

**FACILITATING POSITIVE YOUTH DEVELOPMENT THROUGH YOUTH
SPORT: THE ROLE OF MOTIVATIONAL CLIMATES AND ADULT SOCIAL
AGENTS IN SECONDARY SCHOOL SPORT TEAMS**

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**NATIONAL INSTITUTE OF EDUCATION
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SPORT: THE ROLE OF MOTIVATIONAL CLIMATES AND ADULT SOCIAL
AGENTS IN SECONDARY SCHOOL SPORT TEAMS**

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2021

Statement of Originality

I hereby certify that the work embodied in this thesis is the result of original research and has not been submitted for a higher degree to any other University or Institution. In addition, I declare that to the best of my knowledge, this thesis is free of plagiarism, and contains no material previously published or written by another person, except where due reference has been made in the text.

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AUTHORSHIP ATTRIBUTION STATEMENT

This thesis contains material from 2 papers published in the following peer-reviewed journal and accepted at conferences in which I am listed as an author.

Chapter 4 is published as Lim, S. H. R., Koh, K. T., & Chan, M. (2019). “Two Heads Are Better Than One”: How Supporting Staff Complement High School Sport Coaches in Promoting Positive Youth Development. *International Sport Coaching Journal*, 6(2), 160-171. <https://doi.org/10.1123/iscj.2018-0024>

The contributions of the co-authors are as follows:

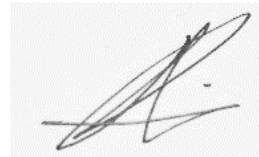
- I co-designed the study with Assistant Prof. Dr. Koh Koon Teck.
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- Assistant Prof. Dr. Koh Koon Teck and Dr Chan Chee Yeen Melvin revised the manuscript.

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List of Abbreviations

4Cs	Competence, Confidence, Connectedness, Character
5Cs	Competence, Confidence, Connectedness, Character, Caring
CCA	Co-Curricular Activities
CFA	Confirmatory Factor Analysis
ESEM	Exploratory Structural Equation Modelling
HOD	Head of Department
PE	Physical Education
PYD	Positive Youth Development
MOE	Ministry of Education

LIST OF PUBLICATIONS

1. Lim, S. H. R., Koh, K. T., & Chan, M. (2019). “Two Heads Are Better Than One”: How Supporting Staff Complement High School Sport Coaches in Promoting Positive Youth Development. *International Sport Coaching Journal*, 6(2), 160-171. <https://doi.org/10.1123/iscj.2018-0024>
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2. Koh, K. T., George Lam, C. S., Regina Lim, S. H., & Sam, K. L. (2019). Physical activity patterns and factors that facilitate or hinder exercise among adolescents in an all-boys school. *European Physical Education Review*, 25(2), 456-473. <https://doi.org/10.1177/1356336X17744520>
3. Koh, K. T., Lee, T. P., & Lim, S. H. (2018). The Internet as a source of learning for youth soccer coaches. *International Journal of Sports Science & Coaching*, 13(2), 278-289. <https://doi.org/10.1177/1747954117724980>
4. Koh, K. T., Camiré, M., Lim Regina, S. H., & Soon, W. S. (2017). Implementation of a values training program in physical education and sport: a follow-up study. *Physical Education and Sport Pedagogy*, 22(2), 197-211. <https://doi.org/10.1080/17408989.2016.1165194>

SUMMARY

School sport is a fertile platform to facilitate positive youth development (PYD). However, studies have evidenced that sport engagement does not always produce positive benefits and youth athletes remain susceptible to negative outcomes as a result of competition. Yet, it remains unclear which are the specific processes through which participation in youth sport impact youth development in positive or negative ways. This is further complicated by a lack of agreement on which developmental outcomes are key to PYD and should be consistently used as outcomes in the design and evaluation of sport programmes. To address these issues and further the potential of youth sport to facilitate PYD, three related studies were designed, culminating in the testing of an intervention programme that sought to negate undesirable impact of competitive youth sport.

The first study investigated the validity of the 4Cs (i.e., competence, confidence, connectedness, character) as an evaluative framework for PYD and its utility in the intervention study. A robust analytical approach, the bifactor exploratory structural equation modelling, supported the multi-dimensionality of the 4Cs in which four distinct constructs co-existed with an overarching bifactor. The results revealed that PYD may be more anchored on the confidence of youth athletes.

To understand how sport participation influence athlete development, the influence of adult figures in the youth sport environment cannot be understated. The second study examined the roles of supporting staff in secondary school sport teams - a group of adult mentors to youth athletes that has been underrepresented in research. In-depth interviews evidenced that supporting teachers complemented the role of coaches in facilitating PYD,

and in some areas, was more influential than the coach. This study provided one of the first accounts that extensively discussed the contributions of supporting staff to youth sport teams.

The third study tested the effectiveness of a TARGET-based intervention programme to facilitate PYD in secondary school sport teams. The intervention sought to encourage positive development amidst competitive pressures through promoting a task climate. A unique approach adopted in the intervention design was the integration of two related concepts into a framework to guide intervention design and evaluation. The mixed methodology provided evidence for the effectiveness of the intervention in preserving the task climate in secondary school sport teams and the 4Cs among youth athletes. Contrary to prior studies, the intervention did not reduce the salience of an ego climate and antisocial behaviour. Qualitative inquiry illustrated how TARGET structures can be translated into practical strategies and how they impact specific 4Cs outcomes, benefitting its future applications.

This thesis presents one of the few attempts to apply TARGET structures to youth sport settings by adopting the 4Cs as an evaluative framework. I presented detailed evidence supporting the effectiveness of the TARGET structures and unveiled much needed information on practical strategies that can be derived from them. This study is among the first to provide intervention to supporting staff and evidence their potential in promoting PYD in secondary school sport. Practical implications and limitations of the study are discussed while potential future applications are recommended.

CHAPTER 1 INTRODUCTION

1.1 General Introduction

In his best-selling novel *Tuesdays with Morrie*, internationally renowned author Mitch Albom recounted an experience shared by his philosophy professor Morrie Schwartz. The scene was set in 1979 where a basketball game was ongoing in a high school gym. The home team was leading on the scoreboard and the crowd was calling out “We’re number one! We’re number one!” Amidst the chanting, Morrie Schwartz stood up to yell “What’s wrong with being number two?” The crowd stop chanting and went silent. This short excerpt aptly illustrates how sporting excellence is often perceived as being achieved only through outperforming others to emerge as the sole victor, sometimes even at all costs. Hall of Fame coach George Allen aptly captured this perspective in his definition of sporting success: “You’re either a winner or a loser, period. Success means winning championships” (Smith & Smoll, 2012, p. 24).

Indeed, the glory of winning in sport has been so coveted that athletes are sometimes driven to extremes at the cost of their physical and psychosocial well-being. For example, it is common among athletes to sustain injuries from overtraining or overexertion from preparing for competition (Bergeron et al., 2015; Fraser-Thomas, Côté, & Deakin, 2005). Pressure to perform has also been known to cause performance anxiety and burnout among athletes of various age and levels of competition (Smith, Smoll, & Cumming, 2007). In addition to undermining youth athletes’ well-being, overemphasising winning can result in undesirable attitudes towards sport excellence (Harwood, Keegan, Smith, & Raine, 2015). Consistent evidence from motivation research have shown that individuals are more

likely to exert minimal effort and feel fearful of mistakes when their learning environment defines success as outdoing others, as opposed to personal improvement (Ames, 1992; Wang, Liu, Chatzisarantis, & Lim, 2010). In doing so, athletes may even resort to unethical and aggressive behaviours that run contrary to sport ethos like fair play and sportsmanship (Duda, 2007; Harwood et al., 2015). In fact, this trend has been observed not only in elite sport but also at the developmental level of school sport (Camiré & Trudel, 2010; Duda & Balaguer, 2007). An overemphasis on winning in sport can therefore take a toll on athletes' well-being and even character. However, it begs the question as to whether such unwanted athlete outcomes are inevitable by-products of sport participation. In other words, could competitive sport provide enriching experiences for athletes? If so, what might these be and in what contexts are they most optimal?

In a separate line of studies, benefits of sport participation have been well established. In particular, participating in organized sport during formative years has been found to not only hone athlete potential, but also contribute to socio-emotional health (e.g., confidence, meaningful relationships) and enable athletes to acquire beneficial life skills and values (Bean, Kramers, Camiré, Fraser-Thomas, & Forneris, 2018; Holt, 2016; Koh, Camiré, Bloom, & Wang, 2017). Moreover, sport has unique contributions to youth development when compared against other structured youth activities (Holt & Neely, 2011). For example, studies have suggested that sport participation offers more opportunities for youth to develop beneficial life skills such as social skills and goal settings (Eccles, Barber, Stone & Hunt, 2003; Larson, Hansen, & Moneta, 2006). Adolescents who engage in sport report greater levels of confidence, emotional regulation, problem solving, goal achievement, and social skills (Barber, Eccles, & Stone, 2001; Eccles

et al., 2003). Therefore, favourable and nurturing environmental conditions in youth sport can offer a fertile avenue to develop athletes in a holistic manner beyond their sport abilities (Bean et al., 2018; Holt, 2016; Larson et al., 2006).

A number of prominent scholars in youth sport have come to an agreement that mere engagement in sport does not always produce positive benefits, and more needs to be done to understand the underlying processes of how engaging in sport can lead to positive or negative outcomes (Danish, Forneris, Hodge, & Heke, 2004; Fraser-Thomas et al., 2005; Holt 2016; Lyras & Peachey, 2011). As Holt and Neely (2011) cautioned, youth sport researchers should “avoid being seen as ‘sport evangelists’ who view sport as a mechanism that inevitably leads to various forms of development” (p. 302). This indicates that for youth sport to benefit athletes, there needs to be deliberate and concerted efforts to propel them towards positive development while minimising negative consequences. Therefore, effective implementation of sport programmes would benefit from clear objectives and road map for promoting positive youth development (Holt, 2016; Lyras & Peachey, 2011).

While research has identified various factors influencing outcomes of youth sport participation, the training environment created by adult mentors (e.g., coaches, assistant coaches, team managers) seemed to consistently have a profound influence on the development of youth athletes (Erickson & Côté, 2016; García-Calvo et al., 2014; (Ntoumanis & Biddle, 1999; Smith et al., 2007). However, while daily interaction with these adult figures moulds the thoughts and values of impressionable young athletes, it is fundamental to know how these institutional mentors communicate the meaning of success to their athletes (Ames, 1992). To appreciate the potential positive effects of coaches’ definition of success on athletes, we look to sport coaches who share Morrie Schwartz’s

opinion that being ‘number one’ should not be the only goal of sport participation. One of these is collegiate basketball coach John Wooden, who is convinced by many of his contemporaries to be the greatest coach of his time. He believed that sporting excellence should hinge on well-rounded positive development that goes beyond mere sport achievement. According to him “success is a peace of mind which is a direct result of self-satisfaction in knowing you did your best to become the best that you are capable of becoming” (The Voice of Coach John Wooden, 2019). In his definition, success should be focused on overall personal excellence (e.g., being the best one can be) rather than outdoing others. While coach Wooden seemed to place a stronger focus on developing character, he left a legacy of record-breaking number of championship titles and had many of his young athletes go on to compete for world class basketball teams. In an interview, Bill Walton, renowned National Basketball Association player, described Wooden’s coaching philosophy:

Coach Wooden never talked about winning and losing, but rather about the effort to win. Coach Wooden is never tired of telling us that once you become a good person, then you have a chance of becoming a good basketball player (“What Coach Taught Me”, 2019).

Coaches like John Wooden are beacons to those who believe that sporting excellence can also be achieved by developing athletes as a whole rather than focusing simply on being athletically superior. His success story, while anecdotal, exemplifies how a coach’s definition of success can influence the dynamics of training environment and ultimately athlete development. From a research perspective, however, it is important to clarify how coaches’ beliefs about sporting success can be translated into day-to-day

behaviours and decisions in youth sport teams so that when applied consistently, these beliefs can develop athlete excellence both on and off the court.

On the other hand, initiatives aimed at promoting positive youth development would need to go beyond the scope of imparting specific knowledge and skills, to helping youth coaches resolve practical coaching issues (e.g., time constraints, manpower shortage). This is because coaching at the developmental level of youth sport is often met with harsh realities of constraints in resources integral to sport training (e.g., manpower), performance pressures, and managing issues unique to coaching adolescent athletes (Lemyre, Trudel & Durand-Bush, 2007; Rathwell, Bloom, & Loughhead, 2014; Stuntz, 2016; VonMeter, 2014).

Therefore, while competitiveness is inevitable in sport, sport coaches and institutions can provide conducive environments that facilitate the development of sporting potential and holistic psychosocial well-being. Moreover, youth sport teams have to reconcile the need to apply positive coaching practices and competing coaching issues to facilitate positive development of youth athletes. Yet, there remains gaps in research pertaining to the specific processes and practices that can simultaneously promote PYD and address existing coaching issues. The purpose of this research study is therefore to address these research gaps and provide critical insights to guide practices that promote PYD in youth sport.

The next sections briefly introduce the theoretical concepts and critical issues in relation to facilitating positive development of youth athletes. Each of these concepts and issues will be further expanded in Chapter 2. This follows with the aims of this doctoral thesis and how they will be addressed by each of the three studies. Lastly, this chapter concludes by

discussing the significance of this study's contributions to research and practice in youth sport.

1.2 Background and Rationale

1.2.1 Positive Youth Development in Sport

Positive youth development (PYD) is a strength-based perspective advocating that developmental capacities of youths are malleable and that they can grow in positive ways in the presence of beneficial ecological conditions (Fraser-Thomas et al., 2005; Holt, 2016). Researchers with this line of thought advocate that youth development should focus on building skills and knowledge that lead to desirable outcomes rather than eliminating and preventing negative ones (e.g., Lerner et al., 2005; Roth et al., 1998). Among the contexts that foster PYD is participation in youth sport, which has been found to facilitate purposeful development (Holt, 2016; Larson et al., 2004).

In the wider youth development literature, Lerner et al.'s (2005) 5Cs (i.e., competence, confidence, connectedness, character and caring) emerged as one of the most dominant framework to operationalize PYD. In this conceptualization, PYD is made up of separate but related constructs derived from extensive review of literature in socio-educational development. The aim of youth initiatives should therefore be aimed at nurturing the 5Cs among youth participations. When applied to the context of sport, Côté and Gilbert (2009) found that PYD is more appropriately understood in a 4Cs framework, with character and caring integrated into a single construct as the two are not significantly differentiated in sport. The 4Cs model is currently a well-referenced framework for studying PYD in sport (Erickson & Côté, 2016; Vierimaa, 2013; Vierimaa, Bruner, & Côté, 2018), and has been advocated as a universal standard to evaluate coaching effectiveness

(Côté & Gilbert, 2009; Erickson & Côté, 2016). In this doctoral study, the 4Cs model is adopted as the main framework to study PYD in the youth sport context.

1.2.2 Motivational Climates

In pursuing factors determining PYD, it is fundamental to delve into the underlying motivation behind youth behaviours. In this aspect, the Achievement Goal theory has been widely reference as a framework to understand individuals' behaviour in achievement settings (e.g., school, competitive sport). Accordingly, youth behaviour is influenced both by dispositional goal orientation and situational motivational climate (Ames, 1992; Nicholls, 1989; Duda & Balaguer, 2007). With respect to the former, individuals with a task goal orientation derive a sense of competence through the mastery of skills, improvement of their performance and doing their best. On the contrary, individuals with ego goal orientation only derive a sense of competence if they are able to outperform others and accomplish a task with less effort than others (Nicholls, 1989). Research has consistently showed that task orientation rather than ego orientation is more closely linked to enjoyable experience in youth sport (e.g., Biddle et al., 2003; Ntoumanis & Biddle, 1999; Jaakkola, Hillman, Kalaja & Liukkonen, 2015).

Researchers have argued that to understand motivations underlying youth behaviour, there is a need to consider the motivational climate which they are exposed to (e.g., Nicholls', 1989; Treasure & Roberts, 1995). According to Ames (1992), motivational climates exert an influence over youth behaviour through the definition of success conceived and advocated by important social agents in the learning environment (Ames, 1992). A motivational climate can be either task-oriented (task climate) when it advocates that success is the attainment of personal development and achieved through cooperation

(Ames, 1992), or ego-oriented (ego climate) when it emphasizes normative comparison and outperforming of others. For example, Coach Wooden's coaching style is more characteristic of a task climate as it focused on personal mastery and effort rather than outdoing competitors.

The concept of motivational climate has been well-established in youth development literature. A plethora of studies has focused on examining the impact of motivational climates on youth behaviour and found that the motivational climate in achievement settings has direct influences on various developmental outcomes (Ames, 1992; Duda & Balaguer, 2007; Harwood et al., 2015; Wang et al., 2010). For instance, correlational studies (Duda & Balaguer, 2007; Harwood et al., 2015; Wang et al., 2010) have provided empirical evidence that a task climate is associated with more adaptive motivational behaviours like optimism toward achieving excellence and proactive attitudes towards activities. Conversely, links have been found between an ego climate and undesirable outcomes like cheating, choosing less challenging tasks, low self-efficacy, and passive attitudes among youth (Wang, Liu, Sun, Lim, & Chatzisarantis, 2010). There is also some evidence that the motivational climate can influence the degree to which individuals adopt task- or ego- orientation (Jaakola et al., 2015; Morris & Kavussanu, 2008; Ommundsen, Roberts, Lemyre, & Miller, 2005).

Fundamental to the creation of motivational climates is the socialization of athletes by important social agents in their learning environment (Ames, 1992; Erickson, 2013, Lerner et al., 2015). Studies found that coaches' overt emphasis on competitiveness over intrinsic qualities can negatively impact athletes' performance (Dworkin & Larson, 2006), leading to lower self-esteem and sport retention (Duda & Balaguer, 2007). Such an ego

climate has been found to encourage undesirable behaviours such as maladaptive competition strategies and dishonest game play (Harwood et al., 2015; Palou et al., 2013). In contrast, training environments where coaches promote supportive relationships and effort (i.e., task climate) have been found to contribute towards sport excellence in ways that support holistic athlete development (Duda & Balaguer, 2007; Fraser-Thomas et al., 2005; Holt, 2016).

These insights have spurred intervention efforts to train youth coaches on the need to move away from performance-focused pedagogies (i.e., ego climate) to equipping youth athletes with life assets and skills that promote positive outcomes. Intervention aimed at teaching coaches how to cultivate a task climate has shown considerable success (e.g., McLaren, Eys, & Murray, 2015; Smith et al., 2007). However, these studies were mostly conducted in the general education or physical education (PE) contexts, and related studies on youth sport have been limited (Hassan & Morgan, 2015). Creating a task climate in youth sport contexts may face more challenge given the stronger emphasis on competition that results in a more salient ego climate (Ntoumanis & Biddle, 1999). For example, sport teams usually send their best performing athletes to compete in tournaments. As a result, coaches often spend more time with and pay more attention to better players to optimize training for them and prepare them for competition (Dworkin & Larson, 2006). It can therefore be difficult to eliminate the unequal recognition and social comparison, characteristic of ego climates, given that the goal of most youth sport teams is to prepare the team to compete.

Nonetheless, a handful of studies that have evidenced success of cultivating a task climate in the context of youth sport teaching sport. However, they are not without

limitations. For example, Smith and colleagues (2007) conducted a 75-minute *Mastery Approach to Coaching* workshop with sport coaches to share with them behavioural guidelines that create a task climate. They found that athletes whose coaches attended the workshop reported higher task climate scores as compared to those in the control group whose coaches did not attend the workshop. A more detailed description of this intervention study is presented in section 2.3.3 of Chapter 2. In a more recent study conducted by McLaren et al. (2015), the authors replicated the intervention programme by Smith et al. (2007) on youth recreational soccer coaches and found that athletes whose coaches underwent the intervention reported increased perceptions of behaviours characteristics of those from a task climate.

While these studies provide some evidence that it is possible to educate teams on how to create a task climate, they lack robust evidence on how sustainable the benefits of the initiatives were. Specifically, the studies measured intervention effects at 12 and 15 weeks respectively. In contrast, scholars and research in psychosocial intervention studies recommend that intervention initiatives should survey longitudinal effects by collecting evaluation data at multiple time points over a time period of at least nine months after intervention ended (Holt & Neely, 2011). Moreover, there was no information on how coaches translated what they have learned into daily coaching behaviours or the challenges they faced in applying what they have learned from the interventions. Such qualitative data is valuable to ascertain the effectiveness and sustainability of social interventions but are often left out in quantitative study designs and statistical analyses (Lipsey & Cordray, 2000). More importantly, such information provides practical references to practitioners and help them better facilitate positive development among youth athletes.

1.2.3 Role of Supporting Staff in Youth Sport

Apart from the need to acquire knowledge and skills to effectively promote PYD (e.g., through creating a task climate), youth sport coaches often face challenges that hinder their efforts to develop their athletes in positive ways (Lacroix, Camiré, & Trudel, 2008; Robbins & Rosenfeld, 2001). While many intervention programmes have shown promising outcomes immediately after intervention, coaches often return to their day-to-day coaching duties facing persistent challenges of competing coaching demands such as insufficient time and limited resources (Camiré et al., 2013; Holt, 2016). Moreover, in the context of youth sport, coaches face challenges related to socioemotional maturation characteristic of adolescence (VonMeter, 2014). For example, secondary school athletes are often challenged by relational problems with peers, parental pressure (Dworkin & Larson, 2006) and academic stress (Camiré & Trudel, 2013), all of which can hinder optimal sport training. Promoting PYD among secondary school athletes may therefore be a complex and daunting task that entails a different set of knowledge and skills.

While limited, there have been studies documenting how supporting staff in youth sport teams can alleviate issues coaches face in youth sport coaching and contribute towards athlete development (Lemyre et al., 2007; Rathwell et al., 2014; Stuntz, 2016). In this thesis, supporting staff refer to any personnel who work alongside sport coaches to develop sport teams. They may assist with coaching duties (e.g., assistant coaches, athletic trainers) and/or deal with non-sport related needs of athletes (e.g., team managers, sport administrators). In a study by Rathwell et al. (2014), head coaches in university football teams reported that assistant coaches are important to developing sport teams as they not only coach sport skills to athletes but also manage administrative matters. This allowed the

head coaches to maximize their time and effort on sport development of the team (e.g., supervising athlete training, designing training plans). Assistant coaches were also found to facilitate healthy relations through establishing rapport with athletes and their parents – something which coaches struggle with finding time to accomplish. Indeed, maintaining supportive and positive relationships with adults (parent and coaches) are crucial to creating an optimal environment for athletes to focus on their training (Bohnert, Fredricks, & Randall, 2010; Fraser-Thomas et al., 2005). In some youth sport contexts (e.g., Singapore, Malaysia), teachers play a supporting role as the team manager to secondary school sport teams. Apart from managing administrative matters (e.g., attendance, competition logistics) and dictating the dynamics of the team (e.g., setting the tone, disciplinary actions) like conventional sport managers, these supporting teachers have the responsibility to manage the overall welfare of student athletes in terms of character development and socio-emotional well-being (SSSC, 2015). They are therefore well-positioned in secondary school sport teams to complement sport coaches in facilitating youth athletes' positive development.

While research generally shows that supporting staff contributes meaningfully to athletes' development, discussions of their role in PYD have largely been brief at best, as compared to that of coaches (Durand-Bush & Salmela, 2002; Gilbert & Trudel, 2004). Moreover, most of these were done in the context of collegiate and elite sport that may differ from the secondary school sport setting (Rathwell et al., 2014; Stuntz, 2016). At the time that this thesis is written, no studies have provided extensive accounts on how supporting staff, especially teachers, contribute towards PYD in secondary school sport.

1.2.4 The Need for Culturally Sensitive Intervention Programmes

While youth sport is a universal phenomenon, it is important to note that there exist important and fundamental cultural differences among nations that should be considered when applying intervention programmes across cultural contexts (i.e., Singapore). Where human motivation is concerned, core values and practices embedded in various cultures strongly influence the attitudes and behaviour of individuals, as well as how receptive they are to new practices (Dorobantu, 2014; Kumpfer, Alvarado, Smith, & Bellamy, 2002). Therefore, given that most theories related to human motivation and development originated from the West, especially in the US and Northern Europe (Biddle, Wang, Kavussanu, & Spray, 2002), scholars have noted that “the transfer of these theories to other cultures with a different value system can make their application, analysis and practical outcomes problematic” (Dorobantu, 2014, p.109).

Of interest to this study are reported cultural differences of how PYD operates within youth sport. For example, various studies found the 5Cs model of PYD (Lerner et al., 2005) to be empirically valid based on samples drawn from the West (Ireland: Conway, Heary & Hogan, 2015; US: Lopez, Yoder, Brisson, Lechuga-Pena & Jenson, 2015). However, when Chen and his colleagues (2018) examined the 5Cs model (Lerner et al., 2005) in a Chinese sample, they found that not all the constructs in the 5C model were perceived in the same way as reported in prior studies done in western nations. Specifically, while the constructs of connection and caring were well defined in their sample, confidence and competence were less defined. The authors explained that this was consistent with the cultural emphasis on relationships (i.e., connection) and kindness to others (i.e., caring). On the other hand, individuality and focus on the self (i.e., competence and confidence) is less

valued in the Chinese society. Furthermore, Morgan and his fellow researchers (2006) also discovered cultural difference in the pedagogies of physical educators. In their study, physical education educators in Singapore displayed higher levels of teaching behaviours related to an ego climate than their counterparts in the United Kingdom. Indeed, such inconsistent findings due to cultural differences have urged scholars to call for cross-cultural research that include more cultural groups in sport psychology and wider academic literature (Chen et al., 2018; McInerney, 2008; Morgan et al., 2006). These findings demonstrate the importance of examining cross-cultural validity of theories in order to effectively design any youth sport or psychosocial programmes. This is fundamental to ensuring that the contents of the intervention meaningfully cater to the specific needs of its recipients.

This section highlighted and summarized several issues in facilitating PYD in the realm of sport. Firstly, while research has suggested that PYD can be achieved in youth sport through creating a task climate, it is unclear how related knowledge can be translated into practical strategies that can be applied in day-to-day coaching. Secondly, youth sport coaches struggle with constraints and challenges in the training environment that may be better addressed by supporting staff in youth sport teams. However, little research has been conducted to explore this. Thirdly, cultural differences pertaining to the needs of intervention recipients has not been adequately addressed in PYD research.

1.3 Guiding framework

PYD scholars have recommended that PYD sport-based intervention and initiatives should be guided by clear PYD objectives that is backed by empirically-based research findings (Gould & Carson, 2008; Haudenhuyse, Theeboom, & Coalter, 2012; Holt et al.,

2017; Jones et al., 2017). In this thesis, I propose a guiding framework (Figure 1) to guide the investigations and discussions in this thesis. In the framework, I contend that when adult social agents create an adaptive task climate, positive youth development can occur through youth sport participation. This integrative framework is preferred as it organizes relevant constructs (i.e., motivational climates, 4Cs) in a theoretically consistent manner, especially when strong theoretical links have been pre-established by literature. A detailed description and justification of this guiding framework and the rationale for adopting it is found in section 2.7 of Chapter 2.

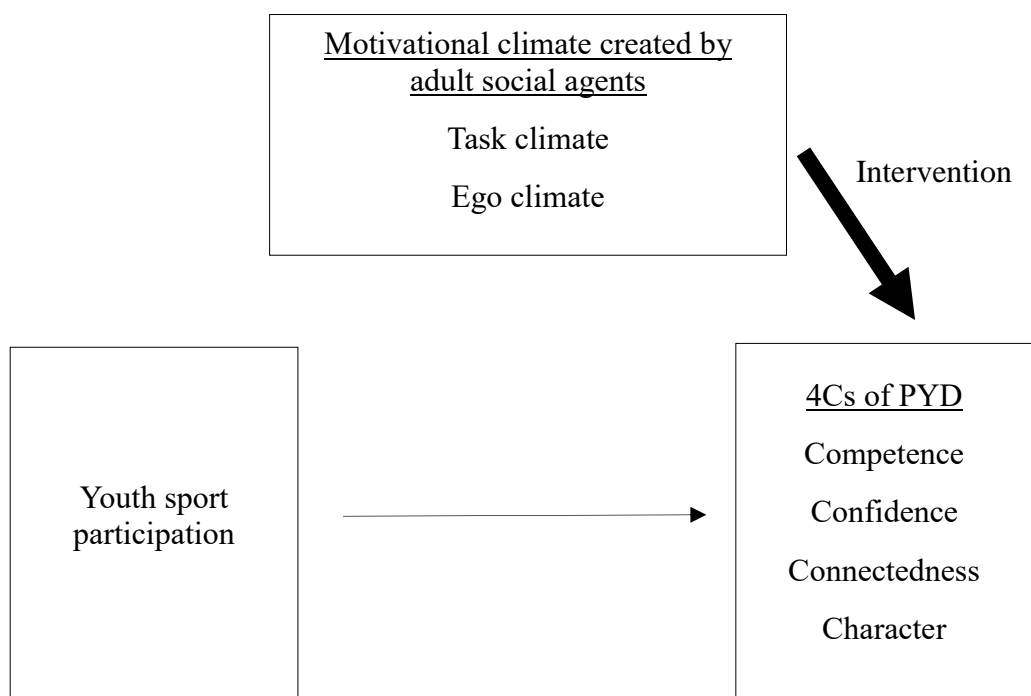


Figure 1 Guiding framework illustrating the link between youth sport participation and 4Cs of PYD outcomes, with motivational climate as the intervention.

1.4 Research Aim, Research questions and Overview of Studies

The overarching aim of this research project is to design and evaluate an intervention programme that strives to reconcile the aforementioned issues in PYD sport

research. Specifically, the initiative seeks to facilitate Singapore secondary school sport teams in creating a task climate with the assistance of supporting teachers. To this aim, this thesis sought to answer four research questions through a series of three studies that were conducted in sequential order culminating in an intervention programme.

1. How valid and reliable is the PYD toolkit in assessing competence, confidence, connectedness and character among secondary school athletes in Singapore?
2. Do Singaporean youth athletes perceive the 4Cs in ways similar to their counterparts in the western context where the instrument was developed?
3. How do supporting staff in secondary school sport teams contribute to PYD in ways that complement and extend the role of sport coaches?
4. To what extent does a TARGET intervention on supporting teachers that promote a task climate affect PYD outcomes of secondary school sport teams compared to the control group?

Research questions 1 and 2 were addressed by Study 1 which involved validating the PYD toolkit, a collection of instruments that measures each of the 4Cs, on a sample of 510 student athletes from Singapore secondary schools. The multidimensional structure of the 4Cs framework was examined with contemporary validation methods of exploratory structural equation modelling (ESEM) and bifactor modelling. This study also investigated participants' perception of PYD through the close examination to how the 4C constructs relate to each other and contribute to overall PYD score. It was hypothesized that the relative contributions of the 4Cs constructs will be different from those reported in Western context due to the influence of the East Asian culture in Singapore. Table 1 summarizes the aim, participants, measures and data analyses for the three studies.

Table 1

Summary of Studies

Study No.	Aim	Participant	Measure	Data Analyses
1	To validate the PYD toolkit and examine Singaporean student athletes' perception of 4Cs.	510 secondary school student athletes from Singapore	a) Demographic details b) PYD toolkit	a) CFA b) ESEM c) Bifactor modelling
2	To explore the roles of supporting teachers and their contributions to PYD	Eight supporting teachers Eight coaches 48 student athletes	Standardized interview guide	Inductive and deductive thematic analyses
3	To test the effectiveness of a TARGET intervention on facilitating PYD in secondary school sport teams	Control groups: 4 teams of student athletes ($n = 109$), 4 CCA teachers, 4 coaches Intervention groups: 4 teams of student athletes ($n = 108$), 3 CCA teachers, 3 coaches	a) Demographic details b) PYD toolkit c) Perceived motivational climate in sport-2 (PMCS-2)	a) Repeated one-way MANOVAs b) ANOVA c) t-tests

Research question 3 was addressed by Study 2. It was a qualitative study that explored the roles and contributions of supporting teachers in secondary school sport teams to PYD. One-to-one interviews were conducted with eight coaches and eight supporting teachers while focus groups were conducted with 48 student athletes from eight secondary school sport teams. Inductive and deductive thematic analyses were adopted on transcripts to explore the roles played by supporting teachers and how they contribute to PYD in

secondary school sports. It was expected that participants would perceive supporting teachers to be crucial to student athlete development especially in non-sporting PYD outcomes due to their background training and strategic position in school sport teams.

Research question 4 was addressed by Study 3. This study was a longitudinal quasi-experimental study that investigated the effectiveness of a TARGET-based intervention programme amongst eight secondary school sport teams. It was hypothesized that after the intervention, student athletes from the intervention group will perceive their sport training environment to be more reflective of a task than ego climate and score higher on the PYD toolkit than those from the control group.

1.5 Significance and Contributions of Study

Findings from this doctoral study contributes to the youth sport coaching literature and practice in several ways. Firstly, given the considerable proportion of youth taking part in sport, findings from this study could have a wide-reaching impact by helping this significant population achieve positive outcomes from sport participation. A survey by Guèvremont, Findlay, and Kohen (2008) found that more than three quarters of the Canadian youth population from ages six to seventeen took part in organized sport from 2001 to 2002. A similar study of sport participation in the United States of America also estimated that 36 million youth ages 5 to 18 participated in sport each year (Minnesota Amateur Sport Commission, 2015). Such a phenomenon is not exclusive to international sport powerhouses, but even in smaller nations like Singapore, more than two-third of the youth population (i.e. 72%; Sport Singapore, 2015) participate in leisure and competitive sport.

Secondly, the validation of the Positive Youth Development (PYD) toolkit will offer a measure to evaluate sport programmes that is validated in the context of East Asian youth sport, which is currently lacking in literature. This will facilitate schools and related sport organizations in assessing whether their programmes are beneficial to athletes' development. This is important to jumpstart any intervention action or improve the quality of training because coaches and teachers need to first identify what is lacking in their programmes. More importantly, the quality of training programmes can only be ensured over time with active assessments and targeted intervention measures when necessary. At the global level, this study also contributes to literature in PYD by providing cross-cultural validation of the measure outside of the western context.

Additionally, examining the 4Cs framework using contemporary bifactor and ESEM models would generate a deeper understanding of the 4Cs framework that has implications on how it is studied in youth sport research. The 4Cs were previously understood as distinct but related constructs with little psychometric evidence of their relative weights on PYD. Bifactor and ESEM models would provide more precise and in-depth information on whether the 4Cs exist within a multidimensional construct contributing to an overarching PYD factor (i.e., bifactor), and also shed light on the relative contributions of each C to PYD. Greater clarity of the 4Cs' factor structure would provide psychometric support on how the 4Cs can be measured and analysed in youth sport research (i.e., as a single PYD factor and/or individual 4Cs factors).

A significant contribution of this study was the discussion of how the role of supporting staff (i.e., CCA teachers) can contribute to PYD in youth sport. While being unique to East Asian countries like Malaysia and Singapore, supporting teachers to

secondary school sport teams share similar responsibilities to supporting roles (e.g. assistant coach, team manager, sport administrators) in youth sport in other countries. Nonetheless, unique to this context is that these supporting teachers are equipped with training as educators and primed in an advantageous position (i.e., team manager), both of which help them more effectively promote PYD. Youth sport teams in other nations could benefit from considering how youth sport teams can delineate the roles of supporting staff and practical strategies adopted by supporting teachers to facilitate PYD in youth sport teams. This scholarly undertaking would be a refreshing perspective and novel contribution to literature since intervention programmes have been mostly focused on training coaches, particularly in the western context. The findings of the proposed study have the potential to benefit youth athletes by further enhancing their developmental in ways that have yet to be explored.

Lastly, the design of the final intervention study offers a case in point of a culturally-sensitive methodology to youth sport intervention that integrates cultural needs (i.e., role of CCA teacher in Singapore) with adopted strategies (i.e., PYD and motivational climate). This reconciles the fidelity-adaptation tension commonly faced by cultural adaptation of intervention programmes (Castro, Barrera, & Martinez, 2004). The study therefore makes empirical and methodological contributions to the literature in youth sport coaching and intervention.

Information derived from this doctoral thesis provides valuable reference and guidelines to stakeholders (e.g., youth team managers, sport organizations), policymakers, and budding coaches in both western and east cultures who are interested to promote the holistic development of youth athletes.

1.6 Structure of the Thesis

This thesis is organized into six chapters. Chapter 1 presented the background of positive youth development and motivational climates in the context of youth sport. The chapter then identified fundamental issues and gaps in research that inspired this research endeavour. Chapter 2 presents a review of the literature to provide more critical and in-depth discussions of relevant theories and studies that guide and support the objectives of this doctoral study. The chapter presents key findings and recommendations of past studies aimed at promoting positive youth development through sport and highlighted areas that warrant further investigation.

Chapters 3 to 5 document the interrelated phases of this research study that culminates with the design of an intervention programme. Chapter 3 presents Study 1 of the thesis which focuses on a psychometric investigation of the PYD toolkit, an instrument to be used as an assessment tool in Chapter 5. The study adopted contemporary validation procedures of ESEM and bifactor modelling to examine the factor structure of the 4Cs framework that underlies the instrument. The results discussed the validity of the instrument to study PYD in youth sport and its cultural appropriateness in the context of secondary school sport in Singapore. Chapter 4 presents Study 2 of the thesis which focuses on a qualitative investigation of the roles played by CCA teachers and their contributions towards PYD in secondary school sport teams. Findings of this study provided information for the intervention programme in Chapter 5 by identifying key areas where CCA teachers can complement sport coaches and the strategies CCA teachers use to facilitate PYD. Chapter 5 presents Study 3 of the thesis which focuses on the evaluation of an intervention programme that integrated recommendations from past literature and grounded findings

derived from Chapters 3 and 4. A mixed method approach of quantitative and qualitative analyses were adopted to examine the effects of the intervention and its effectiveness in facilitating PYD outcomes. Across all three chapters, a discussion of results is included along with practical implications/recommendation, limitations and conclusion. Chapter 3 has been submitted to a journal while Chapter 4 has been published.

The final chapter presents a general discussion that addressed how findings of the studies answered the research questions and how they relate to existing literature pertaining to PYD in youth sport. The chapter then discusses how the research work contributes toward a deeper appreciation of how secondary school sport can nurture positive development among youth athletes. Recommendations for future research and practical implications are then summarized for researchers, stakeholders and practitioners in related fields.

CHAPTER 2 REVIEW OF THE LITERATURE

This chapter begins with a review of the theoretical underpinnings of and dominant frameworks in general PYD research. I review the theoretical origins of PYD in the *Developmental Systems theory* and dominant research approaches that sprung from this predecesing framework. The next section discusses how youth sport can be a platform to facilitate PYD and I present research evidence of developmental youth outcomes arising from sport participation. This is followed by a review of how PYD theories and approaches have been applied in the youth sport setting. In the third section, literature on motivational climates is reviewed and this framework is proposed as a suitable theoretical link between sport participation and resultant youth developmental outcomes. I further discuss and propose for TARGET structures to be adopted as the guiding intervention framework for this thesis. Despite its usefulness in promoting a task climate that is beneficial to youth development, this framework has under-researched in the field of youth sport. The fourth section discusses how social agents, particularly sport coaches, play an important role in youth development and how they mould the motivational climate of youth sport programmes. The role of supporting staff in youth sport is introduced with discussion of how this group can support coaches in optimizing PYD through sport. The last section of the literature review proposes secondary school sport as a suitable context to facilitate PYD. It introduces secondary school sport in Singapore, and the Co-curricular activities (CCA) system it is embedded in, as the context to which the three studies in this thesis is based on. A summary of the chapter, a review of the research questions together with and an overview of the three research studies, and the proposed guiding framework, is presented at the end of the literature review.

This literature review is therefore divided into seven main sections: 1) Positive Youth Development (PYD); 2) Facilitating PYD through Sport; 3) Motivational Climates; 4) Role of Social Agents in PYD; 5) Secondary School sport as a Context for PYD; 6) Summary; 7) Guiding Framework to Guide Youth Sport Programmes.

2.1 Positive Youth Development

Positive youth development (PYD) is an ongoing movement predicating that youth are malleable beings who have the potential to develop in positive ways (Lerner et al, 2005). This strength-based perspective is a paradigm shift from the traditional deficit-based view which perceived adolescence as “a period of tumultuous years, and youth as problems to be solved” (Roth & Brooks-Gunn, 2003, p.94). The focus of youth studies has therein been redirected to creating conditions that facilitate positive growth to help youth thrive in their environment (Roth & Brooks-Gunn, 2000; Holt 2016). This following section reviews the how youth development through sport can be understood through Bronfenbrenner’s (1977) ecological systems theory and how later PYD approaches were built upon this framework.

2.1.1 Bronfenbrenner’s Ecological Systems Theory (EST)

Bronfenbrenner (1977) differentiated four levels of an individual’s ecosystem (i.e. microsystem, mesosystem, exosystem, macrosystem) which are nested in each other. Together, they form an ecology of dynamic and complex relationships which is popularly referred to as the “ecological systems theory” of human development. In this framework, youth interact with that environment at multiple levels. To illustrate the relevance of this

framework to this thesis, a brief review of each level of the ecosystem is presented here and reference is made to the youth sport context.

The first and primary level is the *microsystem* which comprises of the immediate settings that youth are in contact with (e.g., family, classroom, sport team). This also includes the interactions and relationships that they have with the people in these settings (e.g., parents, teachers, coaches, peers). The *mesosystem* is made up of links between the microsystems. For example, experiences from sport training can influence how individuals interact with peers in the classroom. Confidence built from being an athlete in the school team might contribute to a student communicating confidently with classmates in the classroom. The *exosystem* encompasses the wider structures to which the microsystem and mesosystems exist in but does not influence individuals directly (e.g., the school, sport organization). For example, private schools in Singapore are independently funded, as opposed to government-funded schools. These schools are known to possess richer financial resources which are utilized to build more advanced structures in the school (e.g., more training venues) and provide more resources for their school sport teams (e.g., multiple coaches, training equipment). The school type can therefore have a direct impact on the team resources (i.e., microsystem) and an indirect impact on athlete performance.

The *macrosystem* is the overarching ecosystem to which the other systems are embedded in. This is often made up of wider societal culture, practices and regulations. For example, the United States is well-known for their strong sporting culture, where sport is perceived to be a source of pride for both participating athletes and supporters. It is a common practice for colleges to offer scholarships to individuals who display outstanding sporting talent and parents are relatively more involved in their children's sport

engagements (Peter, 2011). In comparison, sport is less valued in societies like Singapore that favour the pursuit of academic qualification (Michael & Marcus, 2015). College scholarships to outstanding youth athletes are rare and parental involvement in their children's sport is less common. The differential regard for the value of sport (macrosystem) affects the resources (e.g., scholarships) and incentives (e.g., acknowledgement) available to young individuals to pursue sports (exosystem) contribute to their sporting experience (mesosystem, microsystem). Lastly, the *chronosystem* includes events that occur in the various systems over time that impact development over and beyond the lifespan of the individual. For example, Singapore's past decades of meritocracy and knowledge-based economy has groomed a society that places great value on academic achievements. This has an impact of how parents in general view the importance of sport participation for their young children (Boon & Gopinathan, 2008; Fry & McNeill, 2011). Similarly, when positive interactions between the individual and the environment occur regularly over time, positive development occurs (Bronfenbrenner, 1995).

Application of Bronfenbrenner's Ecological Systems Theory in this thesis.

Taken together, the EST framework is appropriate to study PYD in the youth sport context because it provides a clearer understanding of how sport participation can influence youth development directly and how the sport context interacts with other significant youth contexts (e.g., home, school, other youth involvement) to impact youth development over time (Lerner et al, 2005). The study of PYD in youth sport is therefore context specific. Based on these premise, the DST serves a dual-function in this thesis: 1) laying the

foundation for the significance of investigating PYD in the sport setting, and 2) guiding the objectives of the studies in this thesis.

Firstly, EST lays the significance of understanding PYD in the sport context. To be specific, sport training as a microsystem has the ability to facilitate PYD through reinforcing youth involvement in contexts outside sport (e.g., other youth programmes, family, community) over time. For example, Zarrett and colleagues (2009) to examine the impact of involvement in various youth programmes on their development. They found that students who participated in a combination of sport and non-sport youth programmes reported higher scores on indicators of PYD and contributed more to their families and community (e.g., helping others, serving community) than those who committed their time to non-sport programmes. The authors also highlighted that these youth programmes showed greater positive impact when the duration (i.e., time spent at each session) and frequency (i.e., number of sessions a week) of participation is high. PYD through sport is therefore a worthy endeavour as it is an avenue to impact positive outcomes that has the potential to impact youth lives as a whole.

Secondly, the theory has also guided the objectives of studies 1 to 3 of this thesis. In Study 1 (Chapter 3), having an appreciation that youth athlete behaviour and perception is a product of ecological influences, it becomes important to investigate whether psychosocial constructs such as the 4Cs is perceived similarly in Singapore as the western context where it was initially conceptualized. This is because differences in culture and practices in different countries mould the ecology and the layers of systems. These, according to the DST, influence the development of the individual. Subsequently, Study 2 investigated the unique role of CCA teachers in managing secondary school sport teams. Notably, this adult

social agent is an outcome of the compulsory CCA system which in turn is determined by the wider educational system in the country. This again displays how influences by the wider exosystem can be cascaded down to the microsystem to which youth athletes have direct contact with. While the conventional setting of school sports exists, that is comprising of the coach and youth athletes, examining PYD in Singapore secondary school sport context would not be complete without considering this other important social agent. This is especially so given that CCA teachers are in direct contact with youth athletes and have authority over decisions in the school sport teams. Indeed, as discussed in detail in Study 2 (Chapter 4), this unique role opened up new perspectives into how PYD can be supported in the youth sport context. Next, driven by the believe in relative plasticity (a fundamental tenet of EST) of youth athletes, coupled with findings from studies 1 and 2 that took into account the ecological influences exerted on secondary school sport in Singapore, a context-specific intervention is tested. Specifically, I wanted to investigate is manipulations on the motivational climate through the TARGET approach can facilitate the 4Cs of youth athletes.

The next section discusses how PYD was subsequently defined and researched based on the fundamental concepts of EST that has been discussed in this section.

2.1.2 Definitions and Approaches to PYD Research

The EST provided a comprehensive framework to explain how various environmental influences can impact youth development directly and indirectly. However, in order for framework to be meaningfully applied into intervention and practice, more specific elements (e.g., of training climate, type of resources) that contribute to positive interactions between youth and their environment needs to be identified. There has been a

proliferation of research efforts aimed at operationalizing PYD to facilitate its application into youth intervention and initiatives (Holt, 2016; 2017; Johnston, Harwood, & Minniti, 2013). For example, Gould and Carson (2008) defined PYD to be “the promotion of any number of desirable competencies or outcomes in young people” (p. 59). Benson and colleagues (2006) gave a more detailed explanation of PYD as: “promoting competent, healthy, and successful youth and involve the production of experiences, and supports opportunities known to enhance positive developmental outcomes” (p. 895). Although these perspectives differ on the specific PYD outcomes being proposed, they converge on the important characteristic of PYD in equipping youth with developmental assets that help them better regulate and protect against the onset of negative behaviours (Lerner et al., 2005; Roth et al., 1998). Building on this definition, the section below discusses three approaches – life skills, developmental assets, and 5Cs of PYD – frequently adopted by PYD scholars and practitioners in guiding youth initiatives and research. While varying in emphasis, all of these approaches fall under the purview of PYD and advocates to promotion of positive development among youths. The life skills and developmental assets approaches focus on the antecedents needed to support PYD. Lerner’s 5C model emphasizes the developmental outcomes that should result from youth engagement.

2.1.2.1 Life skills

Among the various methods for promoting PYD outcomes, an important approach is the development of life skills. By honing specific life skills, adolescents are more capable of managing life challenges. In fact, many PYD researchers advocate the teaching of life skills as the main foci of sport programmes as the honing and acquisition of relevant life

skills have been found to correlate positively with adolescent thriving (Camiré, 2012; Gould & Carson, 2008).

Goudas (2010) reviewed studies that advocate the teaching of life skills and found that researchers have defined life skills in multiple ways. For example, according to the World Health Organization (1999), life skills are knowledge and the know-hows that facilitate individuals' ability to be adaptive and efficient in managing everyday demands. Danish and Nellen (1997) discussed how life skills can be physical (e.g., catching a ball), behavioural (communicating effectively with peers), or cognitive (e.g., problem-solving), but are parallel in that all of them help individuals cope with problems of everyday life. Gould and Carson (2008) added the concept of *transferability* to life skills when they defined PYD as: “those internal personal assets, characteristics and skills such as goal setting, emotional control, self-esteem and hard work ethic that can be facilitated or developed and are transferred for use outside the context they are learnt” (p .60). Other PYD scholars also advocate that in order for youth sport participation to yield positive youth outcomes, youth need to be able to apply life skills in other life domains (e.g., family, community) outside of the setting (e.g., classroom, sport training) to which they acquired those skills (Danish, Petitpas, & Hale, 1993; Gould & Carson, 2008). For example, sport participation is often thought to teach resilience due to the physically demanding training routines and competition pressures. If youth athletes learn to be resilient during training, it would only become a meaningful life skill if they are actually able to display resilience outside of sport training, in the face of difficulty when they face academic pressures in school or familial challenges like financial difficulty.

2.1.2.2 Developmental assets

Another method that has been extensively employed to assess the effectiveness of PYD programmes and outcomes is the promotion of developmental assets. Rather than the deficit perspective which views youth development as a period of “storm and stress” (Roth et al., 1998), the developmental assets approach involves identifying and building up individuals’ strengths across various youth contexts such as the home, school and community (Benson, Scales, & Syvertsen, 2011), and more recently within sport clubs (Säfvenbom, Geldhof & Haugen, 2014). Specifically, Benson and colleagues (1998, 2011) identified 40 developmental assets that fall into either one of the two categories – internal and external assets. Accordingly, internal assets refer to skills, competencies, and values developed internally within the individual and are shaped by life experiences over time (Falcão, 2010). External assets, on the other hand, are features outside of the individual that are related to the relationships that youth form and social interactions they engage in over an extended period of time. Hence, while the life skills approach focuses on developing the individual, developmental assets purport that there is a need to make available facilitating factors outside of youth (i.e., positive interactions) for positive development to occur. Each developmental asset is uniquely related to one of eight subsidiary domains, equally represented along the broadly *external* (support, empowerment, boundaries and expectations, and constructive use of time) and *internal* (commitment to learning, positive values, social competencies, positive identity) dimensions. For a detailed description of the 40 developmental assets and the subsidiary domains they fall under, see Benson et al., 1998. One advantage of the developmental assets framework is that recommendations are

both practical and actionable, making it easy to communicate to PYD scholars or community programme leaders (Benson, Leffert, & Scales, 2006).

A studies have shown support for developmental assets, specifically in how they reduce the likelihood that youth turn to maladaptive high-risk behaviours (e.g., alcohol, drug-use) and struggle with emotional difficulties (e.g., depression, suicide), and help youth thrive in their various life contexts be it showing leadership in school or being a mature and caring sibling at home (Benson et al, 1998; Benson et al., 2011; Roth & Brooks-Gunn, 2003). The developmental assets framework has also been adapted as an assessment tool and guiding framework for national-wide youth programmes in the United States and other countries (Benson et al., 2011). For example, Roehlkepartain, Benson, and Sesma (2003) conducted a four-year long study of youth development in St. Louis Park where they surveyed the changes in developmental assets among 6th to 12th grades students over a span of five years (1997-2001). The authors observed that students with more developmental assets are more likely to excel in academics, be more optimistic and less likely to engage in high-risk behaviours. They also found that the number and specific development assets students have depended on their demographics (e.g., gender, age, socioeconomic status) and that some developmental assets were more commonly reported (e.g., positive peer influence than others, positive family communication). Similarly, a transnational study conducted by Scales, Roehlkepartain and Fraher (2012) involving adolescents from countries such as Bangladesh, Rwanda, Jordan, and Honduras, found that higher amounts of developmental assets were linked to enhanced general well-being.

The developmental assets framework has been used as an intervention guide. For example, schools and community organizations in Canada have recently adopted the Search

Institutes' (2010) developmental assessment framework, based on the 40 developmental assets (Benson et al., 1997), to guide youth programmes aimed at effecting PYD. The developmental assets as a measurement tool has also been tested in both western and eastern countries (e.g., Albania, Bangladesh, Japan, Lebanon, and the Philippines) that yielded comparable validity to studies based in the United States (Scales, 2011).

While the developmental assets framework has demonstrated utility and validity, many research studies and programmes often focus on a subset of individual assets, instead of the full spectrum of assets, for purposes of feasibility (Benson et al., 2011). This would therefore mean that programme owners would still have to make judgement calls on the selection of assets depending on the purpose of their programme and resources available.

Nonetheless, the National Research Council and Institute of Medicine (National Research Council, 2002) integrated the developmental assets framework together with theories and empirical findings related to community programmes. This led to a list of eight features in community programmes that are crucial to PYD. While the developmental systems framework focused external assets mainly on the social relationships youth have with people around them and their environment (e.g., neighbourhood boundaries, high expectations), the National Research Council's framework places additional focus on the design of programmes (e.g., safety and health promoting facilities, opportunities to meaningful inclusion, empowerment practices that support autonomy) and considers the interaction between youth's life contexts (i.e., integration of family, school and community efforts). This framework therefore more comprehensively integrated features relating to the individual (e.g., internal assets), community (e.g., external assets) and programme that facilitate PYD. Please see National Research Council (2002) for the full descriptions for the

eight features and studies establishing links between each of the eight features and the relevant positive youth outcomes. Researchers have recommended that youth sport programmes consider incorporating these features into the design and delivery of youth sport programmes (Fraser-Thomas et al., 2005; Holt, 2016).

2.1.2.3 Outcomes of PYD: Lerner's 5C model

While the life skills and developmental assets approach focuses on the ingredients youth programmes should possess in order to promote PYD, Lerner and colleagues (2000) focused on the ideal outcomes that should culminate from such youth programmes. Specifically, in their *Model of National Youth Policy*, Lerner et al. (2000) operationalized PYD as represented by five developmental outcomes (i.e., 5Cs: competence, confidence, connection, caring or compassion, and character) that are evident of healthy development among youth when policies and the community provide sufficient and appropriate resources for their growth. The development of the 5Cs of PYD was an effort to address two issues which Lerner and colleagues (2005) identified as obstacles to the scholarship of adolescent development: 1) the absence of an agreed upon vocabulary to discuss PYD, and 2) standardized constructs representing PYD that can be objectively measured and therefore studied. Table 2.1 below provided detailed definitions for each of the 5Cs provided by Lerner et al. (2000). It is recommended that youth programmes should be assess on how they impact these five fundamental outcomes PYD (Lerner et al., 2000).

Table 2.1

Definitions of 5Cs factors

	Definition
Competence	Positive view of one's actions in domain specific areas including social, academic, cognitive, and vocational. Social competence pertains to interpersonal skills (e.g., conflict resolution). Cognitive competence pertains to cognitive abilities (e.g., decision making). School grades, attendance, and test scores are part of academic competence. Vocational competence involves work habits and career choice explorations, including entrepreneurship.
Confidence	An internal sense of overall positive self-worth and self-efficacy; one's global self-regard, as opposed to domain specific beliefs.
Connectedness	Positive bonds with people and institutions that are reflected in bidirectional exchanges between the individual and peers, family, school, and community in which both parties contribute to the relationship.
Character	Respect for societal and cultural rules, possession of standards for correct behaviours, a sense of right and wrong (morality), and integrity.
Caring	A sense of sympathy and empathy for others.

In a four-year longitudinal study, Lerner and colleagues (2005) validated their 5Cs model through the examination of a wide range of youth programmes and assessed the developmental assets that were embedded in them. One thousand seven hundred adolescents participated in the study and reported their experiences from the programmes through responding to a comprehensive questionnaire designed by the researchers (For more details of the study, see Lerner et al., 2005). Confirmatory factor analysis supported the factor structure of the 5Cs framework which displayed good validity ($\chi^2 [134] = 552, p < .01$; RMSEA = 0.043; GFI = 0.97; CFI = 0.99; NNFI = 0.98). The five factors also showed strong positive correlation between other indicators of positive development. For example, it was found that participants who had high scores for the 5Cs also reported more

positive outcomes like lower drug and alcohol use, positive contribution to self, family, and community. In the study, the 5Cs were also found to have negative correlations to negative youth outcomes like depressive symptoms and deviant behaviour. These findings provide evidence for the discriminant validity of the 5Cs model and further support its relevance in measuring outcomes related to positive development. Recent studies have affirmed the validity of the 5Cs among involving children (Heck & Subramaniam, 2009), adolescents (Conway et al., 2015) and college students (Dvorsky et al., 2019). Increasingly, the 5Cs framework has been employed in intervention settings to assess the effectiveness of youth programmes related to positive developmental outcomes (Damon, 2004; Jenson, Alter, Nicotera, Anthony, & Forrest-Bank, 2013). While the 5Cs model has been extensively studied in socio-developmental research, its application in the field of sports has been rare. However, some researchers have noted its relevance to study the development among youth athletes. Indeed, Côté, Bruner, Erickson, Strachan, and Fraser-Thomas (2010) adapted the 5Cs model in the youth sport setting as a guide to assess coaching effectiveness. The modified 4Cs framework by Côté and his colleagues will be discussed in detail later in the next section.

2.2 Facilitating PYD through Sport

Organised sport, especially during formative years, has been found to benefit youth development and presents an appropriate platform to promote PYD. This section discusses research evidence supporting the notion that youth sport can be leveraged to facilitate PYD.

2.2.1 Research Findings on PYD Outcomes of Youth Sport Participation

Sport is an attractive and popular activity among youth as compared to other structured youth activities (Camiré, 2012; Guèvremont et al., 2008; Minnesota Amateur Sport Commission, 2015). A recent nation-wide study in Singapore found that 72% of the youth ($n = 335,655$) aged between 13 and 19 years old engaged in regular and frequent sport and physical activities (Sport Singapore, 2016). When asked about their motivations to engage in sport, the most common reasons highlighted were related to it contributing to good health and having fun with their peers. Larson and Seepersad (2003) found that adolescents tend to experience greater enjoyment participating in sport as compared to other dominant youth activities such as socializing during leisure time or attending school. Given the appeal of sport to the youth population, it is imperative for national sport organizations and policy makers to ensure that the sporting experience is beneficial to the younger generation.

Positive outcomes from participation in youth sport. Indeed, research has found that participation in youth sport has the potential to not only promote physical activity but also benefit the development of overall psychosocial well-being (Gestsdottir, Geldhof, Lerner, & Lerner, 2017), and support the acquisition of general life skills (Armour, Sandford, & Duncombe, 2013; Gould & Carson, 2008; Larson et al., 2006) and values crucial for the attainment of PYD outcomes (Bean, 2018; Holt, 2016; Koh, 2017). Compared to adolescents who do not engage in sport, those who participate in sport report greater levels of confidence, emotional regulation, problem-solving, goal achievement, and social skills (Barber et al, 2001; Eccles et al., 2003). Larson and colleagues (2006) examined secondary school students' ($n = 2280$) experience of various extracurricular

activities (i.e., art, sport, faith-based, service-based) and observed that youth sport creates relatively more opportunities for students to display behaviours related to showing initiative, goal setting, expending effort to achieve goals, emotional regulation, and time management. Similarly, studies related to the development of resilience found that an emphasis on challenge and performance, inherent to the sport setting, provides youth with abundant opportunities to set goals and develop the virtue of persistence (Duda & Ntoumimis, 2005). Indeed, Bandura (1995) explained that sport may be a useful context to teach goal setting because goals related to sport are usually tangible, short-term and measurable in nature. This makes it easier for youth to appreciate the value of setting goals since they are more likely to successfully set goals and achieve them.

Furthermore, sport participation has also been associated with better academic outcomes – an important milestone in adolescent life (Bruner et al., 2017; Fox, Barr-Anderson, Neumark-Sztainer, & Wall, 2010; Marsh & Kleiman, 2003; Taylor, Davies, Wells, Gilbertson, & Tayleur, 2015). Marsh (1993) found that participation in sport showed statistically significant, positive effects on academic achievement among secondary students. Specifically, students who engaged in sport had better school attendance, took up more challenge in school, spent more time on homework, formed healthier social and academic self-concepts, and had positive educational aspirations. Similarly, Eccles and Barber (1999) observed that, relative to other school-based extracurricular activities, participation in sport was associated with lower rates of school dropout and higher rates of students pursuing further education. Taylor and colleagues (2015) conducted an in-depth review of the social impact of sport and found that across 25 studies, youth sport participation was associated with educational benefits. However, the impact of engaging in

sport on youth outcomes was also dependent on psychological/affective benefits (e.g., improved self-esteem), cognitive benefits (e.g., focused attention, self-regulation) and social capital (e.g., social competence, supportive relationships) derived from sports. See Taylor et al. (2015) for a detailed discussion of studies highlighting specific psychological, cognitive and social correlates of youth sport participation.

Collectively, these studies agree that engaging in youth sport nurtures positive development among youths through encouraging the acquisition of useful attitudes and life skills.

Negative outcomes from sport participation in youth sport. At the same time, other lines of research have also found that youth are exposed to negative influences when participating in sport (Harwood et al., 2015; Smith et al., 2007). Indeed, studies have highlighted that the competitive nature of sport has been associated with lower self-esteem and sport retention among youth athletes (Duda & Balaguer, 2007). In a qualitative study, Dworkin and Larson (2006) interviewed secondary school athletes who reported that their sport participation led to issues with their peers (e.g., formation of cliques, social comparison), coaches (e.g., favoring better players, pressure to perform), and also increased stress (e.g., pressures to perform, juggling sport and school). The student athletes expressed that these issues affected their motivation to train for their sport and sometimes resulted in burnout or them dropping out of their teams.

Additionally, participating in competitive sport teams has been found to encourage immoral competition strategies and dishonest game play (Harwood et al., 2015). May (2001) found that secondary school players often receive contradicting messages pertaining

to sportsmanship, competition and success in sport. Youth athletes in the study reported that their teams often advocate a win-at-all cost mentality that influenced how they perceived fair play and moral behaviour in sports. Similarly, Camiré and Trudel (2010) documented how secondary school athletes adopted negative gamesmanship strategies (e.g., taunting, intentional fouling) to gain an advantage against their competitors. More worrying is that the athletes perceived such behaviours as acceptable and are seen as an inevitable aspect of competition even if they violated sport ethos of fair play and sportsmanship.

Such outcomes arising from sport participation is evidently incongruent to PYD, especially from the perspective of 5Cs or 4Cs framework. For example, Lerner et al.'s (2005) study found that the 5Cs were negatively linked to depressive symptoms and antisocial behaviour. Yet, studies surveying the impact of sport participation have shown that it can have a strong positive impact on the emotional well-being and character of youth athletes. Underlying these mixed, and sometimes contradicting outcomes of sport participation highlight that the mere participation in sport does not guarantee positive development. Fraser-Thomas and colleagues' (2005) aptly echoed this shared sentiment in their comment on sport participation:

While organized sport has the potential to play a significant role in contributing to youth's positive development, it is necessary to recognize that positive youth development through sport is not automatic, but on the contrary, is dependent upon a multitude of factors that must be considered when planning and designing youth sport programs (p. 35).

2.2.2 Contemporary Approaches to PYD through Sport

Scholars and researchers now agree that in order to direct sport participation towards positive youth development and negate negative experiences, there needs to be intentional planning, management and evaluation of sport programmes (Holt, 2016; Lyras & Peachey, 2011). Indeed, scholars in youth sport have adapted dominant PYD theories into the youth sport setting to guide sport practice. Among the application of PYD frameworks into youth sport, this section reviews two of these adaptations. The latter of the two is adopted as a guiding framework for the three studies found in chapters three to five of this thesis.

2.2.2.1 Framework for planning PYD sport programmes

Petitpas, Cornelius, and Van Raate (2005) proposed a comprehensive framework for youth development through sport, based on their accumulated experiences as youth programme owners and also through an extensive review of related literature in PYD. This framework was guided by theoretical underpinnings from the asset-building and life skills approach of PYD as discussed in section 2.12. The authors highlighted key features of youth programmes that are more likely to promote positive growth: 1) contexts, 2) external assets, 3) internal assets, and 4) evaluation and research.

Context. Petitpas et al. (2005) advocated that youth sport programmes should be a context where youth can develop initiative, take on a role in an important group, participate in activities that are voluntary, and convey clear rules and goals incentives that require persistence and effort (Larson, 2000). Importantly, the nature of the activities should also be sufficiently challenging and meaningful to motivate youth to expend time and effort (Petitpas & Champagne, 2000). Additionally, the environment should provide a

psychologically safe space that encourages youth to take risk and learn from mistakes (Danish et al., 1993).

External assets. External assets consist of supportive environment and positive social interaction with caring adults, both of which facilitate youth in maneuvering life challenges that can otherwise lead to psychosocial problems or maladaptive coping methods (Petitpas et al., 2005). Research has consistently established the link between quality social interactions with caring adult mentors and the acquiring of beneficial developmental assets like life skills and values. The quality relationship established between adult mentors and youth may be more important than the content of intervention programmes (Bernard, 1997; Petitpas, Danish, & Giges, 1999). For example, Bernard's (1997) study highlighted that adult mentors who are most beneficial to youth are those who hold high expectations of youth while at the same time are willing to provide caring support over an extended amount of time. Such a relationship would also require regular and sufficient contact over time. In this aspect, teachers and sport coaches often stand out as having the greatest influence over youth actions and beliefs apart from their parents due to their extended, consistent contact with youth (Camiré, 2015b; Lim et al., 2019).

Another aspect of external asset are opportunities for youth to apply positive qualities and skills meaningfully. Danish and colleagues (1996) have found that youth who had the opportunities to teach or lead younger peers developed greater self-esteem and are more likely to form a positive identity. Petitpas et al. (2005) also recommended that the community can serve as an external asset by making available volunteer opportunities for youth in community services.

Therefore, a conducive environment with sustained supporting relationships is fundamental to facilitating PYD as they support youth while they manoeuvre life challenges presented to them.

Internal assets. A plethora of research have established that the more life skills that youth possess, the less likely they are to engage in risky behaviours, dropout of school, and more likely to be well-adjusted in their environment (Danish & Nellen, 1997; Gould & Carson, 2008; Holt, 2016; Petitpas et al., 2005). It is recommended that youth sport initiatives teach life skills in a deliberate and structured manner and offer youth with strategies on how to transfer those skills to other life domains (Camiré, 2012). Moreover, successful learning and transfer of life skills requires multiple trials over time to ensure that youth experience the benefits of their endeavour (Jacobs & Wright, 2018).

2.2.2.2 4Cs of PYD

The 4C's of PYD in sport presents a concise spectrum of PYD outcomes specific to the sport context. This conceptualization of PYD was adapted from Lerner et al.'s 5Cs (2005) measurement model which listed indicators of ideal youth outcomes (i.e., competence, confidence, connection, character, caring/compassions) that should culminate from engaging in PYD initiatives. Unlike the framework for planning PYD programmes that emphasizes on antecedents of sport participation that is believed to facilitate PYD, the 4Cs focuses on the outcomes of sport participation.

When applied to youth sport setting, Côté et al. (2010) observed that the component of Caring/Compassion in Lerner's 5C model can be collapsed into the concept of Character, as in sport, athletes do not differentiate significantly the concepts of Caring, Compassion, and Character (Côté et al., 2010). The 4Cs perspective therefore comprehensively examines

youth development not only in the area of performance (competence) but also important psychosocial factors (confidence, connection, character) in youth sport (Holt, 2016; Johnston et al., 2013; Vierimaa et al., 2013). Table 2.2 summarises the components and definitions of the 4Cs taken from the study by Vierimaa and colleagues (2012) that proposed the PYD toolkit.

Research studies have shown support for the appropriateness of the 4Cs framework in youth sport. Côté and Gilbert (2009) adopted the 4Cs to evaluate sport coaching effectiveness in delivering the 4Cs outcomes for their athletes. Vella, Oades, and Crowe (2011) interviewed youth sport coaches on what they perceived should be objectives of youth sport coaching and found that a majority of the outcomes discussed coincided with those in the 4Cs framework. Allan and Côté (2016) adopted the 4Cs framework to study the relationship between the emotional tone of coaches' behaviour and athlete outcomes. The findings suggested that coaches who had a calm and inquisitive demeanour have athletes that reported higher rates of prosocial behaviour and lower rates of antisocial behaviour towards opponents.

The 4Cs framework has also been adopted to create an instrument to measure PYD. Based on the 4Cs outcomes, Vierimaa et al. (2012) developed the PYD toolkit as an instrument to measure the 4Cs of youth development in sport. The authors referred to the term 'toolkit' for two reasons: the first was because the 4Cs instrument is a compilation of existing measurement tools in youth sport research. Therefore, each 'C' is associated with a specific measurement tools (e.g., the developmental outcome of competence is assessed by the Sport Competence Inventory from Causdrove et al., 2007). The second reason was that the instrument could be used as evaluative 'tools' to assess athlete development across the

4Cs as well as coaching quality. In a review of PYD measures, Holt (2016) commented that the PYD toolkit serves as a comprehensive tool to evaluate PYD programmes from the perspective of an established framework (i.e. 4Cs). Therefore in this thesis, the 4Cs framework is adopted as the main assessment framework to evaluate the effectiveness of PYD sport programmes.

Table 2.2

Definition of 4Cs Factors Taken from Vierimaa et al. (2012)

4Cs	Definition
Competence	A high level of achievement, performance or athletic ability in terms of technical, tactical and physical skills (Martens, 2004).
Confidence	A belief or degree of certainty individuals possess about their ability to be successful in sport (Vealay, 1986).
Connectedness	The measure of quality of relationships and degree of interaction with peers and coaches in the immediate sport environment (Vierimaa et al, 2012)
Character	Moral development and sportsmanship (Bredemeier & Shields, 1996), specifically the display of prosocial behaviours and avoidance of antisocial behaviours.

2.2.3 Recommendations for research and practice in PYD sport programmes

While PYD sport programmes have seen success in helping youth recipients acquire intended knowledge and skills, researchers have raised issues and proposed solutions to both PYD research and the application of PYD into youth sport programmes. A summary of the issues and recommendations is presented here.

2.2.3.1 Issues and recommendations for sport-based PYD research

Scholars and researchers in youth sport have raised several concerns arising from empirical studies examining PYD sport programmes. These issues need to be considered

when interpreting and referencing research that examine the impact of PYD sport programmes on youth development.

Identifying key PYD constructs. Firstly, while empirical studies have linked sport participation to individual outcomes, these outcomes appeared to be sparsely related to various PYD theories (e.g., Self-determination Theory: Deci & Ryan, 2000; Achievement Goal Theory: Nicholls, 1989). This lack of consistency creates ambiguity as to which constructs are key to the transference from sport participation to youth development, and the necessary processes that are crucial to effecting PYD outcomes (Burnett, 2001; Coakley, 2011). Jones et al. (2017) called for an integration of key theoretical approaches to the study of PYD in sport that “connect individual outcomes with specific programme processes” (p. 14). Holt and colleagues (2017) also urged for “a need to consolidate the contemporary evidence base to establish the extent to which there are regularly identifiable developmental outcomes associated with sport participation” (p. 2). Indeed, the identification of key PYD outcome crucial to youth development is fundamental to inform programme design and evaluation (Gould & Carson, 2008).

Accounting for social context. Furthermore, many studies focused on the outcomes of youth sport participation but failed to examine the underlying processes, and related factors (i.e., process factors), that link sport participation to PYD outcomes (Holt, 2016; Haudenhuyse, 2012). An important process factor is the contextual influence derived from social structures (e.g., school structure, CCA system) and culture (e.g., Singapore sport culture) that may mediate the impact of youth sport participation on PYD (Coalter, 2010). There is a need for greater consideration of how wider social contexts and structures influence the relationship between sport participation and PYD outcomes (Strachan, Côté,

& Deakin, 2009). Indeed, a review of empirical sport-based PYD studies by Jones and colleagues (2017) found that only 27% of the articles ($n = 185$) considered the context that sport initiatives being studied is embedded in (i.e., community, school). This is in spite of longstanding recommendations from research in developmental psychology (Bronfenbrenner, 1977) and youth sport (Côté et al., 2008; Strachan et al., 2009) that wider social structures (e.g., community, culture) exert an influence on youth sport programmes and youth athlete development. For example, studies have found that the culture of a specific context may result in different attitudes and behaviours towards sport (Holt, 2016; Wilson, 2009). Leaving out such contextual influences paints an incomplete picture of the effectiveness of youth sport programmes and limits the external validity of recommended practices and recommendation derived from such studies (Coalter, 2010). This is also in line with criticism by scholars that PYD research has been outcome-oriented but fails to provide greater clarity into the processes (e.g., socialization from adult leaders) underlying how sport participation can lead to PYD (Holt, 2016; Haudenhuyse et al., 2012; Holt & Jones, 2008). Hence, PYD sport studies need to consider and include contextual factors into the design and evaluation of sport programmes.

Bridging research-to-practice gap. Moreover, researchers have criticized that many studies have failed to bridge the research-to-practice gap due to the lack of a coherent theoretical framework that can clearly guide intervention actions and provide evaluative criteria that shows clear relation to intervention objectives (Holt et al., 2017). For example, Jones and colleagues (2017) found that more than 80% of the empirical studies in their review omitted information on the rationale of the programme and how programme contents are theoretically linked to constructs that were used to evaluate the programme

(Hansen, Larson, & Dworkin, 2003; Holt et al., 2017). Indeed, the omission of such theoretical clarification fails to ‘practically constrain the field, as practitioners do not have an overarching framework to guide their interventions’ (Gould & Carson, 2008, p. 65). This creates ambiguity when replicating intervention designs and recommendations for PYD sport-based programmes.

Need for longitudinal empirical studies. Lastly, a majority of empirical studies in PYD sport-based research have focused on cross-sectional or short-term evaluation of programmes. For example, Jones et al. (2017) commented that evaluation in many sport journal articles “typically end with short-term attitudinal outcomes, which are often linked conceptually or theoretically with long-term impacts, but very seldom explored empirically” (p. 15). PYD sport researchers have also called for longitudinal designs that examine the long-term impact of youth sport initiatives and factors that may contribute or hinder their sustainability (Holt & Jones, 2008; Long & Sanderson, 2001).

In summary, these mentioned theoretical and methodological gaps in research needs to be addressed as the failure to do so may obscure the interpretation of causal links between PYD practices and sport participation outcomes as suggested by empirical studies (Coakley, 2011). An incomplete understanding of important antecedents and underlying processes of sport PYD programmes may impede their effectiveness to induce meaningful change among youth athletes (Coalter, 2015). Therefore, these concerns point to the need for empirical research design that 1) is guided by a comprehensive theoretical framework that integrates theory, practice and evaluation; 2) considers process factors that explain how sport participation can result in observed youth outcomes; 3) ensure sound evaluation of the intervention effects and sustainability.

2.2.3.2 Recommendations for sport-based PYD programmes

Apart from highlighting gaps in PYD sport-based research, scholars in this area also proposed recommendations to enhance the effectiveness of PYD sport-based programmes in facilitating intended outcomes.

Recruitment of effective and committed adult programme leaders. A key aspect of successful youth programmes is the recruiting, training and retaining of effective adult mentors who deliver the programmes to the youth (Armour et al., 2013; Petitpas et al., 2005). However, it is common that public schools and community programmes lack funds to attract qualified staff to conduct youth programmes. Hence, many of these programmes are run by volunteers or part-time staff which results in staff/individuals with disparing levels of skill and experience as compared to teachers or staff working in the school or organization on a full-time basis. To address this concern, it is recommended that structured and diligent screening protocols should be designed for the recruitment of volunteers, building healthy relationships with staff, and providing sufficient structured training and supervision to guide and retain staff (Petitpas et al., 2005). With regards to the lack of funds, a system of non-monetary rewards and incentives should also be put in place to compensate for programme leaders.

Indeed, Petitpas et al. (2008) highlighted that community programmes are often run by programme leaders who are either volunteers or adults hired by the programme owners, both of whom are not part of the school or organization. It is sometimes difficult to ensure that the programme leaders are able to uphold the philosophies and qualities inherent to the programmes designed. One reason for this is the lack of commitment and investment on the part of these programme leaders since they are often engaged on an ad hoc basis whenever

there are programmes being run. It is possible that they do not feel a sense of belonging to the organization or school that they are working for given their temporary involvement and roles. Moreover, personal characteristics of programme leaders are essential to the success of all youth developmental programs (Peterson, 2004). The lack of committed and trained programme leaders may therefore constraint the effectiveness of youth programmes.

Catering to diverse contexts. Different schools or community programmes have different existing resources, structures and restrictions when it comes to delivering intervention programmes, thus making it necessary to alter some features of the programme to cater to these differences. This can lead from minor changes such as programme duration, to more extensive ones like altering the materials and contents of the programme. Programmes designers have sought to alleviate this problem by putting in place evaluation materials and procedures to ensure control in the quality and also assist individual programme leaders to plan and evaluate the progress of programmes delivered in different schools or organizations. This is in agreement with researchers like Lerner et al. (2000), who advocate the importance of appraising youth intervention programmes aimed at not only teaching life skills but promoting PYD in general.

Cultural appropriateness. Practitioners and scholars in youth development and intervention studies have constantly emphasized that intervention programmes targeted at psychosocial attitudes and behaviour need to consider cultural differences when adopting programmes across cultural contexts (i.e., Holt, 2016; Wilson, 2009). For example, cross-cultural validation studies of instruments measuring PYD have shown that youth athletes in different cultures may perceive indicators of PYD differently. Chen, Wiium and Dimitrova (2018) validated Lerner's 5Cs framework in Chinese youth athletes. Contrary to prior

studies that found the framework to be well-defined in western samples (Lerner, 2005; Phelps, Zimmerman, Warren, Jelicic, von Eye, & Lemer, 2009), only the constructs of connectedness and character were well-defined in the Chinese sample. The authors explained that this was likely due to the collectivistic nature of the Chinese culture that emphasizes communal harmony (i.e., connectedness) and Confucianism (i.e., character) over individual characteristics (i.e., competence and confidence). Similarly, in Kim and Gill's (1997) validation of the Task and Ego Orientation in Sport Questionnaire (TEOSQ) and the Intrinsic Motivation Inventory (IMI), the factor structures of both instruments did not hold in their Korean sample, despite the instruments displaying strong factor structures in previous North American samples.

Moreover, cultural emphasis on particular values may influence the behaviours of adult leaders in youth learning contexts. Morgan et al. (2006) adopted Ames' (1992) TARGET structure and compared the teaching behaviours of PE teachers from Singapore, an East Asian country, and their western counterparts in the United Kingdom. The authors found that PE classes in Singapore reflected a more ego-oriented motivational climate. For example, tasks given by Singaporean teachers were more likely to be undifferentiated and competitive instead of being diverse and cooperative. Lessons were also more teacher-oriented with students having little or no authority over their learning. Indeed, students of Singaporean teachers perceived their learning environment to be more ego-oriented than students in the UK. In a recent study, Alfermann, Geisler, and Okade (2013) examined cultural difference between Japanese and German athletes in their perception of their goal orientation and coaching support. Similar to Morgan et al.'s (2006) study, Japanese athletes reported their sport training environment to be more focused on performance. The German

athletes on the other hand, reported higher frequencies of coaching behaviours related to a task climate (e.g., positive feedback, social support). These studies suggest that East Asian countries like Singapore and Japan may have a more ego-oriented culture. Therefore, an appreciation of cultural influences on human attitudes and behaviours is important as it would facilitate more precise interpretations of research findings and the design of more targeted intervention.

Collectively, these findings suggest that intervention initiatives that aims to target PYD need to be mindful of how their programme content and delivery is relevant in cultures different from where the programmes and theories originated from. Hence, cultural differences in recipient nations in terms of related attitudes and practices need to be more closely examined.

This section discussed how youth sport is an appropriate platform to facilitate PYD and highlighted considerations for the design of PYD sport programmes and research. The next section discusses how contextual factors in the youth sport environment can influence youth's experience in sport and the outcomes arising from their involvement.

2.3 Motivational Climates

Research in PYD has identified beneficial antecedents (e.g., developmental assets) and outcomes (e.g., 4Cs) that are key to youth development in the sport context. However, as discussed in the previous section, research in this area has been limited in accounting for specific contextual factors that may circumvent youth's sport experience (Larson, 2000; Vella, 2011). For example, while prior research has shown that youth can experience positive development (4Cs) through sport participation, it is unclear what underlying

processes in the sport environment contributes to such development. In this regard, the motivational climate presents a useful framework to understand how the environment can influence athletes' motivation in sport. This is because the study of motivational climate revolves round how features of the environment can shape the attitudes and behaviours of youth (Ames, 1992). Given that impacting PYD involves inculcating positive attitudes and behaviours, I propose that an understanding of motivational climate is beneficial to PYD research. In section 2.7 of this chapter, I also discuss in detail theoretical links between motivational climates and the 4Cs of PYD, further supporting the adopting of the two frameworks in effort to facilitate PYD.

This section presents the theoretical origins of the motivational climate and how it can impact outcomes of youth's engagement in various learning environments including youth sport. A description of the two types of motivational climate is first presented, followed by a review of empirical studies drawing links between various developmental outcomes of youth and the two motivational climates. The last section discusses practical applications of motivational climates in youth sport by reviewing empirical studies that have applied recommendations pertaining to motivational climates in youth coaching practice.

2.3.1 Theoretical Origins of Motivational climates

The Achievement Goal theory is one of the most prominent frameworks referenced in studies of youth motivation (e.g., Duda & Balaguer, 2007; Hulleman et al., 2010; Senko & Dawson, 2017; Treasure & Roberts, 1995; Van Yperen, Blaga & Postmes, 2015). Achievement goal theorists purport that youth motivation and behaviour results from an interplay between individuals' dispositional competence-relevant purposes (i.e., goal

orientation) and the contextual instructional practices and goal-related messages communicated to youth (e.g., motivational climate) (e.g., Treasure & Roberts, 1995; Duda & Balaguer, 2007).

An individual's goal orientation represents the dispositional aspect of achievement goal theory and can be understood as the competence-goals that individuals possess that guide their behaviour in achievement setting (Nicholls, 1989). Individuals can adopt one of two distinct achievement goals depending on how they perceive the meaning of success - task goals or ego goals. When individuals' evaluation of success is self-referenced – based on personal improvement and mastery- a task goal is adopted. Alternatively, when success is achieved according to normative standards – outdoing of others - ego goals are adopted. A large body of research has documented the impact of adopting either achievement goals on a myriad of achievement-related outcomes (for detailed reviews, see e.g., Hulleman et al., 2010; Van Yperen et al., 2015; Senko & Dawson, 2017). Consistent across studies is that a task orientation rather than ego orientation is related to positive experience in youth sport (e.g., Biddle et al., 2003; Ntoumanis & Biddle, 1999; Jaakkola et al., 2015). In the context of youth sport, several reviews have shed light on how both task and ego goal orientations can be useful (Ntoumanis & Biddle, 1999). In a review of correlation studies on task and ego goal orientations in competitive sport, Lochbaum and colleagues (2016) highlighted that caution is needed to conclude the benefits related to an ego orientation due to the consistent difference in ego orientation scores when one of the two prominent instruments are adopted (for a detailed discussion see Lochbaum, Kazak Cetinzap, Graham, Wright, & Zazo, 2016).

Researchers have suggested that individuals' goal orientations are susceptible to the manipulation of motivational climates (e.g., Ames, 1992; Lloyd & Fox, 1992; Standage, Duda, & Ntoumanis, 2003). According to Ames and colleagues (1992), there are two types of motivational climates – *task* and *ego*. A task climate is one that defines success as having achieved learning and personal development. It rewards effort, advocates that errors are considered a part of development and provides autonomy to individuals (Ames, 1992). On the other hand, an ego climate is one that defines success according to normative comparison. It reinforces the outperforming of others, using the least effort possible to achieve one's goals, and punishes mistakes. When applied to the sport domain, Newton, Duda, and Yin (2000) further differentiated features of the two types of motivational climates that are perceived by athletes. A perceived task motivational climate consists of the components of cooperative learning, effort and improvement, and important role; while one that is of an ego climate involves intra-team rivalry, unequal recognition, and punishment for mistakes. In Table 2.3 below is a summary of the dimensions of task and ego descriptions of their corresponding features.

Studies have found strong links between goal orientations and their associated motivational climates (Bortoli, Bertollo, Robazza, 2009; Duda & Hall 2001; Smith et al. 2008). For example, Bortoli and colleagues (2009) found that positive experiences (e.g., socializing, collaborative relationships) was related to a task climate regardless of the goal orientation scores (i.e., task or ego) of adolescents aged 13–14 years who participated in organized sport. Furthermore, a handful of intervention studies have also demonstrated how manipulating the motivational climate can result in changes to the goal orientations of youth students in PE (e.g., Morgan & Carpenter, 2002) and youth sport settings (Hassan &

Morgan, 2015; Smoll et al., 2007). For example, Morgan and Carpenter (2002) conducted a seven-week mastery intervention programme on secondary school PE students and found that students who underwent the mastery intervention significantly increased their task orientation while those in the control group saw no change in their task orientation scores. In an experimental study, Gershgoren and colleagues (2011) manipulated the parent-initiated motivational climate of youth male soccer players by varying the type of feedback their parents gave them (i.e., task- or ego-oriented). The results showed that when parents created an ego motivational climate (i.e., provided ego-oriented feedback), the athletes' ego orientation scores increased significantly (Gershgoren et al., 2009). Conversely, when parents created a task motivational climate (i.e., provided task-oriented feedback), task orientation scores increased and ego orientations scores decreased. Collectively, these findings suggest the importance of creating a task motivational climate to provide positive experiences to youth athletes (Gershgoren et al., 2009).

Table 2.3

Features of Task and Ego Motivational Climates Perceived by Athletes

Perceived motivational climate	Sub-dimension	Definition
Task	Cooperative learning	Cooperation is emphasized in learning new skills.
	Effort and Improvement	Emphasis is put in trying as hard as possible and improvement is valued.
	Important role	Each member is seen as playing an important role in the team.
Ego	Intra-team rivalry	Comparison of athletes' abilities is emphasized.
	Unequal recognition	Members with better skills or achievements are favoured.
	Punishment for mistakes	Mistakes are seen as undesirable and are responded negatively to.

2.3.2 Empirical Evidence for Impact of Motivational Climates in Youth Sport

Several studies (e.g., Duda & Balaguer, 2007; Harwood et al., 2015; Wang, Liu, Sun et al., 2010) have found evidence that a task climate is associated with more adaptive motivational attitudes (e.g., optimism toward achieving sporting excellence, greater perceptions of sport ability) and behaviours (e.g., increased effort in sport training) among youth athletes (Ommundsen et al., 2005; van de Pol, Kavussanu, & Ring, 2012). A task climate has also been shown to improve sport performance by alleviating anxiety through reducing social comparison (McArdle & Duda, 2002; Vazou, Ntoumanis, & Duda, 2006). Smith et al. (2007) suggested that athletes are less likely to feel performance anxiety when they focus on “controllable effort rather than incompletely controllable outcome, and by creating a mutually supportive team environment” (p. 2). Petitpas et al. (2005) also found that benefits of a task climate extend beyond sport-related outcomes to possessing a strong work ethic, resilience in the face of challenges and failures, commitment to allocated task and the acquiring of beneficial life skills. Conversely, an ego climate has been associated with negative effects on athletes’ socio-cognitive outcomes such as low self-esteem, poor social team cohesion, and diminished quality of friendship with teammates (Ommundsen et al., 2005). Similarly, links have also been found between ego-focused environments with poorer learning behaviours such as choosing less challenging tasks, low self-efficacy, and passive attitudes (Wang, Liu, Sun et al., 2010).

Although previous literature suggests that task climates are preferred when considering positive athlete development and that athletes perceive either one of the two motivational climates, recent studies have found benefits to some components of ego climates. For example, Gould, Flett and Lauer (2012) found a significant association

between ego climate and some positive youth outcomes (i.e., perceived teamwork, social skills, physical skills development initiative). Studies by Shaillee and colleagues (2017) and MacDonald et al. (2011) also found that an ego climate is linked to the development of cognitive skills. It may be plausible that comparing oneself with others and a focus on using least effort to achieve one's goals require additional cognitive effort and creativity that may help youth develop cognitive skills. Such discussions support prior research that found associations between participation in competitive sport and better academic achievement (Eccles & Barber, 1999; Fox et al., 2010; Marsh, 1993).

These findings agree with several studies observing that task and ego motivational climates jointly provide athletes with multiple sources of motivation and therein satisfaction that sustain engagement (Roberts, 2001; Swain & Harwood, 1996). Kim and Gill's (1997) study of middle-school athletes found positive associations between task and ego orientations in their Korean sample. This reflected that youth athletes adopted both forms of criteria (i.e., personal improvement and normative comparison) to evaluate success in sports. Indeed, Roberts (2001) also observed that experienced athletes are able to alternate between a task or ego orientation in response to the achievement context (i.e., during training or competition) and situation (i.e., whether winning is possible). However, this ability is derived over time with exposure to training and competition. Nonetheless, given that most studies generally reported negative experience when exposed to an ego climate, more research is needed to ascertain if there are indeed positive effects of an ego climate and how it can benefit youth athletes (Shaillee et al., 2017).

2.3.3 Intervention studies of Motivational Climate in Youth Sport

While research has evidenced how the type of motivational climate can influence youth athlete outcomes, intervention studies that tested the impact of task or ego motivational climate are mostly concentrated in the field of physical education and there is a need for more studies doing so in the youth sport setting (Hassan & Morgan, 2015; Roberts, 2001). It is noteworthy that the sport context presents a different and possibly more challenging context than the PE context to build a task climate. To be clear, physical education classes are different from youth sport context. The latter refers to settings that involved formal and organized competitive structure, with a selection of athletes based on their skill level for a specific sport” (Camiré, 2012). This is unlike in physical education where the objective is educating youth on various sports and promoting activity rather than preparing for competition. This is largely due to the stronger emphasis on competition in youth sport (Ntoumanis & Biddle, 1999), which is more in-line with an ego climate.

Moreover, intervention and experimental studies have mostly been cross-sectional in nature (Clancy, Herring, MacIntyre & Campbell, 2016; Harwood et al, 2015; Hassan & Morgan, 2015) and those of sufficient duration conducted in the youth sport setting have been scarce (Digelidis, Papaioannou, Laparidis, & Christodoulidis, 2004; Keegan, Harwood, Spray, & Lavalley, 2011; McLaren et al., 2014). In this section, I present a summarized account of two prominent studies that applied the concepts of motivational climates into practice in youth sport settings. The Mastery Approach to Coaching and TARGET structures are two working frameworks that have been used to guide intervention efforts that seek to improve coaching practice among sport coaches. The latter is adopted as a guiding framework for the intervention study that will be discussed in Chapter 5.

2.3.3.1 Mastery approach to coaching (MAC)

Smith et al. (2007) conducted one of the most prominent intervention studies on motivational climate in sport. The researchers provided youth basketball coaches with a 75-minute MAC workshop on creating a task climate for sport training. The workshop focused on two themes: 1) positive vs aversive control of athlete behaviour, and 2) perceiving success as expending maximum effort rather than outperforming others. In the first theme, the instructors provided examples and explanation of specific behaviours related to positive reinforcement, mistake-contingent encouragement, corrective instruction provided in an encouraging manner, and effective technical instruction. In the second theme, coaches are encouraged to emphasize and reward athletes when they expend effort and achieve their personal best, provide individual attention to all athletes and place emphasis on deriving joy from sport participation. Multilevel analyses revealed that athletes who trained under coaches in the intervention group reported higher frequencies of coaching behaviours related to a task climate as compared to those in the control group. The authors also observed that youth athletes in the intervention group showed reduced performance anxiety as the season progressed while the opposite occurred in the control group.

McLaren et al. (2015) replicated the MAC workshop on recreational youth soccer to examine the effect of creating a task climate on team cohesion. Similar to Smith et al.'s (2007) study, athletes who played for coaches in the experimental group reported more task-oriented coaching behaviours after the intervention ended. In addition, the athletes also reported higher levels of positive cohesion in the team as compared to those whose coaches were in the control group. These two studies evidenced the potential of intervention to modify the motivational climate created by coaches and perceived by youth athletes. More

importantly, they also illustrated how creating a task motivational climate can bring about positive changes to athlete outcomes.

2.3.3.2 TARGET structures

Even though studies have consistently provided evidence that a task climate is beneficial to PYD, it is less clear what specific measures should be taken to promote task climate in a learning environment. Based on Epstein's (1989) research on motivational climate in academic classrooms, Ames (1992) discussed six components of learning situations which are crucial to creating a task climate (i.e., Task, Authority, Recognition, Grouping, Evaluation, and Time). The first letter of each component constitutes the well-known acronym TARGET for this framework. Table 2.4 summarized the TARGET structures, recommendations and rationale behind those recommendations.

Task is related to the design of learning activities. As Ames (1992) discussed, the nature of a learning activity can influence how youth perceive their ability. Activities should offer variety of task difficulty to challenge individuals with varying competence. Studies have established that learning environments that offer varied and challenging tasks are more likely to encourage intrinsic interest and task-oriented behaviours (Rosenholtz & Simpson, 1984; Theeboom, De Knop, & Weiss, 1995). Rosenholtz and Simpson (1984) explained the adoption of such variety occupies individuals in a way that reduces the chance of them comparing with each other and gear them towards focusing on mastery and improvement.

Authority is the degree to which individuals are engaged in their learning process in terms of whether they are offered opportunities to take up leadership roles and making decisions related to their learning. Children perceive themselves to be more competent

when their learning environment provides them with the authority to make decisions meaningful to their learning (Ryan & Deci, 2000). Treasure (2001) warned that allowing individuals to choose the task they would like to engage in may result in them picking activities that may be too difficult or easy if evaluation is done publicly or when they perceive themselves to have low ability for the task. Ames (1992) therefore added that options to learning tasks should be perceived to be of equal standards to ensure that choices made are based on interest rather than to avoid being evaluated. Nonetheless, studies have shown that feelings of authority over one's learning increases individuals' sense of competence and intrinsic motivation which encourages more adaptive behaviour (Cohen 1994; Morgan, Kingston, & Sproule, 2005).

Recognition is related to the rewards and reinforcements offered when success is achieved. In effort to encourage good behaviour, rewards and recognition are often presented publicly and based on normative performance. This however heightens social comparison in groups of individuals who have varying levels of competence and interests (Treasure, 2001). Moreover, extrinsic rewards may erode intrinsic interest if they are perceived to control behaviour (Ryan & Deci, 2000). Therefore, it is recommended that teachers and coaches acknowledge individuals without comparing with others (i.e., in private).

Grouping refers to how individuals are brought together in a learning environment. When the teacher or coach treats particular individuals or groups of individuals differently (e.g., more attention, more contact time) they encourage social comparison and encourage an ego climate. Ames (1992) recommend that getting individuals to work in small groups

of mixed abilities promotes greater involvement and cooperative learning as it signals that individual differences are accepted.

Table 2.4

Recommendations and Rationale for TARGET structures

TARGET Structures	Recommendations	Rationale
Task	<ul style="list-style-type: none"> • Challenging • Diverse • Progressive 	<ul style="list-style-type: none"> • Engaging, foster effort and mastery • Engaging, reduce complacency and social comparison
Authority	<ul style="list-style-type: none"> • Decision-making opportunities • Leadership role 	<ul style="list-style-type: none"> • Encourage responsibility • Afford autonomy
Recognition	<ul style="list-style-type: none"> • Recognized privately • Individual praise • Praise for improvement and effort 	<ul style="list-style-type: none"> • Reduce social comparison • Emphasize value of learning process and striving for personal progress
Grouping	<ul style="list-style-type: none"> • Small, heterogenous • Regardless of ability • Increase cooperative learning and interaction 	<ul style="list-style-type: none"> • Reduce labelling and social comparison • Emphasize everyone is equally valued
Evaluation	<ul style="list-style-type: none"> • Self-referenced • Maximal effort • Personal improvement 	<ul style="list-style-type: none"> • Value effort • Reduce social comparison
Time	<ul style="list-style-type: none"> • Flexibility in duration • Sufficient to practice and complete 	<ul style="list-style-type: none"> • Increase likelihood of achieving competence • Allow for personal improvement regardless of ability

Evaluation can either be self-referenced or other-referenced. Ames (1992) found that when evaluation focuses on individual improvement, striving towards goals and expending effort, individuals are more likely to adopt a task orientation towards goal achievement. On the other hand, evaluation based on comparing with others undermines self-perceived ability (Rosenholtz & Simpson, 1984). Evaluation should therefore best be

based on effort and mastery to prevent social comparison and the evoking of an ego orientation.

Time is embedded in almost all other TARGET structures (Hassan, 2011): task (e.g., sufficient time to complete), authority (e.g., allowed to plan own schedules), grouping (e.g., equal amount of time given to every individual), and evaluation (e.g., pressure of limited time during sessions or assessments). Regardless of the components involved, scholars recommend that time allocated for tasks should be adequate and flexible to accommodate to learners of different learning pace and to increase their chances of experiencing mastery (Ames, 1992; Epstein, 1989; Morgan et al., 2005).

TARGET intervention studies. Several studies have provided evidence that TARGET structures can be manipulated in the sport and PE settings to foster a task climate (Bortoli et al., 2017; Braithwaite, Spray, & Warburton, 2011). Prichard and Deutsch (2015) have highlighted that elements within the TARGET structures are greatly within the control of coaches and the effects of implementing the suggested elements can be substantial. Three studies that applied TARGET structures in the youth sport context showed promising results.

Theeboom and colleagues (1995) developed a 3-week programme that incorporated TARGET structures into a youth summer sport programme. The researchers found that despite the short duration of the intervention, youth in the experimental group showed significantly higher levels of enjoyment and skill development. Qualitative interviews also showed some evidence that the programme contributed to increase sense of competence and intrinsic motivation among the youth participants. However, the authors acknowledged

that length of the programme may have been too short to fully assess the usefulness of the TARGET structures on youth development.

A recent study by Cecchini and colleagues (2014) evaluated the longitudinal effects of an intervention programme which trained five youth coaches on the strategies outlined in Epstein's TARGET structures. The results of the study found significant effects on all dimensions of task climate (i.e., cooperative learning, improvement and effort, importance role), basic psychological needs (i.e., competence, autonomy, relatedness), self-determined motivation, persistence in sport, and enjoyment among participant youth athletes. More importantly, these gains were observed to be sustained six months after the programme terminated.

In a five-month long study, Hassan and Morgan (2015) tested the TARGET structures on coaches to varsity athletes of various sport (track and field, women's soccer, netball, trampolining). The intervention involved observation and filming of three coaching sessions conducted by the coaches, followed by discussions between the researcher and coaches on how to modify coaching behaviours to be more task-oriented. It was observed that after the intervention, there was a statistically significant increase in task-oriented coaching behaviours as compared to before the intervention. This was also supported by an increase in perception of task climate and decreased perception of an ego climate among athletes.

These studies suggest that the TARGET structures have the potential to serve as an intervention guide to promote a task climate in the youth sport context. However, similar to studies in motivational climate, most studies related to TARGET programmes have focused on the PE setting and few have implemented the TARGET structures into competitive sport

programmes (Braithwaite et al., 2014; Hassan, 2011). Moreover, research adopting the TARGET structures has typically been cross-sectional and more empirical and qualitative evidence is warranted to establish the effectiveness and sustainability of TARGET-based sport programmes (Digelidis et al., 2004; Hassan, 2011).

2.4 Role of Social Agents in PYD

The previous section discussed how the environment (i.e., motivational climate) can influence youth developmental outcomes from sport participation. In the same vein, an important aspect of the environment is the social agents that come into direct contact with youth and play an important role in shaping their behaviours and attitudes. Consistent across youth development theories (i.e., developmental systems, PYD, motivational climates) is the tenet that youth behaviour and development are profoundly influenced by their interaction and relationships with significant others (Ames, 1992b; Bengoechea, Wilson, & Dunn, 2017; NRCION, 2002). Researchers have used terms like ‘social factors’, ‘social capital’ or ‘external assets’ to suggest that youth’s social relationships serve as buffers or protective factors against life challenges and negative experiences (Bengoechea et al., 2017; Benson et al., 1998). In this dissertation, significant others in the youth sport context refer to people whom youth athletes come into contact with on a regular basis pertaining to their sport participation (i.e., coaches, peers, parents, teachers). Studies in motivational climates explain that social agents exert their influence through shaping and reinforcing youth’s concept of success which in turn guides their motives and behaviours in sport training (Boixadós, Cruz, Torregrosa, & Valient. 2004; Erikson, 2013; García-Calvo et al., 2014). This section discusses the various social agents in the ecosystem of youth

sport and research findings on their contributions to PYD. The section concludes with my contention that supporting staff to youth sport teams play a crucial role alongside coaches and warrant greater research attention.

2.4.1 Peers

Research have shown that peer socialization and relationships are particularly crucial during formative years of youth sport experience. Studies have found that positive peer relationships are integral to youth deriving enjoyment in sport participation (Chan et al., 2012; García-Calvo et al., 2014; Vazou et al., 2006), greater sense of competence (Ommundsen et al., 2005; Vazou et al., 2006), and sustained sport participation (Atkins et al., 2015; Riley & Smith, 2011; Smith & Smoll, 2007). Studies have also found that affiliation with peers is a strong predictor of youth acquiring personal and social skills (MacDonald et al., 2011) such as displaying sportsmanship (Ntoumanis, Taylor, & Thøgersen-Ntoumani, 2012) and valuing effort (Vazou et al., 2006).

Indeed, several studies have suggested that peer relationships may have a strong predictive power on PYD (Donlan, Lynch, & Lerner, 2015; Holt, 2016). Although research indicates that a task sport climate is generally adaptive and an ego climate maladaptive (Chan et al., 2012; Duda & Balaguer 2007; García-Calvo et al., 2014), recent studies have challenged these univariate findings. MacDonald et al. (2011) observed that close and positive peer relationships may buffer the effect of motivational climate on developmental gains. The authors found that regardless of whether athletes perceived the team's motivational climate to be ego or task oriented, supportive peer relations were associated with higher levels of personal and social skills. Vazou and colleagues (2006) examined the influence of peers and coach reinforcement on youth sport experience and found that

positive peer reinforcement was a stronger predictor for adolescent enjoyment and self-rated effort than positive reinforcement given by the coach. In a similar study among youth athletes in Hong Kong, Chan et al. (2012) found that peers' positive reinforcement had significant associations with athlete's self-rated effort while positive reinforcement of coach did not have such an effect. Additionally, they found that peer-created task climate predicted team cohesion above and beyond coach created task climate. Evidently, peers play an integral role in youth athletes sporting experience and development.

2.4.2 Coaches

It is well-established that coaches play an integral role in youth athlete development. Positioned as the main figure of authority, coaches exert a strong influence on athletes through their control over the sport training environment (i.e., setting training tone, team rules, design training routine, team goals) and their relationship with athletes (Duda & Balaguer, 2007). These in turn have been found to either positively or negatively affect athletes' interest, satisfaction, sustained involvement in their sport and whether they achieve developmental outcomes (Allan & Côté; 2016; García-Calvo et al., 2014).

Longstanding research in motivational climate purport that coaches influence athlete outcomes through their control over the training environment (Duda & Balaguer, 2007; García-Calvo et al., 2014; Holt, 2016). Studies have found that coaches and parents can induce either a task or ego goal orientation from youth through the structure they impose in the training environment and expectations they communicate to youth athletes (Alfermann et al., 2013; Ames, 1992; van de Pol et al., 2011). For example, for more targeted training, coaches often group athletes according to their abilities during training sessions. Moreover, it is common for the most abled athletes to be selected to represent

teams in competitive tournaments. While these decisions may increase the chances of the team winning games, it can send across the message that only good athletes are valued and being successful means being more athletic than other teammates (i.e., ego climate). The guidance and interaction between coaches and athletes can therefore shapes athletes' understanding of what is valued in sport training and their role in the team (Camiré et al., 2013; Koh et al., 2017). On the other hand, Gould et al. (2012) found that when coaches foster a supportive task climate, youth athletes reported higher levels of positive developmental gains. In a sample of 510 youth athletes from team sports, MacDonald et al. (2011) found that a coach-created task climate strongly predicted the likelihood of youth athlete experiencing positive experiences such as acquiring social skills, setting and striving for goals and display of initiative. Both of these studies also found that a coach-created ego climate was associated with negative experiences.

Moreover, specific coaching behaviours (e.g., communication, interaction with athletes) have also contributed toward athlete development (Smith & Smoll, 2007; Vella et al., 2011). Studies in self-determination theories have revealed that specific coaching actions (e.g., clear instruction, supporting athletes' decisions) contribute positively to athlete's intrinsic motivation through satisfying their basic needs (i.e., competence, autonomy, relatedness) which in turn facilitate engagement in adaptive behaviours (Pope & Wilson, 2012). For example, Buning and Thompson (2015) found that when collegiate athletes perceived their coach's communication to be consistent, clear and direct, they show greater motivation during training (e.g., put in more effort, proactivity). Other studies have also found that athletes whose coaches adopted a positive interpersonal style of coaching (e.g., transformational leadership style, autonomy-supportive) derived more satisfaction

from their sport participation and performed better (Alfermann et al., 2013; Erickson & Côté, 2016)

A plethora of studies have documented the effects of coach-athlete relationships on athlete development. Côté and Salmela (1996) found that when youth athletes have supportive and close relationships with their coaches, they are less likely to internalize failures (i.e., losing games) into their self-concept, and in general display greater confidence. Vella and colleagues (2013) found that the poor coach-athlete relationships were predictive of a higher frequency of negative experiences and fewer opportunities to acquire important life skills (i.e., personal and social skill, goal setting skill, cognitive skill, initiative).

There is research evidence that during adolescence, coaches play a stronger role on youth athlete developmental outcomes as compared to parents and peers of youth athletes. Chan, Lonsdale, and Fung (2012) found that parental influence, in particular that of mothers', was more crucial for children than adolescent athletes. One possible explanation is that while enjoyment is the main motive of sport participation in childhood, a sense of competence becomes more valued in adolescence when individuals are engaging in identity formation (Weiss & Williams, 2004). A coach's feedback thus becomes more a salient source of competence during this life phase and thus has a greater impact. Given that the focus of this thesis is on youth development, as compared to children, greater attention may be needed on coaching behaviours that are conducive to the facilitation of positive youth development.

Existing research also supports the strong influence of coaches even when compared to youth athletes' peers as the motivational climate created by them exert an

indirect influence on that created by their peers. Using regression analyses, Garcia-Calvo et al. (2014) found an interaction effect between peer- and coach-created task climate on team cohesion. Specifically, they observed that while coach-created task climate showed positive relation to team cohesion, this relationship was strengthened when peer-created task climate was also high. The authors suggested that coaches, being figures of authority in the team, may exert an influence on the climate created by peers. Studies have also observed that positive perception of athlete-coach relationships encouraged improved friendship quality in the team and athlete's perception of peer acceptance (Ommundsen et al., 2005; Riley & Smith; 2011). Therefore, coaches remain a strong influence given that they have both direct and indirect influence over youth athlete experience either through their own behaviours or through the behaviours that they induce among athletes' teammates (Garcia-Calvo et al., 2014; Schailée, Theeboom & Cauwenberg, 2017).

Collectively, these findings suggest that coaches are athletes' main source of influence and may have the most power to effect change given their authority in the sport training environment.

2.4.3 Supporting Staff to Youth Sport Teams

The term 'supporting staff' is defined as a person who works alongside sport coaches to assist in either coaching duties (e.g., assistant coaches, athletic trainers) and/or manage related needs of the team (e.g., athletic directors, team managers, sport administrators). A number of recent studies have showed that supporting staff in youth sport teams can support coaches in facilitating PYD by contributing to sport competence and psychosocial development of youth athletes (Lemyre et al., 2007; Rathwell et al., 2014; Stuntz, 2016). In a study of University football headcoaches, Rathwell et al. (2014) found

that assistant coaches not only developed the sport skills of athletes but also fostered rapport with athletes and their parents. Lemyre et al.'s (2007) study also found that team managers and athletic directors assisted coaches in managing communications with parents of youth athletes. The role of a supporting staff in maintaining positive relationships between parents and youth athletes pertaining to their sport involvement is fundamental to a stable and supportive environment for athletes to focus on their day-to-day sport training (Fraser-Thomas et al., 2005). However, while these studies suggest that supporting staff can play a role in facilitating positive development among youth athletes, discussion of their contributions to PYD have mostly been periphery to coaches and brief at best (Durand-Bush & Salmela, 2002; Gilbert & Trudel, 2004), and focused on university and elite sport (Rathwell et al., 2014; Stuntz, 2016).

Teachers as supporting staff. One aspect that is lesser known is that in some east Asian education systems (i.e., Malaysia and Singapore), school teachers assume supportive roles as managers alongside sport coaches in secondary school sport teams (Lim, Koh, & Chan, 2019). In these contexts, school sport is part of a compulsory after-school programme and constitutes a core function of holistic student development (Koh et al., 2012; Salamuddin, Harun, & Abdullah, 2011). Given the stronger affiliation to the school, as compared to club or elite sport teams, a school teacher is therefore tasked to oversee the activities in the team to ensure that the decisions and philosophies of the sport teams are in-lined with that of the school. In Singapore, teachers supporting school sport teams have responsibilities that extend beyond that of administrative matters (e.g., keeping track of attendance, facilitating competition logistics) to ensuring the overall welfare of students (e.g., mediating coach-student conflict, being updated with the academic and familial well-

being of athletes), and also dictating the dynamics of the team (e.g., setting the tone, disciplinary actions, cascading school values) (Singapore Schools Sports Council, 2015). It is important to note that, with a stronger attachment to the school, and a training background in educational pedagogy, the interactions of a supporting teacher is different to that of conventional sport managers. They often bring along with them skills related not only to student academics but also student management and counselling that help them manage socioemotional issues commonly experienced by adolescent students (Hargreaves, 2000; Watkins & Donnelly, 2014).

However, there is currently limited research studying the unique contributions of school teachers who manage school sport teams alongside a coach (Lim et al., 2019). This is in spite of their established influence on youth development in academic classrooms (Farmer et al., 2011; Farrington et al., 2012; Morgan et al., 2005; Wang et al., 2013) and PE (Morgan & Kingston, 2008; Ntoumanis & Biddle, 1999). For example, developmental studies have shown that apart from parents and peers, teachers play a vital role in students' development during adolescence, given their status of authority and involvement in the school context. Studies have documented how the quality of relationship between students and teachers strongly influences students' social functioning (Farmer et al., 2011), behaviour (Wang et al., 2013), and engagement in learning activities (Farrington et al., 2012). Garcia-Reid, Reid, and Peterson (2005) observed that while both support from parents and teachers displayed unique contributions to youth engagement in school, support from teachers more strongly predicted school engagement as reported by students. Wentzel (1998) examined the effect of teacher support and family cohesion on students' motivation and found that only teacher support was significantly associated with students pursuing

goals in a responsible manner. Family cohesion however, predicted the motivational climate perceived by students. These findings suggest that when teachers are present in the learning environment, they exert an influence on youth that may sometimes supersede that of other adult social agents. These findings suggest that teachers can make significant and positive contributions to PYD.

Teacher-coaches in youth sport. In the context of youth sport, research pertaining to the contribution of teachers mostly focus on the role of teacher-coaches, who are teachers by training but voluntarily takes on additional coaching work in school sport teams (Camiré, 2014; School Sport Canada, 2013). Camiré (2015b) highlighted that this dual-role has additional advantages in helping teacher-coaches encourage positive outcomes for youth athletes. The additional contact time with students (i.e., during school hours and team trainings) strengthens the relationship between athletes and teacher-coaches, which forms the basis of the influence they exert. Indeed, research has shown that the extent to which youth derive positive experiences and outcomes from their interaction with adult mentors depend on the quality and intensity of the relationship that is greatly influence by the amount of time they spend interacting with each other (Bohnert et al., 2010; Petitpas et al., 2005). Camiré and Trudel (2014) conducted an intervention to teach secondary school teacher-coaches and community coaches in Quebec on how to coach psychological skills to youth in sport teams. They found that teacher-coaches could apply the strategies learned more easily than community coaches due to their daily contact with students that helped them monitor students' progress. On the other hand, community coaches did not have this luxury of time and contact with athletes as their engagement are limited to weekly training sessions.

However, their dual role poses some challenges that can undermine their work. In their large-scale survey (n = 3062) that examined the profiles of teacher-coaches in Canada, Camiré, Rocchi, and Kendellen (2016) found that teacher-coaches may not have adequate training in sport pedagogy and techniques that optimize athletes' performance and potentials. To note, coaching certification was not compulsory for teacher-coaches in Canada, given the voluntary nature of the position. Moreover, a common struggle teacher-coaches report is having to juggle multiple duties from teaching, coaching and family obligations (Camiré et al., 2016). The stress that teacher-coaches face from managing their multiple responsibilities often resulted in role conflict (Konukman, Agbuga, Erdogan, Zorba, Demirhan, & Yilmaz, 2010; Richards & Templin, 2012), lowered job satisfaction, family tension, burnout and even withdrawal from coaching positions (Camiré, 2015a). Hence, while teacher-coaches are in an advantageous position to facilitate PYD in youth sport, having to fulfill responsibilities of being both a teacher and sport coach may compromise their ability to develop their athletes.

Nonetheless, these findings suggest that teachers, when playing a supportive role, can contribute meaningfully to development of youth athletes given their extended and direct contact with youth in the school setting. Considering their expertise in youth management and strong attachment to the school and its values, it is plausible that they exert an influence on the development of the youth athletes in ways yet to be determined by extensive research. There is however, a dearth in research examining how teachers can play supporting roles alongside coaches in youth sport setting and how they can complement the role of sport coaches (Lim et al., 2019).

2.4.4 Relative Influence of Social Agents

Given that social agents in the sport setting have influence over youth development through their direct contact with them, it becomes important that their impact complement each other rather than impede the facilitation of PYD. However, studies investigating the relative contributions of social agents and how conflicting climates can impact youth athletes development are rare (Chu, & Zhng, 2019; Keegan et al., 2009; Weigand et al., 2001). Chu and Zhng (2009) commented that this is especially true for quantitative investigations on the relative contributions of various social agents and explained that this dearth in research could be attributed to complex and statistical and practical challenges in collecting and analyzing quantitative data from multiple sources of social environments (e.g., motivational climates).

Nonetheless, researchers converge on the view that influence by social agents should be mutually reinforcing to optimize PYD in youth sport (Chu, & Zhng, 2019; Keegan et al., 2009; O'rourke et al., 2014). For example, O'rourke and colleagues (2014) discussed how interventions aimed at teaching coaches to promote a task climate should also be accompanied by parent interventions so that the communication and interactions with youth athletes are reinforcing. Indeed, Smith et al.'s (2007) study found success in their Mastery Approach to Coaching (MAC) intervention that taught both parents and coaches on strategies aligned with a mastery (or task) motivational climate. Specifically, compare to the control group, youth athletes in a community basketball programme saw a reduction in cognitive and somatic anxiety over the competitive season. Taken together, it is important that interventions targeting the behaviours or social agents of youth athletes need to consider how to structure the environment such that the influence of various social

agents are “mutually supportive of one another’s efforts to reduce unnecessary pressures on athletes” (Smith et al., 2007, p. 3).

2.5 Secondary School Sport as a Context for PYD

Of the various sport settings (i.e., community, club, school sports) that focus on teaching sport skills, secondary school sport may serve as a particularly useful avenue to bring about positive development among youth (Camiré, 2012). Danish, Forneris, and Wallave (2005) advocated the promotion of school sport to facilitate PYD because it possesses all eight features of positive developmental settings for youth (see section 2.1.2 ‘Features of positive developmental settings’ for detailed descriptions of the eight features). Wilkes and Côté (2010) found that youth who participate in secondary school sport have more opportunities to develop knowledge and skills such as emotional regulation, initiative, and prosocial norms than youth who participate in recreational sport. This section discusses factors that are inherent in secondary school sport and how they facilitate PYD. Secondary school sport in Singapore, the context to which this doctoral thesis is situated in, is presented as exemplar.

This dissertation adopted the definition of secondary school sport given by Camiré and Kendellen (2016): “school-sponsored sport practices outside regular class hours in which students compete in organized interscholastic leagues that lead to end-of-season championships” (p. 1). With reference to Trudel and Gilbert (2006) classification of sport contexts (i.e., recreational, developmental, elite), secondary school sport belongs to the developmental context characterized by “formal and organized competitive structure, a selection of athletes based on their skill level, and a stable coach-athlete relationship”. This

therefore differentiates secondary school sport from other school-based sport programmes which are non-competitive in nature (i.e., physical education, or short term sport modules).

2.5.1 Features that Facilitate PYD

Not only does secondary school sport have the furthest reach of the youth population as compared to other sport context, there exist facilitating factors in secondary school sport that make it an ideal setting to facilitate PYD.

Safe and structured learning environment. Secondary school sport exists within the ecology of educational institutes that are structured in a way to provide youth with a conducive and safe environment to learn and play (i.e., physical/psychological safety). One key aspect that differentiates the school from other learning environments are the rules (e.g., punctuality, prohibition of substance use) and expectations of behaviour (e.g., respect for authority, school values) that are reinforced by clearly communicated consequences (e.g., detention, suspension). These serve to maintain a healthy and stable environment conducive for learning (Newman & Newman, 1987). Secondary school sport, being part of the school system, are mandated to follow school rules. Student athletes who violate them face respective consequences, which sometimes entail them being suspended from team trainings or withdrawn from school tournaments. This is in line with research in developmental assets purporting that clear rules and consequences form healthy boundaries and expectation that serve as an external asset to PYD (Benson et al., 1997; Petitpas et al., 2005). More importantly, the resultant safe and positive environment facilitates PYD by allowing positive learning to occur consistently over time (Benson et al., 1998; Bronfenbrenner, 1995; Lerner et al., 2000; NRCION, 2002).

Emphasis on life skills and values. Scholars studying PYD in youth sport have suggested that secondary school sport is an appropriate context for teaching life skills and values as it is an extension of educational institutes that targets holistic development and well-being of adolescent students (Danish et al., 2005). For example, secondary school sport teams, being an extension of the school, are also expected to uphold school values and rules. Marsh (1993) observed that greater commitment and participation in secondary school sport teams lead to a higher level of identification with their school and accompanying school values. Many secondary school sport teams follow a “no pass/no play” policy, whereby athletes who fare poorly in academic results are not allowed to compete in inter-school tournaments (Oliphant, 2011). In Singapore, athletes who consistently display poor conduct in school are not allowed to represent their school in annual national tournaments. Such practices have the effect of reinforcing the display of beneficial life skills (i.e., time management) and values (i.e., responsibility).

Acknowledging the potential of school sport to teach life skills and values, many nations have sport organizations that collaborated with secondary schools to reinforce this advocacy of life skills and values through sport (e.g., Canada and United States: Camiré, 2012). For example, secondary school sport in Singapore is embedded in the Sport Education Programme (SEP) which is a collaboration between Sport Singapore (SportSG) and the Ministry of Education (Sport Singapore, n.d.). The aims of SEP sport programmes are to: 1) to develop skills and sport knowledge of students; 2) promote sport participation in schools; 3) promote positive attributes of team spirit and character; 4) promote sustained involvement in sport among students (Sport Singapore, n.d.). Secondary school sport therefore offers a suitable context for youth to learn and apply life skills and values.

Access to social assets. Moreover, developmental studies have established that youth's ability to manage life experiences and grow into well-adjusted adults depend largely on the availability of supportive social relationships (Benson et al., 1997; Petitpas et al., 2005). These factors form fundamental social assets that buffer youth from negative life experiences and determine if youth successfully navigate the formation of a healthy identity – a primary milestone during adolescence (Goldberg & Chandler, 1992). Studies have suggested that being part of an organized school sport team, practising multiple times weekly and representing the school in tournaments contribute to the development of self-esteem, self-concept, social capital (Camiré, 2012; Coulangeon, 2018; Fry & McNeill, 2011) and a greater sense of school connectedness (Fox et al., 2010; Marsh & Kleiman, 2003). More importantly, Eccles and Barber (1999) have discussed how supportive relationships and a healthy self-identity are also fundamental to positive educational outcomes such as stronger attachment to the school and reduced involvement in maladaptive behaviours.

There may be several explanations why secondary school sport may provide a suitable context to offer positive relationships (e.g., coach-athlete, peer relations) Firstly, apart from the close mentorship by sport coaches, secondary school sport teams have access to both sport administrative staff (i.e., athletic directors, sport administrators) and also school staff (i.e., teachers, counsellors) who are trained to manage youth athletes and provide them with necessary emotional support and counselling. More importantly, when these relationships have been formed, they generally remain stable within the fixed school system. Moreover, having teammates who attend the same school or class may facilitate the forging of closer peer relationships which is important for the well-being of youth athletes.

Weiss and Smith (2002) highlighted that the quality of youth friendship depends on self-disclosure and loyalty which are anchored on the possession of similar values and beliefs developed over time. Having a shared identity from being in the same team and school increases the commonality and shared experience secondary school athletes have. Coupled with the increased opportunities and time that secondary school athletes have to interact with each other (i.e., during school hours and after-school team trainings), participation in secondary school sport programmes further strengthens the relationship of youth and their teammates. Strachan et al. (2009) compared the friendships of ‘samplers’ (i.e., youth who participate in more than one sport at lower commitment to each) and ‘specializers’ (i.e., youth who focused on only one sport at higher level of commitment) and found that the latter formed more intimate relations that contributed to higher levels of enjoyment and persistence in their sport. Secondary school sport therefore presents a conducive environment that can facilitate the formation of healthy and stable relationships that supports PYD.

Access to committed and competent adult leaders. As discussed in an earlier section (see section 2.2.3 Recommendations for research and practice in PYD sport programmes), difficulties in recruiting skilled and committed adults to run PYD sport-based programmes can undermine the integrity of the programme objectives and ultimately their sustainability. A potential solution is to have coaching and/or administrative staff of secondary school sport teams manage the non-sport aspects of PYD (i.e., teaching life skills and values). Firstly, these adult leaders are already in the secondary school system and recruitment is less of a problem. Furthermore, adult leaders who hold full-time positions in the organization are more likely to be personally invested in the welfare of student athletes

as their responsibilities, and often job performance is dependent on the well-being of the student athletes under their charge. They would therefore be more personally invested in promoting PYD than adult leaders who are hired on an ad-hoc basis in community sport programmes. This would entail them being more open to learning and applying knowledge and skills aimed at facilitating positive youth development.

Creating a complex environment. Bengoechea and colleagues' (2017) discussed how secondary school sport are 'complex environments' that are particularly ideal to facilitate the learning of crucial life skills. Such environments are characterized by the presence of stress and challenges but simultaneously provides access to meaningful and supportive relationships. The authors explain that when exposed to challenges in their sport (i.e., competition pressure, stress from managing school and sport), athletes are pushed to mobilize their social capital (i.e., supportive relationships) and life skills (i.e., emotional regulation, time management) to cope with the additional pressure. When done regularly and over time, secondary school athletes become equipped with a repertoire of life skills that they are confident of applying. This is consistent with existing research on adolescent parenting which recommends that optimal adolescent functioning is developed through a combination of parental demandingness and pressure, and parental support and responsiveness (Routledge, Gute, Gute, Nakamura, Csikszentmihalyi, 2014).

Indeed, Larson and colleagues (2006) examined secondary school students' (n = 2280) experience of various extracurricular activities (i.e., art, sport, faith-based, service-based) and observed that secondary school sport exposes students more intensely to successes and failures due to the competitive nature of the activity. These experiences create opportunities for student to apply life skills such as initiative, goal setting, expending

effort to achieve goals, emotional regulation, and time management. Similarly, Wilkes and Côté (2010) found that female basketball athletes from high school sport teams had more opportunities, as compared to their counterparts in recreational or community team, to develop their identity, initiative, emotional regulation skills, and prosocial behaviours. Coupled with the access to multiple sources of supportive relationships, secondary school sport can indeed be a complex environment that is conducive to student athletes' development and acquiring of life skills.

2.5.2 Secondary School Sport in Singapore

The context of this doctoral study is based on secondary school sport in Singapore which occurs within the Co-curricular Activities (CCA) system. It is a compulsory after-school programme where students participate in at least one CCA in the areas of sport, performing arts, or clubs and societies (Fry & McNeill, 2011). This system was initially known as Extracurricular activities (ECA), which was a voluntary programme similar to commonly known after-school programmes in other countries. It was later restructured and renamed into the current system of compulsory participation since 1999. This was an effort by the Ministry of Education (MOE) to emphasize that after-school programme is integral to rather than an add-on to education (MOE, 2003). Each secondary school often offer several sport CCA programmes (e.g., basketball, soccer) for students to choose from. The objective of CCA is to nurture “holistic development of students in terms of life skills, competencies and values” (Ministry of Education Singapore, 2014). Sport CCA in Singapore can be considered a PYD sport programme where their purpose is to develop not only sport competence but also socioemotional skills and moral development. It is important to note that the CCA system may be unique to some nations (i.e., Singapore and

Malaysia) in that they are integrated into the school curricula and managed by a school staff and sport coach. In contrast, most secondary school sport programmes in other parts of the world exist outside the school curriculum (i.e., extracurricular activities) and are managed by volunteer teacher-coaches or community coaches.

Adult social agents. The school assigns at least one teacher to supervise each CCA team, regardless if he or she has background knowledge in the CCA team being managed. External instructors and coaches are usually hired to teach CCA-specific skills (e.g., basketball) on a part-time basis. This is unlike most organized youth programmes in western (e.g., United States, Europe) contexts where youth programmes occur outside school curriculum and does not usually involve a supporting school staff attached as a manager to each team (Marais, 2011). However, the responsibilities of CCA teachers are similar to supporting staff that are more commonly known in sport literature. For example, similar to team managers or athletic directors, they are the main figure of authority who approves all team decisions as they represent the school leadership. They manage the change or retaining of sport coaches who are hired on a yearly contract. CCA teachers are also administrators who manage administrative matters from purchasing sport equipment to preparing training schedules. And above all, they are expected to nurture student athletes' talents and develop their character in collaboration with coaches or instructors while ensuring their well-being and safety. The division of power between the CCA teacher and coach is varied. Schools often leave the distribution of power and delineating of role expectations to the negotiation between the two parties. In many sport CCA teams, CCA

teachers allow coaches to share the same authority as them and work together to make decisions for the team.

Sport CCA structure and climate. The primary objectives of sport CCA programmes are to teach student athletes sport skills and prepare them for annual inter-school tournaments. Sport CCA teams are divided into two divisions to allow more student athletes to compete according to their age group. Students in the first and second year of their secondary school studies compete in the ‘C’ division (i.e., 13-14 years old) secondary, while students in their third and fourth year compete in the ‘B’ division (i.e., 15-17 years old). Sport CCA teams typically train from one to three times a week depending on contextual situations between the school and the managing CCA teacher, and available school funding. To note, due to limited financial resources in schools, sport CCA teams that have obtained greater sporting achievements (i.e., obtained medals or went further in tournaments) usually have greater leveraging grounds to request for additional training days and resources.

While schools strive to facilitate holistic development of their student athletes, the competitive nature of school sport presents some obstacles that are similar to competitive sport in other contexts (i.e., club, elite sport teams). For example, coaches are hired based on a contractual basis that is renewed annually. Currently, the only objective measure of sport coaches’ competence is the team’s performance in inter-school tournaments and the subjective evaluation of sport CCA teachers pertaining to the mentorship of the coach. As a result, coaches are likely to place more emphasis on the sport performance of sport CCA teams since their livelihood is dependent on it. This is of concern given that the objective of CCAs is to promote holistic development of student athletes.

While schools have laid down objectives for CCAs related to holistic youth development, at the time this thesis was written, there exist no standardized appraisal procedures to evaluate whether sport CCA programmes or coaches are meeting stated objectives. Moreover, there are no clear guidelines to sport training structure or plans to guide CCA teachers and coaches who are left to make decisions for their CCA teams (e.g., training structure, routines) based on their discretion. This goes against recurring reminders that PYD requires planning and assessment of youth sport programmes that is intentional and backed by empirical research (e.g., Holt, 2016; Lyras & Peachey, 2011).

2.6 Summary

In this chapter, I presented an in-depth review of the literature documenting how youth sport, particularly secondary school sport, presents an appropriate context to facilitate PYD. The PYD perspective advocates that youth have the potential to grow in positive ways when they are equipped with personal assets and are presented with beneficial ecological conditions (Lerner et al., 2005). Research have found that engagement in sport during formative years can nurture beneficial life skills and values (i.e., initiative, goal setting, resilience), and contribute to psychosocial well-being (e.g., self-esteem, meaningful relationships) among youth (Camiré, 2012; Coatsworth et al., 2005; Danish et al., 2005). However, the competitive nature of sport exerts performance pressures that can expose youth to negative experiences (e.g., performance pressure, favouritism of coaches, normative comparison) that lead to outcomes (e.g., lowered self-esteem, cheating, burnout) disadvantageous to PYD (Harwood et al., 2015; Smith et al., 2007). Researchers have come to agreement that mere participation in sport does not guarantee positive development of

youth and there needs to be intentional planning, management and assessment of sport programmes (Fraser-Thomas et al., 2005; Holt, 2016; Lyras & Peachey, 2011). In this thesis, the 4Cs is adopted as an assessment framework to evaluate the effectiveness of PYD sport programmes. However, given that most research in sport PYD has been conducted in the western context, particularly north America, extra attention is needed when incorporating these research findings and resultant recommendations into research studies in other contexts (e.g., East Asia). Specifically, the cross-cultural validity of theoretical frameworks (e.g., 4Cs of PYD) and instruments (e.g., PYD toolkit) related to PYD in sport needs to be ascertained given that PYD-related constructs are largely psychosocial in nature.

Crucial to successful youth sport programmes is also the need to clarify underlying processes that links sport participation to key PYD outcomes (Larson, 2000; Vella, 2011). Studies in motivational climates presents a useful framework to understand how sport participation can impact youth outcomes through social processes. Root to these social processes is the definition of success that can occur in two types of motivational climates – task and ego. A task climate defines success as personal improvement and learning while an ego climate emphasizes that success is achieved through outperforming others. Studies have evidenced that a task climate encourages more adaptive behaviours (i.e., proactivity, optimism, increased effort) and positive outcomes (i.e., enjoyment, increased self-esteem) than an ego climate (i.e., low self-esteem, poor social relations, cheating). Given the competitive nature of sport that more closely reflects an ego climate, key to development of youth athletes is the adopting of sport practice that promotes a task climate and negates the negative effects resulting from an ego climate. The TARGET structures recommended by

Epstein (1989) have been shown to effectively create a task climate in academic classrooms and physical education lessons. There is preliminary evidence that these recommendations can be beneficial to PYD in the youth sport setting (Cecchini et al., 2014; Theeboom et al., 1995). The TARGET structures is used in this thesis as a guiding framework for intervention aimed at creating a task climate in youth sport programmes.

Traditionally, youth sport intervention and initiatives sought to induce change in athlete attitudes and behaviours through the training of the coach. However, little attention is given to involve supporting staff in youth sport teams (Durand-Bush & Salmela, 2002; Gilbert & Trudel, 2004). Research has documented, albeit often briefly, how supporting staff are well-positioned to complement the work of sport coaches by attending to other important non-sporting developmental needs of athletes such as providing emotional support to athletes and promote positive relationships in the team (Lemyre et al., 2007; Rathwell et al., 2014; Stuntz, 2016). The training background and work of academic teachers may place them in a prime position to help school sport coaches facilitate PYD. However, school teachers are underrepresented in youth sport literature. This dissertation sought to examine the unique role of teachers who manage school sport teams (i.e., CCA teachers) alongside sport coaches to provide insight into their role and contributions to PYD.

Secondary school sport provides a conducive context to facilitate PYD due to resources inherent to this setting. Firstly, the secondary school environment affords a safe and structured environment conducive to the learning of positive attitudes and behaviour (Newman & Newman, 1987; Petitpas et al., 2005). Moreover, the culture of emphasizing beneficial life skills and values are a natural aim of secondary school systems (Camiré,

2012). Furthermore, as discussed in the previous sections, positive interaction with social agents are fundamental to PYD. In the secondary school settings, youth have access to relatively stable and positive relationships with adult mentors (e.g., teachers, coaches) and peers (e.g., classmates, teammates) that buffer them from the competitive nature of secondary school sport (Goldberg & Chandler, 1995; Weiss & Smith, 2002). Such an environment is considered a ‘complex environment’ that has been found to be ideal for learning life skills and values (Bengoechea et al., 2017). In addition, the secondary school sport context is relieved of the common problems faced by many PYD sport programmes – namely, the lack of competent adult mentors and appropriate sport programmes that cater to the varying needs of youth in different contexts. The CCA system in Singapore is an exemplar of a secondary school sport context that can be leveraged on to facilitate PYD among youth athletes.

2.7 Proposed Guiding Framework to Guide Youth Sport Programmes

This thesis proposes a framework to organize the concepts of motivational climates and PYD to guide the design and evaluation of youth sport programmes. Given the established impact of motivational climate created by adult social agents on PYD, I advocate that the key to negating the undesirable consequences of the performance-focused climate in youth sport is through a deep investigation of motivational climate features that encourage PYD in a way that does not compromise athlete performance. Specifically, this framework advocates that adult social agents impact PYD, operationalized as the 4Cs, through the motivational climate that they create (see Figure 1 for an illustration).

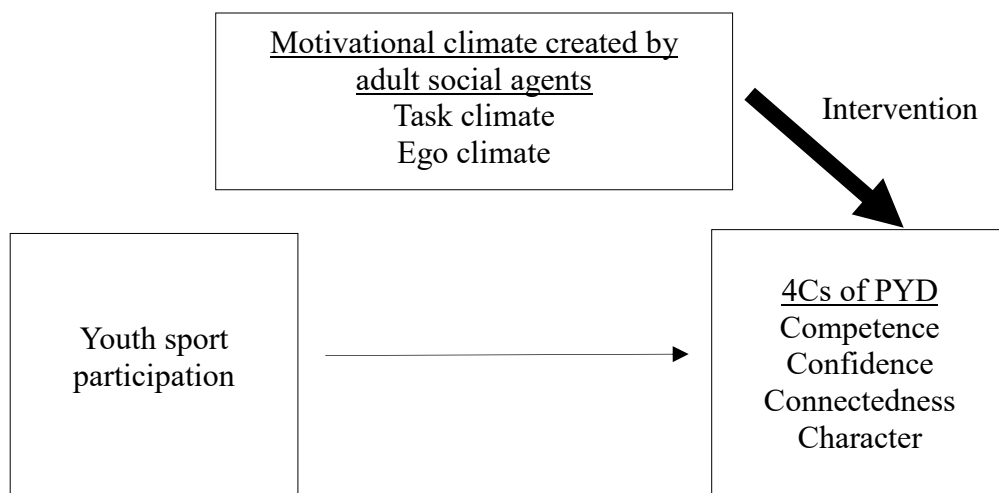


Figure 1. Guiding framework illustrating the link between youth sport participation and 4Cs PYD outcomes, with motivational climate as the intervention.

This guiding framework is adopted for several reasons. Firstly, PYD research has been criticized to be focused on PYD outcomes (e.g., developmental assets, supportive relationships) but fail to consider the processes underlying how sport participation lead to positive or negative outcomes (Larson, 2000; Vella, 2011). This is a crucial theoretical gap to fill especially for educating designers and stakeholders of PYD sport programmes. Discussions and investigations of PYD studies in sport should therefore jointly discuss processes (e.g., motivational climate) and outcome constructs (i.e., 4Cs of PYD) to facilitate a deeper understanding of PYD in youth sport and guide intervention efforts.

Secondly, while research studying the relationship between motivational climate and PYD outcomes is not new, studies have associated the respective types of motivational climate to wide arrays of PYD indicators in a dispersed manner, independent of an integrative framework that considers key youth developmental outcomes (i.e., 4Cs). This becomes a challenge for designers of PYD sport programmes when deciding which PYD indicators to focus on in assessing the effectiveness of their programmes. Yet, scholars

have recommended that to facilitate PYD in sport, there needs to be intentional planning and delivery of PYD programmes that are guided by clear objectives and supported by empirical findings. An integrative framework that specifies guidelines for programme design (e.g., features of task motivational climate) and specific evaluative variables (e.g., 4Cs of PYD) provides clearer guidance to stakeholders in PYD sport programmes.

Thirdly, a close observation of the outcomes of task and ego climates would reveal theoretical links to the 4Cs framework of PYD, where a task climate has been found to promote the 4Cs of PYD while an ego climate has an opposite effect (See Table 2.5).

Importantly, an underlying and important premise is that the type of motivational climate exert influence on youth sport participation on their developmental outcomes. For example, studies have found that when youth perceived their sporting environment to be a task climate, they report greater self-esteem of their abilities which is similar to the concept of confidence in the 4Cs (Vazou et al., 2006). In contrast, if an ego climate is perceived, athletes display lower self-esteem of their abilities, that is congruent to lower confidence in the 4C framework (Boixadós et al., 2004; Moreno, Cervelló, & Moreno, 2008). These findings suggest that the creation of a task motivational climate targets each of the 4Cs of PYD and provide empirical support that the latter can be used as meaningful outcome measure of motivational climates. However, at the time this thesis was written, no study has investigated the how the 4Cs framework can be used to evaluate the outcomes of motivational climate specified by Newton et al. (2000).

Table 2.5

Links between the Dimensions of Perceived Motivational Climate and 4Cs

	Task climate	Ego climate
Competence	Higher perceived ability (Vazou et al., 2006)	Low self-esteem, low perceived ability (Boixadós et al., 2004; Moreno et al., 2008).
Confidence	Higher perceived self-esteem (Vazou et al., 2006)	Low self-esteem (Boixadós et al., 2004; Moreno et al., 2008)
Connectedness	Team cohesion (García-Calvo et al., 2014); higher satisfaction of the need for relatedness (Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002).	Rivalry (Duda, 2007); lower satisfaction of the need for relatedness (Sarrazin et al., 2002).
Character	Sportsmanship (Ntoumanis, Taylor, & Thøgersen-Ntoumani, 2012); higher moral functioning (Duda & Treasure, 2010).	Rivalry, cheating behaviour (Duda, 2007).

Moreover, given that individuals may not observe the same achievement for various developmental outcomes, it may be crucial to delve into how motivational climate can differentially influence each of the 4Cs. For example, using structure equation modelling, Jaakkola and colleagues (2015) investigated the relationships among perceived motivational climate (task or ego), perceived sport ability (i.e., perceived competence), and enjoyment among competitive ice hockey players. They found that a task motivational climate has a direct impact on enjoyment only for players who perceived themselves to be of high ability. An ego motivational climate on the other hand was not associated with enjoyment among the competitive athletes regardless of their perception of ability. This study although anecdotal, highlights that the effect of motivational climates on developmental outcomes (e.g., perceived competence) may not be straightforward and warranted further investigation.

This chapter presented an in-depth review of key concepts and issues pertinent to promoting positive growth among youth through sport, and in particular, secondary school sport. With a fundamental appreciation of key ingredients needed to sprout positive development through sport engagement, the next chapter presents the first of three studies conducted to address the issues raised in pursuing the overarching aim of promoting PYD in secondary school sport.

CHAPTER 3 STUDY 1: PSYCHOMETRIC INVESTIGATION OF THE POSITIVE YOUTH DEVELOPMENT TOOLKIT USING EXPLORATORY STRUCTURAL EQUATION MODELLING

3.1 Introduction

Given that sport remains one of the most popular activities that youth participate in, researchers and practitioners have been called upon to appraise the effectiveness of sport programmes in delivering PYD outcomes for them (Holt, 2016; Vierimaa, 2012). This has led to the proliferation of PYD-based instruments which often vary across contexts and outcomes being measured (Armour et al., 2013; Vierimaa et al., 2012). Chapter 2 discussed how this lack of agreement on developmental outcomes key to PYD can impede applications of PYD to research and practice.

Although Lerner et al.'s (2005) *5Cs* (competence, confidence, connectedness, character and caring) is among the most dominant conceptual framework for PYD in general socio-educational literature, Côté and Gilbert (2009) advocated a more sport-specific *4Cs* framework (competence, confidence, connectedness, and character). Côté et al. (2010) found that when the *5Cs* was applied to the sport setting, the Caring/Compassion subfactor in Lerner's *5C* model was more appropriately collapsed into the concept of Character in the *4Cs*. The *4Cs* model is therefore a sport-specific adaptation of the *5Cs* model which was derived from general youth development literature. This specification of *4Cs* encompasses distinct but related constructs of PYD and was based on extensive review of literature in empirical sport development (Côté & Gilbert, 2009; Vierimaa et al., 2012). A detailed description of each of the *Cs* in the *4Cs* model was presented in section 2.2.2 of

chapter 2. The 4Cs model is currently a leading framework for researching PYD in sport (Erickson & Côté, 2016; Vierimaa et al., 2012; Vierimaa et al., 2018), specifically in its adoption as a universal standard to evaluate coaching effectiveness in improving athlete outcomes (Côté & Gilbert, 2009; Erickson & Côté, 2016). However, these constructs have been mostly examined in isolation instead of considering them together as a holistic measurement of PYD outcomes (e.g., Holt, 2016; Vierimaa et al., 2012). MacDonald & McIsaac (2016) highlighted that a lack of consistent measurement approach in sport PYD can be problematic as different measures may define similar constructs differently. This could lead to complicated explanations of the constructs and inconsistent results in studies when different instruments are adopted. The present study attempts to address this issue by examining both the specific and hierarchical dimensions of the 4Cs PYD framework. In other words, if the PYD instrument is explicitly designed to tap on multiple specific “C” constructs, do they also integrate well as a single overarching construct.

3.1.1 PYD toolkit

To examine the effectiveness of youth athletes’ developmental outcomes and programmes, Vierimaa et al. (2012) proposed the *PYD toolkit* as an integrated measurement framework that assessed four distinct but related areas of development: competence, confidence, connectedness, and character. A detailed description of the 4Cs framework was presented in Chapter 2. Briefly, competence refers to the level of athletic ability in terms of technical, tactical and physical skills (Martens, 2004); confidence refers to individuals’ belief regarding their ability to be successful in sport (Vealey, 1986); connectedness refers to the quality of relationships between athletes and coaches in the sport environment (Vierimaa et al., 2012); and character refers to the display of prosocial and avoidance of

antisocial behaviours (Vierimaa et al., 2012). In recent years, a handful of studies have adopted the PYD toolkit to examine correlates of PYD in terms of 4Cs. For example, using cluster analysis, Erickson and Côté (2016) grouped athletes according to their summed 4Cs scores and found that athletes with higher 4Cs scores were those who experienced higher frequency of interaction with their coach regarding matters beyond sport performance. This supports studies advocating that positive relationship with adults has a strong influence on youth development (Petitpas et al., 2008). In a similar study, Vierimaa et al. (2018) also performed cluster analysis using individual 4C subscale scores of youth athletes and found that athletes in the high 'C' group (confidence, connection and character) engaged in more frequent communication with their coaches, which is pivotal to athletes' overall sport and emotional development (Buning & Thompson, 2015). Allan and Côté (2016) adopted the PYD toolkit to examine the impact of coaches' emotion behaviours on youth development. Unlike the studies by Vierimaa et al. (2018) and Erickson and Côté (2016), the authors analysed the correlation between coaches' behaviour with scores on individual Cs rather than a combined score. While these studies provide some early evidence to support the utility of the PYD toolkit for assessing the influence of coaching behaviours and related constructs on PYD outcomes, the validity of the PYD toolkit that remains to be established.

Firstly, there was a general assumption that the instrument as a collective whole (i.e., of the 4Cs) is valid solely because it was made up of individual scales (for each C) that have been previously validated. Despite the 4Cs being adopted as a multidimensional construct, assumptions of the instrument's validity is based on prior psychometric validation of individual scales. Indeed, all three studies only reported internal consistencies

of the individual scales and did not perform a validation that integrates all four Cs into a single measurement construct. Secondly, prior validation of the individual scales in the PYD toolkit adopted conventional confirmatory factor analysis (CFA), that may not be suitable for multidimensional constructs like the 4Cs. A detailed discussion of how conventional CFA might be less appropriate than contemporary validation methods in validating multidimensional constructs is presented in the next section.

In sum, due to the recency of the PYD toolkit and the reliance its validity on CFA, its psychometric integrity is yet to be established using robust multivariate statistical procedures that correctly accommodate the multidimensionality of PYD.

3.1.2 Contemporary approaches in the validation of multidimensional constructs

A fundamental limitation of multidimensional psychosocial construct validation studies is the assumption that subscales are unidimensional, and items representing each subscale are independent and do not covary (or cross-load) significantly with items in other subscales. Although conventional CFA remains the gold standard for validating multi-item measurement constructs, its restriction of cross-loadings between indicators and non-target factors to zero may be too restrictive to assess the complexity of socio-educational constructs that are often conceptually related and multidimensional in nature (Marsh et al., 2009). According to Morin and colleagues, CFA is unable to address two important sources of construct relevant psychometric multidimensionality where instruments often contain items related to more than one source of true-score variance: 1) the fallibility of indicators (i.e., the tendency of indicators to have some degree of valid association with other non-target factors); and 2) the concurrent existence of a general superordinate construct relative to specific subfactors (Morin, Aren, & Marsh, 2016). These issues seemed to be better

addressed by other analyses such as exploratory structural equation (ESEM) and bifactor modelling. While ESEM attends to the first issue – by allowing cross-loadings to be specified across partially overlapping constructs (i.e., items represent more than one domain), bifactor modelling addresses the second issue – whereby items are expected to be associated with a global construct as well as to unique sub-factors to which they represent. In their seminal empirical study, Morin, Marsh, and Nagengast (2013) proposed the integrated bifactor ESEM (BESEM) psychometric framework as an alternative and more flexible representation of complex multidimensional instruments that incorporates both conceptually-adjacent (ESEM) and hierarchical-ordered (bifactor) constructs within the same model.

The overly restrictive assumption imposed by conventional CFA (e.g., zero cross-loadings) may explain why past studies examining multidimensional constructs often reported unsatisfactory results due to poor model fit, inflated factor correlations and non-invariance (Marsh et al., 2009; Morin et al., 2016). Marsh et al. (2010) re-examined the Big Five factor structure and found that ESEM overcame problems of poor fit observed in previous studies that used conventional CFA approaches. They concluded that “ESEM fits the data better and results in substantially more differentiated (less correlated) factors” (p. 471), consistent with theory. In particular, when Chen and colleagues (2018) re-examined the psychometric properties of the multidimensional 5Cs construct, their results confirmed those of Marsh and colleagues (2010) that acceptable model fit was achieved only when items were allowed to covary across subscales. Moreover, to accommodate for high correlations typical among multidimensional subfactors, the authors recommended that a priori correlated uniqueness should be included in models - a consistent practice in current

empirical scholarship. In ESEM, all “non-target” factor loadings and residual correlations are freely estimated to be as close to zero as statistically possible. The cross-loading of items on non-target factors addresses the fallible nature of manifest items typically neglected in conventional CFA analyses (Morin et al., 2016). Accommodating for small cross-loadings in the model also increases discriminant validity as inter-item correlations, across different factors, are not required to go through their pre-specified latent factors, resulting in less inflated inter-factor correlations that are closer to theoretical expectations (Asparouhov & Muthén, 2009).

Additionally, in the presence of higher order factors, higher-order models assume that the relation between indicators and higher-order factors is completely mediated by first-order factors and that higher ordered factors have no direct relation with the indicators (McAbee, Oswald, & Connelly, 2014). This had been criticized to be overly restrictive may not hold in research settings. This may also explain why higher order models often fail to meet minimal requirements of adequate model fit (Morin et al., 2016; Reise, 2012). On the other hand, the co-existence of specific and global constructs calls for a bifactor representation that provides a more flexible alternative to higher-order factors. Indeed, there is increasing discussion among scholars that while higher-order models are more parsimonious, and therefore more preferred, model selection needs to more closely examine parameter estimates (i.e., size of factor loadings, factor correlations) and theoretical meaningfulness of factors in the selected model (Morin et al., 2016; Morin et al., 2018; Sellbom & Tellegen, 2019). Bifactor models have been well-established in studies on psychosocial multi-faceted constructs such as intelligence (Gignac & Watkins, 2013), it has

been underutilised in the fields of sport, exercise and performance psychology (Myers, Martin, Ntoumanis, Celimli, & Bartholomew, 2014).

3.1.3 The present study

The purpose of study 1 was to address the first two research questions in this thesis:

RQ1: To what extent does the 4Cs PYD toolkit reliably measure the constructs of confidence, competence, connectedness and character among Secondary school athletes in Singapore?

RQ2: How valid and reliable is the PYD toolkit in assessing the 4Cs among Secondary school athletes in Singapore, as a global measure of PYD that is concurrently represented by four sufficiently distinct constructs?

A series of latent factor models were examined to investigate the structural validity of the instrument starting first with the most restricted specification (i.e., a unidimensional factor structure) before proceeding towards alternative multidimensional models of ESEM and bifactor proposed in the recent methodological literature (Morin et al., 2016).

Specifically, the bifactor-exploratory structural equation modelling framework supports the co-existence of specific Cs and a global PYD factor. The present study will provide clarity on the measurement and theoretical validities of the PYD toolkit and therein the appropriateness of it as an assessment tool for youth sport programmes in Singapore.

3.2 Methods

3.2.1 Participants

A sample of 510 student athletes (46% female) aged between 14 and 17 years old ($M = 14.79$ years; $SD = 1.04$) were recruited through convenience sampling from a range of sport teams in Singapore. These teams needed to satisfy two selection criteria: 1) competed regularly at annual national level competitions, and 2) athletes belonging to the same sport team for at least a year to ensure familiarity with the training programme and team dynamics. Seven schools with varied profiles were identified and email contact was established with the Head of Departments for Physical Education. Twenty-four sport teams participated in the study: badminton ($n = 2$), basketball ($n = 4$), floorball ($n = 2$), netball ($n = 6$), rugby ($n = 1$), soccer ($n = 4$), tchoukball ($n = 1$), and volleyball ($n = 4$). Consistent with current instrumentation of the *Sport Competence Inventory* (Vierimaa et al., 2012), coaches ($n = 24$) of each sport team was invited to rate the competence of athletes in their team. This study was approved by Nanyang Technological University's ethical review board and parental and informed consent were obtained from all participants.

3.2.2 Measures

This study adopted the PYD toolkit developed by Vierimaa and colleagues (2012) to measure the 4Cs of PYD (i.e., competence, confidence, connectedness, character). While validation studies of the instrument as a whole is limited, published studies examining individual Cs typically reported Cronbach's α values ranging from .78 to .96. Questionnaire items of the PYD toolkit and descriptive statistics of the items and subscales (i.e., means, standard deviation, Cronbach's α) are shown in Appendix A.

Competence. This was represented by two subscales of perceived competence (i.e., student athlete-rated) and observed competence (coach-rated). This approach allows a triangulated perception of each athlete's abilities which often produces a more accurate and objective representation of athletes' competence (Dirks, Treat, & Weersing, 2007). Each subscale consisted of three identical items that assessed athletes' technical skills, tactical skills, and physical skills (Sport Competence Inventory; Vierimaa et al., 2012). Each item was rated by both athletes and coaches separately on a five-point Likert scale ranging from 1 = 'Not at all competent' to 5 = 'Extremely competent'.

Confidence. This was a single scale factor composed of five items that followed a four-point Likert scale with responses ranging from 1 = 'Not at all' to 4 = 'Very much so'. It is measured using the self-confidence subscale of the Self-Confidence Inventory from the Revised Competitive State Anxiety-2 (CSAI-2R: Cox, Martens, & Russel, 2003) survey. The original question stem "indicate how you feel right now" was revised to "indicate how you generally feel" so as to assess confidence as a general sport trait (Vierimaa et al., 2012). This modified subscale has been validated with two separate groups of athletes and deemed suitable for use in the context of sport (Cox et al., 2003).

Connectedness. This was measured by 11 items on the Coach-Athlete Relationship Questionnaire (CART-Q: Jowett & Ntoumanis, 2004), with three subscales of cognitive (three items), affective (four items) and behaviour (four items). Items were rated on a seven-point Likert scale ranging from 1 = 'Not at all' to 7 = 'Extremely' (e.g., 'I trust my coach').

Character. This was measured by the Prosocial and Antisocial Behaviour in Sport Scale (PABSS: Kavussanu & Boardley, 2009). The questionnaire consists of 20 items

scored on a five-point Likert scale ranging from 1 = *Never* to 5 = *Very often*. It measured the frequency of athletes' display of prosocial (e.g., 'encouraged a teammate') and antisocial (e.g., 'criticized an opponent') behaviours. It is made up of four subscales representing prosocial behaviour towards teammates (four items) or opponents (three items), antisocial behaviour towards teammates (five items) or opponents (eight items).

3.2.3 Analytical Strategy

The analyses were performed using Mplus version 7.31 (Muthén & Muthén, 2015), with robust maximum likelihood estimator implemented to adjust for biased standard errors that may result from non-normality. This study focused on the application of emerging advances in latent variable methods to examine and validate the underlying factor structure(s) of the 4Cs in the sport context, namely, competence, confidence, connectedness and character. Figure 2 illustrate the factorial structure of each individual C.

The analysis procedure was performed in a manner to attend to the two sources of construct relevant psychometric multidimensionality. Firstly, to account for the existence of a general superordinate construct relative to specific subfactors, higher-order CFA (HCFA) and higher-order ESEM (HESEM) were also explored alongside bifactor CFA (BCFA) and BESEM. The six models are presented in incremental complexity (i.e., CFA-HCFA-BCFA-ESEM-HESEM-BESEM) and statistical fit indices are compared to evaluate model fit. Secondly, to examine the fallibility of indicators (i.e., the tendency of indicators to have some degree of valid association with other non-target factors, parameter estimates and factor correlations of models are examined. I followed Morin and colleagues' (2016) recommendation to contrast the Independent Clusters Model of Confirmatory Factor

Analysis (ICM-CFA) with the first-order ESEM model. This is followed by incremental comparisons of relevant higher-order models (i.e., HESEM and BESEM).

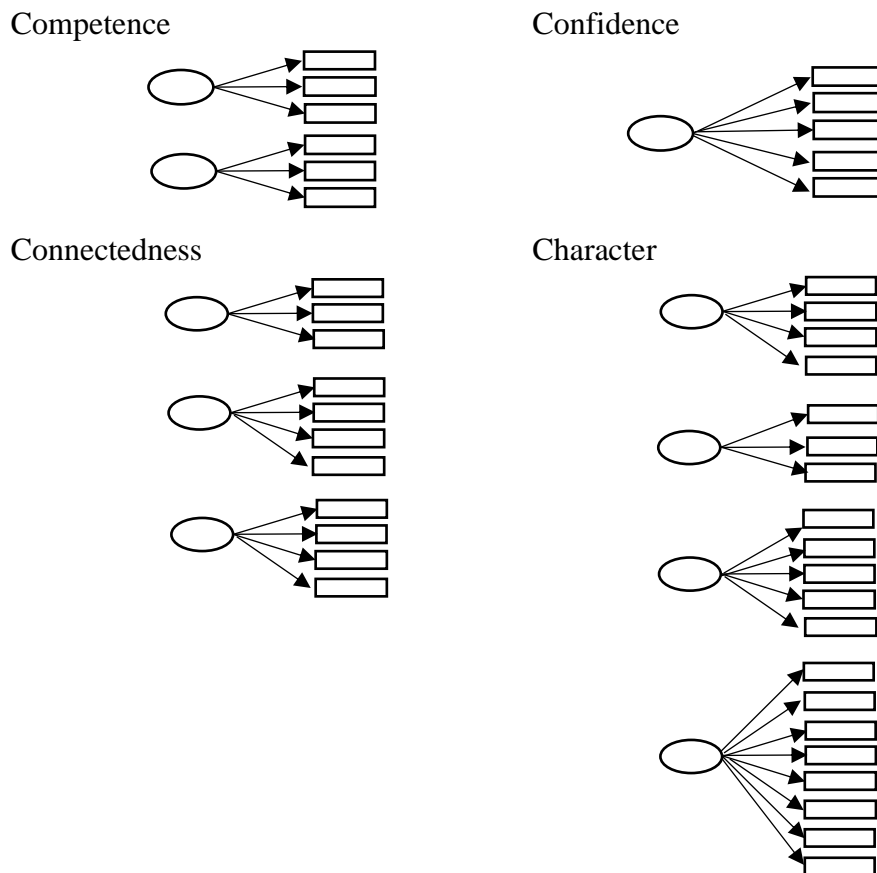


Figure 2. Graphical representation of ICM-CFA models for competence, confidence, connectedness, and character.

Alternative models to address the existence of a general superordinate construct.

To explain the difference in factor structure among the six latent models the discussion of the specifications below used connectedness, one of the Cs, as an example. This is supplemented by a pictorial illustration in Figure 3. In the CFA models (i.e., ICM-CFA, HCFA, BCFA), all items were specified to load only on its intended factor. With regards to models that contain multiple factors, item cross-loadings were not allowed. For ICM-CFA, arrows move from first-order factors to respective indicators (i.e., load on indicators), suggesting that they account for the covariance of the groups of indicators. All items within

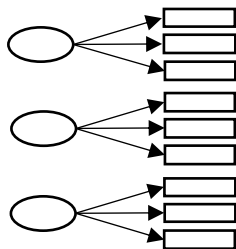
a cluster of factors have zero cross-loadings with other factors except within the factor to which they belong. Figure 3 illustrates the starting ICM-CFA for competence, confidence, connectedness and character. Notably, since confidence is a single-factor scale, only the CFA model will be tested. For the other Cs with multidimensional factor structures, higher-order (i.e., HCFA, HESEM) and bifactor models will be tested.

In HCFA, individual Cs represent third- and second-order factors to which first-order factors load on. The higher-order factor serves as an independent variable that accounts for the covariance of first-order factors (Reise, 2012). The BCFA model is an extension of the ICM-CFA model where items load onto their respective first-order factors and concurrently onto a general factor. The general and specific factors are interpreted as orthogonal to each other (Chen, West, & Sousa, 2006; Jennrich & Bentler, 2012).

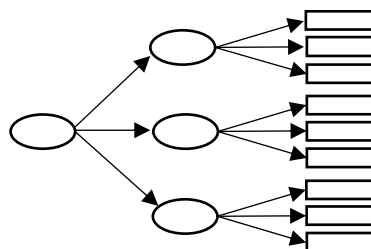
In the ESEM model, a confirmatory approach with oblique target rotation was implemented. Similar to the ICM-CFA model, target indicators (e.g. Conn1 to Conn3) load on respective factors (e.g., cognitive subscale), but ‘non-target’ indicator (e.g., Conn4 to Conn 11) are allowed to load on the same factor with loadings estimated to be as close to zero as possible. According to recent applications of the HESEM and BESEM, the specification of higher-order factors (given substantive theoretical justifications) reduces the likelihood that cross-loadings are inflated (Morin et al., 2016) because higher-order factors account for similarities among items that would otherwise be subsumed into cross-loadings. Drawing on the work of recent advances in multivariate measurement of hierarchical and multidimensional instruments (e.g., Morin et al., 2016), two additional models were examined: HESEM and BESEM. The HESEM model was constructed using an ESEM-within-CFA model (Morin et al., 2013). Extending from ESEM model (i.e., each

item is specified to load onto a targeted first-order factor, while all first-order factors (e.g., ‘cognitive’, ‘affective’, ‘behaviour’) load onto second-order factor (e.g., connectedness). However, to circumvent model complexity, within-factor item factor loadings and cross-loadings were fixed to the estimated values obtained from the prior ESEM analysis. On the other hand, the BESEM model combines the ESEM with a bifactor target rotation (i.e., B-ESEM), thus, making it possible to test a priori hypotheses for confirmatory purposes (Asparouhov & Muthén, 2009). Specifically, (e.g., Conn1 to Conn11) loaded onto a general factor (e.g., connectedness), whereas the items that loaded on the specific subscales (e.g., cognitive, affective, behavioural) were defined using the same target and non-target factor loading parameters derived from the previous ESEM solution (Morin et al., 2016).

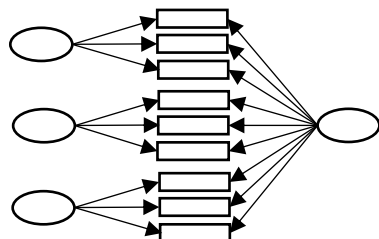
A) CFA



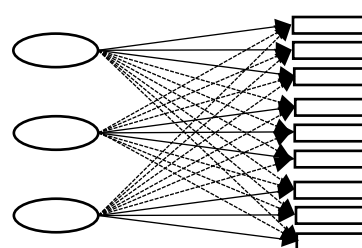
B) HCFA



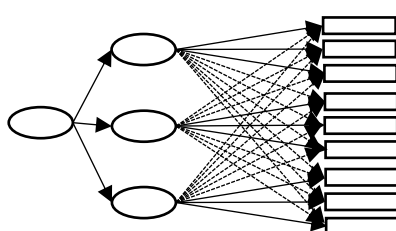
C) BCFA



D) ESEM



E) HESEM



F) BESEM

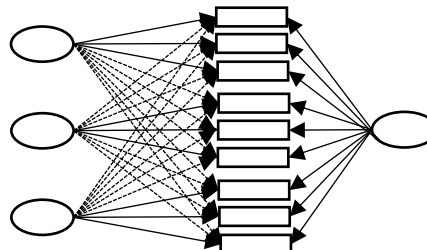


Figure 3. Graphical representation of different model specification. This specification closely represents the three-factor model of Connectedness.

Addressing the fallibility of indicators. The comparison between ICM-CFA and first-order ESEM investigates if allowing cross-loading of items on non-target factors reveal changes in factor correlations and model fit statistics. The ESEM model is preferred if factor loadings remain well-defined and factor correlations are reduced, accompanied by improve model fit. The retained model is then compared with the hierarchical counterparts (i.e., higher order, bifactor). This was done to examine if the presence of a hierarchical factor better accounts for the variance among items and whether a higher-order or bifactor representation more accurately encompass the hierarchical factor.

In addition, given the ubiquitous phenomenon of method or measurement error in complex latent variable models (Cole, Ciesla, & Steiger, 2007), theoretically justified correlated uniqueness (CU) was implemented by examining the modification index. A review by Tóth-Király, Bőthe, and Orosz (2017) showed that with three latent factors, at least two CUs would be expected to achieve satisfactory model fit. With 10 factors in this study's ESEM model, it is possible that at least six correlated residuals could be included *Reliability*. To assess model-based reliability, four omega coefficients were examined: omega (ω), omega subscale (ω_S), omega hierarchical (ω_H), and omega hierarchical subscale (ω_{HS}) (Rodriguez et al., 2016). Omega coefficients were used as they are model-based estimates of reliability that provide better controls for measurement error and take into account the unique contributions of each item to the corresponding factor. Omega is more appropriate to assess the internal consistency of multidimensional instruments as it considers the different contributions of subfactors towards the global multidimensional construct (Rodriguez et al., 2016). This is opposed to Cronbach's alpha that assumes

unidimensionality where all items in a scale are equally related to the variable. According to Peters (2014), it is unrealistic to assume that subfactors in multidimensional constructs have equal contributions to the overarching factor given their difference in theoretical definitions. In fact, studies have found this assumption to be often violated in the 'real world' (Dunn, Baguley, & Brunsten, 2013; Sijtsma, 2009). Model-based estimates like Omega are therefore more suitable to measure the reliability of multidimensional constructs like the 4Cs. ω and ω_S assessed the reliability of the total scale and subscales, respectively. ω_H assessed the portion of the variance that could be accounted for by the general factor, while ω_{HS} indicated the viability of subscales after controlling the variance due to the general factor. Dividing ω_H by ω would produce the reliable variance in the scores that is accounted for by the general factor. ω_H values need to be at least .50, with .75 or above supporting the use of a total score (Reise, Bonifay & Haviland, 2013).

Measurement invariance. Upon establishing satisfactory model fit, measurement invariance of the final model across gender was examined by putting it through a series of increasingly restrictive invariance tests. Studies examining measurement invariance typically consider invariance factors of age and gender subgroups. In this study, as the student athletes are of a similar age category (i.e., between 14 to 16 years old), it is less meaningful to break the age of the participants into sub-groups for analysis. Therefore, only gender was examined for measurement invariance. More importantly, gender is also among the most widely investigated variable in sport and motivation research due to known differences in the physical and cognitive aptitude. Configural invariance was first tested by modelling similar specifications for both genders without adding any equality constraints. Weak measurement invariance was then tested by constraining all factor loadings (and

cross-loadings) to be invariant across the two genders. Next, strong measurement invariance was tested by further constraining item intercepts such that they were invariant across the groups. Extending the previous test, strict measurement invariance was tested by constraining item uniquenesses to be invariant across gender groups.

3.2.4 Model Evaluation and Comparison

Model fit was assessed with conventional goodness-of-fit indices that included the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA) with 90% confidence interval. CFI and TLI values close to .95 (Hu & Bentler, 1999), and RMSEA values close to or below .06 (Morin et al., 2016) reflect acceptable model fit. To compare the incremental models, recommended guidelines for changes in goodness-of-fit indices were adopted (Cheung & Rensvold, 2002). The more restrictive model is preferred when the change in CFI (Δ CFI) is greater than .01 or RMSEA (Δ RMSEA) greater than .015. However, as RMSEA is sensitive to small sample size (or small sample-parameter ratio; which is the case for this study), CFI took precedence when both indices did not agree. In addition, I considered the Akaike Information Criteria (AIC), Bayesian Information Criterion (BIC), and sample size adjusted BIC (ABIC). While the absolute value of information criteria is not typically used to evaluate model fit, lower values indicate a better fitting model.

To determine the best fitting model, fit indices and information criteria should be understood as rough guidelines and model selection should consult theoretical expectations and close examination of parameter estimates (e.g., standardized factor loadings, cross-loadings and correlations). For instance, ESEM solutions should be preferred over CFA models if factor correlations are significantly reduced and model fit is significantly

improved (Morin et al., 2016). In addition, despite higher-order models being more parsimonious, they are inferior to bifactor models when items load directly on both global and specific dimensions (e.g., Chen et al., 2006). According to Morin and colleagues (2018), the bifactor model should be preferred if both general and specific factor exhibit comparatively salient factor loadings ($|\lambda| > .30$) and the presence of the bifactor reduce cross loading across subscale factors.

3.3 Results

To select the best-fitting model, competing models were contrasted in incremental complexity as suggested by Morin et al. (2016). To uphold parsimony of measurement models, the more complex model is only selected if it superior to the more parsimonious model in terms of model fit, parameter estimates and theoretical meaningfulness of the model. This section summarized the fit of each measurement model in order of incremental complexity. This was done for each 4Cs subscale followed by a more comprehensive summary of the fully integrated 4C model.

3.3.1 Validation of Individual 4Cs Subscales

All first-order correlated ICM-CFA models fitted the data acceptably (CFI = .926-.997; TLI = .914-.985; RMSEA = .079-.028). Table 3.1 presents the model fit statistics for competing models of each individual 4Cs subscale. The ICM-CFA model best fitted that data. It is represented by two first-order subscales which comprised feedback from coaches and teachers on athletes' competence. The ICM-CFA model also fitted the confidence subscale well. No other models were tested as confidence was represented by a single factor. For connectedness, the best-fitting model was the bifactor ESEM model. It displayed the best results on fit indices and drastically reduced the factor loadings of items

from the ESEM model: cognitive ($|\lambda| = .633-.731$ to $.432$ to $.514$); affective ($|\lambda| = .599-.765$ to $.349-.515$); behaviour ($|\lambda| = .379-.401$ to non-significant). Moreover, there were strong loadings of items on the general connectedness factor ($|\lambda| = .681-.915$).

Table 3.1

Goodness-of-fit Statistics and Information Criteria for 4Cs Factors

Model	X² (df)	CFI	TLI	RMSEA (90%CI)	AIC	BIC	ABIC
<i>Competence</i>							
CFA	11.103 (8)	.997	.995	.028 (.000, .063)	6754.28	6834.74	6774.43
HCFA							
BCFA	6.755 (3)	.997	.984	.050 (.000, .100)	6761.36	6862.98	6786.80
ESEM	8.792 (4)	.996	.984	.048 (.000, .093)	6759.58	6856.97	6783.96
HESEM	4.396 (2)	.998	.984	.048 (.000, .111)	6763.58	6869.44	6790.09
BESEM							
<i>Confidence</i>							
CFA	20.855 (5)	.985	.970	.079 (.046, .115)	4423.30	4486.82	4439.20
<i>Connectedness</i>							
CFA	162.894 (41)	.955	.940	.076 (.064, .089)	15046.04	15198.48	15084.21
HCFA							
BCFA	129.042 (33)	.965	.941	.076 (.062, .089)	14972.73	15159.05	15019.38
ESEM	78.601 (24)	.980	.954	.067 (.051, .084)	14912.45	15136.87	14968.64
HESEM							
BESEM	55.246 (17)	.986	.955	.066 (.047, .086)	14860.77	15114.83	14924.38
<i>Character</i>							
CFA	361.686 (164)	.926	.914	.049 (.042, .055)	24063.03	24342.50	24133.00
HCFA							
BCFA	290.67 (149)	.947	.932	.043 (.036, .051)	23977.27	24320.26	24063.15
ESEM	163.472 (116)	.982	.971	.028 (.017, .038)	23914.01	24396.73	24034.88
HESEM	170.099 (199)	.981	.969	.029 (.018, .038)	23914.79	24384.81	24032.48
BESEM	93.972 (100)	1.000	1.004	.000 (.000, .020)	23859.41	24409.89	23997.25

Note. CFA = Confirmatory factor analysis; H = Hierarchical model; B = Bifactor model; ESEM = Exploratory structural equation modelling; df = Degrees of freedom; CFI = Comparative fit index; TLI = Tucker-Lewis index; RMSEA = Root mean square error of approximation; CI = Confidence interval; SRMR = AIC = Akaike information criterion; BIC = Bayesian information criterion; ABIC = Sample size adjusted BIC; ESEM were estimated with target rotation.

It is notable in this subscale I added one a priori correlated uniqueness. Cnn6: “I respect my coach” from the affective subscale of connectedness, & Cnn10: “When I am coached by my coach, I am ready to do my best” from the behaviour subscale of connectedness. It is possible that student athlete’s perceived respect for their coach influence how willing there are to put in effort into their training. In a recent study, Gorgulu (2019) found that affective connectedness, which encompasses respect for coach, mediated the relationship between sport coaches’ transformational leadership and additional effort expended by athletes. There is therefore a meaningful association between respect for coach and effort from the perspective of student athletes and allowing these two items to correlate is theoretically justified. For the character subscale, the four-factor ESEM model fitted the data best. It showed superior fit than the ICM-CFA model ($\Delta CFI = .056$). Despite superior model fit statistics, a close evaluation of the factor loadings and factor correlations did not support acceptability of the HESEM, BESEM and bifactor models. Specifically, the HESEM model did not reduce factor correlations among the subscales, and many of the factor loadings of the bifactor model became non-significant (all items in ‘antisocial behaviour towards opponents’, general factor).

3.3.2 Validation of the Integrated 4Cs Framework

To identify the best fitting model for the integrated 4Cs framework, the model comparison sequence suggested by Morin and colleagues (2016) was adopted. This section describes in detail the comparisons made between the competing models. In general, the BESEM model was the best fitting model due to its superior model fit based on the predetermined criteria (i.e., goodness-of-fit, factor correlation, theoretical appropriateness). Table 3.2 displays a summary of the goodness-of-fit statistics for the competing models.

Table 3.2

Goodness-of-fit Statistics and Information Criteria for Integrated 4Cs Framework.

Model	X^2 (df)	CFI	TLI	RMSEA (90%CI)	AIC	BIC	ABIC
CFA	1328.852 (774)	.944	.938	.037 (.034, .041)	49915.085	50639.169	50096.391
HCFA	1497.066 (808)	.930	.926	.041 (.038, .044)	50036.478	50616.593	50181.735
BCFA	1362.616 (770)	.940	.933	.039 (.035, .042)	49941.011	50682.033	50126.559
ESEM	737.188 (486)	.975	.955	.032 (.027, .036)	49777.381	51720.975	50264.045
HESEM	805.936 (798)	.999	.999	.004 (.000, .014)	49286.264	49908.722	49442.123
BESEM	767.744 (760)	.999	.999	.004 (.000, .014)	49304.882	50088.248	49501.032

Note. CFA = Confirmatory factor analysis; H = Hierarchical model; B = Bifactor model; ESEM = Exploratory structural equation modelling; df = Degrees of freedom; CFI = Comparative fit index; TLI = Tucker-Lewis index; RMSEA = Root mean square error of approximation; CI = Confidence interval; SRMR = AIC = Akaike information criterion; BIC = Bayesian information criterion; ABIC = Sample size adjusted BIC; ESEM were estimated with target rotation.

CFA vs ESEM. The ESEM solution produced a significantly superior fit to the data (CFI = .975; TLI = .955; RMSEA = .032) compared to the ICM-CFA model solutions (CFI = .944; TLI = .938; RMSEA = .037). Factor correlations among the 4Cs were statistically significant ($|r| = .272-.721$; $M = .504$). Observation of the parameter estimates found that 26 out of 37 factor loadings in the ICM-CFA model were higher ($|\lambda| = .422-.915$, $M = .743$) than their corresponding target factor loadings in ESEM model ($|\lambda| = .212-.842$, $M = .616$). The ESEM solution further reflected 36 statistically significant non-target cross-loadings, of which 15 were non-trivial ($|\lambda| \geq .100$). The factor loadings for both models and cross-loadings for ESEM model are found in Appendix B. These results support the psychometric multidimensionality of the 4Cs on the existence of item cross-loadings on

non-target factors. Restricting cross-loadings to zero resulted in inflated factor loadings in the ICM-CFA solutions. Moreover, factor correlations in the ICM-CFA solutions ($|r| = .005-.898$; $M = .275$) were higher than those reflected in the ESEM solutions ($|r| = .012-.748$; $M = .219$), reflecting how the prohibition of CFA solutions can also result in inflated factor correlations (see Table 3.3). The superior fit and reduction in factor correlation estimates in the ESEM model relative to its ICM-CFA counterpart provides strong justification to retain the former (Morin et al., 2016).

HESEM vs BESEM. Retaining the ESEM solutions, hierarchical models were fitted on the data to test for substantive multidimensionality of the 4Cs. It was found that the two competing models had comparable fit to the data: HESEM (CFI = .999, TLI = .999, RMSEA = .004); BESEM (CFI = .999, TLI = .999, RMSEA = .004). These two models displayed excellent fit to the data and had the lowest AIC, BIC and ABIC values, signalling the presence of a substantive multidimensionality where the 4Cs follow a hierarchical structure. The factor loadings for the items under the HESEM model is presented in Appendix C while Tables 3.4 displayed the factor loadings and uniqueness of items under the BESEM model. Despite being less parsimonious, the BESEM model did not produce worse fit than the more restrictive H-ESEM model ($\Delta\text{CFI} = .000$; $\Delta\text{RMSEA} = .000$). Target loadings in the HESEM model ($|\lambda| = .191-.937$, $M = .688$) were relatively higher than those for corresponding specific factors in the BESEM model ($|\lambda| = .197-.906$, $M = .609$). Cross-loadings were also smaller in the BESEM solution as compared to the HESEM in general.

Table 3.3

Means, Standard Deviation and Correlations of 4Cs Factors from CFA and ESEM Solutions (CFA Values above Diagonal).

	M (SD)	1.CmP	2.CmO	3.Cf	4.CnC	5.CnA	6.CnB	7.ProT	8.ProO	9.AntiT	10.AntiO
1	9.923 (1.917)		.457**	.635**	.397**	.265**	.341**	.367**	.329**	.064	.073
2	9.350 (2.784)	.413**		.276**	.365**	.208**	.242**	.236**	.100*	.045	.008
3	13.180 (2.807)	.551**	.244**		.455**	.301**	.377**	.303**	.182**	.005	.140*
4	13.976 (4.137)	.302**	.313**	.371**		.818**	.818**	.361**	.174**	-.077	-.049
5	22.644 (4.945)	.192**	.133*	.253**	.667**		.898**	.326**	.143**	-.148*	-.104
6	21.699 (4.939)	.228**	.166**	.258**	.670**	.748**		.339**	.189**	-.145**	-.056**
7	15.316 (2.883)	.311**	.201**	.263**	.278**	.268**	.297**		.449**	-.106*	.022
8	7.820 (2.794)	.280**	.067	.122*	.113*	.109*	.108*	.363**		.128*	.253**
9	8.880 (3.241)	.037	.054	.016	-.012	-.092	-.071	-.037	.101*		.599**
10	12.960 (5.027)	.043	.018	.122*	-.064	-.113*	-.050	.029	.210**	.502**	

Note: CmP = Perceived competence; CmO = Observed competence; Cf = Confidence; CnC = Cognitive connectedness; CnA = Affective connectedness; CnB = Behavior connectedness; ProT = Prosocial attitudes towards teammates; ProO = Prosocial attitudes toward opponents; AntiT = Antisocial attitudes towards teammates; AntiO = Antisocial attitudes towards opponents. * p < .05. ** p < .01.

These two findings suggest that some of the variance in HESEM might be better explained by an overarching general factor in the BESEM model. In addition, factor correlations among the 4Cs were moderate to high in the HESEM ($|r| = .314-.672$); $M = .480$). On the other hand, restricting correlations to zero among the 4Cs in BESEM did not produce a significantly worse fit. This suggested that the correlations expressed in the HESEM were inflated and can be better accounted for by an overarching general factor provided in the BESEM solutions. Given these considerations, the BESEM model was selected to be the best fitting model to the data in this study.

BESEM parameters. Retaining the BESEM model, item loadings on the general factor were examined. Apart from items belonging to the antisocial factor, all items loadings on the general PYD factor were statistically significant and non-trivial ($|\lambda| = .158-.615$, $M = .403$). This supported the presence of a global PYD factor when items from the antisocial factor are excluded. Items from the specific factor of perceived competence ($|\lambda| = .532-.603$, $M = .564$) had the highest loadings, followed by confidence ($|\lambda| = .430 - .615$, $M = .531$). Other specific factors displayed moderate loadings on the general PYD factor: observed competence ($|\lambda| = .346-.359$, $M = .352$), cognitive connectedness ($|\lambda| = .484-.486$, $M = .485$), affective connectedness ($|\lambda| = .265-.364$, $M = .327$), cognitive connectedness ($|\lambda| = .324-.426$, $M = .385$), prosocial team ($|\lambda| = .301-.344$, $M = .328$), and prosocial opponent ($|\lambda| = .158 - .257$, $M = .222$). Items from antisocial team and antisocial opponent had non-significant loadings on the global PYD factor. Hence, with the exclusion of loadings from antisocial factor, loadings support a relatively well-defined global PYD factor.

Beyond the general PYD factor, all loadings on target specific factors ranged from moderate to high. Observed competence ($|\lambda| = .639-.831$, $M = .751$) produced the highest target loadings. Other factors showed moderate to high target loadings: cognitive connectedness ($|\lambda| = .584-.678$, $M = .641$), affective connectedness ($|\lambda| = .234-.835$, $M = .648$), behaviour connectedness ($|\lambda| = .542-.654$, $M = .597$), prosocial team ($|\lambda| = .531-.702$, $M = .624$), prosocial opponent ($|\lambda| = .491-.906$, $M = .653$), antisocial team ($|\lambda| = .433-.811$, $M = .618$), and antisocial opponent ($|\lambda| = .197-.835$, $M = .613$). Perceived competence ($|\lambda| = .386-.480$, $M = .444$) and confidence ($|\lambda| = .371-.569$, $M = .504$) had lower target loadings. Excluding items from perceived competence and confidence, target loadings of all other specific factors were higher than their loadings on the global factor, demonstrating that the internal structures of these specific factors were well-defined. It is notable that only cross-loadings from perceived competence and confidence became non-significant when the higher-order PYD factor was replaced by a global PYD factor, suggesting that the variance of these items may be better explained by the target and general factors in BESEM.

3.3.3 OMEGA coefficients

The omega coefficients for the general PYD factor ($\omega = .915$, $\omega_H = .613$) suggested that it explained significant proportion of the reliable variance ($\omega_H > .08$). Omega coefficients for subscales were relatively high ($\omega_S = .744 - .871$, $M = .82$), $\omega_{HS} .29 - .833$, $M = .61$) supporting their inclusion in the measurement model. These model-based coefficients therefore support the reliability of the bifactor ESEM model composed of a general PYD factor alongside subfactors.

Table 3.4

Standardised parameter estimates(λ) and uniqueness(δ) from BESEM of 4Cs.

Item	λ											δ
	CmP	CmO	Cf	Cn_C	Cn_A	Cn_B	Pro_T	Pro_O	Anti_T	Anti_O	PYD	
Cm1	.480**	.045**	.007	-.008**	.012**	-.015**	-.023**	.026**	-.045**	.041**	.557**	.445**
Cm2	.465**	.005**	.011	-.024**	.011**	.084**	.014**	-.005**	.085**	-.020**	.603**	.406**
Cm3	.386**	.010**	.066	.056**	-.065**	-.037**	.035**	.006**	-.001**	-.024**	.532**	.555**
Cm4	-.005	.831**	.001	.0130**	.020**	-.041**	-.012**	.047**	.026**	-.014**	.359**	.178**
Cm5	.027	.784**	-.016	-.033**	-.034**	.082**	.035**	.000	-.023**	-.019**	.353**	.245**
Cm6	.028	.639**	.020	.055**	.044**	-.057**	.004**	-.042**	-.017**	.001**	.346**	.458**
Cf1	.008	.001**	.565**	.051**	-.081**	.046**	.032**	-.017**	-.078**	.066**	.555**	.363**
Cf2	.066	.009**	.567**	.002**	-.089**	.108**	.003**	-.007**	-.030**	.012**	.615**	.289**
Cf3	.064	.017**	.569**	.004**	.060**	-.049**	-.087**	.003**	-.006**	.026**	.540**	.371**
Cf4	-.006	-.026**	.448**	-.027**	.065**	-.034**	.062**	.074**	.048**	-.051**	.515**	.516**
Cf5	.047	.022**	.373**	.036**	.076**	-.067**	.057**	-.042**	.076**	-.044**	.430**	.660**
Cn1	.068	.083**	-.003	.660**	-.025**	.102**	-.002**	.030**	-.006**	.000	.486**	.245**
Cn2	-.016	.026**	.020	.678**	.113**	.021**	.057**	.000	.015**	-.003**	.484**	.172**
Cn3	.029	-.014**	.048	.584**	.125**	.041**	.014**	-.009**	-.035**	.003**	.485**	.275**
Cn4	.032	.023**	-.014	.230**	.615**	.047**	-.019**	-.005**	.008**	-.027**	.364**	.203**
Cn5	-.031	.065**	.023	.052**	.835**	-.012**	-.043**	.021**	-.014**	.001**	.356**	.129**
Cn6	.025	-.029**	-.003	-.116**	.798**	.084**	.121**	-.035**	-.003**	.026**	.265**	.288**
Cn7	-.025	-.033**	-.001	.085**	.343**	.402**	.085**	-.014**	.003**	-.014**	.326**	.326**
Cn8	-.036	.091**	.046	.09**	-.025**	.638**	-.087**	.061**	-.062**	.030**	.426**	.190**
Cn9	-.013	.010**	.036	.033**	.113**	.654**	-.023**	.042**	.009**	-.041**	.413**	.157**
Cn10	.091	-.043**	.016	.074**	.125**	.553**	.128**	-.014**	.033**	.002**	.375**	.369**
Cn11	.145	-.016**	-.042	.095**	.108**	.542**	.046**	.011**	-.066**	-.008**	.324**	.381**
PT1	-.022	.002**	.006	.108**	.184**	.002**	.577**	.072**	-.013**	.044**	.344**	.507**

Table 3.4 (Continued)

Standardised parameter estimates(λ) and uniqueness(δ) from BESEM of 4Cs.

Item	λ										δ	
PT8	.009	.037**	-.007	-.010**	.105**	.019**	.685**	-.047**	-.051**	.027**	.325**	.440**
PT12	.049	-.026**	-.010	.044**	.119**	-.118**	.702**	.054**	-.031**	-.042**	.344**	.360**
PT15	-.009	.038**	.043	-.135**	-.049**	.054**	.531**	.048**	.001**	-.036**	.301**	.596**
PO4	.047	.060**	-.018	.048**	-.019**	.126**	.121**	.491**	.044**	-.033**	.252**	.625**
PO6	.016	.036**	-.015	-.050**	.050**	.072**	.036**	.561**	.007**	.107**	.158**	.617**
PO10	-.006	-.038**	.025	.008**	.099**	-.061**	-.002**	.906**	-.022**	.008**	.257**	.111**
AT3	-.023	-.055**	-.016	.080**	-.109**	.005**	-.003**	.021**	.519**	.013**	.006	.713**
AT7	.075	-.014**	.026	-.053**	-.044**	-.052**	-.058**	.066**	.723**	.049**	.033	.419**
AT11	-.007	-.015**	.000	-.006**	.053**	.040**	-.085**	.027**	.811**	-.026**	-.031	.360**
AT14	-.004	.046**	-.043	-.015**	-.032**	-.104**	.002**	.003**	.602**	.151**	-.073	.505**
AT18	.018	.074**	.021	-.012**	.028**	.032**	.078**	-.122**	.433**	.198**	.072	.664**
AO2	.024	-.003**	-.029	.093**	-.034**	.063**	.086**	-.051**	.401**	.197**	.073	.693**
AO5	-.014	-.001**	.034	-.011**	.034**	-.049**	.004**	.108**	.346**	.340**	.070	.454**
AO9	.022	-.048**	-.015	.064**	-.037**	-.025**	.009**	.110**	-.088**	.754**	.110	.604**
AO13	-.144	.055**	.079	-.016**	-.062**	.081**	.066**	-.05**	.158**	.605	.114	.461**
AO16	.065	-.006**	-.024	-.037**	.089**	-.008**	-.008**	-.035**	-.106**	.835	.028	.379**
AO17	-.056	-.011**	.033	.036**	-.025**	.038**	-.026**	-.020**	-.081**	.779	.082	.441**
AO19	.055	.030**	-.071	-.079**	-.098**	-.004**	-.069**	.042**	.040**	.652	-.083	.523**
AO20	.031	-.037**	.012	.008**	.035**	-.062**	.002**	-.017**	-.046**	.742	.081	.472**
ω (ω S)	.762	.872	.855	.846	.829	.804	.800	.744	.761	.841	.915	
ω H (ω HS)	.291	.714	.406	.538	.660	.568	.626	.667	.761	.834	.613	

Note: Note: Cm_P = Perceived Competence; Cm_O = Observed Competence; Cf = Confidence; Cn_C = Cognitive connectedness; Cn_A = Affective connectedness; Cn_B = Behaviour connectedness; Pro_T = Prosocial attitudes towards teammates; Pro_O = Prosocial attitudes toward opponents; Anti_T = Antisocial attitudes towards teammates; Anti_O = Antisocial attitudes towards opponents. Note: * p < .05, ** p < .01. Factor loadings of target items are in bold.

3.3.4 Measurement Invariance

Table 3.5 presented the goodness-of-fit statistics for each of the four invariance models for the respective 4Cs subscales.

Table 3.5

Results for Measurement Invariance Test of Individual Cs and Integrate 4Cs Framework.

Model	X^2 (df)	CFI	TLI	RMSEA (90%CI)	Model modification
<i>Competence</i>					
Configural	8.792 (4)	.996	.984	.048 (.000, .093)	^a
Weak	9.723 (8)	.999	.995	.029 (.000,0.082)	
Strong	23.427 (16)	.994	.988	.043 (.000, .077)	
Strict	62.236 (20)	.964	.946	.091 (.066, .117)	
<i>Confidence</i>					
Configural	16.856 (5)	.987	.973	.068 (.034, .105)	^a
Weak	20.692 (10)	.988	.976	.065 (.023, .104)	
Strong	22.826 (14)	.990	.986	.050 (.000, .085)	
Strict	24.573 (18)	.993	.992	.038 (.000, .072)	
<i>Connectedness</i>					
Configural	72.093 (24)	.982	.960	.063 (.046, .800)	^a Cnn6 W Cnn10
Weak	78.441 (47)	.989	.974	.051 (.030, .071)	^b
Strong	119.922 (71)	.983	.974	.052 (.035, .068)	^b
Strict	145.821 (79)	.977	.968	.058 (.043, .072)	^b
<i>Character</i>					
Configural	113.514*(101)	.995	.991	.016 (.000, .029)	^a
Weak	259.380*(202)	.975	.958	.0330 (.020, .0450)	^b
Strong	315.362*(261)	.977	.969	.029 (.014, .039)	^b
Strict	340.379*(276)	.972	.966	.030 (.018, .040)	^b
<i>Integrated 4Cs model</i>					
Configural	669.822 (455)	.978	.960	.03 (.025, .035)	^a
Weak	1342.667 (906)	.957	.922	.043 (.039, .048)	^b
	1665.281				^b
Strong	(1216)	.955	.940	.038 (.033, .043)	
Strict	1751.364 (1247)	.950	.934	.040 (.035, .044)	^b

Note. df = Degrees of freedom; CFI = Comparative fit index; TLI = Tucker-Lewis index; RMSEA = Root mean square error of approximation; CI = Confidence interval; CU = Correlated uniqueness. ^a Configural invariance results are derived from ESEM solutions. ^b All Weak invariance, Strong invariance, Strict invariance include model modifications from respective Male and Female ESEM.

Due to the complexity of the hierarchical and multidimensional 4Cs framework, measurement invariance tests were not admissible for the final BESEM model. Invariance tests on the ESEM model, which is foundational to the BESEM model, were conducted. The configural invariance model displayed excellent fit to the data (CFI = .978, TLI = .960; RMSEA = .016). When invariance constraints were progressively added to the factor loadings (weak invariance), items' intercepts (strong invariance), items' uniqueness (strict invariance), correlated uniquenesses, latent variances and covariances, and latent means, the integrated 4Cs framework maintained acceptable to good fit to the invariance models (CFI = .950-.957, TLI = .922-.940; RMSEA = .033-.043). Similar to the ESEM analysis of connectedness subscale, one correlated uniqueness was added (i.e., Cnn6: "I respect my coach" from the affective subscale of connectedness, & Cnn10: "When I am coached by my coach, I am ready to do my best" from the behaviour subscale of connectedness. Item A017 from the antisocial subscale (i.e., "Distracted an opponent on purpose") was also removed.

3.4 Discussion

In this study, I examined the psychometric multidimensionality of the PYD toolkit among youth athletes in the context of Singapore. Unlike the original PYD framework (Lerner et al., 2005), this toolkit was grounded in the concise 4Cs PYD framework in the sport context which was subsequently operationalized by Vierimaa et al. (2012). The validity of the 4C framework was evidenced by employing ESEM that better accommodates its multidimensional structure. It is notable that this has yet to be attempted in current literature in youth sport. Using BESEM, the findings of this study support the PYD toolkit

as an appropriate instrument to measure global positive development of youth athletes as well as more specific PYD indicators of competence, confidence, connectedness and character. An important contribution of this study is that it provides empirical evidence about the differential effects of each 4Cs on the overall PYD construct. Specifically, confidence exerted the strongest influence on the general sense of positive development among secondary school athletes.

3.4.1 Validity of the Bifactor Structure of 4Cs

To examine the structure of the 4Cs, the ICM-CFA model was first contrasted against the ESEM model and found that suppressing the cross-loadings (i.e., fixed to zero) resulted in poorer fit and inflated factor correlations in ICM-CFA solutions. This supported prior research findings that ESEM is superior to CFA in examining multidimensional constructs as it accounts for the fallible nature of items to be related to multiple similar factors (Chen et al., 2018; Geldhof et al., 2014; Lerner et al., 2005). The resultant cross-loadings among 4Cs items on non-target factors are expected given the conceptual relatedness among the Cs. For example, it was expected that individuals who are competent in their sport abilities (i.e., competence) may be more confident of themselves (i.e., confidence). This is evidenced by the observed correlations among the 4Cs factors (Table 3.3), agreeing with prior research that found relatively high correlations among the Cs in sport and non-sport settings (Miller & Siegel, 2017).

In addition, the BESEM model showed excellent fit to the data with parameter estimates that supported a well-defined internal structure of the multidimensional framework. This suggests that 1) psychometric multidimensionality (i.e., presence of cross-loadings due to conceptual related constructs), and 2) substantive multidimensionality exist

in the 4Cs framework. While both HESEM and BESEM models produced similar model fit according to fit indices, there were drastic changes to parametric estimates when comparing the two solutions. Specifically, when moving from the HESEM to the BESEM model, most target loadings on the specific factors were reduced and all cross-loadings from the factors of perceived competence and confidence became non-significant. Moreover, while HESEM solutions showed that the 4Cs are correlated to each other, restricting the factor correlations of the Cs to zero in the BESEM solution did not produce worse fit. This suggests that the common variance shared by the factors were inflated and can be better accounted for by a global factor in BESEM.

More importantly, the BESEM solution was more aligned with theoretical expectations and serves as a more practical hierarchical structure of PYD. In fact, researchers have urged that when higher-order models are comparable to bifactor models, the latter should be preferred due to its parsimony and closer representation of real-world data (Morin et al., 2016). Specifically, HESEM would explain that an individual's level of PYD is mediated by their competence, confidence, connectedness and character and has no direct influence on the indicators. Such an explanation is overly complex when applied to real world explanation of the relationship among the 4Cs. On the other hand, BESEM solutions have the advantage of presenting a global, interpretable latent construct of PYD that allow for the examination of predictors and correlates of overall PYD and the individual Cs' simultaneously. For example, Gestsdottir and colleagues (2017) used a bifactor approach to study the relationship between the 5Cs of PYD and intentional self-regulation. They found that intentional self-regulation was more strongly associated with the global PYD factor than any of the individual Cs. A HESEM model would have masked

this relationship given that the higher-order factors are purported to explain the similarities and differences among the lower order items. A bifactor ESEM model may provide a more theoretically meaningful understanding of PYD whereby individual items (e.g., “I feel that my sport career is promising with my coach.”) reflect both aspects of a general level of positive development shared by all items (i.e., bifactor PYD) and at the same time aspects shared by the items under the target factor (i.e., connectedness to coach). The current study therefore provided empirical backing for this theoretical conception of a global PYD factor and supported the psychometric validity of the PYD toolkit to measure individual Cs’ as well as examine a global PYD score of youth athletes.

3.4.2 Differential Contributions of 4Cs to PYD

Further examination of the parameters brought several interesting findings regarding PYD in sport. One of these was how the Cs differentially impact youth development, an area that has received little research attention (Vierimaa et al., 2018). Analysing the integrated 4Cs framework with bifactor analysis allowed the examination of how the Cs relate to each other in terms of their contribution on the global PYD factor. I discovered that, at least in this study’s sample, youth athletes’ general positive development (i.e., global PYD) appears to be strongly anchored on their perception of their abilities (i.e., perceived competence, confidence) as compared to their actual ability (i.e., observed competence), relationship with their coaches (i.e., connectedness), or their moral behaviour (i.e., character). This was evidenced by the stronger loadings of perceived competence and confidence items on the general factor compared to their specific target factors. This suggests that a positive perception of one’s ability (i.e., perceived competence and

confidence) could be more fundamental as compared to the other Cs to a general PYD (strong loadings on global PYD factor).

While perceived competence focuses on athletes' perception of their specific sport skills and confidence on athletes' general believe in their likelihood to succeed in sport, both factors greatly overlap in their theoretical focus on athletes' belief in their abilities and have been discussed interchangeably (Vealey, Chase, & Cooley, 2017). Findings in this study support prior research evidencing that a positive perception of one's competence is an important predictor of important outcomes like self-esteem (Collins, Cromartie, Butler, & Bae, 2018), motivation (Sari, Soyer, & Eskiler, 2015), and sport performance (Vealey et al., 2017). Indeed, studies have reported that such perception buffers athletes against negative outcomes in sport engagement such as performance anxiety (Martin & Gill, 1991) and burnout (Harris & Watson, 2014). For example, Harter and Connell (1984) found that athletes who were more confident of their sporting competence evaluated their success using internal standards instead of comparing with others. They were also less vulnerable to feeling demoralized with their performance and felt more in control of their success. Similarly, Levy, Nicholls, and Polman (2011) found that athletes who had higher levels of confidence engage in more adaptive coping when dealing with competition pressure as compared to athletes who reported lower levels of confidence. The authors found that the former were more likely to adopt task-oriented (i.e., mental imaging) rather than disengagement-oriented (i.e., giving up) coping. Indeed, the stronger role of confidence evidenced in this study provided empirical support for prior research on the possible predictive role of positive perception of one's abilities (i.e., perceived competence and

confidence) of PYD, and suggest that it may be more fundamental than other Cs in impacting holistic youth development.

Another notable observation is that items related to antisocial behaviour, while being integral to the 4Cs framework, did not appear to be central to the psychosocial makeup of PYD among athletes in this sample. Interpretation of this finding is however not straightforward. On one hand, items in the antisocial scale may be biased by social desirability. For example, items belonging to the antisocial subscale (e.g., “Cursed vulgarities at teammate”; “frustrate an opponent”) reflect behaviours that are socially frowned upon and usually entail punitive consequences (e.g., reprimanding by the coach) in sport. Moreover, one would expect that many of the antisocial opponent items (e.g., “deliberately injured an opponent”, “physically intimidate an opponent”) might be avoided as these behaviours are usually faulted during competitions and can cause teams to either lose a point or even a game. Behaviours that disrupt group harmony and well-being are generally frowned upon especially in Asian contexts like Singapore where the group is valued over the self (van den Bos, van Veldhuizen, & Au, 2015). It is therefore not surprising that youth athletes responded consistently for antisocial items regardless of their responses on the other scales as this scale is culturally biased.

3.4.3 Practical Implications

The current study established the utility of the PYD toolkit to concurrently study PYD as a global factor and examined the individual 4Cs. Findings from this study suggest that researchers and owners of PYD sport programmes can utilise this instrument to study correlates and predictors of PYD in sport. This would benefit empirical research that seek to ascertain the effects of sport on youth athlete development. Moreover, the PYD toolkit

can be adopted to evaluate youth sport programmes - a fundamental step to ascertain that these initiatives positively impact young athletes (Holt, 2016).

Findings in this study pertaining to the role of perceived competence and confidence in PYD suggest that helping youth athletes develop a positive perception of their abilities might be of primary focus when developing youth sport teams. Coaches may want to first develop confidence before working on other aspects of youth development like relationship among peers (i.e., connectedness) and prosocial behaviour (i.e., character) or even athletes' actual competence in their sport (i.e., observed competence). Amasiatu (2013) observed that while coaches acknowledge that athletes' positive believe in their abilities is foundational to youth development, there is a common believe that athletes need to first achieve success or display actual competence before confidence or perceived competence can be more optimally developed. A common practice among sport coaches is therefore to focus efforts on first developing athletes' sport competence by separating athletes according to their competence levels and pitching the rigor of training respectively. On the contrary, Vealey and colleagues (2017) recommended that building confidence among adolescent athletes would require a stronger focus on personal improvement and mixed ability group training, as normative comparison of athletes' abilities would increase the salience of their lack of ability and hinder the development of confidence. Coaching staff may need to be educated on the foundational significance of confidence rather than placing the focus of training primarily on the actual competence of athletes.

3.4.4 Limitations and Future Directions

Several limitations in this study should be considered. First, as the current study was conducted in the context of team sport, the findings may differ from those of individual

sports. For example, Păunescu and Popescu (2016) found that youth athletes who participated in team sport perceived themselves to be more competent than those in individual sport, particularly in the presence of collegial relations with teammates. This is because, in team sports, positive peer relations and acceptance provide an important affirmation that reinforces one's sense of self-competence. Therefore, while overall satisfaction and success derived from sport training is largely influenced by interaction with teammates in team sports, this might not be the case for individual sport. More research is therefore needed to investigate if the patterns observed for the 4Cs in this study hold true among youth athletes involved in individual sport. Second, the sample in this study comprised Singaporean youth athletes whose perceptions of 4Cs may well differ from their counterparts from other cultures. Recent studies have discussed how the 4Cs is culturally charged as the various Cs might be differentially emphasized in different cultures (e.g., Chen et al., 2018; Gestsdottir et al., 2017). Using the non-sport specific 5Cs framework, Chen et al.'s (2018) cross-cultural research found that only connectedness and character were well-defined in their Chinese sample, but not confidence and competence. The authors attributed the unique findings to the stronger focus on group harmony in collectivistic societies that place particular importance in familial and community relationships (i.e., connectedness) and display of moral behaviours (i.e., character) over individualistic ideals of striving for competence and confidence. Moreover, this study found that antisocial behaviours are less well-integrated into overall PYD in sport for Singaporean athletes. This runs contrary to past research emphasizing that both prosocial and antisocial behaviours are integral to our understanding of moral character (Kavussanu & Boardley, 2009). More empirical studies are warranted to ascertain if the findings in this study are comparable to

other cultural contexts and why positive youth development may be less anchored on antisocial behaviours.

3.5 Conclusion

The current study provided empirical support for the validity of the 4Cs framework and the PYD toolkit that draws on the bifactor and ESEM statistical methodological. Specifically, findings in this study support the validity of the PYD toolkit in which a global PYD factor occurs alongside the individual 4Cs (i.e., competence, confidence, connectedness, character) among youth athletes. This study therefore extends current application of the 4Cs as an integrated framework that is theoretically aligned with the multidimensionality of the instrument. From the PYD perspective, I found that it might be more crucial to prioritize youth athletes' confidence and perceived competence than coach-rated competence, relationship with coaches, and character when targeting overall youth athlete development. This study also supports recent advancements in research that promotes bifactor ESEM as an alternative, and substantively flexible, approach to conventional validation methods that appropriately addresses the psychometric and substantive characteristics of multidimensional instruments.

CHAPTER 4 STUDY 2: TWO HEADS ARE BETTER THAN ONE”: HOW SUPPORTING TEACHERS COMPLEMENT SECONDARY SCHOOL SPORT COACHES IN FACILITATING POSITIVE YOUTH DEVELOPMENT

4.1 Introduction

In the purview of facilitating PYD through sport, coaches have one of the most profound impact on youth athletes. They shape the training climate, influence the goals set by athletes and form stable, longterm relationships with youth athletes under their charge (García-Calvo et al., 2014; Holt, 2016). Chapter 2 discussed how coaches’ control over the training environment and their relationships with youth athletes greatly influence athletes’ outcomes from sport participation (Duda & Balaguer, 2007). Indeed, a coach-created ego climate has been found to encourage undesirable behaviours such as maladaptive competition strategies and dishonest game play (Harwood et al., 2015). In contrast, coaching styles emphasizing supportive relationships and effort have been found to contribute towards sport excellence in ways that support holistic athlete development (Duda & Balaguer, 2007; Fraser-Thomas et al., 2005; Holt, 2016). These concerns have spurred intervention efforts to educate high school sport coaches on the need to move away from performance-focused coaching, while equipping athletes with positive skills that better promote PYD (Camiré, 2013; Fraser-Thomas et al., 2005).

However, the youth sport setting pose several challenges that hinder the ability of coaches to facilitate PYD. PYD scholars have highlighted that after PYD interventions, coaches often return to their coaching duties facing persistent challenges of competing coaching demands, insufficient time and limited resources that hinder their application of

the PYD knowledge learned (Camiré et al., 2013; Holt, 2016; Lacroix, et al., 2008; Robbins & Rosenfeld, 2001). For example, Camiré and colleagues (2013) found that while coaches value holistic athlete development, technical and administrative responsibilities (e.g., managing team drills, logistics) leave them with little time and energy to develop non-sporting skills they learned from the intervention programme, widely regarded as core aspects of PYD (e.g., socio-emotional skills, character). Although emotional well-being is fundamental to PYD, Robbins and Rosenfeld (2001) observed that coaches intentionally withheld emotional support from youth athletes recovering from injuries in fear of disrupting the training routines of active players. Additionally, coach education programmes are often brief, constraining the ability of coaches to impart PYD-related knowledge and skills through sport participation (Rathwell et al., 2014), and nurture their athletes' resolve to meet the demands of sport training and adversities in life (Durand-Bush & Salmela, 2002). More worryingly, some coaches hold an overly optimistic view that athletes experience PYD through sport training on their own, and do not require additional intervention (Bean & Forneris, 2017; Lacroix et al., 2008).

In addition, unlike adult athletes, coaching secondary school athletes is associated with unique challenges as coaches have to attend to complex issues of social and emotional maturation (VonMeter, 2014). Secondary school athletes often struggle with parental pressure, conflict with peers, performance anxiety (Dworkin & Larson, 2006) and academic commitments (Camiré & Trudel, 2013), all of which can hinder athletes from training optimally. As such, promoting PYD among secondary school athletes can be complex and daunting, and managing secondary school sport teams may therefore require a particular set of knowledge and skills to promote PYD outcomes.

In Chapter 2 I highlighted several studies that have explored how supporting positions in youth sport teams can alleviate issues in youth sport coaching and contribute towards positive development among athletes (Lemyre et al., 2007; Rathwell et al., 2014; Stuntz, 2016). Supporting staff refer to personnel who work alongside sport coaches. They either assist in coaching duties (e.g., assistant coaches, athletic trainers) and/or manage non-sport related needs of the team (e.g., athletic directors, team managers, sport administrators). Rathwell et al. (2014) reported that head coaches in university football teams considered assistant coaches crucial to team development as they coach sport skills to players and take care of administrative matters. This allowed head coaches to concentrate on the team's sporting development (e.g., athlete supervision during training, development of training programmes). The authors highlighted that assistant coaches also helped to maintain healthy relations in the team by building rapport with athletes and their parents, thereby improving the quality of the tripartite coach-athlete-parent relationship. This is crucial as supportive and positive relationships with adults (parent and coaches) are fundamental for athletes to focus in their sport training (Fraser-Thomas et al., 2005). Similarly, Lemyre et al.'s (2007) study found that coaches delegated the task of parent communication to team managers or athletic directors because parents sometimes exert unnecessary pressure on coaches to achieve sporting excellence. These findings suggest that supporting staff can contribute meaningfully to PYD in youth sport teams. However, discussions pertaining to their contributions to PYD have mostly been brief (Durand-Bush & Salmela, 2002; Gilbert & Trudel, 2004), with the majority of these studies focused on university and elite sport (Rathwell et al., 2014; Stuntz, 2016).

In this regard, I highlighted in Chapter 2 that there exist a unique role of CCA teachers who are supporting teachers to school sport teams in some nations (i.e., Singapore, Malaysia). I contended that their training in student management and position in school sport teams place them in an advantageous position to enhance PYD in those settings. For a detailed description of the CCA system in Singapore and the job responsibilities of CCA teachers, see section 2.5.2 of Chapter 2. To our knowledge, no studies have extensively explored the role of supporting staff in the context of secondary school sport. Given prior evidence, albeit limited, I believe that supporting teachers to secondary school sport teams may be an untapped potential that when explored could complement coaches' work in enhancing PYD. Greater information on the contributions of supporting staff to secondary school sport teams could benefit stakeholders in facilitating PYD among athletes.

The present study therefore used PYD as a guiding framework to investigate how supporting staff complement secondary school sport coaches to promote PYD. I drew on the role of CCA teachers in secondary school sport teams in Singapore. This group was chosen because they share responsibilities with supporting staff of youth sport teams in other contexts and are concurrently school educators. To investigate their contributions to PYD in secondary school sport, three main research questions guided this study: 1) What roles do CCA teachers play in secondary school sport teams? 2) In what ways do CCA teachers promote PYD? 3) How do CCA teachers impact PYD differently from sport coaches?

4.2 Methods

This study was guided by the interpretivist approach (Willis, 2007) which assumes that knowledge is relative to the context (i.e., relativistic ontology) and is interpreted and constructed (i.e., constructionistic epistemology) by individuals. I therefore sought to explore how athletes, coaches, and CCA teachers perceive the roles of CCA teachers and how CCA teachers impact youth athlete development in secondary school sport.

4.2.1 Participants

This study recruited 48 athletes (22 males and 26 females, $M_{\text{age}} = 14.60$ years, $SD = 0.57$), eight coaches (6 males and 2 females, $M_{\text{age}} = 37.00$ years, $SD = 9.27$), and eight CCA teachers (two males, six females, $M_{\text{age}} = 34.50$, years, $SD = 7.45$) from eight secondary school sport teams from different team sports (i.e., badminton, basketball, hockey netball, rugby). The athletes had an average of 1.68 years of training experience with the team ($SD = 0.57$) while coaches had an average of 10.50 years of experience coaching secondary school sport teams ($SD = 4.89$), and CCA teachers had an average of 9.25 years managing secondary school sport teams ($SD = 4.89$). The greater proportion of female CCA teachers recruited in this study reflects the majority population of female teachers at the secondary school level. Considering the differences found for team dynamics and athlete outcomes between individual and team sports (Agans & Gedlhof, 2012), this study only examined the latter to facilitate appropriate interpretation. This study categorised badminton as a team sport as athletes from badminton secondary school teams in Singapore train predominantly for doubles play, even if some compete in singles play. Official national tournaments for secondary school badminton are also team-based. Guided by the PYD framework, this study sampled teams relatively successful in balancing excellence in both sport

achievements and non-sporting areas of PYD. The teams were selected according to the following criterion: 1) improved or sustained win-loss records in annual inter-school national tournaments over the past three years, and 2) recommended by CCA head of departments [HOD] for commendable efforts in striving for sport excellence and PYD (e.g., character, socio-emotional development, academic excellence). The coaches and CCA teachers saw their athletes on an average of two days (*range* = 1-4 days) every week and each training session lasted around two to three hours.

4.2.2 Procedure

Approval was sought from Nanyang Technological University's ethical review board and Ministry of Education. Stratified sampling was adopted to recruit the schools. Emails were sent to the CCA HODs of five co-educational government secondary schools that were selected from each of Singapore's four school zones (i.e., north, south, east, west). The CCA teams were recruited by purposive sampling where the schools were informed of the purpose of the study and the criteria of the participants to be recruited. A total of five schools that represented the four school zones responded and recommended a total of eight school sport teams for the study. Responses from all three social agents within each team (i.e., athletes, coaches, CCA teachers) were collected to yield a comprehensive account of the research interest. Participants signed an informed consent form before the study commenced and parental consent was obtained from student athletes.

One-to-one, semi-structured interviews were conducted with coaches and CCA teachers while focus groups were conducted with athletes. Focus groups consisted of athletes from the same team to create a non-threatening, familiar setting where they could

share their views freely. Each focus group was limited to six to eight athletes as suggested by qualitative researchers (Krueger & Casey, 2014). All interviews and focus groups were conducted in the respective schools of each team and during CCA training hours to reduce additional time commitments. A standardized interview guide was used and all interviews and focus groups were audio-recorded with participants' permission. Discussions were facilitated by me who had four years of experience in qualitative research and undergone formal training in qualitative research analysis at the postgraduate level. Interviews lasted between 40 to 75 minutes while focus groups lasted between 45 to 90 minutes.

4.2.3 Interview Guide

The interview guide (See Appendix D) was designed to explore how the supporting role of CCA teachers contributed to positive athlete development. A pilot test was conducted with a secondary school sport team, that did not participate in this study, to ensure that the interview questions were well-understood by the participants. Similar to the current study, the pilot test had a focus group for athletes and one-to-one interviews for the coach and CCA teacher. Similar interview questions were used for athletes, teachers and coaches, but varied by referent (e.g., 'your CCA teacher' for athletes and coaches, 'you' for CCA teachers). Upon getting feedback from some student athletes that they had difficulties comprehending questions two and four, I refined the complex phrasing to a simpler version that used a series of related follow-up questions or prompts.

Each interview began with introductory questions to build rapport with the participants and to survey their demographic background. These were followed by main questions that surveyed their opinions of the roles played by the CCA teacher (e.g., What

are the roles and responsibilities of the CCA teachers in this team?). Through this question, I hoped to establish if a common perception about the primary role of CCA teachers was concordantly held by student athletes and their CCA teachers. This was followed by the tone CCA teachers set for goal achievement (e.g., How does the CCA teachers in this team/you define what success is?), the ways in which CCA teachers contribute to athletes' PYD (e.g., How do you think CCA teachers/you affect the development of athletes?), the differing influence that CCA teachers have on PYD as compared to sport coaches (e.g., How do you think the team would be affected if the CCA teacher role was removed?). In line with Krueger and Casey's (2014) recommendations, probing and follow-up questions were asked to facilitate clarification and deeper discussion of the responses. For each question, I asked participants to provide examples of what they shared (e.g., Can you give me an example of what the CCA teacher does during or outside training to fulfill this responsibility?). This urged participants to consider what is practised in the training environment.

4.2.4 Data Analysis

All audio-recorded interviews were transcribed verbatim and analysed using the QSR software NVivo 11 by me. The study adopted the analysis procedure recommended by Braun and Clarke (2013). This began with me familiarising myself with the data by reading the transcripts several times and writing notes relevant to the research questions. I then thoroughly coded the transcripts both deductively (i.e., according to the themes targeted by the three main research questions) and inductively (i.e., themes beyond the theoretical underpinnings of PYD, but that answered the research hypotheses). The codes were made up of sentences or paragraphs and were labelled according to what they conveyed (e.g.,

‘parental role’). Codes that were semantically similar were gathered to form higher-order subthemes using predominantly inductive analysis. For example, ‘parental role’ and ‘friend’ were grouped inductively to form the subtheme “emotional support”. The subthemes were then organized into main themes (e.g., ‘roles played by CCA teachers’). The first main theme (i.e., ‘roles played by CCA teachers’) was derived deductively from the first research question, while the second and third main theme (i.e., ‘contributions to PYD’, ‘advantages over coaches in promoting PYD’) were derived from the second research question. I thoroughly reviewed the coding structure to examine whether themes, subthemes and codes were linked to each other in a meaningful way and fit together in a logical structure to address the research questions. All transcripts derived from the interviews and focus groups were analyzed together using the same coding structure.

Steps were taken to ensure qualitative rigour in the data analysis. *Member reflections* were adopted to facilitate dialogue between the researcher and participants (Tracy & Hinrichs, 2017). Main points of discussion were first noted during the interviews, summarized and presented to participants after each session. This allowed participants and the interviewer to reflect deeper on and resolve any conflicts in interpretation of what was discussed. Participants were also given opportunity to elaborate on what they have shared according to the summary. This was particularly helpful for the focus groups as some of the participants added on to examples or opinions shared by other participants during the discussions but were forgotten while waiting for their turn to speak. Secondly, a summary of the coding structure with representative quotes was sent to the school teams to allow for verification, clarification and further contributions. None of the participants requested clarification or amendments. In addition, my supervisor, who was neither involved in the

coding process nor familiar with the role of a CCA teacher, acted as a *critical friend* (see Brewer & Sparkes, 2011) to challenge and encourage me to reflect upon my interpretation and decisions made during data analysis. He provided critical feedback on the selection, labelling and organization of codes, subthemes and themes. This resulted in minor changes to the grouping of subthemes and rephrasing of labels to accurately reflect underlying codes. He also asked critical questions on the relevancy of the themes and subthemes with respect to overarching research questions. This procedure challenges researchers to consider alternative interpretations and ideas, ensuring that codes and themes represent the data and coding is not ‘forced’ or biased (Corbin & Strauss, 2008; Tracy & Hinrichs, 2017).

4.3 Results

This section is divided into three sections that correspond to the three research questions in this study: 1) roles played by CCA teachers, 2) contributions of CCA teachers in promoting PYD, and 3) advantages CCA teachers have over coaches in promoting PYD (See Table 4 for detailed hierarchy of themes). For purposes of confidentiality, CCA teachers are labelled as T1 to T8, coaches as C1 to C8. Athletes are labelled as T1S1 to T8S6 to represent the team, followed by athlete number.

4.3.1 Roles Played by Supporting CCA teachers

Participants discussed how CCA teachers were not simply team managers with administrative roles but were character coaches, an emotional support and academic advisors.

Table 4

Overview of Themes, Higher-order and Lower-order Categories

Themes	Higher Order Categories	Lower Order Categories
Roles played by CCA teachers	Character coach	
	Emotional support	Parental role Friend
	Team Manager	Administrator Ensure athlete attendance Make team decisions
	Academic mentor	
Contributions to PYD	Develop character	Consistent and regular communication of values Emphasize effort and improvement
	Promote emotional well-being	Attend to athletes left out by coach Monitor for socio-emotional problems Make time to understand athlete problems
	Nurture team cohesiveness	Mediating conflicts in the team Organize team bonding activities Create symbols for team identity Creating roles for athletes
	Indirectly contribute to sport ability	Offloading administrative duties from coach Support coach in developmental activities Securing necessary resources
	Help athletes balance academics and sport commitments	Monitor athletes' academic progress Organize academic related activities
Advantages over coaches in promoting PYD	Closer relationship with athletes	More access to athletes More personal interaction
	Knowledge and skills beyond sport	Skills to manage athlete emotions

Familiar with academic demands in school

Access to school resources

Character coach. Many participants expressed that while their coaches focused on developing athletes' sport ability, CCA teachers played a bigger role in nurturing athletes' character. S2 commented: "the coach wants us to have the skills but then the teacher wants us to have values more". Many of the coaches also felt that they needed CCA teachers to work with them to develop athletes' character. C7 explained: "If a team has CCA teachers who support the team, they would instil values [among athletes]. They would also support the values that the coach tries to inculcate. They work hand in hand together."

CCA teachers expressed awareness of their responsibility in the character development of athletes. T7 shared: "I [T2] always tell coach to focus on imparting the netball skills. When it comes to discipline, the character part, leave it to the teachers."

Emotional support. All participants agreed on how CCA teachers supported athletes emotionally by playing the role of a parent, and sometimes a friend, when they encountered negative experiences. T5S2 explained: "In our CCA, coach is like the fierce father. To neutralize things, our CCA teachers is like our mother. I are like a family." This was also echoed by T4 who commented on her role: "It's a mothering kind of role. The coaches drill skills, I [CCA teachers] guide and take care of their [athletes'] emotional needs."

Athletes discussed how they felt that their CCA teacher was more approachable than their coach and that they could relate to their CCA teacher as a friend. T2S5 explained: "I think CCA teachers are more like friends to us. They are very encouraging while coach

is fiercer.” T8 shared how I interacted with the athletes outside CCA training to provide support and build rapport with them: “I am strict during training, but outside of training, I try to talk to them as a friend. Listen to them, tell them jokes.”

Team manager. Participants mentioned how CCA teachers made administrative decisions in the team and were responsible for the well-being of the team and individual athletes. T4 summarized this role: “Coaches are external vendors employed by the school while teachers represent the school to make every day decisions.” C1 shared a similar sentiment: “Who is going to be responsible for any injuries or field accidents? I need to be accountable to the school and the kids’ parents. And I am only an external party [to the school].” Athletes were aware that CCA teachers are responsible for the administrative processes of important events. T6S3: “They plan our training schedule and competitions. They register us, plan the bus trip. Basically, the admin stuff which I think is very important.”

Many coaches and CCA teachers discussed how CCA teachers are needed to ensure athletes attend trainings. They explained that CCA teachers can leverage their position as a school staff to reach out to athletes and their parents to remind them of the importance of attending training sessions regularly. T6 commented: “Because the coach will only come to coach the team in the afternoon, they can’t be going to the classes to find the students or chase after them if they don’t come for training.” C2 also echoed this sentiment, saying:

If I go to the court and they are not there, I can’t go out of school to pull them back. But CCA teachers can call their parents or look for them during school hours. This is the authority that the teachers have, I can’t do these.

Academic mentor. Participants discussed how CCA teachers took ownership of mentoring athletes' academic progress. T4S4 shared: "I [CCA teacher] doesn't only care about what I do for volleyball, I cares about our grades too. He checks on our results and advises us on what I can do to study better."

4.3.2 Contributions to PYD

Even though the main function of sport CCAs was to develop the sport abilities of athletes, participants reported ways that CCA teachers contributed to PYD in the areas of character, emotional well-being, team cohesiveness and academic achievement.

Develop character. Participants discussed how CCA teachers developed the character of athletes during and outside trainings (e.g., debrief sessions at the end of the trainings, during school hours). One way they did so was communicating the importance of displaying good character regularly and consistently. T3S5 shared:

Our aim is to win medals but I [CCA teacher] always reminds us it's not about how you start, it's about how you end. Even though you didn't win, your character grew during the journey, and you are not only good in floorball, but also good in character.

Many athletes highlighted that their CCA teachers instilled in them certain character values through constant reminders. T8S2 shared one example: "Respecting each other. I don't humiliate others who are slower or if they can't do something. I need to help each other and that's what our teacher always says". CCA teachers also reminded coaches to encourage good character even in competitions. T7 recounted:

Coach initially did not believe in the writing of the notes [to opponents after losing a game]. I felt that the opponent has beaten you, why are you thanking them? But I told coach that since this is something the students initiated and it displays good character, I should do it. It is not only about winning, I need to also teach values.

CCA teachers leveraged on ‘teaching moments’ during trainings to educate athletes on good character. C3 shared: “Sometimes when the teacher sees them putting in less than optimal effort [during training], he gets me to stop [training] and I bring them in to address it.”

Participants reported that CCA teachers emphasized for athletes to put in their best effort. This was seen when CCA teachers considered the effort and improvement displayed by athletes when selecting players to participate in tournaments. T1 elaborated on this:

I always tell coach that I pick the best players to play [in competitions] but I also consider those who put in their best effort. It is not just about winning. If athletes show willingness to put in effort, they are keen on improving, I should give them a chance.

Some athletes reported that their CCA teachers reinforced the emphasis of effort regularly. T5S2 illustrated: “They believe that to achieve what I want I must put in effort. If I don’t put in effort during training, I will be given straight punishment and scolding”. CCA teachers reported that they made it a point to acknowledge athletes when they put in effort. T8 shared:

Athletes need affirmation from us that their efforts are being recognized. During training, I always shout out [into the field] to them or talk to them, “good effort”, “I like that you are trying hard”. I need to constantly acknowledge them.

Promote emotional well-being. Participants highlighted that CCA teachers were usually the ones who paid attention to the emotions of athletes while their coaches focused on coaching the team in their sport. One way CCA teachers attended to the emotional needs of athletes is to reach out to those who were inadvertently neglected. T2 explained: “Coach needs to focus on the main players. What about the others who are weaker or can’t catch up? CCA teachers have to come in, to talk to them and make them feel valued.”

One athlete shared how her CCA teacher reminded her that I is valued in the team:

As a reserve player, I am usually on the bench during competitions. I would come and remind me that the team needs me. If my teammate is too tired or injured I must be ready to go on court. I helps me realize I am also important in the team. (T3S2)

Participants articulated that CCA teachers were better positioned to monitor athletes’ emotions during and outside training because the coach was usually preoccupied with coaching. T5S3 explained: “[CCA] Teachers can provide an unbiased perspective as they can see whether the players are too tired or sad. The coach might not be able to see it”. Coaches added that CCA teaches helped to identify athletes’ issues outside of CCA training. C3 commented: “Athletes may face family problems or other problems I are unaware of. Little things that I don’t know, I need the teacher to find out and inform us”.

Participants shared how CCA teachers made themselves available to find out about how athletes are doing in and outside CCA. T3 shared: “We get to know the players; their family background, if they face problems in school, at home, with friends. Players want teachers and the coaches to know them and give them attention.” Athletes explained that being able to have casual conversations with their CCA teachers motivated them to put in

effort to train. T7S1 shared: “Sometimes during training, I sit down and chat with him. Because I feel closer to him, I want to come to training and put in 100% effort.”

Nurture team cohesiveness. Participants shared that CCA teachers were crucial to maintaining team cohesiveness by ensuring that athletes form strong and meaningful bonds with teammates or the coach. One way was through conflict management. T1 illustrated:

If two athletes get into a fight, is the coach going to stop the whole training to deal with that? It’s not efficient use of his limited time with the kids. That is when I must step in, bring them aside and talk to them.

All coaches shared that CCA teachers helped to address resentment that athletes might develop against the coach when they were being disciplined or not selected to compete in tournaments. C3 shared how he appreciated CCA teachers for following up with athletes who received disciplinary feedback when they misbehaved or were lacklustre during training:

Sometimes when I scold them [athletes], they go to the [CCA] teacher to complain.

The [CCA] teacher needs to know what to say to them to help them understand why

I do certain things. If not, they might resent me or not attend training.

Many CCA teachers discussed how they soothed the disappointment of athletes not selected to compete for the school and reminded them that they were valued in the team. T6 shared:

The team trains hard for the national games. But coach can only select some players for competition. I need to talk to those who were not shortlisted, who may be

disappointed. I encourage them that they have done well and acknowledge their efforts.

If athletes fail to perceive these well-meaning intentions as efforts to help the team improve, they could take it personally and this could affect their relationship with the coach.

CCA teachers were usually the ones who organized activities and events aimed at bringing the athletes closer as a team. T3 explained how the team's annual team bonding camp is important to forge stronger bonds among the athletes:

Before the team has 'gelled', you cannot talk about contributing to the team because they cannot identify with it. That is why our yearly camp is very important. After they have trained for some time and lived together, they feel more like a team.

Some coaches agreed that team bonding activities organized by CCA teachers were beneficial. C2 recounted:

The teachers come up with team bonding activities that teach them [athletes] how to motivate and encourage each other. For example, they took the athletes for the forest adventure where the kids did high-element obstacles. After that experience, the kids were more helpful towards each other during trainings and competitions.

An interesting strategy used by one of the CCA teachers was to lay down a code of conduct into a team creed that is unique to the team. C3 recounted how this started:

I [CCA teacher] proposed that I have an 'Eagles' creed where I talk about courage and doing nothing but our best. It is something that can build team identity. The kids feel that this belongs to them and have a reference point to always follow.

Athletes in the team identified with the creed and were proud of it. T3S5 said: “This creed makes us feel special and other teams know us for this.”

Three of the CCA teachers built team cohesiveness through creating roles for athletes on the team. They believed that this gave athletes a sense of belonging to the team because they feel needed. T7 elaborated: “We provide leadership opportunities to our athletes. It’s not just the captain and vice-captain, I have teams to take care of admin, logistics, and publicity.” C7 explained how this is especially important for players with lower sport ability:

There are fringe players that don’t get selected into the main team. They sometimes see themselves as less important. That is why I really supported the idea when the teachers suggested to give such athletes more leadership opportunities, more roles, so they can contribute in another way and that helps them feel valued.

Athletes in this team articulated that every team member was important because everyone was responsible for the team to function effectively. T7S4 commented how having a teammate put in-charge of logistics helped maintain orderliness of the equipment:

For example, logistics; without them, our cage will be messed up. And for other areas such as the admin, they are important for giving out information or even handling our social media. I think everyone plays a part here, I are important to each other.

Indirectly contribute to sport ability. CCA teachers did not directly impact athletes’ sporting abilities since they did not usually coach the sport. Yet, participants acknowledged that offloading administrative duties from the coach and supporting coaches’ training plans

were crucial to build athletes' sport ability. C1 explained how CCA teachers helped coaches save precious training time by attending to administrative work: "Without the CCA teacher, I will spend half of training time to take attendance and prepare equipment. I will not have enough time to train athletes' skills". This was agreed by CCA teachers. T4 shared: "We hire coaches on an hourly basis, so they have a fixed number of hours with the athletes. If they spend time doing administrative work, they will have lesser coaching time."

All the coaches shared that CCA teachers can enhance or hinder the sporting development of the team as they usually made the final team decisions. C7 explained: "If my CCA teacher does not support me, I can have all the experience and ideas, but I cannot execute them. The athletes won't benefit from my training." C6 commented that coaches need CCA teachers' support to materialize their coaching plans:

The coach can be enthusiastic in planning for developmental activities. But if the [CCA] teacher says that there is no need for games and activities outside training hours, or additional training during school holidays, there's nothing you [coach] can do about it.

Helping athletes balance academic and sport commitments. Participants discussed how it was important for athletes to excel not only in the sport but also be able to manage their academic progress. Some of the CCA teachers took on the additional responsibility of monitoring the academic progress of their athletes. T4 shared:

At the end of each major examinations, I will look for their [subject] teachers for feedback [on their performance] and talk to the athletes separately. I explain how they

should not only excel in their sport but also strive for excellence academically.

Because ultimately, they are students, academics is important.

Athletes in the team confirmed this. T4S4 shared: “Once our exams are over, if I did badly I would talk to us personally. It motivates us on our sport and also our school work.”

Some CCA teachers went the extra mile to implement academic-related activities to help athletes who are weaker in this aspect. T6S1 shared how his CCA teacher puts aside studying time during training sessions for athletes who were weaker in their academics:

Another player and I were not allowed to play for the games because of poor grades.

I had to use up 30 to 45 minutes of CCA time to study in front of our [CCA] teachers.

They tried to help us when I had questions. I am grateful for my CCA teachers.

C3 shared a strategy a CCA teacher used to remind athletes to take their academics seriously:

The teacher got each student to write in a journal; what they didn’t do so well in [academically], what they have learned and what can be done. I also push athletes who fail their academic examinations. I want them to take academics seriously.

4.3.3 Advantages over Coaches in Facilitating PYD

A majority of the student athletes, CCA teachers and coaches commented that CCA teachers may be in a better position to develop some aspects of athletes’ development. They explained that as a non-coaching staff they are more available during and outside training to forge closer ties with athletes. They also possess non-sport knowledge and skills that can

benefit athletes' non-sporting development. Moreover, CCA teachers have access to resources due to their affiliations with the school.

Closer relationship with athletes. All participants agreed that CCA teachers are in a better position to positively impact the well-being of athletes because they have more access than the coach to the athletes. One advantage of this is that CCA teachers were able to monitor the behaviour of athletes outside training hours. C4 explained:

How players spend their time outside training every day with friends, I need eyes on. If this player mixes with the wrong group of friends or misbehaves in school, I need to know so I will be able to talk to them. CCA teachers are usually the first to find out.

CCA teachers echoed on their additional access to the athletes. T5 explained:

Being school teachers, I have access to the girls. I will check their school records to see if they are late for school too often and ask them why. I want them to understand that it's not just about CCA, I also care about them outside of CCA.

Several athletes explained how their CCA teachers kept them on alert in terms of behaviour during school hours. T2S1 explained: "We see the [CCA] teachers in school almost every day so I am more afraid of them and pay more attention to our attitude in school."

CCA teachers discussed how they, as compared to coaches, were able to attend to the needs of the athletes because they know their athletes more personally. T7 explained:

While I don't have the technical knowledge [of the sport], I know the athletes. I am more aware when they are afraid, unsure or not confident. When I see that, I am able to encourage them, talk to them and see how I can bring them forward.

Most athletes shared that they have more personal interactions with their CCA teacher than their coach who was perceived to be an authoritative figure. T2S2 shared: "We feel closer to our CCA teacher. I sometimes look him up for a chat before training. He would ask about how I am doing in school, at home. Coach does not really ask us about such things."

Knowledge and skills beyond sport. Participants acknowledged that CCA teachers might, as compared to coaches, be more competent in nurturing non-sporting areas of athletes' PYD because they possess more relevant knowledge and skills. Some athletes shared how their CCA teachers can better help them manage their emotions. T3S2 explained how her CCA teacher helped reframe negative experiences: "Whenever coach scolds us, our CCA teacher will be there to encourage us and turn our negative thoughts into positive ones."

T3 opined on how CCA teachers are more sensitive to the socioemotional needs (e.g., confidence) of athletes while coaches focus more on performance goals:

Coach usually wants to push them [the athletes] by arranging for games with better teams. I tell coach it is important to build their confidence. So, I suggested I start with teams that are on par [in terms of skills] with us. After our students gained experience and confidence, I then give them more challenging opponents.

Participants acknowledged that coaches are often less able to help athletes in academic matters. On the other hand, CCA teachers are subject teachers and can provide

either subject-specific or academic advice. T2S1 explained: “Our CCA teachers sometimes tutor us in the subjects they teach. They also give us study tips or get other teachers to help us. Coach cannot really help us with our studies.”

Access to school resources. Participants highlighted that CCA teachers could provide the team with useful resources with their access to school funds. T6 commented: “Extra equipment like tackle pants, jerseys, and training kits I can get through the school funding. Whatever the athletes and the coach cannot get their hands on, that’s where the teachers can help”. Some of the teams had additional training time because their CCA teachers were able to provide access to equipment from the school outside CCA training hours. C3 shared:

I suggested to implement the recess programme where they do some [floorball] stick work during recess time. I saw a huge improvement in their skills. If the CCA teacher did not make available the venue and equipment, it would not have happened.

4.4 Discussion

Research documenting the impact of supporting staff on athletes’ development has been limited and brief, particularly in the context of secondary school sport. This is despite evidence showing that they can contribute meaningfully to PYD among youth athletes. This study sought to investigate strategies applied by supporting staff to impact PYD among secondary school athletes through the supportive roles they play alongside the coach. Extending preliminary information in current literature, the present study examined a unique group of supporting staff (i.e., CCA teachers) and provided a critical reference for

the multiple roles they can play in secondary school sport. I considered the perspectives of athletes, coaches and CCA teachers to present a comprehensive account of the often-overlooked but crucial influence that supporting staff can have on athletes' PYD, and how they may be more able than coaches to impact some areas of PYD. Additionally, our findings highlighted important strategies afforded by CCA teachers being educators in secondary school sport teams.

4.4.1 Complementary Role of Supporting CCA Teachers

In support of our research question, CCA teachers in our study complemented coaches and adopted strategies that have been effective in facilitating PYD. Congruent with prior research on the contributions of supporting staff (e.g., sport administrators, assistant coaches), CCA teachers in this study helped to share some of coaches' workload, freeing up time and energy for them to work on their athletes' sport development (Lemyre et al., 2007; Rathwell et al., 2014; Stuntz, 2016). They also helped offload administrative work from coaches, addressed athletes' emotional issues, and facilitated team building. As they were free of coaching duties, CCA teachers in the study were able to observe for and identify emotional difficulties that athletes faced during training (VonMeter, 2014), and could approach them sensitively and offered support in an appropriate and timely manner. This is congruent with existing literature, which also found that supporting staff like assistant coaches (e.g., Rathwell et al., 2014) and athletic trainers (e.g., Robbins & Rosenfeld, 2001) are more available than coaches to provide emotional support to youth athletes. More importantly, supporting staff are able to do so without disrupting the training sessions. Indeed, managing multiple roles and socio-emotional issues among secondary school athletes have been reported as main stressors that can sometimes lead to burnout among

coaches (e.g., Holt, 2016; Konukman et al., 2010). In fact, this source of emotional support provided by CCA teachers could be creating what Bengoechea et al. (2017) term as ‘complex environment’. As discussed in Chapter 2, such an environment nurtures the learning of useful life skills through presenting ‘pressures’ that urge youth to engage their repertoire of adaptive life skills while providing supportive relationships that buffers this challenging endeavour (Bengoechea et al., 2017). Indeed, the participants in this study commented that the coach acts as the ‘fiercer father’ who sets high expectations on their behaviour while the CCA teacher is akin to a ‘motherly’ figure that they derive emotional support from. Therefore, having a supporting figure such as CCA teachers attend to the non-sporting, yet crucial needs of the team can be beneficial as it reduces the strain on coaches yet ensures athletes’ needs are met.

While the coach and CCA teacher may have different ‘parental’ roles to play, it is important that they are consistent in their emphasis and communication pertaining to expected youth behaviour and attitudes. In section 2.4.4 of Chapter 2, I discussed how significant adult social agents need to ensure that their influence over youth athletes (e.g., motivational climate created) is mutually reinforcing to reduce athlete confusion and optimize their development (Chu & Zhng, 2019; Keegan et al., 2009; O’rourke et al., 2014). For example, PYD researchers have advocated for healthy parent-coach relationships to support the development of youth athletes (Hellstedt, 1987; Smith et al., 2011). One suggestion is to maintain regular and effective communication (e.g., coach providing feedback to parents) to keep both parties updated on the development and needs of youth athletes and maintain a working relationship between coaches and parents (Smith et al., 2011). It is also recommended that intervention efforts at training coaches on

strategies to promote PYD should also involve or have complementary training for parents (O’rourke et al., 2014; Smith et al., 2007, Smith et al., 2011). For example, with the aim of promoting a mastery climate in basketball teams, Smith and colleagues (2007) designed and intervention programme that educated both parents and coach on the importance of and strategies to create a supportive mastery environment for youth basketball players. It is therefore important for coaches and CCA teachers to have a healthy collaborative relationship to facilitate optimal development of youth athletes.

A novel contribution of this research is the finding that having school educators as supporting staff affords important advantages to PYD in secondary school sport. CCA teachers in the present study had greater access to athletes during school hours; five days a week as compared to the coaches who only had access to athletes during scheduled CCA trainings (typically two to three times, four to eight hours a week). Unlike coaches or sport administrators who manage a few sport teams, CCA teachers in this study were exclusively available to athletes during trainings. In a study by Camiré (2015b), teacher-coaches, who are school teachers, reported that regular contact with their athletes during and after school hours helped developed mutual respect and closer relationships with their athletes. The teacher-coaches believed that these greatly facilitated them in helping athletes navigate personal issues and derive more satisfaction from their training. However, it should be noted that teacher-coaches often struggle with time and energy demands from fulfilling multiple roles as teacher and sport coach (Camiré, 2015a; Konukman et al., 2010). Nonetheless, these findings suggest that a supporting staff of closer physical proximity and who have closer relationships with youth athletes may better address their socio-emotional needs and struggles.

The greater accessibility to athletes also facilitated the reinforcement of messages related to developing good character. An interesting finding of this study was that CCA teachers played a stronger role than the coach in developing the character of athletes. While coaches were usually caught up with observing and correcting the skills of athletes during training sessions, CCA teachers in this study were able to leverage on ‘teachable moments’ (e.g., when conflict arose among members of the team) and discussions (e.g., from free time during training, debrief) to educate athletes on good character. Similarly, assistant coaches in Bloom, Stevens, and Wickwire’s (2003) study helped to reiterate and reinforce expectations for behaviour and attitudes among athletes through frequent contact with them. Regularly reinforcing ideals of good character is fundamental as character building requires consistent effort and communication over time (e.g., Koh et al., 2017; Sackett & Gano-Overway, 2017). Indeed, one barrier to successful character development is the lack of continuity and consistency outside the context where character education was taught (Koh et al., 2017). The additional contact time that CCA teachers have with athletes outside of training hours helped to reinforce character development outside of training hours.

Moreover, researchers advocate for both explicit (i.e., direct discussions with athletes) and implicit (i.e., creating conditions for athletes to discover on their own) strategies to teach values and life skills (Bean et al., 2018; Sackett & Gano-Overway, 2017). However, explicit approaches require extensive planning and training, and are usually adopted in programmes that focus on personal development rather than sport-specific skills (Turnnidge, Côté, & Hancock, 2014). Indeed, coaches mostly adopt implicit methods to teach life skills as these are more feasible amidst financial and time constraints (e.g., Turnnidge et al., 2014). In contrast, with more time and contact with athletes, CCA

teachers in this study adopted a combination of explicit approaches such as discussing with athletes on how to display positive moral behaviours and implicit approaches such as selecting athletes based on moral conduct rather than their sport ability.

4.4.2 Advantageous Expertise of CCA Teachers

Additionally, even though CCA teachers may not possess necessary technical knowledge or professional coaching qualifications, they are trained educators equipped with knowledge and skills in character development and student management (Watkins & Donnelly, 2014). For example, teaching in a secondary school classroom often involves being attentive and responsive to the emotions of students (Hargreaves, 2000). Secondary school teachers have therefore more experience with managing socio-emotional problems among adolescents. Indeed, many of the athletes and coaches in the present study talked about how CCA teachers took care of the ‘counselling’ and ‘following-up’ of athletes’ emotional and disciplinary issues. However, as compared to conventional supporting staff like assistant coaches or fitness trainers whose expertise lie in developing the sporting ability and fitness of athletes, supporting staff with training as an educator may be more competent in helping youth sport teams deal with socio-emotional issues among youth athletes.

Furthermore, balancing academics and sporting pursuits can be a source of emotional stress among athletes that can sometimes lead to psychological problems like athlete burnout (Camiré & Trudel, 2013; Gustafsson, Hassmén, Kenttä, & Johansson, 2008). Unlike coaches, CCA teachers are well-acquainted with the academic demands and needs of athletes as they are part of the educational system. They are able to give informed

and useful advice to youth athletes in academic matters. In this study, several coaches discussed how the CCA teachers monitored the academic progress of their athletes and even tutored them in their school work. Such practices not only require time and attention, but also knowledge and skills of academic subjects – areas that coaches usually lack. Indeed, best practices in PYD have highlighted that model youth sport coaches made additional effort to ensure that their athletes managed their academics well apart from their sport training (e.g., Camiré & Trudel, 2013).

Further CCA teachers have more access to school resources that can enhance both sport and non-sport development of athletes under their charge. Participants in this study discussed how CCA teachers are needed to secure training venues and equipment for additional training when needed (e.g., during competition season, during school holidays). In contrast, coaches do not usually have access to school funds should they want to send athletes for additional experiences that can benefit their sport progress (e.g., carnival games), or other aspects of team well-being such as team cohesiveness (e.g., team outings). Indeed, funding and training resources (e.g., equipment, venues) have been issues that coaches frequently battle with (Fraser-Thomas et al., 2005; Lemyre et al., 2007). Challenges related to funding could thus be alleviated if youth sport teams are led by CCA teachers who are a school staff and have a more power to request for funding from schools.

The value CCA teachers bring to holistic PYD in secondary school sport is further supported by the results found in Chapter 3. Specifically, psychometric investigation highlighted that overall PYD of youth athletes is anchored on the four distinct but related Cs. In this study, contributions by CCA teachers indeed spanned across all 4Cs. For example, CCA teachers indirectly contribute to sport competence of the youth athletes by

securing resources fundamental to sport training and allowing coaches to focus more time and effort on developing the sport skills of athletes. With the luxury of time during training and access to student athletes outside of sport training hours, CCA teachers forged closer relationships with student athletes and promoted team cohesiveness (i.e., connectedness). Their expertise in character development, on top of extended exposure to student athletes, facilitated their inculcating of values through implicit and explicit ways.

Evidently, supporting staff need not be experts in their designated sport to help coaches promote PYD among athletes. However, unlike conventional supporting staff in youth sport teams, CCA teachers in this study have similar, if not greater authority than coaches due to the nature of CCAs in Singapore. They have the authority to endorse or reject decisions made by the coach, and implement routines and practices that they deem beneficial to their athletes (e.g., team cohesion, academic management, character development). This is perhaps more crucial for character development as coaches oftentimes neglect this aspect of PYD amidst coaching duties and desire to strive for sport excellence (Bean & Forneris, 2017; Camiré et al., 2013). However, participants in this study agree that there needs to be a collaborative working relationship between CCA teachers and coaches, where they are consistent in their communication of expectations and decisions in the team. This is in line with studies finding that a healthy and collaborative working relationship between adult leaders is paramount to the progress of youth sport teams (Rathwell et al., 2014; Robbins & Rosenfeld, 2001). For instance, head coaches in Lemyre et al.'s (2007) study emphasized that one of the strategies to enhance sport teams' progress was to work closely with assistant coaches and team managers whom they sought

advice and feedback from. Supporting staff with the authority to act as critical checks on decisions made by coaches can reduce an overemphasis on sport performance over PYD.

It is notable that the presence of supporting staff may not be universal for youth sport teams. Having a school teacher take on multiple roles and responsibilities in secondary school sport teams, may be unique to and even considered a luxury for secondary school sport in Singapore. Indeed, in contexts where secondary school sport teams have access to supporting staff, budget constraints often limit whether this materialized for the team. I would however like to emphasize that it is the undertaking of or allocation of the various discussed roles to an individual or individuals other than the coach themselves, that is beneficial to youth sport teams. This is in light of established coaching challenges of time constraints, youth-related issues, and a lack of coaching manpower.

4.4.3 Practical Recommendations

Training would have to be provided to coaches and supporting staff explaining the benefits of having supporting staff in youth sport teams and provide practical advice on how they can work together (e.g., types of duties that can be allocated). Rathwell et al.'s (2014) study highlighted how coach education in Canada, at various levels of sport, seldom teach head coaches how to effectively work with their assistant coaches. The best practices presented in this study could contribute as useful reference for programmes that aim to educate youth sport teams on the roles supporting staff can take on and specific practices they can adopt to assist coaches in their coaching duties and promote PYD. In contexts where resources (e.g., budget) do not allow for a supporting staff, recommendations can be made to delegate duties that would otherwise be undertaken by supporting staff to

alternative groups (e.g., voluntary parents). Given our findings that academic teachers can potentially enhance PYD in secondary school sport, school leaders should consider engaging them to support secondary school sport teams. Training should be provided to equip these teachers with necessary skills and knowledge to support sport coaches and promote PYD in this setting. However, schools should consider how the workload of these teachers can be managed since this would add on to their pre-existing responsibilities and duties. While pending further evidence, it appears that CCA teachers in this study did not place particular focus on building the confidence of athletes despite this being relatively more fundamental to PYD as highlighted in Chapter 3. Secondary school sport teams might want to explore how supporting staff can contribute more extensively to the development of confidence among youth athletes.

4.4.4 Limitations and Future Directions

Several limitations in this study should be considered. Firstly, our study focused on youth sport at the secondary school setting. Team dynamics and expectations on sport performance in this context would likely differ from that of recreational or elite sport. More research could be done to explore the role of supporting staff in those contexts. Moreover, it is uncertain as to whether other conventional supporting staff (e.g., sport administrators, team managers) has sufficient knowledge and skills, or feels confident to promote PYD among youth athletes. It would be beneficial to explore their opinions with regards to their perceived ability and efficacy to promote PYD among youth athletes. Moreover, I did not measure student athletes' level of PYD as it is beyond the scope of this study. Future studies could measure changes in indicators of PYD over time to collect empirical data that can complement the qualitative evidence. Furthermore, close affiliation of sport CCAs to

the secondary school educational system in Singapore may be unique from other secondary school sport contexts. This strong connection to the school entails a greater alignment of the training environment in sport CCA teams with the schools' direction on holistic development and character building. Lastly, there was a gender imbalance observed in the participant coaches (25% females) and CCA teachers (75% females). This distribution reflects the natural population of coaches and CCA teachers in secondary school sports. Given that research have found that female coaches in youth sport settings provide a more supportive sporting environment and have a stronger tendency to emphasize effort over performance (Pieterse, 2018; Revesz et al., 2014), the gender differences would have influence over the qualitative findings derived from the responses of these adult leaders. Nonetheless, it reflects the predominant sporting environment that naturally exist in the ecosystem of youth sport in Singapore secondary schools. Future studies might want to investigate how the general motivational climate might be influenced or even balanced when adult leaders of different gender work closely together in youth sport teams.

4.5 Conclusions

By taking reference from the unique supporting role of CCA teachers, this study laid down foundational knowledge of the various roles that supporting staff can play in promoting PYD at the secondary school sport setting. Adopting an interpretivist approach, this paper accounted for the perspectives of athletes, coaches and supporting staff from secondary school sport teams to document effective practices adopted by supporting staff in promoting PYD. I presented a novel perspective that having educators support secondary school sport teams can increase the success of promoting PYD. This is due to them being able to resolve the challenges coaches typically face. However, I advocate that greater

collaboration and sharing of authority between coaches and supporting staff is crucial to effect PYD. Further research is needed to explore the influence of supporting staff in other sport contexts and for other supporting staff positions. More research and discourse are needed to resolve the feasibility of having such positions in youth sport teams that do not typically have supporting personnel. The practices adopted by supporting staff in this study can be incorporated into training programmes and initiatives to educate coaches and supporting staff on the best practices to promote PYD in secondary school sport.

CHAPTER 5 STUDY 3: TESTING THE EFFECTIVENESS OF A TARGET INTERVENTION INVOLVING CCA TEACHERS IN SECONDARY SCHOOL SPORT TEAMS

5.1 Introduction

School sport has been advocated as an appropriate setting to facilitate positive youth development (PYD) as it is the mission of schools to strive for holistic development of youth athletes (Holt et al., 2008). Danish and colleagues (2005) discussed how school sport inherently possess all eight features of positive developmental settings listed by the National Research Council and Institute of Medicine (2002). For instance, school curriculum and rules provide school sport teams a safe and stable environment conducive to learning. Above all, the school sport environment provides youth athletes access to sources of social support within (e.g., coaches, sport directors, sport administrators) and outside (e.g., teachers, school mates, counsellors) of sport training (i.e., supportive relationships). For a list and discussion of the eight features, see ‘Features of positive developmental settings’ of section 2.1.2. In Singapore, the Ministry of Education acknowledges this developmental role of school sport and has set it as an integral component of the after-school CCA system aimed at promoting ‘holistic development of students in terms of life skills, competencies and values’ (Ministry of Education Singapore, 2014).

As discussed in the Chapter 2, involvement in school sport has been associated with a wide array of positive developmental outcomes, some of which fall under the 4Cs (i.e., competence, confidence, connectedness, character) - the main framework for PYD in this thesis (e.g., Côté et al., 2010; Holt, 2016; Johnston, 2014; Vierimaa et al., 2012). At the

same time, school athletes may also be exposed to negative experiences that arise from the competitive nature of school sport. A detailed documentation of the positive and negative experiences related to youth sport participation has been presented in section 2.2.1 of Chapter 2. Similar to what has been found internationally (e.g., Camiré & Trudel, 2010; Harwood et al., 2015; Smith et al., 2007), local researchers have contended that the emphasis on winning in Singapore school sport could be creating an environment that brings about negative experiences for youth athletes that can undermine their development. Indeed, Koh et al. (2012) found that youth athletes in Singapore reported negative experiences such as performance pressures, social exclusion, and favouritism from the coach. Collectively, the competitive pressures of sport performance can harm the potential of school sport to facilitate PYD. To ensure that school sport facilitates holistic youth development, there is a need to understand the underlying processes of how it can lead to these negative outcomes and identify practices that negates their impact on youth athletes. This chapter attempts to address this issue.

Given that school sport is inherently a learning context (i.e., development of sport skills), an understanding of the motivational climate in sport teams can provide greater insight into how competition can influence youth outcomes. Specifically, the salience of competition in school sport calls for the appraisal of what success means and how it can be achieved – a core element of the study in motivational climate. This thesis therefore proposes for the consideration of motivational climate in investigating how school sport participation can impact PYD outcomes (see section 2.7 for a details discussion on the theoretical links between motivational climate and PYD). Indeed, studies have found that the motivational climate of youth sport teams and can greatly influence whether sport

participation leads to positive or negative outcomes (Duda & Balaguer, 2007; Harwood, et al., 2015; Wang, Li, Sun et al., 2010). Specifically, the definition of success and type of goal emphasized within youth sport teams may show features of either a task or ego climate (Newton et al., 2000). A task climate is one that encourages athletes to focus on personal improvement and effort, cooperative learning and makes athletes feel valued in the team. Conversely, an ego climate emphasizes outperforming others, punishment of mistakes and favouring of more abled athletes (Ames, 1992). While youth sport teams may possess features from both types of motivational climates (Gould et al., 2012; MacDonald, 2011; Schaillee et al., 2017), studies have consistently evidenced that a task climate is more closely linked to adaptive behaviours (i.e., proactivity, optimism) and positive developmental outcomes (i.e., increase self-esteem, development of resilience). On the other hand, an ego climate has been associated with maladaptive behaviours (i.e., selection of less challenging tasks, cheating) and negative youth outcomes (i.e., lowered self-esteem, diminished quality of relationships). It is therefore important to consider the role of motivational climates when targeting PYD of youth athletes.

More importantly, given that the objective of school sport is to facilitate PYD, it is key to consider practical strategies that can mitigate the negative impact of a competitive ego climate while accommodating task climate practices that are more conducive to PYD. To achieve this objective, this study employs the TARGET (Epstein, 1989) structures as a recommended strategy for promoting a task climate in youth sport settings (Ames, 1992; Cecchini et al., 2014; Theeboom et al., 1995). Please refer to Appendix C for details of TARGET components and recommendations, and also section 2.3.3 in Chapter 2 for a detailed description of relevant research findings. Briefly, the term ‘TARGET’ is an

abbreviation of six operationalized features reflective of a task climate (i.e., task, authority, recognition, grouping, evaluation, time). For example, the first letter of TARGET refers to ‘task’ which is related to the activities presented to youth athletes. It is recommended that tasks given to youth should be challenging, diverse and progressive in order to engage youth to expend effort and focus on individual improvement while avoiding social comparison and complacency (Ames, 1992; Nicholls, 1989). The advantage of the TARGET structures is its clearly stated guidelines that has been shown to provide practical and instructional recommendations (Prichard & Deutsch, 2015). The TARGET structures have been widely applied in physical education and academic classrooms and have shown success (Bortoli et al., 2017; Braithwaite et al., 2011). In recent years, a handful of studies (e.g., Cecchini et al., 2014; Theeboom et al., 1995) have tested the TARGET structures in the youth sport setting and found supporting evidence of its effectiveness in facilitating a series of positive developmental outcomes such as enjoyment, sense of competence, intrinsic motivation, and persistence in sport. However, the application of TARGET structures in the youth sport setting, particularly school sport, remains limited and current findings have typically employed cross-sectional designs (Digelidis et al., 2004; Hassan, 2011).

Notably, applying TARGET structures in youth learning context develops a sense of competence (Cecchini et al., 2014; Theeboom et al., 1995) that is fundamental to the development of general confidence among youth (Collins et al., 2018; Vealey et al., 2017). In Study 1, I provided evidence and discussed how holistic PYD might be more strongly anchored on confidence (amongst the other Cs) and yet in Study 2, there was evidence that developing the confidence of secondary school athletes did not seem to be a priority of

managing teachers. Applying TARGET structures into the routines of secondary school sport teams would therefore be beneficial to the facilitation of holistic PYD in this context.

Additionally, while these past studies have consistently highlighted the positive effect that the TARGET intervention have on promoting a task climate, its effect on the ego climate is less clear. For example, the intervention studies conducted by Theeboom et al. (1995) and Cecchini et al. (2014) only examined effects of positive development of youth participants but did not survey the effect of the intervention on the salience of an ego climate. Therefore, while there has been evidence of the positive impact of TARGET structures to facilitate PYD in youth sport, more research is needed to ascertain its effectiveness in facilitating PYD. For example, are TARGET interventions effective in promoting key PYD outcomes (e.g., 4Cs)? If so, what are the underlying processes to which TARGET interventions impact PYD outcomes? In light of the need for longitudinal evidence of PYD sport-based interventions, are the positive effects derived from TARGET interventions sustainable over time? These limitations call for more support for the effectiveness of the TARGET structures through empirical studies with longitudinal designs (Hassan, 2011).

Another emerging field of research in youth sport is the role of adult social agents. Research has shown that adult social agents (e.g., teachers, parents, coaches), particularly coaches, have a strong influence on the motivational climate in youth sport programmes (Ames, 1992; Smith et al., 2007). This is not surprising because coaches mostly dictate youth sport programmes (e.g., plan sport programmes, set-up training routines, select school representatives) and are in direct contact with youth athletes on a regular basis. It is therefore crucial that coaches create a positive motivational climate that facilitate PYD.

Although numerous intervention studies in the youth sport literature have advocated training and educating sport coaches to employ effective strategies to facilitate PYD outcomes, coaches face a multitude of challenges that hinder their ability to effectively apply PYD practices into their coaching (Camiré et al., 2013; Lacroix et al., 2008; Robbins & Rosenfeld, 2001). As documented in Chapter 4, the contributions of supporting teachers in school sport teams have been underrepresented in research despite them being well-positioned to complement coaches in promoting non-sporting, yet crucial aspects of PYD (Lemyre, 2007; Rathwell et al., 2014; Stuntz, 2016). To critically examine the effectiveness of the TARGET intervention, the roles played by supporting staff ought to be included.

With the objective of promoting PYD through sports, this study took reference from recent recommendations by established PYD scholars regarding the planning of PYD sport-based programmes (Gould & Carson, 2008; Haudenhuyse et al., 2012; Holt et al., 2017). A detailed review of this was presented in section 2.2.4 of Chapter 2. In response to these recommendations, the following approaches were adopted: 1) adopting an integrated guiding framework to guide the design and evaluation of the intervention (see Figure 1 taken from Chapter 2 below), 2) adopting a context-sensitive intervention design (i.e., participatory action research), 3) engaging effective and committed adult programme leaders (i.e., involving CCA teachers), and 4) exploring long-term effects of intervention (i.e., six months after intervention terminated).

For the final research question, this study sought to address the research gaps in PYD-based sport programmes by testing the effectiveness of a TARGET intervention, involving CCA teachers in secondary school sport teams, on facilitating 4Cs outcomes. To address this aim, three research questions were set:

1. How does a TARGET intervention involving CCA teachers affect PYD over time in secondary school sport teams?
2. How does a TARGET intervention with CCA teachers increase athletes' perception of a task climate?
3. How is the 4Cs related to the perception of a task and ego climate in secondary school sport teams?

Guiding framework. The design and evaluation of the intervention was guided by the same guiding framework which was introduced in Chapter 2. A detailed discussion of the rationale for adopting the framework is discussed in section 2.7 of the chapter. In brief, however, this guiding framework integrates the theoretically linked constructs of motivational climates and 4Cs into a single framework to more meaningfully connect intervention to PYD objectives. The adoption of the 4Cs as intervention objectives was further supported in Study 1 of Chapter 3 where the 4Cs displayed not only theoretical appropriateness but psychometric integrity in representing PYD in youth sport.

Specifically, the motivational climate created by adult social agents is perceived as a potential process through which sport participation impacts 4Cs of PYD. When youth athletes perceive a task climate in the team, they are more likely to experience the 4Cs. In this study, the TARGET intervention is adopted to promote a task climate that is believed to facilitate the development of the 4Cs. Details of the TARGET intervention is found under the section named 'Teachers' Handbook'.

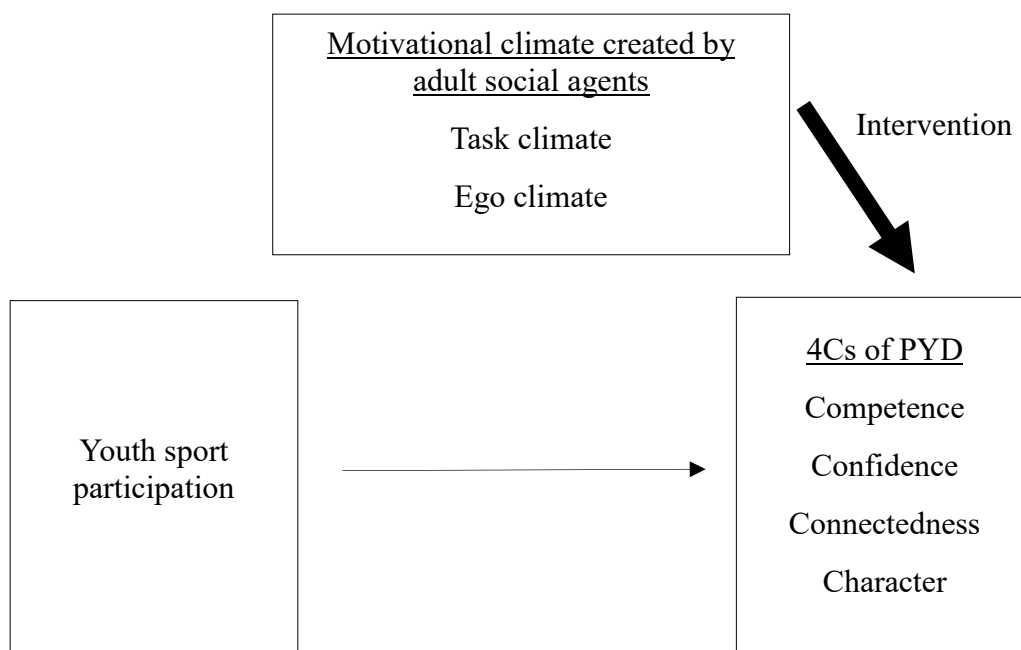


Figure 1. Guiding framework illustrating the link between youth sport participation and 4Cs PYD outcomes, with motivational climate as the intervention. (Taken from Chapter 2)

5.2 Method

5.2.1 Study Design

Study 3 adopted a quasi-experimental, multiple case study design to examine the effectiveness of a TARGET intervention programme. A mixed-method approach was adopted, consisting of a survey and interview.

Quasi-experimental design. This study employed a quasi-experimental design as the allocation of participants to control or intervention group was not random which is commonplace in educational and sport settings (Handley, Lyles, McCulloch, & Cattamanchi, 2018; Peters, De Bruin, & Crutzen, 2015). Specifically, randomly assigning individuals or groups to experimental or control groups would mean withholding potentially effective intervention from individuals, especially to those who might need it

more (Handley et al., 2018; West et al., 2008). Indeed, several participating schools had requested for low performing sport teams as well as teams with behavioural issues to be placed in the intervention. While non-equivalent control groups pose threats to internal validity, Peters et al. (2015) aptly opined that when implementing intervention, researchers should seek to work within real-world constraints and concerns rather than rigidly adhere to controlling for or eliminating these conditions in the name of internal validity.

Chiang, Jhangiani, and Price (2015) have advised that within the limitations of quasi-experiments, efforts to match participants in intervention and control group, combined with a pre-post test design, can support interpretations of intervention effects. This however needs to be supported by explanations against threats to internal validity such as history, maturation and regression to mean which can be achieved to a certain extent through matching. Comparison then focuses on the difference in trends between the intervention and control groups.

History refers to events that might have happened between pretest and posttest (e.g., students being exposed to the viral news of Joseph Schooling's gold medal win and became inspired of their sport endeavours). Maturation refers to changes that naturally occur among participants between pre- and post-test (e.g., students simply become more competent and confident in their sport ability as they received more training over time). Regression to mean refers to a tendency for an individual to score less extremely on a variable at post-test if he or she scored extremely on the pre-test (e.g., students who are extremely weak in their sport could respond extremely and would appear to score higher in the post-test even if the intervention did not have an effect).

Therefore, if students in the control and experimental groups can be matched (e.g., from the same school), comparisons can be made about the changes in their 4C scores before and after the intervention. If students in the intervention group increased in 4C scores after the intervention, it could be due to history (e.g., the news of Joseph schooling obtaining a gold medal inspired students to become more motivated and positive of their sport competence) or maturation (e.g., becoming more confident of their abilities over time). In this case, the control group should follow similar increase in scores since they are exposed to the same historical and maturation factors. However, if the control group did not show significant increase in scores, reasonable speculation can be made about the intervention having some effects. While this design and interpretation does not eliminate confounding variables it provides preliminary insights into the intervention that could inspire further investigation.

Given these considerations, I proceeded with the quasi-experimental design but took additional measures recommended by literature to reduce threats to internal validity and enhance causal interpretation. These measures included: 1) matching intervention and control groups on relevant covariates to reduce confounding variables (please see section 5.2.3 for details of how control and intervention teams were matched), 2) collection of data on multiple intervention groups to determine if intervention effects are robust across different settings (Handley et al., 2018).

Multiple case study. In line with a multiple case study approach, the intervention was tested at multiple sites (i.e., two schools) with multiple school sport teams (i.e., four sport CCA teams). This approach is appropriate in this study considering that each of the

three CCA teachers adopted a different set of TARGET strategies even though these strategies were derived from the same intervention protocol and TARGET recommendations. Applying this approach therefore allows for examining the effectiveness of the TARGET intervention as a whole and provide valuable insights into the processes of how individual practitioners adapted what they learn into their specific working contexts (e.g., secondary school sport teams). For example, this study reported information on the specific strategies that CCA teachers set after the intervention and also examined the successes and challenges each team faced for each strategy. It is noteworthy that while the TARGET structures have been adopted in previous intervention studies, little information is provided regarding how the recipients (i.e., coaches and CCA teachers) applied the structures into their day-to-day coaching or teaching. This information is critical as it would better inform practitioners on appropriate implementation strategies and possible pitfalls.

Mixed method design. A mixed-methods with sequential explanatory design was adopted to evaluate the intervention effects. Specifically, while quantitative data (i.e., from the statistical analysis of survey questionnaires) provide empirical evidence for the magnitude and direction of change following intervention (research questions 1, 2, & 3), qualitative data provide further explanation for the strengths and weaknesses of the various TARGET strategies (research questions 1 & 2). The insights from the latter provides context to the quantitative data and facilitate the generating of in-depth and new knowledge regarding how the intervention affected student athlete's 4Cs and perception of the motivational climate. This combined approach not only provides a broader understanding of a research problem but it also enhances the validity of the findings (e.g., Creswell, 2013; Leech & Onwuegbuzie, 2009; Newby, 2014).

Qualitative triangulation. This study collected qualitative data from multiple methods (i.e., mixed methods), multiple cases (i.e., different teams) and multiple respondents (i.e., coach, CCA teacher, student athletes) for the purpose of data triangulation. It is important to note that in line with a constructivist approach to qualitative enquiry, triangulation in this study aimed to provide multiple perspectives to the intervention to amplify viewpoints that is not captured in quantitative results (Creswell, 2013). This approach to triangulation is particularly beneficial to the Participatory Action Research (PAR) intervention design that examines real-world application of standardized intervention recommendations. It is crucial for follow-up action after intervention (e.g., modification of strategies to enhance effectiveness) and provides practical recommendations for future research and practice (e.g., how TARGET structures can be translated into actionable strategies).

5.2.2 Participants

Eight school sport teams were recruited from a range of sport teams: badminton ($n = 2$), basketball ($n = 1$), soccer ($n = 2$), and volleyball ($n = 3$). The sample ($n = 217$) consisted of 173 males and 44 females, aged between 14 and 17 years old ($M = 14.12$ years; $SD = .86$). The unequal gender sample was due to the natural gender distribution found in the sport CCAs for the two schools and for the general school population in the country. The gender imbalance is therefore not unexpected. For confidentiality purposes and to facilitate discussion of the participants, the two schools were identified as School A and B, CCA teachers as T1-T7 and coaches as C1-C7. For the two interviews (i.e., after intervention terminated and six months after), all CCA teachers ($n=3$), coaches ($n=3$), and six student athletes from each of the four intervention groups ($n=24$) were recruited.

Student athletes were nominated by CCA teachers and they were told to select student athletes based on two criteria: 1) student athletes must have attended at least 75% of the trainings during the intervention period, 2) a mixture of student athletes with and without leadership positions.

Profile of intervention groups CCA teachers. Table 5.1 presents the profile of the CCA teachers in the intervention groups (T1-T3). To note, CCA teacher 3 managed intervention group 3 and 4 (i.e., badminton boys' and badminton girls' teams). Nonetheless, as the CCA teacher managed the two teams independently hence were treated as separate teams. Specifically, the two teams trained separately and competed at different tournaments. More detailed demographic descriptions of the background training of each CCA teacher is found in Appendix D.

Table 5.1

Demographic Profile of CCA Teachers in Intervention Groups

Group	CCA team	Age	Gender	Experience as a sport CCA teacher	Experience with current sport team
1	Soccer boys	38	Male	12	12
2	Basketball boys	27	Male	3	2
3	Badminton (boys)	34	Female	6	4
4	Badminton (girls)		Same as Group 3		

5.2.3 Procedure

Approval was sought from the ethical review boards of Nanyang Technological University (see Appendix K) and Ministry of Education respectively. Eight government-funded, co-educational schools were randomly selected with each from the four school zones in Singapore (i.e., north, south, east, west). Email contact was established with the

Head of Departments for Physical Education (HOD/PE) who were informed of the study aims and recruitment criteria. The HOD/PEs were informed that teams needed to satisfy two selection criteria: 1) competed annually at national school competitions, and 2) athletes belonged to the same sport team for at least a year. Two schools accepted our request for participation and a total of seven teams were recommended by the HOD/PE. Of these teams, four teams were recommended by the two schools to participate in the intervention and CCA teachers accepted the invitation.

All participants signed a written informed consent form before the study commenced and parental consent was obtained from student athletes. The consent forms outlined the purpose of the study, participant involvement (i.e., survey, interviews, focus group discussions) and that there existed no potential risks from their participation in the study. Only CCA teachers, coaches and student athletes from intervention groups underwent interviews and focus group discussions. They were informed of the details for the interviews and focus group discussions in the consent forms. CCA teachers in the control condition were given reading materials similar to those in the intervention group. This is to reduce contamination effects (Sullivan, 2011) where CCA teachers in the intervention group share their knowledge with CCA teachers in the control group as they perceive that teachers in the intervention group has information that they do not have access to. Specifically, control group CCA teachers received the same information and presentation of information on PYD and motivational climates but did not received information on TARGET strategies which is the main intervention in this study. When asked if they had prior knowledge of motivational climates or the TARGET intervention, none the eight CCA teachers indicated that they have learned about or had training in these

areas. Some have mentioned that their pre-service training educated them on general principles of student motivation pertaining to more general theories like Self-determination theories (SDT).

Samples size for intervention ($n = 108$) and control group ($n = 109$) were fairly equal. Due to the quasi-experimental design adopted by this study, allocation of teams was guided by recommendations of the schools that have a tendency to recommend lower performing teams to participate in intervention programmes. Steps were taken to reduce other confounding factors by matching groups in the two conditions (Stuart & Rubin, 2008; Sullivan, 2011): 1) both groups contained teams from both schools to allow the elimination of school effects, 2) all sport teams were from coactive sport, as opposed to individual sport, to eliminate effect by type of sport, 3) each condition had one girls' team and three boys' teams to match the gender distribution.

Intervention. The intervention programme included intervention protocol and materials that considered the social and structural contexts of youth sport in Singapore (i.e., CCA teams in secondary schools). After an initial pilot study done with a school sport team not participating in the study, minor amendments were made to fine-tune the intervention protocol and materials. This was done to closely cater to the needs of and increase the meaningfulness of the intervention to participants. To this aim, a *participatory action research* (PAR) design offered an appropriate methodology.

Participatory action research (PAR). PAR is a qualitative approach to intervention design that emphasizes a democratic and equitable relationship that aims to empower participants to effect meaningful change (Brydon-Miller et al., 2011). Various studies have provided support for the usefulness of PAR approaches in understanding real-world youth

experience related to physical activity and sport in the school context (e.g., Enright & O'Sullivan, 2012; Holt et al., 2013; McHugh & Kowalski, 2011). The PAR approach was particularly appropriate to this study as it takes into account the unique context of each team by engaging supporting CCA teachers in the planning of intervention content. This has the benefits of empowering CCA teachers to initiate meaningful change in their teams. At the same time, leveraging on their knowledge of the specific needs of their team results in a more targeted intervention. This study adopted the five-phase approach to PAR recommended by Frisby, Crawford, and Dorer (1997) that was adapted originally from Green et al. (1995). Specifically, the phases involved: 1) CCA teachers in identifying problems (i.e., needs analysis with CCA teachers on team issues), 2) forging relationships (i.e., developing a collaborative, democratic partnership in designing TARGET strategies), 3) community mobilization (i.e., CCA teachers engaged in designing of TARGET strategies), 4) data collection and analysis (i.e., discussions with CCA teacher on challenges and solutions to application of TARGET strategies), and 5) execution (i.e., modifying team practices according to TARGET strategies).

Intervention protocol. Comprising of two stages (i.e., introduction, practical), the intervention lasted ten weeks and with three workshop sessions were centred round providing pedagogical strategies to CCA teachers through information-sharing (i.e., workshops) and discussions.

Introduction stage. This stage consisted of three two-hour workshops providing an overview of the main tenets of the intervention (i.e., PYD, motivational climates) and how they have been found to be important to positive youth development. Only CCA teachers were involved in the intervention workshops. The three workshops were guided by the

Teachers' handbook that is described in the next section. The workshops were conducted once every week for three weeks at the CCA teachers' preferred timeslot in their school. In line with a PAR approach, a needs analysis was conducted with CCA teachers in the first workshop to identify key issues that they faced in developing their student athletes. These were noted down for later discussion when co-creating the strategies to be applied for the intervention. This was done to more closely cater the intervention to the needs of the respective teams. CCA teachers were encouraged to apply what was discussed after each session in the week's CCA training and take note of their successes and challenges that would be discussed in the following week's workshop. For example, to encourage student athletes in the team to focus on effort, T1 introduced a monthly fitness test (i.e., beep test) into the team routine where student athletes are to record and track their own progress. This was applied in the following week during training. In my visit the week after, T1 and I discussed that the student athletes were receptive to the novel activity but did not have a structured method to track their progress. We agreed that they would log their scores in a notebook to facilitate them in tracking their progress and this would offer opportunities for T1 to identify and reinforce student athletes who show improvement. In this study, all three intervention teams set a fitness task (i.e., beep test, 2.4km run) under the TARGET component of 'Task'. Under this component, the recommendation is to allocate activities to youth athletes that are diverse in standards to encourage them to focus on mastery and personal development. The CCA teachers set a fitness task with the aim of getting student athletes to work on progressive goals set by themselves which was intended to nurture the achievement of own goals rather than measure themselves against a normative standard. The fitness task was therefore selected because it concurrently satisfied the

recommendation of the TARGET component (i.e., Task), which is the focus of this study, and builds the fitness of the student athletes. Indeed, participants highlighted that they felt this task served to build their competence and confidence in their sporting abilities. Nonetheless, given this is largely a fitness task, its effect on the other Cs such as connectedness and character might be less pronounced, nor does it fulfill all the other TARGET components. Therefore, it is crucial that multiple strategies are set to ensure that all TARGET components are addressed. Indeed in this study, all CCA teachers covered at least five out of the six TARGET components to maximize the impact the TARGET intervention have on the development of the athletes as they were encouraged to do so.

Practical stage. After the three workshops were completed, all CCA teachers who underwent the intervention were told to apply what they have learned in the intervention into their respective team training over the course of seven weeks. I made on-site visits (once every 2 weeks) where I observed the training sessions at the individual teams' training venues and recorded field notes for later evaluation and discussions with the CCA teachers pertaining to their implementation of the strategies. The discussions were done at the end of each observation. This allowed me to provide timely feedback to CCA teachers on observed behaviours relating to the application of the planned strategies and provided them with the opportunity to raise any issues or doubts to be addressed. The CCA teachers and I would then brainstorm and modify the strategies where necessary. This process engaged the CCA teachers in the planning and decision-making process which encouraged them to reflect on their current practices and empower them to take ownership of the intervention. These discussions resulted in some modifications to the TARGET strategies planned. For example, T3 planned to get the team captain to conduct the weekly 2.4km

team runs to ensure that the student athletes take the exercise seriously. I suggested that she could assign the task to all the seniors, in the spirit to give more student athletes authority. She agreed and made the change in the following week's training.

Teachers' handbook. A 21-paged handbook was written to guide the intervention process for purpose of standardization. The purpose of the contents was to educate CCA teachers on the concepts of PYD and motivational climate in sport and how a task climate can be created using TARGET structures. All contents and findings presented to the CCA teachers were based on prior empirical support conducted by scholars and researchers of PYD and motivational climates. The contents of the handbook were organized into three sections according to the three weeks of the introduction phase in the intervention. Each section comprised of educational information, and sections named 'Reflection' and 'Action plan' where CCA teachers were asked to consider challenges and successes experienced from applying the TARGET strategies set. TI would then discuss the individual CCA teachers on solutions to the challenges and make appropriate amendments to the strategies to increase their effectiveness. For example, T2 wanted to conduct the beep test, a fitness test, on a weekly basis. However, after the first week of testing, he noticed that it took up considerable amount of time. After discussions with me, we agreed to change the frequency of the test to once every month. Table 5.2 below summarized the breakdown of the contents for the three workshops. For a detailed description of contents and activities for each workshop, please see Appendix E.

Table 5.2

Workshop Focus and Summary of Main Contents for Each Week of Workshop

Workshop focus	Main contents
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Week 1: PYD and motivational climates	<ul style="list-style-type: none"> • Introduction on PYD in sport and the 4Cs • The need for deliberate planning for PYD to occur in youth sport. • Introduction of task and ego climates and their effect on youth motivation in sport • TARGET structures • Setting preliminary TARGET strategies to apply into team's training
Week 2: Working with coaches to create a task motivational climate in sport CCA.	<ul style="list-style-type: none"> • Re-visit and clarification of concepts in PYD (4Cs) and motivational climates (task and ego) • Brainstorm on how coaches can facilitate application of TARGET structures • Troubleshooting and feasibility assessment of TARGET strategies applied
Week three: Getting ready to apply TARGET strategies	<ul style="list-style-type: none"> • Troubleshooting of challenges faced in implementing TARGET strategies • Finalizing TARGET strategies for practical phase

Data collection. In line with a mixed method design, both quantitative and qualitative data were collected.

Quantitative data. Pre- and post-data were collected before, immediately after, and six months after the intervention protocol ended. Post-intervention evaluation was done immediately after the last week of the practical stage where student athletes in both intervention and control groups completed evaluation questionnaires similar to the one given during pre-intervention. Arrangements were made with the various schools to gather student athletes, coaches, and CCA teachers involved to complete the questionnaires in their respective schools before their usual sport training. All surveys were conducted by me and I was present throughout the survey timeslots to answer all queries by the participants.

Interviews and focus group discussions. This study collected qualitative data from multiple respondents (i.e., student athletes, coaches, CCA teachers) with the aim of

providing a more comprehensive account of the intervention effects as it reduces biasness that may arise from retrospective accounts of human behaviour (Golden, 1992).

Specifically, one-to-one, semi-structured interviews were conducted with the coaches and CCA teachers while focus group discussions were conducted with the student athletes. This was done immediately after the intervention and six months after the intervention ended.

The interview and focus group discussion procedures were similar to those presented in Chapter 4. A summary of the procedure is presented here for convenient reference. Each focus group was limited to a size of six to eight student athletes as suggested by qualitative researchers (Krueger & Casey, 2014). Focus group discussion participants were selected by CCA teachers based on the criteria: 1) have at least 75% attendance at training sessions, 2) the group should consist of a mixture of student athletes from both the main competitive team and those who were not. All interviews and focus group discussions were audio-recorded with participants' permission for later analysis. Discussions were facilitated by me who had two years of training in qualitative research (i.e., attended courses in qualitative research at the graduate level) and prior experience with conducting focus group discussions. Interviews lasted from 40 to 75 minutes while focus group discussions lasted from 45 to 90 minutes. Unique to this phase was that after going through the standard interview guide, the CCA teacher was presented with summarized combined findings derived from the focus group discussions and coach interview of the team. This was done to inform the CCA teacher of how the applied strategies were perceived by the student athletes and coaches. This was meant to facilitate further reflection and learning that could guide improvements to the individual strategies planned by the CCA teachers.

5.2.4 Measures

Questionnaires. This study used the Positive Youth Development (PYD) toolkit and the Perceived Motivational Climate Questionnaire in Sport-2 to measure the changes to the PYD and motivational climate respectively.

Positive Youth Development toolkit (PYD). A detailed description of the PYD toolkit and its validation was presented in Chapter 3. Briefly, the PYD toolkit consisted of a battery of measures chosen based on Vierimaa et al.'s (2012) review of PYD literature regarding measures of the 4C's in youth sport contexts (i.e., competence, confidence, connectedness, and character). Competence was measured through coaches and student athletes' subjective ratings of each athlete, while self-report questionnaires were used for measuring confidence, connectedness to coach, and character. An additional section was created for connectedness to CCA teacher by adapting the questionnaire used for connectedness to coach.

Specifically, the referent was changed from 'coach' to 'CCA teacher' For example, "I feel close to my coach" was changed to "I feel close to my CCA teacher". Reliability of the subscales was consistent with Study 1 and ranged from good (>.80) to excellent (>.90) with Cronbach α values .82 for perceived competence, .89 for observed competence, .89 for confidence, .94 for connectedness with coach, .95 for connectedness with teacher, .79 for antisocial, and .86 for prosocial.

Perceived Motivational Climate Questionnaire in Sport-2 (PMCSQ-2). This instrument was created by Newton et al. (2000) to evaluate how athletes perceived the motivational climate of the team created by the coach. The questionnaire consisted of 33

items with 6 subscales covering the dimensions of a task (e.g., “*athletes’ help each other learn*”) and ego (e.g., “*the coach gets mad when an athlete makes a mistake*”). The items are scored on 7-point Likert scale from 1=*strongly disagree* to 7=*strongly agree*. An ego and task climate scores were calculated by summing up the scores for items belonging to each subscale. The reliability and validity of this measure has been established in other studies (e.g., Chian & Wang, 2008; Duda & Balaguer, 2007; Newton et al., 2000). Cronbach α values calculated for the current study were .91 for task and .88 for ego.

Interview guide. Two sets of interview guides were developed for: 1) CCA teachers and, 2) student athletes and coaches for the intervention groups (see Appendix F). All interviews and focus group discussions followed a standardized interview guide but differed in the specific TARGET strategies being discussed with each intervention group. The interview guides were divided into three sections. The first section consisted of introductory questions to help me build rapport with the participants (e.g., ‘How has the team been so far this season?’). This was followed by questions relating to the effectiveness of each TARGET strategy applied by the CCA teacher (e.g., ‘How do you think [TARGET strategy] affects the student athletes in the team?’). The third section composed of closing questions to prompt participants for any additional comments on (e.g., ‘Is there anything you would like to add with regards to how your CCA teacher can help promote positive development among the student athletes in this team?’). For CCA teachers, an additional closing question pertained to comments regarding the intervention programme was asked (e.g., ‘Any comments on how you think the programme can be improved?’).

5.2.5 Data Analysis

Quantitative analyses. The statistical programme IBM SPSS Statistics version 22.0 was used for all data analyses. Two separate repeated measures multivariate analysis of variance (MANOVA) was performed to examine the effect of the intervention programme over the three test phases (i.e., pre-test, post-test, six months after) on the 4Cs and motivational climate respectively. MANOVA was used as Study 3 examined the effect of the intervention on multiple dependent variables (i.e., seven 4C variables and two motivational climate variables). The concurrent analysis on multiple dependent variables (as opposed to a series of ANOVA tests) reduces inflation of the family-wise Type I error rate and a potential decrease in power when the dependent variables are correlated with one another (Huberty & Olejnik, 2006).

For 4Cs, seven dependent variables were considered in this study: 4Cs of PYD (perceived competence, observed competence, confidence, connectedness with coach, connectedness with CCA teacher, prosocial, antisocial), while for perceived motivational climate there were two dependent variables (task, ego). The independent variable was the TARGET intervention programme. The significance criterion was $p < .05$.

A preliminary one-way MANOVA conducted at pre-intervention found significant differences between intervention and control groups for factor scores $F(9, 207) = 1671.90$, $p = .02$. Given the non-random allocation of teams to both groups, differences among the scores reported by teams from the intervention and control groups were expected. As a result, separate repeated one-way MANOVAs were then conducted for intervention and control groups respectively as non-homogenous scores prior to intervention can mask intervention effects. Therefore in this study, positive intervention effect would be

concluded for a variable if the intervention group displayed more favourable changes in scores compared to those in the control group. Follow-up univariate analyses and post hoc tests using Bonferonni correction was conducted to examine changes in scores for each variable over the three time points.

To establish construct validity in the relationships between PYD and motivational climate, Pearson's r correlation analysis was conducted between 4Cs and motivational climate factors. Conventional values for strength of correlations were used (weak: $r < .30$, moderate: $.30 < r < .70$, strong: $r > .70$).

Management of missing data. Initial MANOVA resulted in the omission of 110 (out of 217) cases from listwise deletion. Descriptive overview of the nature of missing data indicated no observable trend to the missingness. All missing data belonged to sporadic items that participants had skipped and was scattered throughout the data set. Moreover, the missing data also did not show any observable relationship with any values. As missing data can be assumed to be missing at random, the expectation-maximization (EM) imputation approach was adopted to recover missing values (Nakai & Ke, 2011). EM involves a two-step approach: 1) means and covariance matrix are generated based on original complete data and expected missing values are "recovered" through a regression imputation process, and 2) a new means and covariance matrix is estimated using the new imputed data and the process is repeated until convergence is reached. Follow-up post-imputation analyses showed that many of the main effects, previously non-significant were now significant with no change in the direction of relationships. Therefore, the missing data analysis was a necessary step that helped increase the statistical power and improved the precision of the statistical effects.

Multivariate assumptions. The data was examined for violation of MANOVA assumptions. The skewness and kurtosis of all items fell within the range supporting univariate normality. Following the univariate tests of normality, Mahalanobis distances were calculated to test for multivariate normality. Only three cases were found to violate accepted p -value of .001. A sensitivity test was done by comparing the results of a means comparison with and without the three items. As there was no significant difference to the results of the test, all items were retained. No multicollinearity was observed (i.e., no correlations exceed recommended critical value of .70) (Tabachnick & Fidell, 2013) and the relationship between dependent variable were linear. For follow-up univariate analyses, Mauchly's test of sphericity was conducted. For dependent variables that violated the test (i.e., $p > .05$), correction was done to the degrees of freedom by using Greenhouse-Geisser (i.e., $\epsilon > .75$) correction. Given these results and follow-up corrective measures taken for violations to assumptions, the use of MANOVA was justified.

Qualitative analysis. All interviews and focus group discussions were audio-recorded and transcribed verbatim using the QSR software NVivo 11. The qualitative analysis was guided by a constructivist paradigm where meaning is derived from the subjective experience of individuals and truth is socially constructed from and relative to individuals' perspective (Searle, 1995).

Thematic analysis. Thematic analysis was adopted to examine the qualitative results. The analysis involved breaking down the transcripts into meaning units known as codes. Similar codes are grouped to form higher order themes that served to answer the research question (Braun & Clarke, 2013). In this study, qualitative data served to provide

insights into the effects of the TARGET intervention. This study observed a two-step procedure to thematic analysis that accommodates the multiple case study approach that involved varying strategies being examined. Specifically, inductive analysis was first conducted separately for transcripts of the three intervention groups. Transcripts belonging to the respective intervention teams were analysed separately to ensure that analysis of responses were in-depth and not biased by data from the other teams. This was followed by a deductive analysis of themes derived from subthemes across transcripts from all three intervention groups.

For inductive analysis, I searched for opinions on the positive impact on challenges faced related to the specific TARGET strategies implemented by the participants (i.e., student athletes, CCA teacher, coach) in each team. This was done using a five-step analysis procedure recommended by Braun and Clarke (2013). This began with me immersing myself and getting familiarising with the data by reading the transcripts several times. Next, the texts were divided into meaning units (i.e., sentences) that were labelled according to the meaning they conveyed (e.g., 'trains stamina'). Next, codes that were semantically similar were grouped into subthemes while similar subthemes were grouped into themes. For example, the codes 'trains stamina' and 'trains agility' were grouped together to be placed under the subtheme of 'Increase fitness'. This is followed by the reviewing the groups of codes by examining whether they are linked to each other in a meaningful way and fit together in a logical structure with regards to the overarching research questions. To facilitate the deductive analysis, reviewing of codes involved using common labels for subthemes that conveyed similar meanings across transcripts from different intervention teams. For example, the codes 'continue pushing' from G1 and 'to

not give up' from G3 were changed to 'never-give-up attitude' since both refer to having a positive attitude of showing resilience in the midst of difficulty.

To answer research question 1 (i.e., effect of TARGET intervention involving CCA teachers on PYD) and 2 (i.e., effect of TARGET intervention involving CCA teachers on motivational climate) a deductive analysis was done across the three sets of subthemes. Specifically, relevant subthemes were categorized under the themes belonging to the PYD (i.e., 4Cs) and motivational climate (i.e., ego- or task climate) where appropriate.

Qualitative rigour. Steps taken to ensure qualitative rigour was similar to those discussed in Chapter 4. The summarized account is presented here for convenient reference. Firstly, member reflections were adopted where important points of discussion were noted during the conversations and summarized at the end of each session to allow participants to consider and expand on what was shared. This enhanced the credibility and richness of the accounts of how the various social agents (i.e., CCA teachers, coaches, student athletes) perceived the effectiveness of the intervention.

To encourage trustworthiness of the analyses, my supervisor, who is an established qualitative researcher, reviewed the summary of the coding structure with representative quotes. He acted as critical friend by challenging me to reflect upon my interpretation and decisions made during data analysis. This was done to ensure that codes and themes represented the data and the coding process was not 'forced' or biased (Corbin & Strauss, 2008; Tracy & Hinrichs, 2017). For example, the subthemes 'effort and improvement', 'cooperative learning' were initially labelled as themes rather than subthemes. However, probing from my supervisor helped me realized that they were more appropriately grouped

as subthemes under the main theme of ‘task climate’ to answer the research question on how the intervention influenced the motivational climate of the intervention groups.

5.3 Results

This section presents the quantitative and qualitative results from the respective analyses. Quantitative results are first presented to provide statistical evidence to the effects of the intervention (i.e., TARGET strategies) through examination of the 4Cs and motivational climate scores over the three time points (i.e., pre-, post-, 6 months after intervention). This is followed by a presentation of the qualitative findings on how participants perceived the TARGET strategies to impact the development of student athletes. In-line with a mixed methods methodology, qualitative findings were discussed in relation to quantitative results to provide greater insight into the observed trends (Creswell, 2003).

5.3.1 Quantitative Results

5.3.1.1 Descriptive statistics

Descriptive statistics for overall sample, control and intervention groups are reported in Table 5.3. When observing the intervention and control groups combined, there were general decreasing trends in scores for all of the 4Cs and motivational climate variables except for perceived competence, observed competence, and ego climate for the sample. For information on the statistical significance of changes over time, see section below on “MANOVA analyses for 4Cs factors. Observed competence saw an increasing trend (7.88 ± 2.32 vs 8.91 ± 2.79 vs 9.13 ± 2.87) while ego climate score was observed to decrease from pre- to post-intervention but increase at six months after intervention

(68.05±16.29 vs 65.66±16.49 vs 68.24±15.88). There was no change observed in perceived competence for both intervention and control groups.

Table 5.3

Descriptive Statistics and t-Tests at Pre-intervention

4Cs Factors	Range		Overall		Control		Intervention		t-Test	P
	Max	Min	Mean	SD	Mean	SD	Mean	SD		
Perceived competence	3	15	10.17	2.23	10.12	2.00	10.22	2.44	.34	.73
Observed competence	3	15	7.88	2.32	7.97	2.49	7.78	2.13	-.62	.53
Confidence	5	20	13.52	3.27	13.62	3.21	13.42	3.34	-.46	.65
^a Connect with Coach	11	77	57.56	12.01	58.53	11.40	56.58	12.56	-1.20	.23
^a Connect with Teacher	11	77	58.99	11.91	61.06	11.89	56.89	11.61	-2.62	.01
Prosocial behaviour	7	35	24.23	5.01	24.67	4.85	23.78	5.16	-1.30	.19
Antisocial behaviour	13	65	23.23	7.51	21.88	6.61	24.59	8.13	2.70	.00
Task	17	119	94.68	14.64	97.09	13.36	92.25	15.51	-2.46	.02
Ego	16	112	68.05	16.29	68.16	16.25	67.94	16.41	-.10	.92

Note. ^aConnect refer to connectedness

After finding a significant effect of condition (i.e., control vs intervention) at pre-intervention, a series of t-tests were conducted to compare the factor scores between the control and intervention groups. Specifically, the control group scored higher than intervention group on connectedness with CCA teacher, $t(215) = -2.62, p = .01$, task climate, $t(215) = -2.46, p = .02$, and task climate by CCA teacher $t(215) = -2.21, p = .03$. The intervention group scored higher on antisocial behaviour, $t(215) = 2.70, p = .00$. These differences were expected given that the participating schools were adamant at recommending weaker teams (i.e., more discipline issues, poorer performance) into the

intervention. This was a unique yet unavoidable challenge as it is difficult to remove selection bias from groups (e.g., classes or school sport teams) unlike when working with individuals. This affirmed the importance of conducting separate MANOVAs especially when there were statistically significant differences in some of the subscale scores measured. It was therefore appropriate that separate MANOVAs were conducted for intervention and control groups.

5.3.1.2 MANOVA analyses for 4Cs factors

To examine if the intervention had an effect on the 4Cs scores, separate one-way repeated MANOVAs were conducted for the intervention and control groups respectively. A significant effect of time on 4Cs factors were observed for both intervention, $F(14, 94) = 4.95, p < .0005, \text{partial } \eta^2 = .424$) and control group, $F(14, 95) = 7.96, p < .0005, \text{partial } \eta^2 = .540$) suggesting that there were statistically significant changes for at least one of the subscale scores measured over time.

Follow-up univariate analyses found different trends in scores between control and intervention groups for five of the seven 4Cs factors. Table 5.4 summarized the changes in 4Cs scores over the three time points for the control and intervention group. For more detailed MANOVA results, refer to Appendix I. For these factors, significant changes were found over the three time points in the control group but not the intervention group. For the control group, four of the 4Cs factors saw a general decrease over the three time points: confidence (13.62 ± 3.21 vs 13.03 ± 2.71 vs 13.52 ± 2.90), $F(2, 216) = 3.22, p = .044$ partial $\eta^2 = .029$; connectedness with coach (58.53 ± 11.40 vs 55.97 ± 11.93 vs 54.92 ± 13.58), $F(1.87, 202.40) = 5.73, p < .004, \text{partial } \eta^2 = .050$; connectedness with CCA teacher (61.06 ± 11.89

vs 58.41 ± 11.12 vs 56.83 ± 12.35) $F(1.85, 199.81) = 8.95, p < .0005$, partial $\eta^2 = .076$;
 prosocial behaviour (24.67 ± 4.85 vs 23.37 ± 4.76 vs 23.39 ± 4.87), $F(2, 216) = 6.70, p = .002$,
 partial $\eta^2 = .058$. For these factors, changes in scores observed was significant from pre to
 post-intervention. However, was not significant from post- to six months after. This
 suggests that the positive changes during the intervention period were sustained, at least for
 six months, after it terminated. Antisocial behaviour scores for the control group increased
 from pre- to post-intervention and decreased at six month after intervention (21.88 ± 6.61 vs
 23.78 ± 7.53 vs 21.73 ± 6.79), $F(1.87, 201.42) = 6.92, p = .002$ partial $\eta^2 = .060$, whereas for
 the intervention group, antisocial behaviour remained stable over time. The higher scores
 for the intervention group could be explained by the teams' profiles as schools had
 requested for low performing teams as well as those exhibiting behavioural problems to be
 in the intervention.

Table 5.4

Summary of MANOVA Results for Comparison of Change in Variable Scores for Intervention and Control Groups Respectively

Variables	Control			Intervention		
	T1 vs T2	T2 vs T3	T1 vs T3	T1 vs T2	T2 vs T3	T1 vs T3
Perceived Competence		-			-	
Observed Competence	Increase	-	Increase	Increase	-	Increase
Confidence*	Decrease	-	Decrease		-	
Connectedness with Coach*	Decrease	-	Decrease		-	
Connectedness with CCA Teacher*	Decrease	-	Decrease		-	
Prosocial*	Decrease	-	Decrease		-	
Antisocial*	Increase	Decrease	-		-	
Task*	Decrease	-	Decrease	-	-	-
Ego*	-	-	-	-	Increase	-

Note. *Difference found in trends of score over time between intervention and control groups. '-' represent non-significant change in score. 'N.A' means not applicable as there was no corresponding qualitative data observed.

5.3.1.3 MANOVA analyses for motivational climate factors

Separate one-way repeated MANOVAs found a significant effect of time on motivational climate factors for both intervention group, $F(4, 104) = 4.215, p = .003$ partial $\eta^2 = .14$) and control group $F(4, 105) = 4.00, p = .005$ partial $\eta^2 = .131$) respectively.

Follow-up univariate analyses found different trends in scores between intervention and control groups for task and ego climate (see Table 5.4). Task scores generally decreased over the three time points for the control group (97.09 ± 13.36 vs 93.06 ± 14.42 vs 93.24 ± 14.40), $F(2, 216) = 6.87, p = .001$ partial $\eta^2 = .060$. The increase from post- to six months after intervention was not significant. This suggests that in the absence of the TARGET intervention in the control group, student athletes' perception of a task climate reduced as the season went along. On the other hand, student athlete's perception of a task climate in the intervention group was preserved as there were no significant changes observed across the three time points. For ego climate scores, there were no significant changes observed over the three time points in the control group. In the intervention group, while there was no significant change in scores from pre- to post-intervention, and scores increased at six months after intervention (67.94 ± 16.41 vs 65.04 ± 16.11 vs 68.82 ± 15.58), $F(2, 214) = 3.25, p = .041$ partial $\eta^2 = .029$. There was however no significant difference from pre- to six months after intervention, $p > .05$. These findings suggest that the intervention did not have a significant effect on reducing student athletes' perception of an ego climate since both groups saw no statistically significant change in ego climate scores from pre- to six months after intervention. This finding was unexpected given that prior research found positive effects of TARGET interventions on alleviating an ego climate. This will be further discussed in section 5.4.1 of this chapter.

5.3.1.4 Correlations between 4Cs and motivational climate factors.

In general, 4Cs factors were found to be correlated with task and ego climate. Details of all correlations among factors at the three time points are presented in Appendix G. Trends in correlation between 4Cs and motivational climate factors appeared to be fairly consistent for all three time points.

It appears that 4Cs factors showed stronger correlation with task climate than ego climate. Task climate consistently showed statistically significant correlation with six out of seven 4Cs factors (i.e., excluding antisocial behaviour) at pre-intervention ($r = 0.20 - 0.60$), post- ($r = .20 - .59$) and six months after intervention ($r = .38 - .71$) across control and intervention groups. For these six 4Cs factors, correlations between ego climate and the 4Cs were ranged from non-significant to weak, but in the negative direction ($r = -.17$ to $-.30$). These findings suggest that positive 4C developmental outcomes (i.e., competence, connectedness with coach and teacher, and prosocial behaviour) were more strongly linked to perception of a task climate than ego climate. Ego climate on the other hand was closely linked to the only negative 4C outcome of antisocial behaviour ($r = -.21$ to $-.4$).

Collectively, the quantitative results in this section suggest that the intervention had a positive and statistically significant, albeit modest, impact on most areas of student athletes' positive development through preserving scores that otherwise were observed to decline (i.e., in control group). In the next section, qualitative findings provide insights into how the TARGET intervention could have resulted in the quantitative trends observed.

5.3.2 Qualitative Results

In general, the qualitative data supported the qualitative findings. Participants in the intervention groups could identify specific areas of PYD that respective TARGET strategies impacted. Participants also listed challenges pertaining to the implementation of the TARGET strategies that should be considered in interpreting the quantitative results (i.e., effectiveness of TARGET intervention in facilitating 4Cs). In particular, these challenges may provide contextual understanding to the changes observed in the intervention group. An integrated discussion of both quantitative and qualitative results will be presented in the discussion section. Table 5.5 summarizes and integrates the quantitative results and whether they are supported by qualitative results.

Table 5.5

Comparison of Change in Variable Scores over Time Points between Intervention and Control Groups, and Support from Qualitative Results

Variables	Quantitative						Support Qualitative results
	T1 vs T2	Control T2 vs T3	T1 vs T3	Intervention			
				T1 vs T2	T2 vs T3	T1 vs T3	
Perceived Competence		-			-		Yes
Observed Competence	Increase	-	Increase	Increase	-	Increase	Yes
Confidence*	Decrease	-	Decrease		-		Yes
Connectedness with Coach*	Decrease	-	Decrease		-		Yes
Connectedness with CCA Teacher*	Decrease	-	Decrease		-		Yes
Prosocial*	Decrease	-	Decrease		-		Yes
Antisocial*	Increase	Decrease	-		-		N.A
Task*	Decrease	-	Decrease	-	-	-	Yes
Ego*	-	-	-	-	Increase	-	Yes

Note. *Difference found in trends of score over time between intervention and control groups. ‘-’ represent non-significant change in score. ‘N.A’ means not applicable as there was no corresponding qualitative data observed.

The qualitative results in this section was organized to cater to the multiple case analysis approach. Data was first inductively analysed from each intervention group separately to form codes and subthemes. Please refer to Appendix H for tables of subthemes and sample codes derived for each intervention team. Common themes were deductively coded from the subthemes collected to have a broader view of how the intervention impacted the 4Cs and motivational climates. To address research questions 1 (i.e., effect of intervention on PYD outcomes) and 2 (i.e., effect of intervention on perception of motivational climate), this section was organized according in two main sections (i.e., positive impact, challenges). Each section is organized according to the themes derived from the analysis (i.e., 4Cs and task climate). Each theme (e.g., competence) is further divided into subthemes that were matched to relevant TARGET structures (e.g., Task - increase fitness). This is done to provide clarity on which TARGET structures were linked to specific outcomes reported by participants. Tables 5.6 and 5.7 display the final summary of themes, subthemes, and codes derived from the two-step (inductive-deductive) thematic analysis. Relevant quotes from the interview transcripts were cited to anchor the discussion. For confidentiality and discussion purposes, CCA teachers were labelled as T1, T2, and T3, coaches as C1, C2, C3. Student athletes were labelled as S1, S2, S3 and S4 according to the focus group that they were interviewed in.

5.3.2.1 Positive impact of TARGET strategies

Applying the TARGET strategies appeared to have a positive impact on student athletes' 4Cs (i.e., competence, confidence, connectedness, character) and also create a task climate. This section presents details of the specific effects the TARGET strategies had on

each of the 4Cs and on facilitating a task climate. Table 5.6 summarised the themes and subthemes of positive effects from the TARGET strategies.

Competence. Participants responses showed that the strategies related to task, evaluation and time contributed to the sport competence of student athletes in terms of their fitness and sport skills. Selecting tasks related to fitness activities that had achievable progression motivated student athletes to pursue continual progress in their fitness. This in turn benefitted overall fitness and sport competence since physical fitness forms an important foundation for sport competence. Engaging student athletes in reflection and providing additional time for extended practice reinforced and deepened their learning process thereby increasing the chances of student athletes experiencing skill mastery.

Task - Increase fitness. CCA teachers, coaches, and student athletes across all three groups agreed that the fitness tasks contributed to their physical and sport related competence. S1 and S2 student athletes reported that the beep test gave them more opportunities to improvement their physical fitness. Several S3 and S4 student athletes shared about the weekly 2.4km team runs and agreed that even though it was tiring, it helped them improve their stamina which they lack. One of the student athletes from S3 shared:

It [2.4km team runs] was really tiring at the beginning, some of us weaker ones were lagging behind. But after two months I think the slower ones were lagging behind less and we felt less tired. For me I think I also have more stamina during PE.

Table 5.6

*Summary of Themes, Subthemes and Sample Codes for Positive Effects of TARGET**Strategies reported by Intervention Groups*

Themes	Subthemes	Sample codes	*TARGET Structure
Competence	Increase fitness	Trains stamina	Task
	Improve sport skills	Work on weaker skills	Task, Time
	Encourages reflection on strengths and weaknesses	Aids in students setting goals to work on weaknesses	Evaluation
	Enhance quality of training	More targeted training	Time
Confidence	Bolster confidence after losses	Main team students feel less discouraged when lose games	Recognition
	Reframe negative self-concept	Help student see themselves in a better light during difficulties	Recognition
Connectedness	Contribute to team bonding	Feel closer to seniors	Authority, Time
	Build CCA teacher-student relationship	Help CCA teacher get to know students better	Recognition
	Facilitate more meaningful communication with CCA teacher	Efficient method to identify student problems and offer solutions	Evaluation
	Build coach-student relationship	Feel closer to coach	Time
Character	Nurture perseverance	'Never give up' attitude	Task
	Nurture responsibility	Be responsible for tasks	Authority
Task climate	Effort and improvement	Allow emphasis of effort over performance	Recognition
	Important role	Attention from CCA teacher makes student feel important to team	Recognition

Note. Under 'TARGET structure', subthemes are matched to the relevant TARGET structures responsible the subtheme being referred to.

Having progressive levels in the task had the effect of motivating student athletes to desire improvement. A student athlete from S1 commented:

I think it [beep test] helped us become fitter. Many of us tried to go to the next level at every test. Mr H asked us to record it down so we can track our scores. I think it helped us want to improve. During training we mostly do technical stuff but do not really get to train physical skills so the beep test helped us get fitter.

T1 agreed and explained that the progressive nature of the beep test scoring makes improvement more achievable and that has the effect of motivating further improvement:

There are levels and sublevels in the [beep] test. It is easier to progress in the sublevels and I think it made it easier for the kids to see improvement and track it. I could see a

lot of them trying to move on to the next sublevel and they will tell me that “Mr H, today I went to the next sublevel” and I commend them for it. So in general I think it made it easier to taste success and is motivating in that sense. Some of them do feel disappointed when they do not do as well for whatever reason. So I guess getting them to think about wanting to get better, to perform, is already a success.

Task - Improve sport skills. The fitness test, while focused on physical fitness rather than sport skills, indirectly benefitted student athletes’ mastery of their sport skills in two ways. Firstly, it reduces the time and effort that the coach has to spend to developing their fitness, freeing up more contact time to focus on sport specific skills. T3 explained this:

I think it is good, because sometimes there is not enough time during training to do PT [physical training], especially during competition period. So getting the kids to do the run trains them up while coach can focus on court skills when she sees them.

Secondly, attaining a basic level of physical fitness maximized sport specific training. While this was not discussed by student athletes or CCA teachers, C2 and C3 discussed about how the increase in fitness indirectly contributed to the sport-specific abilities of the student athletes as training is more optimized when student athletes are fitter. C3 commented:

I noticed they complain less about being tired during training. It really helps that they have more stamina. Then I can get more out of them during training, I can push them a little harder.

C2 explained how physical skills are fundamental to the training of technical skills:

Because it [beep test] trains their endurance, speed. They have to listen to the sound [beep] and move faster and faster, so it trained their reaction time. These skills are very important on the [basketball] court. They don't have these, it is harder to improve their basketball skills or game play.

Task, Time - Improve sport skills. T1 was the only CCA teacher that set a strategy for the TARGET structure of Time where time is allocated to allow student athlete to work on sport drills without the supervision of the coach. Student athletes from S1 and T1 discussed about how the targeted play sessions allowed more time for student athletes to work on weaker areas that they otherwise would not get a chance to during contact time with the coach. One of the student athletes from S1 commented:

We are allowed to decide what drills to do to work on our technical abilities. So we would work on things that we are personally weak at, especially those we do not get to train much during training. We sometimes do mini-game play and scoring.

During training, usually only the strikers train more on scoring and the rest do not get much opportunities to do that.

T1 also commented about how targeted play allowed additional time for student athletes to improve on specific sport skills:

Usually during this time slot [targeted play] the kids will focus on working on more technical and basic drills like long passes, dribbling, scoring. They get extended time to practice on these drills that usually they do not have time to do so on the field because the coach has to move on to the next activity. It is harder to see improvement when they do not practice sufficiently on the drills. They are getting field time on these. So when they see the coach, he can focus on the more complex stuff like tactical play where you need the coach to be around. So it gives them additional practice time to fine-tune their skills.

Evaluation - Encourage reflection of strengths and weaknesses. T1 and T3 got student athletes to do regular reflection on own performance with the intention of getting them to focus on putting in effort to pursue personal improvement. Reflection helped student athletes fine-tune their sport skills by urging them to identify areas of improvement and work on them in a timely manner. All student athletes and CCA teachers from intervention groups 1 and 3 commented that the reflection helped student athletes become aware of their weakness that guided more focused efforts to work on improving them. S3 talked about how the group reflection facilitated setting team goals and achieving them together:

I think it motivates us to work harder because we look at what we need to improve on, then we set a goal. So when we do reflection, we look at it and ask ourselves whether we reach it or not. And if not, then we can brainstorm on what to do to achieve it.

Interestingly, there was an added benefit of getting student athletes to log their reflection. T1 commented how the reflection entries in the journal helped to facilitate his conversations with athletes to act on their areas of weaknesses:

I believe it [journaling] is working. I do read through their journals and bring up what they wrote in their reflections in our individual chats. I notice that for some of them, after a few days or even a few weeks, they try to prove to me that they are working on what they said they wanted to improve on. The idea is that they become aware [of their weaknesses] and that needs to come first before any remediation action. In a way it is also motivating, because right now they are doing it [seek improvement] because they want to and not because I told them to.

Time - Enhance quality of training. Student athletes, the coach and T1 himself commented on how the combined strategies of staggered training and targeted play improved sport competence by enhancing the quality of training and allowed more time for student athletes to work on their areas of weakness. Breaking the team into smaller groups solved the problem of a large group size and allowed more targeted practice. While those supervised by the coach received more attention and feedback, those in the unsupervised group got extended practice time. One of the student athletes from S1 commented about having more feedback from the coach:

Coach can focus more on each division. In the past when both divisions trained together he has to take care of both divisions at the same time so he was not able to focus on everyone. Now the group size is smaller, he can give each player more attention and correct his mistakes.

C1 and S1 agreed that training the juniors and seniors separately allowed training to be more focused. C1 explained how this is beneficial to raising the standards of the team's sport skills.

In the past the two divisions trained in the same time slot. So the standard I set has to be attainable by both. This also means I cannot push the seniors enough or the training will be too tough for the juniors. So sometimes I had to split them up when I need the drills to be different. When I do that, I had to straggle back and forth between the two divisions. So training was less optimized I would say. Now although I get lesser contact time, but more quality out of training. And that is important if we want to bring them forward.

Another student athlete commented how training intensity and complexity was catered more appropriately to juniors and seniors:

It [training] is tougher because we are no longer training with juniors. So the intensity went up. We also do different drills from the juniors. Ours are more advanced. We get to learn higher level skills since we are more experienced.

Confidence. Strategies derived from the TARGET structures of evaluation contributed towards the confidence of student athletes. All three CCA teachers laid down

strategies related to having individual conversations with student athletes to recognize their efforts privately. This was aimed at reducing social comparison and getting student athletes to focus on personal development. It was unexpected that instead of personal development, student athletes shared about how the individual chats served to protect their confidence. It seemed that encouragement from CCA teachers had great weight on how student athletes appraise themselves when faced with game losses or challenges in the team.

Recognition - Bolster confidence after losses. Student athletes from S2 talked about how T2's emphasis on effort over winning played apart in preserving student athletes' confidence by helping them refocus their attention on working towards improvement. One student shared an experience when T2 encouraged the team after they lost a match during an inter-school competition:

He will tell us, as long as we did our best it is ok. We need to think about what we did not do so well and work on it. I think it kind of protects our confidence, and we feel less demoralized. We are already very sad that we lost. When he says that, I think it helps us to look forward instead of cry over the game we lost.

Recognition - Reframe negative self-concept. Another student from S2 shared how talking to his CCA teacher about challenges faced helped to prevent a lowered self-esteem:

Sometimes when things do not go well we may think that we are lousy or not as good as the rest. So when Mr L (T2) talk to me [one-to-one], he helped me see things in a different way and feel less lousy about myself. For example, when I had some conflicts with the seniors, they did not like me. But Mr L explained to me that

it was because they did not understand my behavior, why I always threw my temper. It was not because they thought I was inferior to them.

It was interesting that only student athletes from S2 discussed about how the individual chats with their teacher helped to preserve their confidence. Given that T2 was the only teacher of the three CCA teachers that had competitive experience as an athlete, it could explain why only student athletes from S2 discussed more about how he talked to them about managing competition challenges. It is also possible that being an assistant teacher in-charge, T2 had less responsibilities in the managing of the team and could spend more time interacting with his students for more in-depth conversations.

Connectedness. Several of the target strategies contributed towards forging closer relationships in the team be it among student athletes or between student athletes and the adult mentors (i.e. coaches, CCA teachers). Giving student athletes authority through leadership positions and engaging them in student-led activities increase opportunities for student athletes to work together to get tasks done. Privately recognizing student athletes and reducing the group size that the coach had contact time with helped to forge a closer bond between student athletes and their adult mentors (i.e., coach and teacher). This was further facilitated by getting student athletes to write a journal. Reading the journals help the CCA teacher identify more meaningful topics for private conversations with student athletes.

Authority - Contribute to team bonding. Participants from all three teams discussed about how strategies related to giving student athletes more authority had an impact on fostering closer relationships in the team.

Student athletes from S1 and S3 discussed how having student athletes instead of adults (i.e., coach, teacher) lead team activities increased opportunities for teammates to interact and communicate with each other. One student from S1 shared about how the unsupervised targeted play allowed the team to bond:

It is more fun. Because when coach and Mr H not around we are less serious and so have more fun together when doing the drills. Sometimes we joke around with each other when we make mistakes. If coach is around we will be very quiet. So it is like bonding time for us.

A student from S3 commented that she preferred for seniors to lead physical training (PT) rather than the coach as it allowed them opportunities to interact and talk to each other:

Even though seniors and juniors train together during the usual trainings, seniors are usually grouped together during group rallies and drills. So when seniors started to take us for PT, there was more bonding time. Whether they encouraged or scolded us, there was more communication. So I feel that we became closer to the seniors when they lead us for PT. Last time when coach supervise PT everyone just did the exercises quietly. During breaks seniors and juniors will also usually mingle amongst themselves so we don't get to talk to the seniors much.

Recognition - Build CCA teacher-student relationship. To allow for individual and private recognition of student athletes, all three CCA teachers sought to have one-to-one communication with individual student athletes. While this strategy was meant to focus on praising student athletes, student athletes from T1 and T2 expressed that the gesture contributed to a closer relationship with their CCA teachers. A student athlete from S2

commented how having personal conversations moulded a positive perception of T2, making him more approachable to student athletes:

I think we got closer to Mr L. He will make the effort to talk to us. It makes him more approachable. I feel he is the type of teacher who, if you open up to him, he will talk to you and give you advice and all. He tries to understand you. I feel quite comfortable with him compared to the other teachers.

Another student from S1 also commented that the chats made him feel that the CCA teacher cared for student athletes. He commented:

I think it makes him more approachable and less scary. He will chit-chat with me about how I am doing in the team, what I want out of training. Sometimes he gives me advice about how to improve my skills. Gives me the feeling that he cares.

T1 explained how the individual chats helped him build rapport with the student athletes as it provided the attention that they desired.

It's [the individual chats] not formal, but the informality gives them the idea, subtly, that somebody [the CCA teacher] is actually paying attention or bothers about their development. Kids can feel it. They can tell whether a teacher cares for them or not. So it helps with the rapport building.

T2 commented that the individual chats were particularly helpful to his team that had a considerably large number of students:

The decision to have the individual chats forced me to look at the boys as individuals rather than just them as a whole. So I tried to engage more of the boys, especially those who may feel left out and I can see them slipping away. You see we have a really big team of sixty over students but only one coach. With a big team sometimes some kids fall through the cracks and slip away. It helps me make a connection with them, know their problems and see where I can move from there.

However, through casual conversations, the teachers indicated that the individual chats during training time required teachers to fork out additional time during training time amidst duties which could be challenging.

Evaluation - Facilitate more meaningful communication with CCA teacher. T1 planned for his student athletes to do reflections and jot down their beep test scores in their journals. He commented that the journals gave him access to each student athlete's reflections that made conversations with his student athletes more in-depth and meaningful rather than general. He commented:

The journals facilitate my chats with the kids. I go through their reflections and get to know what they feel are their weaker areas and what they plan to do. So during training, it's not very formal, I just pull them out and say "hey you mentioned in your journal that you want to do this, why don't you do this and what's the next step". I sometimes praise them for the good action plan they have. So our conversations are more individualized so to speak, not just the general "how are you doing? Any problems".

This also corroborated with that student athletes from S1 shared about how T1 made use of what he read in the journals to offer advice to the student athletes on how they can work on their areas of weakness. One of them shared:

He talks about some of our weaknesses that we write in our reflections and gives us tips on what we can do. He shares with coach and coach suggest some drills we can do during the play time [targeted play]. He sometimes shares some of our action plans so the rest also get some ideas on what they can do.

Time - Build coach-student relationship. The combined strategy of targeted play and staggered training by T1 allowed the coach to focus on a smaller team each time.

This allowed each student athlete to have closer contact time during trainings. A student athlete from S1 commented:

In the past when both B' and C' division train together the coach focus more on the main team athletes and seniors. Now he focuses more on everyone, correct their mistakes and talk to them. So like he is closer to us than last time.

Character. The TARGET strategies related to task and authority developed positive character traits among the student athletes. Having progressive fitness tasks encouraged a persevering attitude towards improvement. On the other hand, giving student athletes authority over team routines provided them with opportunities to develop a sense of responsibility.

Task - Nurture perseverance. It appears that being aware of previous performance or having target scores gets student athletes to push themselves or their teammates to outdo themselves.

A student athlete from S2 shared:

It makes us fitter but also teach up not to give up even when you are very tired. I have to try to hit the level you set in your goals or at least try to be better than your previous score. Sometimes I am very close so I try to push myself a little more.

A student athlete from S4 shared that having teammates to push each other toward achieving a team target helps to train perseverance:

Basically it improves our attitude, like perseverance. You see sometimes they cannot really run as fast then you encourage them and cheer them on to make them run. So we push each other and don't let each other give up no matter how tired because we need to try to hit the target she (T3) set for us.

Authority- Nurture responsibility. T1 and T3 shared that getting student athletes to take charge of some of the team activities honed their sense of responsibility by providing opportunities for them to practice responsibility. T1 shared his experience of tasking his student athletes to conduct the beep test on their own started a routine that trained their sense of responsibility.

I put the boys in charge of the beep test. All I do is provide the speaker, I ask the in-charge to download the beep test app. At the beginning they told me they forgot to download or forgot the process. So I told them they need to make sure they are prepared before the test. But now they have gotten into the routine. Now I just give them the speaker and they know what to do. Now it is about doing it properly, ensuring people follow the rules of the test. it trains them to be more responsible. To do what is needed even when I am not there to conduct or supervise.

T3 shared that the senior student athletes in S3 and S4 were tasked to lead the juniors for physical fitness (PT) training and how the opportunity developed their responsibility and leadership.

I got the senior girls to take full charge of PT without the supervision of the coach.

It then became the seniors' responsibility to push their juniors and to ensure that the PT tasks are completed. It was surprising that they rose to the job. I saw them encouraging the juniors when they are lagging behind or even scolding them when they are putting in effort. The coach used to be the one doing that. They faced resistance from the juniors sometimes but it's part of the learning process and it helps them grow as leaders.

Task climate. TARGET strategies related to recognition contributed to creating a task climate by helping student athletes focus on effort and improvement over performance and reached out to more student athletes to make them feel valued in the team. All three participant teachers in the intervention groups planned a strategy that focused on individual communication with student athletes (i.e., individual chats, private messages through text) to recognize their efforts and role. This facilitated the teachers' communication to the student athletes the importance of effort and improvement, which is a main tenet of a task climate. More personal conversations with student athletes also made student athletes feel valued in the team.

Recognition - Effort and improvement. Participants from intervention groups 1 and 2 shared about how the teachers emphasized the importance of effort during individual chats. T1 and T2 shared that the chats provided an avenue to reinforce messages related to effort that were usually conveyed to the whole team. T1 discussed about how the individual

chats with student athletes not only allow him to relay messages to encourage effort among them, but also reminded himself to emphasize effort rather than achievement. T1 shared:

I think the small chats even if it is a few minutes, I get to reach out to individual students and remind them about effort, a growth mindset. The individual chats make me more conscious of what I talk about. Like if I am unhappy with the attitude of a student who is not trying his best, now I try not to get too angry too fast and scold them. But instead I take time to think about how to get them to focus on effort, and praise them for putting in effort.

Student athletes from S2 reported that T2 often reminded them the importance of putting in effort when he spoke to them privately. One of them said:

He says if you want to get there you have to train hard. Every time we lost a match, he will say we are not working hard enough. He says that small effort in each training counts. If we want to do better we have to work on giving 100% every training and not slacken.

Recognition - Important role. Participants from intervention group 1 and 2 shared that individual chats helped teachers to connect with student athletes and this reminded student athletes that they were valued in the team. One student athlete who was not in main competing team explained how the individual chats with T1 changed his opinion of his position in the team:

I think it makes me feel that he values me even though I am not in the school team. Usually the coach focus on the school team athletes so sometimes I feel like if you are not in the school team you are not important.

T2 shared that imposing a plan to have private chats with the student athletes reframed how he related to them:

The decision to have the individual chats helped me reach out to more students. In a big team of sixty-over students like ours, it is easy to neglect students especially if they are not in the main team. And they might just slip away. So I think it is important I connect with individual students and remind them they are an important part of the team regardless.

5.3.2.2. Challenges

While the TARGET strategies have shown promise to benefit student athletes' PYD, participants reported challenges that might have undermined the effectiveness of the strategies in facilitating PYD. Some of these were unintended effects resulting from applying the TARGET strategies (e.g. conflict with leaders) while others were related to issues inherent to the teams even before intervention (i.e., student leaders lack maturity, unequal recognition). Table 5.7 below displays the themes and subthemes related to challenges faced when the strategies were applied.

Connectedness. While giving student athletes authority has shown merits, initial adjustment to the new leadership roles led to conflict within the team that may have hindered the forging of connectedness among student athletes.

Authority – Conflict with leaders. One student from S2 shared about how he struggled with exerting his authority in his new role as the team was not used to taking instructions from a fellow teammate instead of from the coach. As a result, he saw their behaviour as disrespecting him:

I think the problem is that the juniors don't respect us. Like when I talk to them they don't really listen. So I don't have the power and they have egos. They don't think I have can order them around like coach.

Table 5.7

Summary of Themes, Subthemes and Sample Codes for Challenges Faced with TARGET

Strategies Reported by Intervention Groups

Themes	Themes	Sample codes	*TARGET Structure
Connectedness	Conflict with leaders	Peers do not follow leaders	Authority
Character	Student leaders lack maturity	Leaders not stepping up to roles	Authority
Ego climate	Unequal recognition	Main team students get more attention	Recognition

Note. Under 'TARGET structure', subthemes are matched to the relevant TARGET structures responsible the subtheme being referred to.

Character. It appears that most of the difficulties faced arose from giving student athletes authority (i.e., student-led activities) in the team. These were related to inadequate self-management (i.e., less serious without coach, peers do not follow leaders, leaders not stepping up to roles).

Task, authority - Student leaders lack maturity. Teachers, coaches and student athletes shared that when student athletes are left unsupervised by an adult of authority, they are less disciplined and take training less seriously. T1 commented that it was inevitable for some student athletes in the team who become lax when unsupervised. He further commented that the targeted play programme was still beneficial for the majority of the student athletes and should continue:

But there are stragglers, as always, who take this one hour [of target play] to just skive and not put in the effort. But we cannot remove the programme just because the minority are causing problems.

C2 explained that when student athletes are unsupervised, they might become rowdy and the adult mentors would have to spend time reintroducing order:

The problem with kids is when the coach is not around or not paying attention when talking with the teacher, the kids start to play around. They can be quite hard control. Then another 10-15mins is used to control them or punish them for their poor behaviour.

A student athlete from S2 shared C2's sentiment. He commented: "When coach is not there, some people are less serious. Some will fool around or just take the chance to slacken. So it is not as productive."

Ego climate. While the individual chats (i.e., recognition) did show some effect on getting student athletes to focus on personal development (i.e., emphasis on effort and improvement, make student athletes feel important), it may not have eliminated the social comparison that arose from the competitive nature of youth sport. Specifically, more competent athletes still received more attention and recognition from coaches and teachers.

Recognition- Unequal recognition. Participants commented that one challenge hindering efforts to promote PYD and create a task climate is that in competitive sport, student athletes are evaluated according to their sport competence. C2 commented that there still remains pressure from the school to show sport achievement rather than solely focus on PYD:

This is a competitive team. So there are students, even though they train the whole year, there will be a big group not selected to represent the team. And nearing tournament we focus more on the school team. At the end of the day, the school value teams who win games no matter what they say.

T2 explained that while it is not optimal for all student athletes in the team, there is a need to give more attention to the student athletes who were in the main competing team during tournament season to prepare them sufficiently for competition:

Usually the whole team trains together, but during tournament season the coach will give the main team athletes more court time. Because our team is quite large, and we only have one coach, it is difficult to focus on everyone throughout the whole year. If we do so, we would not be stretching the potential of the main team athletes and making sure they are prepared for the tournament. But that is the best we can do within the constraints of time and resources.

Student athletes from all groups commented that it was the more competent teammates that receive more attention from the adult mentors, especially the coach. A student athlete from S1 shared: “Coach normally focus on everyone but when he does more advanced drills, he will emphasise more on the better ones. He pays more attention to main team members.”

In summary, the qualitative findings deepen our appreciation of the quantitative results in two ways. Firstly, they illustrated the pathways of how specific TARGET structures (e.g., recognition) positively influenced specific areas of PYD (e.g., confidence). Secondly, the challenges faced provided some contextual explanation for the modest

intervention effects amidst other limitations in this study that will be discussed in a later section.

5.4 Discussion

The purpose of this study was to test the effectiveness of a TARGET intervention to facilitate positive youth development in secondary school sport teams. In this section, I first provide an integrated discussion of the observed quantitative and qualitative results (section 5.4.1 & 5.4.2). Following up on the results, I discuss in detail the role of the competition in youth athlete PYD, and how it provided contextual understanding of the observed results (section 5.4.3). Implications of the findings on practice in youth sport research and coaching was presented (section 5.4.4) followed by limitations of the study (section 5.4.5) that serve to provide a deeper understanding of this study's findings. Clarity on these areas have important implications on future adoption and implementation of TARGET interventions in youth sport. A unique characteristic of this study was the involvement of supporting CCA teachers as intervention recipients, given their influential position in the youth sport teams (as opposed and in addition to sport coaches).

A clear contribution of this study is that the results provided evidence for the effectiveness of the TARGET intervention in supporting 4Cs outcomes and a task motivational climate. Consistent with prior studies (e.g., Cecchini, Méndez-Giménez, & Sánchez-Martínez, 2019; Digelidis et al., 2004; González-Cutre, Sicilia, & Moreno, 2011), the TARGET-based intervention promoted a task motivational climate, which was found to be associated with positive youth development, specifically in terms of 4Cs outcomes. Notably, these positive effects continued to be sustained six months after the intervention.

The detailed qualitative results regarding the effectiveness of respective TARGET strategies allowed for each TARGET structure to be linked to specific outcomes it impacted (i.e. 4Cs, task climate) providing clarity on the processes to which TARGET structures facilitate the development of specific 4Cs and motivational climate factors. However, contrary to prior research findings (e.g., Ames 1992; González-Cutre et al., 2011; Hassan & Morgan, 2015), the TARGET intervention in this study did not reduce student athletes' perception of an ego climate and their antisocial behaviour.

5.4.1 Impact of Intervention on Motivational Climate

Echoing past intervention studies, Epstein's TARGET structures were shown to be effective in promoting a task climate in youth sport (e.g., Cecchini et al., 2019; Digelidis et al., 2004). While the effectiveness of the TARGET intervention has been widely established in academic classrooms and physical education, it remains to be established in the youth sport context (Braithwaite et al., 2014; Hassan & Morgan, 2015). I discussed this in section 2.3.3 in Chapter 2, and highlighted how the physical education setting is fundamentally different from youth sport as there exists a more salient ego climate in the latter. This poses a greater challenge when promoting a task climate. This study however, supported the efficacy of a TARGET intervention to facilitate a task climate in the competition-oriented youth sport setting. Specifically, student athletes' perception of a task climate remained unchanged in the intervention group but reduced for the control group during the competition season, and this occurred during the pre- to post-intervention phase. This suggests that the TARGET intervention had the effect of preserving athletes' perception of a task climate as compared to teams in the control group.

Contrary to prior studies, perception of an ego climate did not observe any change in both control and intervention groups at post-intervention (i.e., peak of competitive season). This was unexpected given past evidence that TARGET-based interventions increased youth perceptions of a task climate but lowered the ego climate. However, most studies reporting a reduced ego climate from adopting TARGET intervention belonged to those that surveyed the PE setting (Bortoli et al., 2017; Braithwaite et al., 2011). A closer look at the three known TARGET intervention in the sport setting would highlight ambiguities of its effect on the ego climate in youth sport, which is typically much more competitive in nature. Firstly, Theeboom et al. (1995) and Cecchini et al. (2014) only examined effects of TARGET interventions on indicators of positive developmental outcomes (e.g., basic needs satisfaction, motivation, perceived competence) and task climate but did not survey its impact on youth perception of the ego climate. Moreover, Theeboom and colleagues' (1995) study adopted the TARGET structures in a summer sport programme involving children (i.e., 8 to 12 years). The rigour and commitment of a summer sport programme is intuitively different from that of youth sport teams in a structured setting where the competitive element is more pronounced and persist over a longer term. In the more recent study, Hassan and Morgan (2015) tested the TARGET structures on university student athletes and found that the intervention increased student-athletes' perception of a task climate and reduced the salience of an ego climate. However, it can be argued that sport participation at secondary and collegiate levels are inherently different given the different levels of maturity and sport experience of the athletes. This might have implications on their perception and appraisal of an ego climate inherent to youth sport. Collectively, these findings, or a lack of, highlight a lack of clarity in current

research on how TARGET structures can influence the perception of an ego climate in competitive youth sport. In section 5.4.3, I discuss how this may be reconciled by examining the role of competition in youth sport.

It is noteworthy that the modest effect of the intervention on the motivational climate is congruent to past findings of TARGET interventions in the physical education setting which has received more research attention. For example, in a detailed meta-review, Braithwaite and colleagues (2011) found that TARGET interventions produced small to moderate effects among secondary school students in PE classes. The moderate, but statistically significant effect of the intervention in the current study is therefore not unique. However, given that school sport and PE context have important differences (Biddle & Ntoumanis, 1999; Hassan, 2011), results from the PE context should be taken more as a reference for evaluating the effectiveness of TARGET interventions in youth sport rather than a benchmark. It is also important to consider the limitations of this study that may have reduced the potential impact of the intervention. I expand on this further in the section 5.4.5.

5.4.2 Impact of TARGET Intervention on PYD Outcomes

One important contribution of this study is evidence that 4Cs of PYD can be facilitated through the adoption of TARGET structures in youth sport teams. After intervention, scores for PYD factors (i.e., perceived competence, confidence, connectedness with coach, connectedness with CCA teacher, and prosocial attitudes) did not change significantly from pre-intervention for the intervention group but decreased for the control group. This suggests that teams in the intervention group benefited from the

TARGET intervention. Qualitative findings from interviews and focus group discussions corroborated the quantitative findings on the effectiveness of the TARGET intervention. In particular, participants in the intervention group could verbalize the impact of various strategies, derived from the TARGET intervention, on specific 4Cs factors. For example, under the TARGET structure of ‘task’, the beep test was selected to fulfill the TARGET requirements of providing a fitness task that is challenging, catered to diverse standards, and allows goals to be set in a progressive manner. Participants reported that it increased physical fitness and sport skills (i.e., competence), and developed resilience of the student athletes (i.e., character). This study therefore provided evidence that TARGET structures can impact specific areas of PYD (i.e., 4Cs).

An important theoretical extension of this study is that the perception of a task climate, through the implementation of TARGET intervention, can preserve 4Cs of youth athlete development that would otherwise be undermined under competitive environments (i.e., youth sport). Indeed, competition pressures in sport has been found to undermine the perception of a task climate and contribute to negative developmental outcomes for youth athletes (Duda, 2013; Smith, Quested, Appleton, & Duda, 2016). This study demonstrated that integrating TARGET structures into youth sport training can mitigate negative impact of competition on key areas of youth athlete development (i.e., 4Cs). This is further supported by the finding that 4Cs factor scores were consistently linked (i.e., statistically significant correlation) to the perception of a task climate at pre-, post- and six months after intervention. Therefore, in support of previous research that highlighted the impact of TARGET interventions on task climate and youth motivation (e.g., increased enjoyment, less boredom) (see Hassan & Morgan, 2015; Garcia-Gonzalez, Sevil, Aibar, Murillo, &

Julian, 2017), this study provided more precise evidence by linking strategies derived from each component of TARGET structures to its impact on specific areas of PYD. For example, strategies related to ‘recognition’ of the TARGET structures where teachers privately praise the efforts of youth athletes, fostered a closer relationship between the two (i.e. connectedness). While more empirical studies are needed to extend the external validity of this study, the findings provide some baseline evidence, both qualitative and quantitative, that creating a task climate through applying TARGET structures could be a possible mechanism to which PYD can be facilitated in youth sport.

It is notable that while the intervention effects for some outcomes were modest (e.g., task climate and all PYD scores did not increase over time), it is not tantamount to an ineffective intervention. The constant decline in PYD scores for the control group but not for the intervention group (where scores had no change) posit evidence that teams that received the intervention benefitted from the programme. Crucially, the intervention prevented the decline in student athletes’ PYD and perception of a task climate that would have otherwise occurred without intervention. These findings warrant further examination of the constraints and limitations of this study as it has important contributions and implication on practice in youth sport. In the following sections, I discuss how the heightened competition during the intervention period could have interfered with the effectiveness of the TARGET intervention, and highlight limitations in this study that if addressed, could potentially amplify intervention effects in future replications.

5.4.3 Role of Competition on Motivational Climate and PYD in Competitive Youth Sport

In light of the mixed and somewhat contrary findings, there is a need to critically discuss the profound role of competition within the context of prior research on motivational climates (i.e., task and ego) and PYD outcomes in youth sport. According to achievement goal literature, heightened levels of competition can induce an ego climate and has a controlling effect on individuals due to the primary focus on winning (e.g., Duda, Chi, Newton, Walling, & Catley, 1995; Wang et al., 2010). Therefore, the heightened competitive atmosphere (tournament period) during which data was collected, could have undermined the impact of the TARGET intervention on student athletes' PYD that would have otherwise been more pronounced.

It was observed that, in the absence of the intervention, the control group saw a decline in 4C scores that coincided with the peak of the tournament season (i.e., T1 to T2) where competition levels were heightened. During this period, the ego climate in both control and intervention groups remained unchanged despite intervention showing modest impact on the task climate in the intervention group. These trends agree with past research documenting the negative influence competition pressures in sport have on the perception of a task climate and developmental outcomes for youth athletes (Duda, 2013; Smith et al., 2016; van de Pol et al., 2011). Specifically, at heightened levels of competitiveness, the perception of an ego climate prevails. For example, Smith and colleagues (2017) found that at higher competitive levels, coaches tend to focus on performance outcomes as opposed to mastery outcomes when giving their athletes feedback (Smith et al., 2017). Van de Pol and colleagues (2011) also found that adult perceived higher levels of ego climate created by

their coach during competition as compared to during training. The increased perception of an ego climate during competition period could therefore make it more resistant to efforts (e.g., TARGET intervention) to alleviate it. Indeed, in this study, while the TARGET intervention preserved student athletes' perception of a task climate, it was not able to eliminate or alleviate the perception of an ego climate that is inherent to competitive sport. A plethora of studies have also documented how an emphasis on winning in competition is linked to lowered self-esteem (Duda & Balaguer, 2007) and reduced team cohesion from favoritism by coach (Dworkin & Larson, 2006). Similarly, declines in PYD scores were observed for the control group in this study. Qualitative results in this study supported these findings and found that across intervention teams, student athletes, teachers, and coaches themselves acknowledged that behaviors related to an ego climate was persistent. For example, more recognition and attention was given to main team athletes who represented the school in competitions (i.e., unequal recognition). Moreover, most communication from coaches and CCA teachers were focused on strategies on how to win opponent teams during the peak of competition (i.e., winning as definition of success). These behaviours reflect characteristic features of an ego climate. The salience of an ego climate may therefore be inevitable given that related behaviours are inherent to sport competition. The qualitative findings therefore provided clarity on why the intervention, which showed greater success (i.e., promote a task climate and eliminate ego climate) in other youth settings (i.e., PE and academic classrooms), showed less effect in school sport teams. Apart from facilitating a deeper understanding of the results, the findings from this study also highlight the pitfalls or areas of improvement of the intervention that could be potentially addressed to enhance intervention effectiveness.

The levels of antisocial behaviour reported by student athletes in this study also support the influence of competition on the effectiveness of the TARGET intervention. In this study, student athletes' reports of antisocial behaviour were found to be consistently correlated (i.e., at pre-, post-, and six months after intervention) to their perception of an ego climate, characteristic of competition settings, but not a task climate. Additionally, the control group reported an increase in antisocial behaviour during competition period (i.e., pre- to post-intervention) and a decrease after the peak of the competition period (i.e., post- to six months after intervention). This agrees with research findings where competition, characteristic of an ego climate, often result in antisocial behaviour due to the emphasis on outperforming opponents (Camiré & Trudel, 2010; Harwood et al., 2015; Holt, 2016). For example, Arthur-Banning, Wells, Malcarne, and Oh (2018) found that competitive youth soccer athletes were four times more likely to engage in negative sportsmanship behaviours, compared to recreational youth soccer athletes. Other studies have also found that pressures to win can conjure negative coaching behaviours that manifest into neglect of athletes' personal development and promote unsportsman-like behaviours (Hansen, 2003; Smith et al., 2017). These results suggest that heightened competition may be driving a persistent ego climate and antisocial behavior which may have reduced the impact of the intervention on PYD outcomes. Given the closer links between competition, ego climate and antisocial behaviour, reducing antisocial behaviour may require greater attention to the ego climate rather than increasing the salience of a task climate.

Although it may well be the case that a competitive ego climate is inevitable in youth sport (Camiré, 2015c), results from this study show that intentional efforts to promote a task climate can mitigate adverse effects on 4Cs of PYD, even if it does not

eliminate the perception of an ego climate. It was interesting to note that while the TARGET intervention was less successful in reducing reported antisocial behaviour and perception of an ego climate (see sections 5.4.3 & 5.4.4), it buffered student athletes' levels of most 4Cs factors and perception of the task climate. Correlational analyses also found that 4Cs factors, except for antisocial behaviour, was correlated to the perception of a task climate but not an ego climate. This relationship was consistent throughout pre-, post-, and six months after intervention. These findings are expected given prior evidence that the perception of an ego is not interdependent of that for a task climate (Buch, Nerstad, & Säfvenbom, 2016; Lochbaum et al., 2016). Indeed, a recent meta-review by Lochbaum and colleagues (2016) found convincing evidence that task and ego climates while related, are not dependent on each other. This study expanded on prior research findings indicating that the existence of an ego climate is not necessarily incongruent to general PYD as previously thought, as long as efforts are done to increase the salience of a task climate.

Recent research suggests that competition in youth sport can be understood as a driving force of PYD, rather than a stumbling block, thus, setting it apart from other youth developmental contexts (Camiré, 2015c; Pynn & Holt, 2016; Wells et al., 2018; Wilkes & Côté, 2010). Wilkes and Côté (2010) conducted a study with 212 youth female basketball athletes and found that competitive athletes reported significantly more growth experiences (e.g., emotional regulation, time-management, identity work, prosocial norms) than recreational athletes. The authors suggested that the greater level of challenge, focus and commitment required in the competitive programmes help explain why more developmental experiences were reported by the athletes. There has been evidence that competition develops sportsmanship and contribute to overall moral development of

athletes (Camiré, 2015c; Goldstein & Iso-Ahola, 2006; Murphy, 1999). Indeed, PYD researchers are beginning to probe discussions of how competition can be utilized rather than downplayed to optimize PYD (Camiré, 2015c; Pynn & Holt, 2016). This study provided some evidence that creating a task climate might be complementary to the competitive nature of youth sport in facilitating PYD.

However, Bengoechea and colleagues (2017) highlighted that while high expectations and performance pressures in youth sport serve as a catalyst for PYD to occur, youth athletes need access to strong social support in order to thrive. The authors termed such an environment ‘complexed environments’. Accordingly, high expectations and pressures forces youth to apply their emotional (i.e., supportive relationships) and cognitive (i.e., life skills) resources to cope with the demands. In doing so, they gain new perspectives and repertoires of adaptation skills that would otherwise not have been developed. However, the journey of coping with challenges is daunting and strong social support is crucial to help youth sustain their efforts and not give up. The concept of complex environments is congruent to recent research purporting that optimal conditions, particularly strong social support, can be created in youth sport to propel youth athletes toward growth in a competitive context (Duda, 2013; Fenton, Duda, Appleton, & Barrett, 2016). For example, Duda (2013) proposed that optimal environments are those where significant others support autonomy and form strong meaningful bonds with youth athletes. In this study, task climate, connectedness with coach and CCA teacher consistently showed positive correlation to 4Cs factors. It is therefore encouraging that TARGET intervention had an effect on these factors. Moreover, participants reported that several measures introduced by their CCA teachers, derived from the TARGET intervention, fostered

stronger bonds between student athletes with the adult leaders (i.e., coaches and CCA teachers) and also among themselves. These evidence corroborated with past studies finding that the perception of a task climate fosters social cohesion in youth sport teams (Heuzé, Sarrazin, Masiero, Raimbault, & Thomas, 2006; McLaren et al., 2015). It is therefore possible that the TARGET intervention is beneficial to supporting complex environments conducive to PYD through fostering stronger, more supportive relationships in the team.

Taken together, these findings highlight that performance pressures in youth sport do not always have a deleterious influence on youth athlete development, especially when intentional effort is put into promoting a task climate. More importantly, this study provided evidence that a TARGET intervention is a useful measure to create such a supportive task climate in youth sport teams.

5.4.4 Practical Implications

This study has shown that applying the TARGET structures into youth sport training can promote a task climate and benefit positive youth athletes' development. Furthermore, the TARGET structures might most optimally impact PYD when all six components are implemented together. This was evidenced by qualitative results where each of the six TARGET structures benefitted different key areas of PYD (i.e., 4Cs). These findings serve as valuable information to researchers and practitioners who can vary the emphasis on different strategies according to the specific area of PYD that may be of concern. For example, a coach may want to focus on building the connectedness in the team during off-season when there is lesser need to maximize time for competition

preparation. Knowing that specific TARGET structures contributes to connectedness, the coach may want to direct his/her effort and time to support athlete-led activities (i.e., authority), having individual chats with athletes to highlight their efforts (i.e., recognition) and structuring training to allow smaller coach-to-athlete ratio and more unsupervised practice time (i.e., time).

Additionally, the observed positive effects from the integration of TARGET structures into youth sport routine suggest that deliberate effort is required to create conditions that facilitate PYD in youth sport teams. PYD researchers have agreed that intentional efforts must be put into structuring the environment to gear youth athletes towards growth (Bean & Forneris, 2016; Holt, 2016). This study provided evidence that a task climate through the application of TARGET structure can create such an environment.

While the TARGET structures can facilitate the development of positive 4Cs factors (i.e., competence, confidence, connectedness, prosocial behaviour), additional effort may be needed to alleviate antisocial behaviour that appears to be linked to perceptions of an ego climate. In this study, while the TARGET intervention might have prevented an increase in antisocial behaviour in the intervention group, it did not eliminate or alleviate these behaviours that are considered undesirable. One possibility is to integrate, into TARGET interventions, elements of character development through sport – an area that is gaining interest in PYD research. Koh and Camiré (2015) reviewed sport programmes that found success in developing values and provided recommendations for integrating the teaching of values through school sport programmes. Recommendations for values

development can therefore be applied into TARGET interventions to address antisocial behaviour that is relatively more prevalent in competitive youth sport teams.

In addition, while majority of PYD sport intervention studies focused on training coaches, this study provided evidence that adult leaders other than the coach in youth sport teams can be involved to facilitate youth athlete development. This is especially encouraging, as discussed in chapter 3, coaches often struggle with managing sport coaching and simultaneously facilitating youth athletes' development in important psychosocial areas beyond sport (e.g., connectedness, character). It is important however, that these adult leaders have or be given authority over decisions made in team and have continued involvement in team routines. For example, the CCA teachers in this study made permanent changes to team routines by introducing regular fitness tests (e.g., beep test) or make permanent structural changes to team routines (e.g., staggered training). These measures resulted in the facilitation of youth athletes' development in the 4Cs. Should they not have the authority to implement or continue these efforts, the measures would not have had the opportunity to take effect or be sustained. The findings of this study are therefore applicable not only to sport coaches, but also other adult leaders involved in youth sport like athletic directors, team managers or assistant coaches that work alongside sport coaches and have authority to make changes in their respective teams.

5.4.5 Limitations and Future Directions

Several limitations should be considered when interpreting the findings of this study in relation to the effectiveness of the TARGET intervention. Firstly, this study examined the effectiveness of the TARGET intervention specifically in team sports. Caution is

warranted when applying the strategies in this study to individual sports given that team dynamic and routines may differ between team and individual sport training. For example, while some strategies derived from the TARGET structures may be applicable to individual sport due to the focus on the individual (e.g., journaling, individual chats), others focus on interaction between youth athletes that may be less relevant in individual sports teams (e.g., targeted play). Future studies should consider how TARGET structures could be modified to more closely meet the needs of individual sport given their benefits on positive athlete development.

Another limitation pertains to recruiting non-equivalent control groups which is characteristic of quasi-experimental designs (Handley et al., 2018; West et al., 2008). While random assignment is ideal in experimental research as it supports internal validity, it is difficult to control for differences when working with groups of individuals (Ong-Dean, Hofstetter, & Strick, 2011). This holds true in youth sport research where teams are of different sporting abilities and have training environment with varying conditions like team culture and goals. Moreover, when working with educational institutes, CCA HODs have allocation priorities when deciding which groups to be exposed to intervention (Handley et al., 2018). Indeed, at pre-intervention, the intervention group appeared to be the slightly 'weaker' group as participants in this group generally scored lower than those in the control group for three of the nine factors measures (i.e., connectedness with teacher and task climate but higher on antisocial behavior). Steps were taken in this study to enhance the similarities between the intervention and control groups to support causal interpretations of intervention effects (i.e., matching intervention and control groups, collecting data from multiple groups in each condition). Indeed, at pre-intervention, we found that control and

intervention groups had similar scores on six of the nine factors being measures. The intervention group scored lower on connectedness with teacher, task climate, and higher on antisocial behavior. Given that the two groups are largely similar, valid empirical conclusions can be made on the observed difference between the two groups. Specifically, the intervention prevented PYD and task climate scores in the intervention group from following the decreasing trend observed in the control group. Future studies could consider measuring the motivational climate of the team as a manipulation check to assess if the intervention indeed increased the task climate in the intervention groups. This would allow more robust conclusions regarding the impact of the TARGET intervention on the 4Cs of youth athletes through the manipulation of the motivational climate.

I discussed earlier that conducting the intervention during the competitive season could have affected its effectiveness as the ego climate becomes more salient and persistent when levels of competition increased. It is therefore possible that the intervention could have been undermined by the competition season that drove the perception of an ego climate. In a similar intervention study, Cechinni and colleagues (2014) found that a TARGET intervention on secondary school age athletes resulted in significant increase in task climate and decrease in ego climate. There was however no information on that period the intervention was conducted. Future studies should consider investigating the timing of which TARGET intervention is conducted with respect to the competition season. This may be critical to the effectiveness of TARGET interventions, or motivational climate interventions in general, given that a competitive ego climate is in direct conflict with the task climate that the interventions seek to promote.

Another potential limitation is related to the intervention design. This study adopted a PAR approach where I worked separately with the intervention recipients to apply the TARGET structures into practical strategies during the intervention phase. This meant that the final strategy adopted by each CCA teacher in the intervention phase, while guided by TARGET recommendations, was modified to meet the specific needs of individual teams. While doing so catered to the needs of individual intervention teams and potentially contributed to the observed positive effects, it also resulted in different intervention strategies applied. Some strategies may have been more effective and adhered to at varying degrees. Intervention effects of more effective strategies may therefore have been masked in the quantitative data since all intervention group data were analysed together. Future studies evaluating TARGET intervention may more closely examine the adherence and frequency of strategy (e.g., behaviour checklists and observation) to more accurately identify effective strategies. This would be valuable information for practitioners in youth sport coaching. Nonetheless, the PAR approach allowed CCA teachers to cater strategies to specific needs of the team but at the same time ensure that strategies uphold recommendations by the TARGET structures. Indeed, the American Psychological Association (APA; 2006) has recommended that effectiveness of psychological interventions hinges on how well they account for the context of the recipients (e.g., participant characteristics, culture, and preferences).

Another limitation pertains to the time allocated for collaboration between the researcher and intervention recipients. MacDonald (2012) aptly opined that PAR interventions might require more time than conventional standardized youth interventions because it involves collaboration with intervention recipients in an open-ended research

design. The time-frame needed for intended change to occur may be difficult given that time is needed to build rapport for positive collaborative relationship, achieve consensus on issues to address, design intervention strategies and troubleshoot challenges (Whitehead & McNiff, 2006). However, given the time constraints of this study, face-to-face dialogues only occurred during the introduction phase at once a week for three weeks, and three out of the seven weeks during the practical phase which occurred at two-week intervals. This may have lowered the rigour in intervention and could have contributed to the absence of significant increases in 4Cs and task climate scores. It is plausible that if more time was allocated to face-to-face collaboration, a firmer foundation might have been set for the application of the TARGET strategies, thereby reinforcing the fidelity of application and ultimately longterm effectiveness of the intervention. Indeed, CCA teachers in this study highlighted that the face-to-face discussions were beneficial to their learning and application of the TARGET strategies. For example, T1 shared that the face-to-face dialogues helped him reflect more deeply on the effectiveness of the TARGET strategies he applied. He shared:

I think the visits were very helpful. The dialogues we had deepened my reflection of what I did [TARGET strategies] because you gave some constructive feedback and also helped to probe further into what I shared [successes and challenges]. It really helped me question how successful my strategies were. If I were to do self-reflection, if I even do it, I probably wouldn't have covered as much ground since it would be a one-sided perspective.

All three CCA teachers expressed that that my visits made them more engaged as they felt more responsible to prepare for the meetings. T2 shared his opinions on this and

highlighted that these face-to-face discussions might be necessary initially when he was still getting used to the intervention. He shared:

Because I feel more accountable to prepare for the meetings, I would make the effort to be more conscious during the training sessions about the strategies. For example, I would take note of how the students responded to them. If they didn't respond positively or it didn't work for some reason, I did mental notes and later bring them to our discussions. It kind of forces me to do it. I mean, it's a new thing for me so maybe I needed some pushing to make it happen, at least at the beginning stages.

Future studies might consider increasing the frequency and rigour collaborative discussions given that a close collaborative relationship is key to the success of PAR particularly during the early stages of the research process (Fletcher, 2003; Holt et al., 2013). Future applications of TARGET interventions could also consider how intervention recipients can have access to social agents that serve as peers or mentors that can aid in their reflection and evaluation of the strategies being implemented.

A point of consideration for future research is replicating the intervention with the involvement of other important social agents in youth sport teams. A fundamental aim of this study was to investigate if an intervention involving supporting staff, instead of the coach, can positively impact PYD. The positive effect found in this study and Study 2 suggests that supporting CCA teachers can contribute meaningfully and effectively to PYD. However, it is undeniable that the coach has strong influence over youth athlete development being the main adult leader in youth sport teams (Ntoumanis & Biddle, 1999;

Treasure, 2001; Holt, 2016). The effect of intervention adopted in this study can potentially be enhanced if coaches were also involved. In light of the challenges coaches face in facilitating PYD, future research should consider applying this intervention with coaches and supporting staff, but more importantly, investigate how they can work together to leverage on the impact each other has on youth athletes and maximize intervention impact.

Another area of consideration for future research is the examination of how relevant variables might have impact on the intervention from its onset. One of them is student athletes' motivation. This study recruited school athletes belonging to mainstream secondary schools as opposed to independent or autonomous schools that have been known to display relatively better sport performance due to access to more resources (e.g., funding, training equipment). Despite belonging to a similar school context (i.e., mainstream schools), it is expected that the school sport teams would vary in motivation due to their varying sport achievements. It is possible that the motivation of student athletes could have an influence on the intervention effect given that motivation has been found to impact youth outcomes. For example, İhsan, Ekici, Soyer, & Eskiler (2015) found that athletes who have lower motivation in their sport are likely to have low confidence in their abilities. Another variable is the student athletes' baseline confidence. The study in Chapter 4 found evidence that overall PYD might be more strongly anchored on student athletes' level of confidence and discussed how it has been found to influence other areas of youth athlete development such as motivation and sport competence. Therefore, it is possible that student athletes with lowered motivation and confidence could pose challenges for the intervention to take effect as the levels of 4C outcomes are lower than average to begin with. In spite so, there have been evidence that the TARGET intervention can be effective even on teams

with lower motivation. For example, Cecchini, Méndez-Giménez, & Sánchez-Martínez (2019) found that despite the TARGET intervention group reporting lower levels of intrinsic motivation than the control group at pre-intervention, the former showed increases in several forms of self-determined motivation after the intervention. Nonetheless, it is plausible that student athletes with lower motivation may require greater intervention effort (e.g., longer intervention period, more guidance) for their 4C development to benefit from the intervention. It would be insightful for future research to examine their effect on the TARGET intervention.

5.5 Conclusion

This study conducted a TARGET intervention on supporting CCA teachers of secondary school sport teams. Implementing TARGET structures into team routines buffered student athletes' perception of a task climate and important areas of their development (i.e., 4Cs: competence, confidence, connectedness with adult mentors, and prosocial behaviour) from being undermined by competitive conditions. It was found that student athletes' score on PYD factors and perceptions of task climate were sustained six months after the intervention concluded. Task climate was positively correlated with all 4Cs factors while ego climate was associated with antisocial behaviour. An interesting finding was that the TARGET intervention was less effective in reducing student athletes' perception of an ego climate and antisocial behaviours, which contradicted past studies of TARGET interventions that were conducted mostly in the context of physical education or with athletes in other age groups. Qualitative results provided useful insight into how TARGET strategies can be derived from the six TARGET structures and the pathways to

which they impact specific areas of the 4Cs. The role of competition and several limitations of the study were proposed as critical factors to address the mixed findings. This study provided further empirical evidence that TARGET structures can help adult leaders in competitive youth sport teams facilitate positive youth athlete development. Researchers and practitioners in youth sport coaching can benefit from insights in this study on actionable strategies that can be applied into youth sport routine to create a motivational climate that facilitates positive youth athlete development.

CHAPTER 6 GENERAL DISCUSSION AND CONCLUSION

This thesis was motivated by prior research evidence that youth sport is a fertile platform to facilitate positive youth development (PYD), yet its competitive nature presents obstacles to positive growth among youth athletes. This study investigated the effectiveness of an intervention programme, that sought to facilitate PYD outcomes and negate the negative impact of competition through promoting a task climate in secondary school sport teams. Unlike most studies that focused on examining outcomes of PYD sport-based interventions, this study adopted a more holistic approach where the programme objectives, planning of intervention content and programme evaluation were guided by an integrated framework of theoretically related constructs. Specifically, the 4Cs was proposed as intended intervention outcomes and creating a task climate as the mechanism to which these outcomes can be achieved. To determine if the intervention was effective in facilitating 4Cs outcomes, the PYD toolkit was adopted as a measurement tool (Vierimaa et al., 2012). Recent advancements in psychometric procedures have recommended that bifactor exploratory structural equation modelling (ESEM) might be superior to conventional psychometric methods (e.g., CFA) to examine multidimensional psychological constructs (Morin et al., 2016; Myers et al., 2014). As the PYD toolkit is inherently multidimensional, ESEM approaches were adopted which supported these recent methodological recommendations. Unique to this study, the role of supporting teachers in secondary school sport teams was explored in relation to their contributions to PYD in secondary school sport teams. Despite being well-positioned to positively impact youth athlete development, this group of social agents has been very much under-represented in youth sport literature. Findings from this exploration laid the foundation to them being

selected as intervention recipients, instead of sport coaches, due to their influential and complementary position in secondary school sport teams alongside sport coaches.

An in-depth review of the literature in Chapter 2 highlighted that underlying the mixed impact (i.e., positive and negative) of youth sport participation on PYD is the lack of agreement among PYD scholars on development outcomes key to PYD and the specific processes to which youth sport exerts its influence on youth athlete development. These lapses in understanding complicates the process of designing sound PYD sport-based programmes since there is a lack of standardized recommendations for PYD objectives and actionable strategies to achieve them. Moreover, sport coaches, who are the main drivers of youth athlete development in youth sport teams, often struggle with promoting PYD due to competing coaching duties and challenges related to the competitiveness of youth sport. To address these issues, three separate but related studies were conducted.

In the next sections, I first summarize the purpose and key findings of each study to provide an overview of what has been achieved. I then elaborate on the theoretical and practical contributions of the three studies combined, with respect to research and practice in youth sport coaching. At the end of the chapter I discuss general limitations of the studies and recommend areas for future research that would advance the reported findings with respect to facilitating PYD through secondary school sport.

6.1 Summary of Studies

Study 1 of Chapter 3 validated the 4Cs of PYD to investigate its appropriateness as an evaluative framework to measure PYD outcomes (i.e., 4Cs) in youth sport. Using

contemporary ESEM procedures, the psychometric properties of the PYD toolkit was supported by a sample of Singaporean secondary school athletes. This served to provide an evaluation instrument for the intervention programme in Study 3 (in chapter 5). Extending on prior research supporting that the PYD is composed of four distinct but interrelated constructs (i.e., competence, confidence, connectedness and character), findings in this study revealed that the bifactor ESEM adequately represents both the specific dimensions of the constructs as well as a global dimension. An interesting finding that was made possible by applying bifactor ESEM was that each of the 4Cs has varying contributions to overall PYD. For example, in the Singaporean sample, overall PYD seems to be more strongly anchored on their perception of their confidence.

Study 2 of Chapter 4 examined the roles of supporting teachers in secondary school sport teams to understand how they complement sport coaches in facilitating PYD. Past research evidence have suggested that coaches struggle with facilitating PYD due to competing coaching commitments and I contended that engaging another group of adult social agents (i.e., supporting teachers) would enhance the ability of youth sport teams to promote PYD among youth athletes. This study found that supporting teachers facilitated student athletes' psychosocial well-being (e.g., character, emotional well-being, team cohesiveness), contributed to their sport development, and helped them juggle academic and sport commitments. It was observed that the extended contact that supporting teachers have with youth athletes and their expertise in student management poised them in a position where they were sometimes more abled than coaches to develop some areas of student athletes' development. For example, many student athletes reported that they felt closer to supporting teachers as they were more available to them during CCA sessions as

compared to the coach who focused more on conducting the sport training. Findings related to their contributions and position in the team supported their involvement in Chapter 5 as intervention recipients to facilitate PYD in secondary school sport teams. The specific areas to which they impact youth athlete's positive development provided reference for the intervention in study 3 that involved working with supporting teachers on applying TARGET structures into day-to-day work with student athletes.

The results of Studies 1 and 2 were integrated into Study 3 to test the effectiveness of the TARGET intervention programme that sought to facilitate PYD in secondary school sport teams. This programme focused on creating a task climate, through the adoption of Epstein's TARGET structures, that has shown to promote a task climate and alleviate negative effects of an ego climate resulting from competition pressures. Having established the validity of the 4Cs and the PYD toolkit in the first study, the former was adopted as objectives of the intervention and the latter used to assess the effectiveness of the intervention in meeting intended PYD objectives. Unlike most intervention studies in youth sport that focused on sport coaches, this study involved supporting teachers who work alongside coaches. In the intervention, I collaborated with supporting teachers to adopt TARGET structures into actionable strategies that were applied and tested. A mixed method approach was adopted where quantitative data was first analysed to determine the effectiveness of the intervention to impact the 4Cs of student athletes, following which qualitative results were used to triangulate, support and provide further insights. The intervention preserved 4Cs scores of student athletes over the period of intervention that was otherwise observed to decline in the absence of the intervention. Contrary to prior TARGET studies, the intervention did not have an effect on student athletes' perception of

an ego climate. Although this result was initially unexpected, it suggested that the TARGET intervention may be more effective in preserving the perception of a task climate and facilitating the 4Cs than on reducing the perception of an ego climate. I further discussed how the competitive nature of youth sport might have contributed to the mixed findings and how creating a task climate can complement competition in driving PYD in secondary school sport. To provide context and facilitate a more critical interpretation of the study's findings, important limitations and considerations of the study were highlighted.

6.2 Theoretical and Practical Contributions of Studies

In this section, I highlight some important contributions of the findings from this doctoral project to research and practice in PYD through youth sport. The contributions are organized according to the order of the studies.

6.2.1 A Measurement Framework and Instrument to Evaluate Youth Sport

Programmes

An important contribution of this study was the empirical validation of the 4Cs PYD toolkit in youth sport. Findings in this study supported the psychometric validity of the multidimensional PYD toolkit. To my knowledge, this effort is the first attempt in Singapore and possibly among a handful internationally. The utility of the PYD toolkit is further supported in Chapter 5 when it was used to measure the changes in student athletes' levels of 4Cs in the intervention study. These findings provided important empirical support to the 4Cs as a useful framework to study PYD, and the PYD toolkit as a measure of PYD in youth sport. Vierimaa and colleagues (2012) have highlighted that the 4Cs is a comprehensive framework to study PYD as it is an “integrative and holistic approach to our

understanding of athlete development” (p. 609). These findings address two fundamental criticisms of PYD sport-based programmes – 1) a lack of agreement on developmental outcomes key to PYD, and 2) lack of standardized assessment of effectiveness to achieve intended PYD objectives. This study therefore echoed past findings and provided evidence that the PYD toolkit shows promise as an assessment tool to evaluate the effectiveness of youth sport programmes in facilitating PYD. This finding would be of interest to school sport organizations and stakeholders given the increasing attention on promoting PYD through sports.

6.2.2 Updated Understanding on the Factor Structure of the 4Cs Using Bifactor ESEM

The application of bifactor ESEM to examining the 4Cs deepen theoretical understanding of the framework which has theoretical and practical implications in research. Previously, the 4Cs was conceptualized as made up of four distinct and related constructs with little information on their relative weightage on or hierarchical nature of PYD. In Chapter 3, bifactor ESEM advanced theoretical understanding of the 4Cs constructs as being sufficiently distinct from each other and have different contributions to overall PYD (i.e., PYD more strongly anchored on confidence). This finding further echo the application of bifactor measurement models in studying multidimensional constructs (e.g., PYD) which has been rare in sport and exercise psychology research (Stenling, Ivarsson, Hassmén, & Lindwall, 2015).

This updated understanding towards the factor structure of the 4Cs has important implications on how 4Cs scores are managed and interpreted. Specifically, with the assumption that the 4Cs exist as four distinct constructs, prior studies have utilized the

instrument to study a single or a subset of the 4Cs factors. An understanding of the bifactor structure of 4Cs opens up the possibility and flexibility of studying the 4Cs as a single construct (i.e., overall PYD), given the adoption of appropriate statistical methodology. Researchers and owners of PYD sport programmes can therefore utilise the PYD toolkit to study correlates and predictors of PYD in sport. Moreover, the PYD toolkit can be adopted to evaluate youth sport programmes - a fundamental step to ascertain that these initiatives positively impact young athletes (Holt, 2016). This would benefit empirical research that seek to ascertain the effects of sport on youth athlete development – a fundamental step in ensuring that the youth experience PYD through sport participation.

6.2.3 Cultural Influence on the Relative Contributions of 4Cs Constructs to PYD

An important contribution is evidence that the relative contributions of individual 4Cs factors are not homogenous and may be influenced by culture. In the first study, it was observed that perceived confidence and confidence were less well-defined as compared to the other 4Cs factors (i.e., observed competence, connectedness, character). This was consistent to the finding of Chen et al. (2018). The authors explained that confidence is less communicated as compared to connectedness and culture in the Chinese sample whose culture placed great value on group harmony and moral values. Given that Singapore is also largely a collectivistic nation, it is not surprising that perceived competence and confidence are less well-defined in the Singaporean sample in this study. This study therefore provided evidence that while PYD might have cross-cultural applications, there is a need to consider the relative contributions of each of the 4Cs when the PYD toolkit is adopted in different cultural contexts. As discussed in an earlier section (6.2.2), bifactor ESEM makes this clarification possible.

This updated understanding that overall PYD can be more anchored on one or a subset of the 4Cs deepens our understanding of youth development and provides important information that can guide intervention efforts in terms of which aspect of PYD to pay more attention to. For example, it was observed that for student athletes in Singapore, PYD was more anchored on confidence (i.e., higher factor loadings on overall PYD factor) as compared to the other Cs. This would entail that secondary school sport teams in Singapore might want to place more emphasis on building the confidence of student athletes while developing their sport competence right from the start of school sport programmes. This is especially important given that many sport coaches hold a belief that sport achievement precedes confidence and therefore all efforts need to be put into improving student athletes' sport ability and helping them win medals. This has been established to be counterproductive as an emphasis of winning may undermine confidence-building. Understanding the cultural influence on the relative contributions of 4Cs factors provide guidance on prioritising of PYD intervention strategies. This serves as useful and practical information that can enhance the effectiveness of intervention.

6.2.4 Contributions of Supporting Teachers to PYD in Secondary School Sport Teams

Extending the limited research on the contributions of supporting staff in youth sport teams, Chapter 4 documented the multiple roles supporting teachers play that facilitated PYD among secondary school athletes. The third study further provided empirical support for these contributions of supporting teachers in the PYD intervention. This group of social agents in the youth sport context has been underreported and often left out in intervention studies (Lim et al., 2019). This study filled this research gap and at the same time presented potential solutions to challenges sport coaches face in facilitating

PYD. Specifically, coaches struggle with portioning time and efforts to sufficiently address non-sporting area of athlete development (Camiré et al., 2011; 2013; Robbins & Rosenfeld, 2001). Findings in Study 3 illustrated how supporting staff in youth sport teams is a valuable resource that, when utilized effectively, can contribute towards key areas of PYD alongside coaches. Notwithstanding, the findings also noted that for supporting staff to contribute meaningfully to youth athlete development, they need to have authority over decisions made in the team. Findings in Study 3 therefore echo findings from Study 2 that supporting teachers in secondary school athletes can contribute to PYD if meaningfully engaged.

6.2.5 Empirical Evidence on the Effectiveness of TARGET Intervention in Secondary School Sport Teams

A fundamental contribution of this research study is establishing the efficacy of the TARGET intervention to facilitate PYD in youth sport. Prior research has typically focused on the impact of TARGET structures in academic and PE classrooms (Bortoli et al., 2017; Braithwaite et al., 2011) but empirical support of its efficacy has been limited in youth sport, in particular secondary school sport (Digelidis et al., 2004; Hassan & Morgan 2011). This study therefore provided needed empirical evidence that TARGET structures can also be meaningfully applied in the youth sport setting to impact PYD. At the same time, these findings echo past sport-based PYD research on the need for intentional efforts to facilitate PYD in youth sport (Fraser-Thomas et al., 2005; Holt, 2016; Lyras & Peachey, 2011). Specifically, PYD can be facilitated when adult mentors apply TARGET strategies into the day-to-day routines in youth sport teams.

Furthermore, qualitative evidence helped provide practical insights into how TARGET structures can be manifested into practical strategies and the impact each strategy had on respective 4Cs factors. The actionable strategies documented in this study would benefit practitioners in youth sport coaching who wish to leverage on youth sport as a context to facilitate PYD. This is especially helpful given that information on the intervention processes that result in the positive PYD outcomes have often been insufficient or lacking (Haudenhuyse et al., 2012; Holt, 2016). Moreover, clarity on the impact that each TARGET structure has on specific 4Cs factors guide future applications of the TARGET structures according to the unique needs for youth sport teams. For example, a team whose athletes report high competence but low coach-athlete relations may want to place more emphasis on TARGET structures that prioritise connectedness. This study therefore provided a comprehensive and detailed documentation of an intervention programme that can be replicated and applied in secondary school sport teams to facilitate PYD among student athletes.

6.2.6 New Perspective on the Effects of TARGET Intervention on Ego Climate in Secondary School Sport Teams

Contrary to prior studies, the TARGET intervention did not reduce student athletes' perception of an ego climate. Drawing from past research on the impact of competition on youth developmental outcomes, I discussed in Chapter 5 that the more pronounced element of competition in youth sport reinforced the ego climate in secondary school sport teams that plausibly made it more resistant to intervention efforts. This potentially reconciles the contradictory results regarding the impact of TARGET interventions on ego climate between prior TARGET studies and the one in Chapter 5. In Chapter 5, I also highlighted

arguments by PYD scholars who opined that competition, while inevitable in youth sport, can facilitate PYD if coupled with strong supportive relationships (Bengoechea et al., 2017; Gute et al., 2008). The findings in this study supported this argument and further illustrate that this can be achieved through promoting a task climate. Indeed, creating a task climate involves supportive behaviours from adult leaders like recognition for efforts and making youth athletes feel valued in the team (Cecchini et al., 2014; McLaren et al., 2014; Newton et al., 2000; Smith et al., 2007). The findings in this study therefore advanced our understanding for the effects of TARGET structures in secondary school sport by probing areas of inconsistencies with prior research. Specifically, TARGET structures may be less effective in eliminating an ego climate in more competitive secondary school sport. However, it can negate the negative effects of the former through the promotion of a task climate that this study has shown to facilitate key positive 4Cs outcomes (i.e., competence, confidence, connectedness with coach and teachers, prosocial behaviour).

6.2.7 Empirical Evidence for Empirical Links Between 4Cs and Motivational climates

A final contribution of this study is the provision of empirical evidence that the 4Cs and motivational climate frameworks can be meaningfully integrated to guide PYD sport-based intervention. Specifically, while the 4Cs of PYD and motivational climates originated from independent lines of research, Study 3 shed light on how a task climate can be a suitable mechanism to which 4Cs outcomes is achieved in secondary school sport. Prior research has shown that motivational climate can facilitate PYD, but findings have revolved round the effects of motivational climate on various developmental outcomes (Duda & Balaguer, 2007; Harwood et al., 2015; Wang, Li, Sun et al., 2010) that has been sparsely studied, unlike the 4Cs that consolidates key outcomes of PYD. This study

therefore provided a comprehensive, integrated framework for PYD sport-based intervention by providing guidelines for meaningful intervention delivery and evaluation. Further research is needed to validate and provide empirical support to these findings.

6.3 Limitations and Future Directions

This section discussed some of the limitations in this doctoral study that needs to be considered when making conclusions about its findings.

One important contribution of this study was the finding that 4Cs factors of PYD are more closely related to a task climate than ego climate. This was supported by the observation that the TARGET intervention, that was designed to promote a task climate, also had positive impact on the 4Cs among secondary school student athletes. However, these findings were correlational, and causation remains to be determined. It is possible that increased perception of a task climate through applying TARGET structures also increased student athletes' perception of connectedness with teachers and coaches, which could in turn, reinforced and facilitated the other Cs. For example, the TARGET structures recommend that adult leaders (i.e., teacher and/or coaches) provide private and individual praise of student athletes to encourage them expending effort and make them feel valued. While unintended, athletes reported that such supportive and positive interactions fostered closer relationships between athletes and the adult mentors. Close and meaningful relationships have been found to support positive development of youth athletes (García-Calvo et al., 2014; Sarrazin et al., 2002). Therefore, clarifications on the dynamics and directions of causation between the 4Cs and the type of motivational climates (i.e., task and/or ego) would further our knowledge of the precedents and/or antecedents of PYD and

facilitate applications of the TARGET structures. Future studies may therefore want to examine causal relationship in terms of the dynamic relationship between motivational climate and 4Cs.

Moreover, the finding that the TARGET intervention did not have an effect on ego climate remains to be concluded. In chapter 5, I discussed the negative influence of competition on ego climate and contended that the concurrent application of the intervention with the start of the competition season could have hindered the efficacy of the TARGET intervention to reduce perception of ego climate. Introducing the intervention for a period of time before the competition season could have allowed more time for laying a firmer foundation for a task climate. While this study has brought to light a potential hindering factor to TARGET interventions in secondary school sport (i.e., competition season), more empirical investigations and evidence are needed to support this claim. Future studies may want to explore the moderating impact of competition season on the effectiveness of TARGET interventions. Indeed, there is a competing perspective that the presence of an ego climate may not undermine PYD, except for moral behaviours, as previously thought. There is increasing discussion that the drive from competition can actually drive PYD (Gould et al., 2012; MacDonald et al., 2011; Schaillee et al., 2017) and especially in the presence of supportive social relationships (Bengoechea et al., 2017). The role of the competition and an ego climate on the development of youth athletes warrants closer investigation.

In this study, the use of multiple ‘informants’ and data sources provide a comprehensive overview on the impact of the intervention and the practical strategies that

can be applied to facilitate PYD. Future studies could explore complementing such retrospective data with more objective data that can provide greater insight into the effectiveness of the intervention strategies. For example, observational data (i.e., field observations by researcher) could be collected for Study 2 to corroborate with the self-reported data. There may have been positive behaviours and decisions made by CCA teachers that contributed to student athletes' positive development but were not consciously captured by participants. At the same time, it is possible that application of some strategies reported by supporting teachers in Study 3 may not have been as rigorous as intended. Observational data on the frequencies to which some of the strategies (e.g., individual chats) were applied during training sessions could provide a greater understanding of which strategies were more effective and sustainable than the rest. Such information is valuable to inform future initiatives on the potential pitfalls and essential measures to increase the efficacy of TARGET interventions. Future studies may consider exploring the collection of objective behavioural data to enhance the validity of the findings from self-reported data.

This study has provided evidence that supporting staff in the secondary school sport context can play an important role in facilitating PYD. While supporting teachers in this study share similarities with other more familiar supporting staff in youth sport teams (e.g., assistant coaches, sport managers, athletic directors) in general, more empirical research is needed to explore how the TARGET intervention may play out for other supporting staff roles. Given the differences specific roles played by these supporting staff, it is foreseeable that they may face varying challenges different to those experienced by CCA teachers. At the same time, given that coaches are the primary adult mentor in youth sport teams (Allan, 2014; García-Calvo et al., 2014), future studies may also want to explore involving both

coaches and supporting staff into intervention efforts and provide recommendations on how the two can work together to maximize intervention gains.

6.4 Conclusions

Youth sport participation, particularly in secondary school sport, has shown promise in facilitating PYD. However, developmental outcomes arising from youth sport participation has been mixed. Researchers have attributed this to the ambiguity on the developmental outcomes key to PYD and corresponding antecedents that lead to them (Burnett, 2001; Coakley, 2011; Holt, 2016). Clarity on these areas are crucial to effective planning and management of PYD sport programmes. This study provided compelling evidence that an integrated framework composing of 4Cs and motivational climate factors can serve as a suitable framework to guide youth sport research and initiatives. Additionally, creating a task motivational climate through applying Epstein's (1989) TARGET structures was found to serve as an appropriate mechanism to which a task climate and the 4Cs can be promoted. Specifically, 4Cs affords a valid framework that considers holistic development of youth athletes, aptly accounting for both sport and important psychosocial aspects of youth development. It therefore serves as appropriate objectives for youth sport programmes.

Instrument validation supported the psychometric adequacy of the PYD toolkit and further presented a culturally valid instrument to assessment youth sport teams' effectiveness in facilitating the 4Cs. The validation, using bifactor ESEM procedures, provided new insight into the bifactor structure of the 4Cs and made it possible to examine the differential contributions of 4Cs factors to overall PYD. This opens up new possibilities

of studying PYD as both a single construct (i.e., overall PYD) and as a collection of key constructs integral to PYD (i.e., competence, confidence, connectedness, character). Additionally, the finding that PYD was more strongly anchored on confidence for the Singaporean sample, provided evidence that PYD, while showing cross-cultural validity, is to an extent culturally-charged. This highlights the importance of considering cultural influences when interpreting results from investigations using the 4Cs framework and PYD toolkit.

The resultant PYD outcomes from sport participation hinge on the decisions and behaviours by adult social agents who mould the environment youth athletes train in. Their close contact and involvement with youth athletes play an integral role on their experience and development. While the coach has been the focus of PYD sport studies, I contended and provided evidence that supporting staff can meaningfully complement coaches to optimize the potential of youth sport teams in facilitating PYD. Their contributions were also supported in the intervention when their involvement brought about positive impact on the motivational climate and 4Cs of school athletes. This study therefore brought to light another social agent that warrants exploration and research in youth sport literature.

Lastly, an intervention programme that focuses on implementing TARGET structure was found to benefit 4Cs of student athletes. Interestingly, while past research consistently support that TARGET interventions increased youth perception of task climate and reduced that of an ego climate, this study only found evidence for the former. The competitive environment of youth sport seems to be more resistant to intervention given that social comparison and sport performance, characteristic of an ego climate, are inherent

to the youth sport context. Nonetheless, these findings highlight that PYD can occur amidst the presence of an ego climate if there exists a concurrent task climate to counter the negative effects of the former. Prior research has typically focused on the correlates and orthogonality of task and ego climate but fail to address the concurrent existence of the two motivational climates on youth sport and its implications. This study shed light on this research gap and provided recommendations to reconcile the two.

In conclusion, this research study has shown that to ensure youth sport programmes facilitate PYD, it is crucial for them to be guided by a comprehensive framework that accounts for the planning, delivery and assessment of the programme. In this regard, the 4Cs and motivational climates have been presented as related constructs that can be meaningfully integrated into a framework to guide youth sport research and initiatives. At the same time, there is great potential for supporting staff to contribute meaningfully to PYD in youth sport teams.

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APPENDICES

Appendix A Means and standard deviation for items, and Cronbach's λ for scales of 4Cs

Item	M (SD)	Cronbach's λ
Competence		
<i>Perceived competence</i>		.758
Cm1 Please rate your technical skills.	3.394 (.474)	
Cm2 Please rate your tactical skills.	3.244 (.589)	
Cm3 Please rate your physical skills.	3.301 (.725)	
<i>Observed competence</i>		.868
Cm4 Please rate this student's technical skills.	3.200 (1.015)	
Cm5 Please rate this student's tactical skills.	2.980 (1.145)	
Cm6 Please rate this student's physical skills.	3.169 (1.105)	
Confidence		
Cf1 I feel self-confident.	2.706 (.451)	
Cf2 I'm confident I can meet the challenge.	2.692 (.504)	
Cf3 I'm confident about performing well.	2.554 (.447)	
Cf4 I'm confident because I mentally picture myself reaching my goal.	2.706 (.529)	
Cf5 I'm confident of managing under pressure.	2.539 (.570)	
Connectedness		
<i>Affective</i>		.914
Cn1 I feel close to my coach.	4.431 (2.273)	
Cn2 I feel committed to my coach.	4.802 (2.202)	
Cn3 I feel that my sport career is promising with my coach.	4.765 (2.294)	
<i>Cognitive</i>		.920
Cn4 I like my coach.	5.384 (2.233)	
Cn5 I trust my coach.	5.616 (2.233)	
Cn6 I respect my coach.	6.075 (1.429)	
Cn7 I feel appreciation for the sacrifices my coach has experienced in order to improve his or her performance.	5.578 (1.856)	
<i>Behaviour</i>		.891
Cn8 When I am coached by my coach, I feel at ease.	5.120 (2.333)	
Cn9 When I am coached by my coach, I feel responsive to his or her efforts.	5.407 (1.915)	
Cn10 When I am coached by my coach, I am ready to do my best.	5.657 (1.716)	

Appendix A Means and standard deviation for items, and Cronbach's λ for scales of 4Cs (Continued)

Item	M (SD)	Cronbach's λ
Cn11 When I am coached by my coach, I adopt a friendly attitude.	5.531 (1.814)	
Character		
<i>Prosocial Team</i>		.798
PT1 Gave positive feedback to a team-mate.	3.593 (.706)	
PT8 Encouraged a team-mate.	3.967 (.804)	
PT12 Gave positive, helpful feedback to a team-mate.	3.705 (.852)	
PT15 Congratulated a team-mate for good play.	4.112 (.875)	
<i>Prosocial opponent</i>		.845
PO4 Helped an opponent.	2.845 (1.107)	
PO6 Asked to stop play when an opponent was injured.	2.321 (1.501)	
PO10 Helped an injured opponent.	2.704 (1.408)	
<i>Antisocial Team</i>		.776
AT3 Argued with a team-mate.	2.118 (.888)	
AT7 Abused a team-mate with words.	1.566 (.719)	
AT11 Negatively criticized a team-mate.	1.630 (.749)	
AT14 Cursed vulgarities at a team-mate.	1.516 (.673)	
AT18 Showed frustration at a team-mate's poor play.	2.065 (.998)	
<i>Antisocial Opponent</i>		.845
AO2 Negatively criticized an opponent.	2.043 (.786)	
AO5 Deliberately fouled/injured an opponent.	1.523 (.780)	
AO9 Argued/fought back after being fouled wrongly.	1.892 (1.112)	
AO13 Tried to frustrate an opponent on purpose.	1.705 (1.005)	
AO16 Tried to injure an opponent.	1.342 (.606)	
AO17 Distracted an opponent on purpose.	1.69 (1.000)	
AO19 Broke the rules of the game on purpose.	1.286 (.416)	
AO20 Physically intimidate/frighten an opponent.	1.504 (.834)	

Appendix B Standardised parameter estimates(λ) and uniqueness(δ) from ICM-CFA and ESEM of 4Cs.

ICM-CFA solutions			ESEM solutions										
Items	λ	δ	λ										δ
			CmP	CmO	Cf	Cn_C	Cn_A	Cn_B	Pro_T	Pro_O	Anti_T	Anti_O	
Cm1	.732**	.465**	.719**	.049	.001	.015	.020	-.045	-.012	.052	.026	-.013	.441**
Cm2	.777**	.396**	.736**	.005	-.032	-.039	-.035	.090*	.035	.000	-.022	-.020	.392 **
Cm3	.663**	.561**	.568**	.010	.038	.063	.046	-.062	.004	-.047	-.016	.001	.558 **
Cm4	.907**	.177**	-.001	.903**	.013	-.009	.013	-.016	-.024	.029	-.044	.042	.180 **
Cm5	.858**	.264**	.026	.859**	.023	-.027	.012	.092	.014	-.005	.083	-.021	.244 **
Cm6	.734**	.462**	.027	.700**	.127*	.065	-.068	-.039	.035	.007	-.001	-.025	.454 **
Cf1	.794**	.370**	.007	.001	.759**	.058	-.085	.051	.032	-.019	-.076	.067	.365 **
Cf2	.844**	.288**	.064	.010	.790**	.003	-.093	.118*	.003	-.008	-.029	.013	.287 **
Cf3	.781**	.391**	.061	.018	.766**	.004	.062	-.054	-.089**	.003	-0.007	.027	.372 **
Cf4	.668**	.553**	-.006	-.029	.673**	-.032	.069	-.037	.063	.084*	.047	-.053	.522 **
Cf5	.574**	.671**	.044	.024	.518**	.041	.080	-.073	.058	-.048	.075	-.045	.659 **
Cn1	.853**	.272**	.065	.090	-.006	.750**	-.026	.111 *	-.002	.034	-.006	.000	.244 **
Cn2	.912**	.168**	-.015	.028	.038	.774**	.118*	.023	.057 *	.000	.015	-.003	.170 **
Cn3	.851**	.276**	.029	-.015	.093*	.677**	.131*	.045	.014	-.010	-.033	.002	.274 **
Cn4	.894**	.200**	.031	.025	-.026	.265**	.650**	.051	-.019	-.006	.008	-.028	.203 **
Cn5	.898**	.194**	-.030	.071*	.045	.060	.893**	-.013	-.044	.024	-.014	.001	.127 **
Cn6	.800**	.360**	.025	-.032	-.005	-.133*	.824**	.092	.123**	-.040	-.002	.027	.290 **
Cn7	.811**	.342**	-.024	-.036	-.001	.097	.350**	.435**	.086*	-.015	.003	-.014	.320 **
Cn8	.886**	.214**	-.034	.100*	.089*	.104	.114	.704**	-.089*	.069	-.061	.031	.192 **
Cn9	.915**	.163**	-.012	.011	.070	.038	.192 *	.717**	-.024	.048	.009	-.042	.156 **
Cn10	.777**	.396**	.087	-.046	.031	.085	.109	.569**	.129**	-.016	.032	.002	.373 **
Cn11	.774**	.402**	.140*	-.017	-.081	.109	.125	.559**	.047	.012	-.064	-.008	.391 **
PT1	.698**	.513**	-.021	.003	.011	.125	-.051	.002	.639**	.081	-.013	.045	.509 **
PT8	.725**	.475**	.009	.040	-.013	-.011	-.020	.021	.757**	-.053	-.050	.028	.438 **
PT12	.809**	.346**	.047	-.028	-.019	.051	.053	-.129*	.775**	.061	-.031	-.043	.360 **
PT15	.614**	.623**	-.009	.040	.084	-.156**	.104	.058	.576**	.053	.001	-.036	.592 **

Appendix B Standardised parameter estimates(λ) and uniqueness(δ) from ICM-CFA and ESEM of 4Cs. (Continued)

ICM-CFA solutions			ESEM solutions										
Items	λ	δ	Λ										δ
			CmP	CmO	Cf	Cn_C	Cn_A	Cn_B	Pro_T	Pro_O	Anti_T	Anti_O	
PO4	.608**	.630**	.045	.064	-.035	.055	-.114	.137	.122**	.516**	.043	-.033	.618 **
PO6	.640**	.590**	.015	.039	-.029	-.057	-.046	.078	.037	.579**	.006	.108*	.602 **
PO10	.877**	.231**	-.006	-.041	.049	.009	.056	-.066	-.002	.931**	-.021	.008	.127**
AT3	.500**	.750**	-.022	-.061	-.031	.092	-.034	.005	-.004	.024	.518**	.014	.716 **
AT7	.769**	.408**	.072	-.016	.050	-.060	.029	-.056	-.059	.074	.712**	.049	.414 **
AT11	.763**	.418**	-.007	-.016	.001	-.007	-.035	.044	-.087*	.030	.804**	-.027	.357 **
AT14	.707**	.500**	-.003	.050	-.082	-.017	.036	-.113	.002	.004	.597**	.154**	.502 **
AT18	.540**	.709**	.017	.080	.040	-.014	-.039	.035	.079	-.138*	.435**	.203**	.667 **
AO2	.422**	.822**	.024	-.003	-.057	.109	-.066	.070	.088	-.057	.395**	.212**	.706 **
AO5	.718**	.485**	-.013	-.001	.066	-.012	.094	-.053	.003	.122	.338**	.748**	.446 **
AO9	.566**	.680**	.022	-.053	-.029	.074	-.026	-.027	.009	.123*	-.085	.343**	.604 **
AO13	.709**	.498**	-.139	.060	.152 *	-.019	-.102	.089	.066	-.055**	.154*	.607**	.469 **
AO16	.753**	.433**	.063	-.007	-.047	-.042	.037	-.0009	-.008	-.040	-.104 *	.842**	.384 **
AO17	.730**	.467**	-.053	-.011	.063	.042	-.028	.041	-.027	-.023	-.078	.779**	.443 **
AO19	.657**	.568**	.053	.033	-.135*	-.090	.010	-.005	-.070	.047	.038	.650**	.518 **
AO20	.717**	.486**	.029	-.041	.023	.009	.081	-.068	.002	-.019	-.045	.750**	.475 **

Note: * p < .05, ** p < .01. Factor loadings of target items are in bold.

Appendix C Standardised parameter estimates(λ) and uniqueness(δ) from HESEM of 4Cs.

Items	λ										δ
	CmP	CmO	Cf	Cn_C	Cn_A	Cn_B	Pro_T	Pro_O	Anti_T	Anti_O	
Cm1	.712**	.059**	.012**	-.009**	.013**	-.016**	.027**	.027**	-.048**	.046**	.443**
Cm2	.733**	.006**	.020**	-.028**	.012**	.092**	-.005**	-.005**	.091**	-.022**	.378**
Cm3	.583**	.013**	.120**	.067**	.071**	-.040**	.007**	.007**	-.001**	-.027**	.575**
Cm4	-.004**	.901**	.001**	.015**	.021**	-.044**	.048**	.048**	.028**	-.015**	.181**
Cm5	.020**	.870**	-.029**	-.038**	.036**	.088**	.000**	.000	-.024**	-.021**	.234**
Cm6	.020**	.715**	.035**	.063**	.047**	-.061**	-.043**	-.043**	-.018**	.001**	.448**
Cf1	.006**	.002**	.775**	.060**	.088**	.051**	-.018**	-.018**	-.084**	.073**	.373**
Cf2	.049**	.012**	.805**	.003**	.096**	.118**	-.008**	-.008**	-.032**	.014**	.288**
Cf3	.047**	.021**	.763**	.005**	.064**	-.053**	.003**	.003**	-.007**	.029**	.369**
Cf4	-.004**	-.034**	.671**	-.032**	.070**	-.037**	.078**	.078**	.051**	-.056**	.519**
Cf5	.035**	.028**	.524**	.042**	.082**	-.072**	-.044**	-.044**	.081**	-.049**	.659**
Cn1	.051**	.108**	-.005**	.760**	.027**	.112**	.032**	.032**	-.007**	.000	.250**
Cn2	-.012**	.034**	.036**	.783**	.122**	.023**	.000**	.000	.016**	-.004**	.175**
Cn3	.022**	-.018**	.087**	.688**	.136**	.045**	-.009**	-.009**	-.037**	.003**	.280**
Cn4	.024**	.030**	-.024**	.269**	.646**	.051**	-.006**	-.006**	.009**	-.030**	.203**
Cn5	-.023**	.084**	.041**	.060**	.880**	-.013**	.022**	.022**	-.015**	.001**	.128**
Cn6	.019**	-.038**	-.005**	-.136**	.845**	.092**	-.037**	-.037**	-.003**	.029**	.294**
Cn7	-.019**	-.044**	-.001**	.099**	.365**	.439**	-.015**	-.015**	.003**	-.015**	.329**
Cn8	-.027**	.118**	.081**	.105**	.116**	.684**	.063**	.063**	-.066**	.033**	.190**
Cn9	-.010**	.013**	.065**	.039**	.198**	.713**	.045**	.045**	.010**	-.045**	.157**
Cn10	.068**	-.056**	.029**	.087**	.113**	.589**	-.015**	-.015**	.036**	.002**	.382**
Cn11	.110**	-.021**	-.076**	.112**	.130**	.573**	.011**	.011**	-.071**	-.009**	.402**
PT1	-.017**	.003**	.010**	.129**	-.053**	.002**	.639**	.077**	-.015**	.050**	.527**
PT8	.007**	.049**	-.013**	-.011**	-.021**	.021**	.751**	-.051**	-.056**	.030**	.453**

Appendix C Standardised parameter estimates(λ) and uniqueness(δ) from HESEM of 4Cs. (Continued)

Items	λ										δ
	CmP	CmO	Cf	Cn_C	Cn_A	Cn_B	Pro_T	Pro_O	Anti_T	Anti_O	
PT12	.037**	-.034**	-.018**	.052**	.055**	-.130**	.780**	.058**	-.033**	-.047**	.361**
PT15	-.007**	.049**	.078**	-.159**	.108**	.059**	.569**	.050**	.001**	-.040**	.608**
PO4	.036**	.078**	-.033**	.056**	-.118**	.137**	.110**	.519**	.047**	-.036**	.631**
PO6	.012**	.047**	-.028**	-.058**	-.047**	.078**	.033**	.578**	.007**	.117**	.616**
PO10	-.005**	-.050**	.046**	.009**	.058**	-.067**	-.002**	.937**	-.023**	.009**	.117
AT3	-.017**	-.072**	-.028**	.093**	-.035**	.005**	-.003**	.022**	.530**	.015**	.707**
AT7	.055**	-.018**	.046**	-.061**	.030**	-.055**	-.052**	.068**	.721**	.053**	.409**
AT11	-.005**	-.019**	.000 #	-.007**	-.036**	.043**	-.077**	.028**	.821**	-.028**	.355**
AT14	-.003**	.060**	-.077**	-.017**	.036**	-.113**	.002**	.003**	.605**	.165**	.503**
AT18	.013**	.094**	.036**	-.014**	-.039**	.034**	.069**	-.126**	.423**	.213**	.641**
AO2	.018**	-.004**	-.051**	.107**	-.066**	.068**	.077**	-.052**	.423**	.191**	.673**
AO5	-.010**	-.001**	.060**	-.012**	.095**	-.052**	.003**	.111**	.363**	.770**	.449**
AO9	.017**	-.063**	-.027**	.075**	-.027**	-.027**	.008**	.116**	-.093**	.332**	.581**
AO13	-.106**	.071**	.139**	-.019**	-.104**	.087**	.059**	-.051**	.166**	.601**	.462**
AO16	.048**	-.008**	-.042**	-.042**	.038**	-.009	-.007**	-.037**	-.113**	.847**	.372**
AO17	-.041**	-.014**	.058**	.042**	-.028**	.041**	-.024**	-.021**	-.085**	.787**	.436**
AO19	.041**	.039**	-.126**	-.092**	.011**	-.005**	-.063**	.044**	.043**	.663**	.526**
AO20	.023**	-.048**	.021**	.009**	.082**	-.067**	.002**	-.018**	-.048**	.751**	.463**

Note: * $p < .05$, ** $p < .01$. Factor loadings of target items are in bold.

Appendix D Interview Guide for Study 2

Rapport building and demographics questions:

- a) Years of experience training with/coaching/managing this team, b) Years of experience with the sport, c) Years of experience as a coach/CCA teacher, d) Age.

Role of CCA teachers in promoting positive youth outcomes

1. In your opinion, what are the CCA teacher's/your roles and responsibilities in this team?
2. How does the CCA teachers in this team/you define what success?
 - a. What does the CCA teacher/you ask athletes to aim for in this team?
3. How do you think CCA teachers/you affect the development of athletes?
4. How do the CCA teacher/you and coach work together to develop the athletes?
 - a. How do you think the team will be affected if the CCA teacher/your role was removed?
5. Are there any other comments you would like to add about how CCA teachers influence the development of athletes?

Appendix E Descriptions and Rationale for Epstein's TARGET Structures

Structures	Description	Rationale
Task	<ul style="list-style-type: none"> • Challenging • Diverse • Progressive 	<ul style="list-style-type: none"> • Engaging, foster effort and mastery • Engaging, reduce complacency and social comparison
Authority	<ul style="list-style-type: none"> • Decision-making opportunities • Leadership role 	<ul style="list-style-type: none"> • Encourage responsibility • Afford autonomy
Recognition	<ul style="list-style-type: none"> • Recognized privately • Individual praise • Praise for improvement and effort 	<ul style="list-style-type: none"> • Reduce social comparison • Emphasize value of learning process and striving for personal progress
Grouping	<ul style="list-style-type: none"> • Small, heterogenous • Regardless of ability • Increase cooperative learning and interaction 	<ul style="list-style-type: none"> • Reduce labelling and social comparison • Emphasize everyone is equally valued
Evaluation	<ul style="list-style-type: none"> • Self-referenced • Maximal effort • Personal improvement 	<ul style="list-style-type: none"> • Value effort • Reduce social comparison
Time	<ul style="list-style-type: none"> • Flexibility in duration • Sufficient to practice and complete 	<ul style="list-style-type: none"> • Increase likelihood of achieving competence • Allow for personal improvement regardless of ability

Appendix F Demographic and Training Details of CCA Teachers in Intervention Groups

	T1	T2	T3
Demographic details	<ul style="list-style-type: none"> -Male -Overall-in-charge of CCA team -12 Years as teacher -12 Years as sport CCA teacher and with current team -Overall in charge 	<ul style="list-style-type: none"> -Male -Assistant teacher in-charge of CCA team -3 years as PE teacher -3 years as CCA teacher -2 years with current team -Not overall in-charge 	<ul style="list-style-type: none"> -Female -Overall-in-charge of CCA team - years as PE teacher - years as CCA teacher - years with current team -Overall in-charge
Training background	<ul style="list-style-type: none"> -NIE PE trained -Played competitive soccer (school level) -participate in same sport as CCA team (soccer) -masters in sport coaching from NIE 	<ul style="list-style-type: none"> -NIE PE-trained -ex-competitive athlete in swimming (club level) -current volunteer coach in swimming club 	<ul style="list-style-type: none"> -non-sport trained -NIE-trained -played badminton in primary school
CCA teacher observed characteristics	<ul style="list-style-type: none"> -Interest in student motivation -Open to suggestions -Volunteered to be in study 	<ul style="list-style-type: none"> -Interest in developing student athletes' character -Open to suggestions -Volunteered to be in study 	<ul style="list-style-type: none"> -Interest in developing character -open to suggestions -volunteered to be in study

Appendix G Description of Teachers' Handbook

Presented below are the three sections of the handbook that is aligned with the three weeks of workshops conducted by me.

Week 1: PYD and motivational climates. The first section provided an introduction on PYD in sport, explaining to CCA teachers how sport is an avenue to facilitate the 4Cs of PYD. Negative and positive correlates of sport participation were listed to emphasize that deliberate planning is needed for PYD to occur in youth sport.

This was followed by an introduction of the effects of task and ego climates on youth motivation in sport participation, respective features and how success is defined in each climate. Several written activities were designed to help CCA teachers more deeply appreciate the difference between a task and ego climate in youth sport. It also served to help CCA teachers realize how commonly accepted practices in youth sport were actually reflective of less adaptive features of an ego climate. For example, in one activity, common statements used by sport coaches were listed and CCA teachers had to identify the task or ego feature the statement reflected and offer suggestions to improve the statement when it reflected a feature of an ego climate. For example, a statement “Why didn’t you score? You better buck up! Go run 10 rounds around the court” would reflect the ‘mistakes are behaviours to be punished’ feature of an ego climate. CCA teachers are encouraged to rephrase the statement to mimic communication reflective of a task climate. One of the teachers suggested for it to be changed to “focus on getting the ball in in the next shot”.

The next segment of the section discussed how creating a task climate is facilitated by consistent communication of a task-oriented definition of success, role modelling and putting in place supporting structures and practices to anchor a task climate. The last part was a pre-lude to the next section that introduced the TARGET structures.

The last segment presented a table of the TARGET structures that describes in detail features of each TARGET structure and the rationale underlying them. For each component (e.g., Task), CCA teachers were asked to reflect and pen down if current practices in their team were aligned or misaligned to the recommended TARGET structures. The section concludes with CCA teachers laying down preliminary strategies to apply the TARGET structures into their team's training and set action plans to work on these in the coming CCA training week. When discussing the section on action plan CCA teachers and researchers brainstormed for strategies that culminated in a list of TARGET strategies that were to be implemented and tested in the practical phase of the study.

Week 2: Working with coaches to create a task motivational climate in sport CCA. The second section focused on strategies designed and applied in the previous CCA training week (workshop was conducted every week for three weeks). During discussions, I also revisited the concepts that were shared in the previous week (i.e., PYD, motivational climate, TARGET structures) wherever appropriate to reinforce the concepts and strategies discussed and facilitated CCA teachers in reflecting if their strategies were aligned with these concepts. This also allowed CCA teachers to raise concerns or clarifications regarding the appropriateness and feasibility of their strategies.

This was followed by discussions of how CCA teachers can involve coaches in the process of applying the TARGET structures. CCA teachers were asked to brainstorm on

how coaches can facilitate the successful application of the TARGET structures in consideration of the demographics of the student athletes and coaches, logistical needs and constraints (e.g., equipment, time, manpower) inherent in the team. The section concluded with the laying down of action plan for the next week to be reviewed in the final visit.

Week 3: Getting ready to apply TARGET strategies. This section focused on finalizing the strategies that will be applied in the practical phase (seven weeks) of the intervention protocol. CCA teachers were asked to pen down challenges and successes related to their application of their TARGET strategies. They were also challenged to consider additional strategies that their learning so far has inspired. A final action plan was designed to be referenced throughout the practical phase of the intervention protocol. Appendix F displays the final TARGET strategies planned by each CCA teacher according to recommended TARGET structures. CCA teachers were briefed on the 'Weekly reflections' where they would reflect upon challenges they faced and solutions they came up with to manage the challenges during face-to-face visits.

Appendix H Interview Guides for Study 3

For student athletes and coaches

1. Introductory questions
 - How has the team been so far this season?
 - What are some things you like and dislike about your team?
2. Application of strategies to promote positive youth development
 - Did your CCA teacher apply _____ (TARGET strategy) to the team?
 - How do you think _____ (TARGET strategy) affects the students in the team?
3. Closing questions
 - Is there anything you would like to add with regards to how CCA teachers can help promote positive development among the students in this team?

For CCA teachers

1. Introductory questions
 - How has the team been so far this season?
 - How do you think the intervention has affected you as a CCA teacher?
 - Do you think the programme is helpful?
 - Can you share more about why you feel so?
2. Application of strategies to promote positive youth development
 - Do you think the _____ (TARGET strategy) was effective?
 - If so, in what ways?
 - How do you think the _____ (TARGET strategy) affected the students in the team?
 - Did you face any challenges? How did you manage?
 - Any thoughts on how it can be done better?
 - Did you engage other people your team's training environment (e.g. athletes, coaches, school) while applying _____ (TARGET strategy)?
 - Can you give me examples of how you have done so?
3. Closing questions
 - Is there anything you would like to add with regards to how CCA teachers can help promote positive development among the students in this team?
 - Any comments on how you think the programme can be improved?

Appendix I MANOVA Results for 4Cs and Motivational Climate Variables by Time

Variables		Scores					Test statistics			
		T1	T2	T3	MS	F	df1	df2	<i>p</i> -value	Partial η^2
Perceived Competence	Control	10.115	10.113	9.996	.510	.253	2	216	.777	.002
	Intervention	10.217	9.925	0.987	4.619	1.696	2	214	.186	.016
Observed Competence	Control	7.974	9.119	9.275	55.014	40.032	2	216	.000	.270
	Intervention	7.778	8.694	8.981	42.688	24.170	2	214	.000	.184
Confidence*	Control	13.624	13.032	13.520	10.895	3.222	2	216	.042	.029
	Intervention	13.422	13.124	12.950	6.164	1.339	2	214	.264	.012
Connectedness Coach*	Control	58.534	55.973	54.917	377.154	5.726	2	216	.004	.050
	Intervention	56.577	56.871	54.950	115.616	1.616	2	214	.201	.015
Connectedness Teacher*	Control	61.063	58.408	56.833	498.322	8.945	2	216	.000	.076
	Intervention	56.888	56.979	57.402	8.125	.123	2	214	.884	.001
Prosocial*	Control	24.668	23.373	23.391	60.095	6.605	2	216	.002	.058
	Intervention	23.779	23.810	23.772	.044	.004	2	214	.996	.000
Antisocial*	Control	21.884	23.781	21.725	142.678	6.922	2	216	.001	.060
	Intervention	24.593	23.918	23.429	36.903	1.135	2	214	.323	.010
Task	Control	97.089	93.056	93.240	565.182	6.872	2	216	.001	.060
	Intervention	92.250	93.734	91.130	184.261	1.576	2	214	.209	.015
Ego	Control	68.157	66.276	67.672	103.943	.891	2	216	.412	.008
	Intervention	67.941	65.041	68.820	422.429	3.252	2	214	.041	.029

Note. *Difference found in trends of scores over time between intervention and control groups.

Appendix J Correlations between 4Cs and Motivational Climate Factors

Factors	1	2	3	4	5	6	7	8
<i>Pre-Intervention</i>								
1. Perceived competence								
2. Observed Competence	.36**							
3. Confidence	.56**	.30**						
4. Connectedness Coach	.33**	.29**	.39**					
5. Connectedness Teacher	.28**	.18**	.53**	.49**				
6. Prosocial behaviour	.36**	.24**	.46**	.29**	.47**			
7. Antisocial behaviour	.24**	.05	.10	-.10	.03	.11		
8. Task Climate	.34**	.32**	.47**	.55**	.47**	.45**	-.03	
9. Ego Climate	.08	-.17*	.08	-.17*	.01	.08	.40**	.14*
<i>Post-Intervention</i>								
1. Perceived competence								
2. Observed Competence	.29**							
3. Confidence	.48**	.30**						
4. Connectedness Coach	.21**	.38**	.37**					
5. Connectedness Teacher	.38**	.25**	.47**	.47**				
6. Prosocial behaviour	.45**	.32**	.43**	.31**	.32**			
7. Antisocial behaviour	.25**	.12	.25**	.06	.30**	.21**		
8. Task Climate	.31**	.19**	.35**	.58**	.37**	.30**	.07	
9. Ego Climate	-.01	-.28**	-.09	-.24**	-.01	.06	.21**	-.09
<i>Six months after Intervention</i>								
1. Perceived competence								
2. Observed Competence	.42**							
3. Confidence	.61**	.40**						
4. Connectedness Coach	.44**	.56**	.53**					
5. Connectedness Teacher	.44**	.35**	.52**	.56**				
6. Prosocial behaviour	.37**	.39**	.37**	.33**	.32**			
7. Antisocial behaviour	.08	.05	.01	-.07	.09	.16*		
8. Task Climate	.39**	.49**	.44**	.66**	.47**	.40**	.03	
9. Ego Climate	-.04	-.18**	-.12	-.30**	-.05	0.01	.34**	-.04

Note. **Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

Appendix K Table of Subthemes and Codes for Positive Effects and Challenges of TARGET Strategies

Subthemes and Codes for Positive Effects and Challenges of TARGET Strategies for Intervention Group 1

TARGET Strategies	Strengths		Weaknesses	
	Subthemes	Codes	Subthemes	Codes
<i>Task</i> Monthly beep test	Trains resilience	‘Never give up’ attitude		
	Focus on improvement	Put in effort to improve		
	Increase the fitness	Trains stamina Small improvements motivate more improvement		
			Encourage intrateam comparison	Students compare with each other Those with better scores show off
<i>Authority</i> New leadership positions	Trains responsibility	Take ownership of duties	Students may lack maturity	Inconsistent fulfilment of roles Students slacken without adult supervision

Student-led activities (beep test, targeted play)	Teach students to work together	Students get to work together out of own accord Learn to respect leaders	May cause conflict during adjustment	Peers do not listen to leaders Leaders grow resentment against peers who do not follow
	Student-led activities are more motivating	Get to have fun with teammates Do not have to be so serious	Lower quality of training	Students less serious when coach not around Physical training less rigorous
<i>Recognition</i> Individual chats	Build CCA teacher-student relationship	Show that CCA teacher cares Make CCA teacher more approachable Help CCA teacher get to know students better		
	Students feel important	Attention from CCA teacher makes student feel important to team		
	Facilitate encouragement of effort	Allow to emphasis of effort over performance		
<i>Evaluation</i> Journaling	Encourages reflection on strengths and weaknesses	'Forces' students to think about weaknesses Aids in students setting goals to work on weaknesses	Students may not see purpose of strategy	Not effective when no follow-up action is done from journal entries Some write in journals just to fulfil the task

		Students benefit when CCA teacher reads through problems and offer solutions		
			Difficulties in writing journal entries	Not sure of what to write Questions are vague Forgot what happen during training when done at home
	Facilitate more meaningful communication	Efficient method to identify student problems and offer solutions Create topics for individual chats		
<i>Time</i> Staggered training	Enhance quality of training	More contact time with coach More targeted training		Coach emphasize on better players
	Foster team cohesion	More bonding within division		Less bonding across division
	Build coach-student relationship	Feel closer to coach		
Targeted play	More motivating	Can have more fun with teammates without supervision		Students are less serious when unsupervised

		Able to try positions outside of those assigned by coach		
	Help students improve sport skills	Work on weaker skills Allow more practice time Students can help correct each other		

Subthemes and Codes for Strengths and Weaknesses of TARGET Strategies for Intervention Group 2

TARGET Strategies	Strengths		Weaknesses	
	Subthemes	Codes	Subthemes	Codes
<i>Task</i> Monthly beep test	Increase fitness	Get students to push themselves Improves stamina	Time consuming	Takes time away from training technical and tactical skills CCA teacher needs to supervise but often have other work commitments
	Encourage effort through engagement	More willing to expend effort due to it being more interesting than usual running Help keep track of fitness		
<i>Authority</i> New leadership positions	Empowers students to lead		Student leaders lack maturity	Leaders not stepping up to roles Lack competent leaders
Seniors lead juniors for physical training	Foster team cohesion		Difficulty in managing team	Peers do not listen to leaders Fresh leaders find difficulty organizing large team
	Increase quality of training sessions	Maintain order during training Relief duties from coach and CCA teacher for more complex work		

<i>Recognition</i> Individual chats	Build CCA teacher-student relationship	Helps CCA teacher forge meaningful bond with students Helps CCA teacher identify student issues		
	Help students reframe negative self-concept	Help student see themselves in a better light during difficulties		
	Students feel important	Motivates students to work harder Boost students' self-esteem, they feel more important	Not done consistently	Only better players or leaders get more attention CCA admit that other work commitments hinder consistent efforts
<i>Grouping</i> Mixed ability teams for intra-team games	Foster team cohesion	Facilitate students getting to play with different teammates Avoid students sticking to cliques where better players mix only with each other	May encourage intrateam comparison	Weaker students may feel inferior mixing with better players Coach tends to focus on main team during tournament season
	Trains game strategy	Trains adaptability to different team dynamics		
<i>Evaluation</i>	Protects students' confidence after losses	Main team students feel less discouraged when lose games	Unequal recognition	Main team students get more attention

Focus on effort rather than performance				Non-main team students feel less valued
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Subthemes and Codes for Strengths and Weaknesses of TARGET Strategies for Intervention Group 3

TARGET Strategies	Strengths		Weaknesses	
	Subthemes	Codes	Subthemes	Codes
<i>Task</i> Weekly 2.4km team run (also fall under Grouping)	Increase fitness	Improve stamina A push weaker teammates		
	Trains resilience	Never give up' attitude		
	Foster team cohesion	Chance for juniors to train with seniors Help with team bonding		
<i>Authority</i> Seniors to conduct physical fitness training	Foster team cohesion	Increase communication between seniors and juniors More encouragement from seniors	Difficulty in managing team	Team less serious without adult supervision Team do not listen to leaders
<i>Recognition</i> Individual chats	Not done regularly.			
<i>Evaluation</i> Seniors to conduct team reflection after training			Students fail to see purpose	Seniors do not conduct regularly Questions are vague Do not see how it helps development

Subthemes and Codes for Strengths and Weaknesses of TARGET Strategies for Intervention Group 4

TARGET Strategies	Strengths		Weaknesses	
	Subthemes	Codes	Subthemes	Codes
<i>Task</i> Weekly 2.4km team run (also fall under Grouping)	Increase fitness	Improve stamina		
	Foster team cohesion	Help with team bonding		
<i>Authority</i> Seniors to conduct physical fitness training	Foster team cohesion	Increase communication between seniors and juniors	Difficulty in managing team	Team less serious without adult supervision Team do not listen to leaders
<i>Recognition</i> Individual chats through text messages	Not done regularly.			
<i>Evaluation</i> Seniors to conduct team reflection after training			Students fail to see purpose	Seniors do not conduct regularly Questions are vague Do not see how it helps development

Appendix L NTU-IRB Approval Letter



Research Support Office

Reg. No. 200604393R

IRB-2016-09-025

03 November 2016

Assistant Professor Koh Koon Teck
National Institute of Education

NTU INSTITUTIONAL REVIEW BOARD APPROVAL

Project Title: Promoting Positive Youth Development in Youth Sports: The Role of Motivational Climates and Social Agents

I refer to your application for ethics approval with respect to the above project.

The Board has considered your application and noted from your application that your research involves collecting behavioral data from participants using questionnaires and intervention programme.

You have also confirmed that informed consent will be obtained from the participants and you have guaranteed the confidentiality of your participants' biodata obtained from them.

The documents reviewed are:

- a) NTU IRB application form dated **19 September 2016**
- b) Participant information sheet and consent form: version 1 dated **19 September 2016**
- c) Data collection form: version 1 dated **19 September 2016**

The Board is therefore satisfied with the bioethical consideration for the project and approves the ethics application under **Expedited** review. The approval period is from **03 November 2016** to **31 March 2018**. The NTU IRB reference number for this study is **IRB-2016-09-025**. Please use this reference number for all future correspondence.

The following protocol and compliances are to be observed upon NTU IRB approval

1. All research involving procedures greater than minimal risk on minors (individuals who are less than the legal age of 21 years old) requires IRB approved written Parental Consent and assent from the participant to be obtained before any research protocols can be administered. Minimal risk refers to an anticipated level of harm and discomfort that is no greater than that ordinarily encountered in daily life, or during the performance of routine educational, physical, or psychological examination.
2. Only the approved Participants Information Sheet and Consent Form should be used. It must be signed by each subject prior to initiation of any protocol procedures. In addition, each subject should be given a copy of the signed consent form.



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3. Consent forms are important documents therefore they should be stored in the strictest arrangement. Loss of consent form would result in disciplinary action.
4. No deviation from, or changes of, the protocol should be initiated without prior written NTU IRB approval of an appropriate amendment.
5. The Principal Investigator should report promptly to NTU IRB regarding:
 - a. Deviation from, or changes to the protocol.
 - b. Changes increasing the risk to the subjects and/or affecting significantly the conduct of the trial
 - c. All serious adverse events (SAEs) which are both serious and unexpected.
 - d. New information that may affect adversely the safety of the subjects of the conduct of the trial.
 - e. Completion of the study.
6. Continuing Review Request/ Notice of Study completion form should be submitted to NTU IRB for the following:
 - a. Annual review: Status of the study should be reported to the NTU IRB at least annually using the Continuing Review Request/ Notice of Study completion form.
 - b. Study completion or termination: Continuing Review Request/ Notice of Study completion form is to be submitted within 4 to 6 weeks of study completion or termination.
7. All Principal Investigators should comply with existing legislation that would have an impact on the domain of their research.

A handwritten signature in black ink, appearing to read "Lionel".

Professor Lionel Lee
Chair, NTU Institutional Review Board
encl.

cc Members, NTU Institutional Review Board