Very True 7	Not Applicable n/a					
I feel like I can make a lot of inputs to deciding how my training gets done.					1	2	3	4	5	6	7	n/a
I really like the people I train with.					1	2	3	4	5	6	7	n/a
People tell me I am good at what I do.					1	2	3	4	5	6	7	n/a
I get along with people when I train.					1	2	3	4	5	6	7	n/a
I am free to express my ideas and opinions when I train.					1	2	3	4	5	6	7	n/a
I consider the people I train with to be my friends.					1	2	3	4	5	6	7	n/a
I have been able to learn interesting new skills when I train.					1	2	3	4	5	6	7	n/a
Most days, I feel a sense of accomplishment from training.					1	2	3	4	5	6	7	n/a
My feelings are taken into consideration when I train.					1	2	3	4	5	6	7	n/a
When I train, people care about me.					1	2	3	4	5	6	7	n/a
I feel like I can pretty much be myself when I train.					1	2	3	4	5	6	7	n/a
People are pretty friendly towards me when I train.					1	2	3	4	5	6	7	n/a

Deci, E., Ryan, R. M., Gagné, M., Leone, D., Usunov, J., & Kornazheva, B. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former Eastern Bloc country. *Personality and Social Psychology Bulletin*, 27, 930-942.

APPENDIX I

Psychological Need Thwarting Scale for Athletes

For this section, consider how you generally feel when you are participating in your sport and try to answer to the best of your knowledge.

Strongly Disagree 1	2	3	Neither Agree or Disagree 4	5	6	Strongly Agree 7	Not Applicable n/a
I feel prevented from making choices with regard to the way I participate	1	2	3	4	5	6	7 n/a
I feel pushed to behave in certain ways	1	2	3	4	5	6	7 n/a
I feel forced to follow decisions made for me	1	2	3	4	5	6	7 n/a
I feel under pressure to agree with the regimen I am provided	1	2	3	4	5	6	7 n/a
Situations occur in which I am made to feel incapable	1	2	3	4	5	6	7 n/a
There are time when I am told things that make me feel incompetent	1	2	3	4	5	6	7 n/a
I feel I am rejected by those around me	1	2	3	4	5	6	7 n/a
I feel others can be dismissive of me	1	2	3	4	5	6	7 n/a
I feel other people dislike me	1	2	3	4	5	6	7 n/a
I feel other people are envious when I achieve success	1	2	3	4	5	6	7 n/a

Bartholomew, K., Ntoumanis, N., Ryan, R., & Thorgensen-Ntoumani, C. (2011). Psychological Need Thwarting in the Sport Context: Assessing the Darker Side of Athletic Experience. *Journal of Sport & Exercise Psychology*, 33, 75

APPENDIX J

Revised Sport Motivation Scale for Athletes

Using the scale below, please indicate the extent each of the following statements corresponds to the reasons why you are participating in your sport.

Strongly Disagree	Neither Agree or Disagree						Not Applicable					
1	2	3	4	5	6	7	n/a					
Because I would feel badly about myself if I did not take the time to practice.					1	2	3	4	5	6	7	n/a
I used to have good reasons for playing, but now I am asking myself why I should continue.					1	2	3	4	5	6	7	n/a
Because I find it interesting to learn how I can improve.					1	2	3	4	5	6	7	n/a
Because my sport reflects the essence of who I am.					1	2	3	4	5	6	7	n/a
Because people I care about would be upset with me if I didn't.					1	2	3	4	5	6	7	n/a
Because I believe it is a good way to develop aspects of myself that they value.					1	2	3	4	5	6	7	n/a
Because I would not feel worthwhile if I did not.					1	2	3	4	5	6	7	n/a
Because I think others would disapprove of me if I did not.					1	2	3	4	5	6	7	n/a
Because I find it interesting to discover new performance strategies.					1	2	3	4	5	6	7	n/a
I don't know anymore; I have the impression that I am incapable of succeeding in my sport.					1	2	3	4	5	6	7	n/a
Because my sport is an integral part of my life.					1	2	3	4	5	6	7	n/a
Because I have chosen it as a way to develop myself.					1	2	3	4	5	6	7	n/a
It is not clear anymore; I don't think that my place is in my sport.					1	2	3	4	5	6	7	n/a
Because through my sport, I am living in line with my deepest principles.					1	2	3	4	5	6	7	n/a
Because people around me reward me when I do play.					1	2	3	4	5	6	7	n/a
Because I feel better about myself when I do play.					1	2	3	4	5	6	7	n/a
Because it gives me pleasure to learn more about my sport.					1	2	3	4	5	6	7	n/a
Because it is one of the best ways I have chosen to develop other aspects of myself.					1	2	3	4	5	6	7	n/a

APPENDIX K

Basic Need Satisfaction at Work Scale for Coaches

For this section, consider how you generally feel when coaching your sport and try to answer to the best of your knowledge.

Not at all True 1	2	3	Somewhat True 4	5	6	Very True 7	Not Applicable n/a					
I feel like I can make a lot of inputs to deciding how my coaching gets done.					1	2	3	4	5	6	7	n/a
I really like the people I work with.					1	2	3	4	5	6	7	n/a
People tell me I am good at what I do.					1	2	3	4	5	6	7	n/a
I get along with people when I coach.					1	2	3	4	5	6	7	n/a
I am free to express my ideas and opinions when I coach.					1	2	3	4	5	6	7	n/a
I consider the people I work with to be my friends.					1	2	3	4	5	6	7	n/a
I have been able to learn interesting new skills when I coach.					1	2	3	4	5	6	7	n/a
Most days, I feel a sense of accomplishment from coaching.					1	2	3	4	5	6	7	n/a
My feelings are taken into consideration when I coach.					1	2	3	4	5	6	7	n/a
When I coach, people care about me.					1	2	3	4	5	6	7	n/a
I feel like I can pretty much be myself when I coach.					1	2	3	4	5	6	7	n/a
People are pretty friendly towards me when I coach.					1	2	3	4	5	6	7	n/a

Deci, E., Ryan, R., Gagné, M., Leone, D., Usunov, J., & Kornazheva, B. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former Eastern Bloc country. *Personality and Social Psychology Bulletin*, 27, 930-942.

APPENDIX L

Psychological Need Thwarting Scale for Coaches

For this section, consider how you generally feel when coaching your sport and try to answer to the best of your knowledge.

Strongly Disagree	Neither Agree or Disagree				Strongly Agree	Not Applicable						
1	2	3	4	5	6	7	n/a					
I feel prevented from making choices with regard to the way I coach					1	2	3	4	5	6	7	n/a
I feel pushed to behave in certain ways					1	2	3	4	5	6	7	n/a
I feel forced to follow coaching decisions made for me					1	2	3	4	5	6	7	n/a
I feel under pressure to agree with the coaching regimen I am provided					1	2	3	4	5	6	7	n/a
Situations occur in which I am made to feel incapable					1	2	3	4	5	6	7	n/a
There are time when I am told things that make me feel incompetent					1	2	3	4	5	6	7	n/a
I feel I am rejected by those around me					1	2	3	4	5	6	7	n/a
I feel others can be dismissive of me					1	2	3	4	5	6	7	n/a
I feel other people dislike me					1	2	3	4	5	6	7	n/a
I feel other people are envious when I achieve success					1	2	3	4	5	6	7	n/a

Bartholomew, K., Ntoumanis, N., Ryan, R., & Thorgensen-Ntoumani, C. (2011). Psychological Need Thwarting in the Sport Context: Assessing the Darker Side of Athletic Experience. *Journal of Sport & Exercise Psychology*, 33, 75-102.

APPENDIX M

Coach Motivation Questionnaire

For this section, consider why you coach your sport and try to answer to the best of your knowledge.

Strongly Disagree	Neither Agree or Disagree				Strongly Agree			Not Applicable				
1	2	3	4	5	6	7	n/a					
Because I find it stimulating					1	2	3	4	5	6	7	n/a
Because I get a good feeling out of it					1	2	3	4	5	6	7	n/a
Because I enjoy the effort I invest					1	2	3	4	5	6	7	n/a
Because I enjoy the interaction I have with athletes					1	2	3	4	5	6	7	n/a
Because coaching is fundamental to who I am					1	2	3	4	5	6	7	n/a
Because coaching is integral to my life					1	2	3	4	5	6	7	n/a
Because it personifies my values and beliefs					1	2	3	4	5	6	7	n/a
Because it contributes to my development as a person					1	2	3	4	5	6	7	n/a
Because it is moving me toward my personal goals					1	2	3	4	5	6	7	n/a
Because it allows me to achieve my personal goals					1	2	3	4	5	6	7	n/a
Because I don't want to let my athletes down					1	2	3	4	5	6	7	n/a
Because if I quit it would mean I had failed					1	2	3	4	5	6	7	n/a
Because I feel responsible for the athletes' performance					1	2	3	4	5	6	7	n/a
Because I feel pressure from myself to win					1	2	3	4	5	6	7	n/a
To be respected by others					1	2	3	4	5	6	7	n/a
To get recognition from others					1	2	3	4	5	6	7	n/a
Because I want to be appreciated by others					1	2	3	4	5	6	7	n/a
Because I like extrinsic rewards (i.e. money) associated with winning					1	2	3	4	5	6	7	n/a
I often think my coaching efforts are a waste of time					1	2	3	4	5	6	7	n/a
Sometimes I don't know why I coach anymore					1	2	3	4	5	6	7	n/a
Sometimes I feel the costs outweigh the benefits					1	2	3	4	5	6	7	n/a
Sometimes I question my desire to continue coaching					1	2	3	4	5	6	7	n/a

McLean, K., Mallet, C., & Newcombe, P. (2012). Assessing Coach Motivation: The Development of the Coach Motivation Questionnaire (CMQ). *Journal of Sport & Exercise Psychology*, 34, 184-207.

APPENDIX N

ONLINE EXERCISE

Contextual Factors

Using the scale below, please indicate the extent to which each of these factors have a positive and negative influence on your coaching experience.

Never				Sometimes				Always	
1	2	3	4	5	6	7	n/a		

Administration

The administration can influence your coaching environment in a number of different ways. This influence can come from the club administration, the sport administration, or anyone who is involved in the planning and organizing of your athletes or resources.

Does the administration have a <u>positive</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
--	---	---	---	---	---	---	---	-----

Does the administration have a <u>negative</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
--	---	---	---	---	---	---	---	-----

Athletes

Your athletes can influence your coaching through their behavior, motivation, and attitude.

Do your athletes have a <u>positive</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
---	---	---	---	---	---	---	---	-----

Do your athletes have a <u>negative</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
---	---	---	---	---	---	---	---	-----

Compensation

The compensation that you receive for your coaching, either monetary or in another format, can influence your coaching.

Does your compensation have a <u>positive</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
---	---	---	---	---	---	---	---	-----

Does your compensation have a <u>negative</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
---	---	---	---	---	---	---	---	-----

Evaluations

Evaluations from administrations, parents, athletes, or other sources can influence your coaching experience.

Do evaluations have a <u>positive</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
---	---	---	---	---	---	---	---	-----

Do evaluations have a <u>negative</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
---	---	---	---	---	---	---	---	-----

Job Security

The extent to which your coaching position is guaranteed.

Does job security have a <u>positive</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
--	---	---	---	---	---	---	---	-----

Does job security have a <u>negative</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
--	---	---	---	---	---	---	---	-----

Parents

The parents of your athletes can influence your experience through their behaviours, attitudes, and motivations.

Do your athletes' parents have a <u>positive</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
--	---	---	---	---	---	---	---	-----

Do your athletes' parents have a <u>negative</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
--	---	---	---	---	---	---	---	-----

Professional Development

The extent to which you have opportunities for professional development or training as a coach can influence your experience..

Do opportunities for professional development have a <u>positive</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
--	---	---	---	---	---	---	---	-----

Do opportunities for professional development have a <u>negative</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
--	---	---	---	---	---	---	---	-----

Technology

Technology can include everything from email, video recording, electronic score keeping, etc., and it can influence your coaching experience.

Does technology have a <u>positive</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
--	---	---	---	---	---	---	---	-----

Does technology have a <u>negative</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
--	---	---	---	---	---	---	---	-----

Time

Time speaks to the amount of time you spend with your athletes and the time you spend doing your coaching duties.

Does time have a <u>positive</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
--	---	---	---	---	---	---	---	-----

Does time have a <u>negative</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
--	---	---	---	---	---	---	---	-----

Work-Life Balance

Work-life balance speaks to your ability to manage your coaching demands, as well as other aspects of your life and it can impact your coaching experiences.

Does work-life balance have a <u>positive</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
---	---	---	---	---	---	---	---	-----

Does work-life balance have a <u>negative</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
---	---	---	---	---	---	---	---	-----

Additional Factors

In the previous section, you evaluated how relevant the following factors were to your coaching experience: Administration, Athletes, Compensation, Evaluations, Job Security, Professional Development, Parents, Technology, Time, and Work-Life Balance.

Are there any additional factors that are relevant to your coaching context that were not already covered?

If yes, please list up to 5 additional factors below.

1. _____
2. _____
3. _____
4. _____
5. _____

Please provide some background information on this factor in the context of your coaching environment.

Influence of this factor.

Does this factor have a <u>positive</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a
Does this factor have a <u>negative</u> impact on your coaching experience?	1	2	3	4	5	6	7	n/a

Importance

Please consider all of the factors that you have examined today and select the 5 most important ones for you, regardless of whether they have a negative or positive influence.

Please rank your top 5 factors, the factors that have the greatest impact on you and your coaching, regardless of whether they have a positive or negative influence.

APPENDIX O

College Coach and Athletic Administrative Scale

**For this section, we are interested in knowing about how you feel about your sport administration.
Please indicate the extent to which you agree with the statements below.**

Strongly Disagree				Neither Agree or Disagree				Strongly Agree	Not Applicable
1	2	3		4	5	6		7	n/a
My sport administration...									
Allows me to select and procure team's equipment.						1	2	3	4 5 6 7 n/a
Allows autonomy in scheduling.						1	2	3	4 5 6 7 n/a
Allows freedom in spending the budget.						1	2	3	4 5 6 7 n/a
Allows me to engage in fund-raising activities for my program.						1	2	3	4 5 6 7 n/a
Gives me latitude concerning awards for athletes.						1	2	3	4 5 6 7 n/a
Assists in monitoring student-athletes' academic progress.						1	2	3	4 5 6 7 n/a
Allocates adequate funding for assistant coaches.						1	2	3	4 5 6 7 n/a
Gains media exposure for the team.						1	2	3	4 5 6 7 n/a
Makes efforts to report game results to the media.						1	2	3	4 5 6 7 n/a
Shields program from budget cuts at the institutional level.						1	2	3	4 5 6 7 n/a
Allows opportunities for me to formally evaluation the administration and how they are supporting my program.						1	2	3	4 5 6 7 n/a
Conducts a fair evaluation of job performance.						1	2	3	4 5 6 7 n/a
Recognizes my accomplishments in appropriate ways.						1	2	3	4 5 6 7 n/a
Evaluates job performance frequently.						1	2	3	4 5 6 7 n/a

Pastore, D., Goldfine B., & Riemer, H. (1996). NCAA College Coaches and Athlete Administrative Support. *Journal of Sport Management*, 10, 373-387.

APPENDIX P

Social Support Scale

**For this section, we are interested in knowing about your interactions with your colleagues.
Using the scale below, please indicate the extent to which you agree with the following statements about
how your colleagues generally behave with you.**

Strongly Disagree 1	2	3	Neither Agree or Disagree 4	5	6	Strongly Agree 7	Not Applicable n/a
---------------------------	---	---	-----------------------------------	---	---	------------------------	--------------------------

Your coaching colleagues...

Can be relied on when things get tough.	1	2	3	4	5	6	7	n/a
Are willing to listen to your coach-related problems.	1	2	3	4	5	6	7	n/a
Are easy to talk to.	1	2	3	4	5	6	7	n/a
Are helpful to you in getting your job done.	1	2	3	4	5	6	7	n/a
Are willing to listen to your personal problems.	1	2	3	4	5	6	7	n/a

Your athletes' parents...

Can be relied on when things get tough.	1	2	3	4	5	6	7	n/a
Are willing to listen to your coach-related problems.	1	2	3	4	5	6	7	n/a
Are easy to talk to.	1	2	3	4	5	6	7	n/a
Are helpful to you in getting your job done.	1	2	3	4	5	6	7	n/a
Are willing to listen to your personal problems.	1	2	3	4	5	6	7	n/a

Caplan, R., Cobb, S., French, J., van Harrison, R., & Pinneau, S. (1975). Job demands and worker health. IN Frese, M. (1999). Social Support as a Moderator of the Relationship Between Work Stressors and Psychological Dysfunctioning: A Longitudinal Study With Objective Measures. *Journal of Occupational Health Psychology*, 4, 179-192.

APPENDIX Q

Constraints at Work Scale

For this section, consider your coaching environment over the past month and rate the extent to which each of the statements are true using the scale below.

Strongly Disagree	Neither Agree or Disagree					Strongly Agree	Not Applicable						
1	2	3	4	5	6	7	n/a						
My club offers seminars.						1	2	3	4	5	6	7	n/a
I have access to coach training through my administration.						1	2	3	4	5	6	7	n/a
My organization provides opportunities for professional development.						1	2	3	4	5	6	7	n/a

Pelletier, L., Seguin-Levesque, C., & Legault, L. (2002). Pressure From Above and Pressure from Below as Determinants of Teachers' Motivation and Teaching Behaviours. *Journal of Educational Psychology, 94*, 186-196. doi: <http://dx.doi.org/10.1037//0022-0663.94.1.186>

APPENDIX R

Time Pressure Scale

For this section, we are interested in knowing about how you feel about the time you spend with your athletes

Strongly Disagree				Neither Agree or Disagree				Strongly Agree	Not Applicable				
1	2	3		4	5	6		7	n/a				
You have enough time for your athletes.						1	2	3	4	5	6	7	n/a
You worry that you and your athletes do not spend enough time together.						1	2	3	4	5	6	7	n/a
You always have time to talk with your athletes.						1	2	3	4	5	6	7	n/a
When you are with your athletes, you find yourself worrying about other things you have to do.						1	2	3	4	5	6	7	n/a
I have enough time for my coaching duties.						1	2	3	4	5	6	7	n/a
I have enough time to enjoy my family.						1	2	3	4	5	6	7	n/a

Roxburgh, S. (2002). Racing through life: The distribution of time pressures by roles and role resources among full-time workers. *Journal of Family and Economic Issues*, 23, 121

APPENDIX S

Perceived Player Motivation

For this section, *consider the reasons why your players participate in their sport* and try to answer to the best of your knowledge. Using the scale below, please indicate the extent each of the following statements corresponds to the reasons why the *majority* of your athletes are participating in their sport.

Strongly Disagree	Neither Agree or Disagree					Strongly Agree	Not Applicable					
1	2	3	4	5	6	7	n/a					
Because they would feel badly about themselves if they did not take the time to practice.					1	2	3	4	5	6	7	n/a
They used to have good reasons for playing, but now I am asking myself why they should continue.					1	2	3	4	5	6	7	n/a
Because they find it interesting to learn how they can improve.					1	2	3	4	5	6	7	n/a
Because basketball reflects the essence of who they are.					1	2	3	4	5	6	7	n/a
Because people they care about would be upset with them if they didn't.					1	2	3	4	5	6	7	n/a
Because they believe it is a good way to develop aspects of themselves that they value.					1	2	3	4	5	6	7	n/a
Because they would not feel worthwhile if they did not play.					1	2	3	4	5	6	7	n/a
Because they think others would disapprove of them if they did not play.					1	2	3	4	5	6	7	n/a
Because they find it interesting to discover new performance strategies.					1	2	3	4	5	6	7	n/a
They don't know anymore; they have the impression that they are incapable of succeeding in sport.					1	2	3	4	5	6	7	n/a
Because sport is an integral part of their lives.					1	2	3	4	5	6	7	n/a
Because they have chosen it as a way to develop themselves.					1	2	3	4	5	6	7	n/a
It is not clear anymore; they don't think that their place is in sport.					1	2	3	4	5	6	7	n/a
Because through playing their sport, they are living in line with their deepest principles.					1	2	3	4	5	6	7	n/a
Because people around them reward them when they do play.					1	2	3	4	5	6	7	n/a
Because they feel better about themselves when they do play.					1	2	3	4	5	6	7	n/a
Because it gives them pleasure to learn more about their sport.					1	2	3	4	5	6	7	n/a
Because it is one of the best ways they have chosen to develop other aspects of themselves.					1	2	3	4	5	6	7	n/a