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# Parents as social context in youth sport: A validation of the PASCQ with adolescent Singapore athletes

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## Abstract

*The purpose of this study was to validate the factorial validity of the Parents as Social Context Questionnaire for investigating parental influence in youth sport in a non-western cultural context. Data were collected from 258 secondary student athletes in Singapore. Using confirmatory factor analyses, the model fit for the hypothesised six-factor model was compared against that of the highly plausible alternative three-factor model. Analyses showed that scores obtained from the questionnaire are best represented by six unipolar factors and exhibited evidence of measurement model validity. Findings also indicated that the constructs of chaos and coercion as assessed by the questionnaire may not be perceived as distinct by the participants. The factorial validity of the questionnaire is supported by the findings. However, careful examination of the scores from the chaos and coercion subscales in future use of the questionnaire in a similar context is advised.*

*Keywords:* parenting scale, self-determination theory, parenting dimensions, student athletes, adolescent

## Introduction

Adolescents' relationships with their parents constitute important social and emotional resources for further development. Studies conducted mainly in the academic and socialisation settings have shown that authoritative parenting style is associated with positive adolescent outcomes (e.g., Baumrind, 1991; García & Gracia, 2009; Steinberg, Lamborn, Dornbusch, & Darling, 1992). However, in the sports domain, few studies examined the influence of parenting style on the optimal development of young athletes, and future work on parenting in youth sport can potentially add to the existing knowledge base. The use of a sound theoretical framework and well-validated measures can enhance the quality of such work. To this end, this study aimed to validate a parenting measure that is based on a motivational model with a sample that differs from those used originally to develop the scale.

To better understand the effects of parental influence on their child's outcomes, whether in the academic or sports domains, some researchers have advocated looking at specific dimensions of parenting in relation to child correlates (Barber, Stoltz, & Olsen, 2005; Roberts & Steinberg, 1999). It has been argued that the dimensional approach overcomes the drawback of the typological approach of parenting styles (e.g., authoritative, authoritarian, and permissive) where the contribution of each individual parenting dimension cannot be isolated. This approach facilitates theoretical explanations for understanding the effects of parenting dimensions on any chosen dependent variable. One outcome of this development is the deployment of self-determination theory (SDT; Deci & Ryan, 1985) as the theoretical framework for investigating the influence of specific parenting dimensions on child outcomes (e.g., Assor, Roth, & Deci, 2004; Grolnick & Ryan, 1989).

In SDT, it is theorised that human beings are endowed with innate psychological nutrients which are referred to as the basic psychological needs of competence, autonomy, and relatedness. Social context that facilitates need satisfaction promotes the individual's motivation, growth, and well-being whereas social context that thwarts need fulfilment has debilitating effects on these same outcomes (Deci & Ryan, 1985). Parents, as social agents, play an influential role by providing a social-contextual environment that either enhances or thwarts the satisfaction of these innate psychological needs. Research has shown that adolescents' relationships with parents remain important social and emotional resources in various aspects of their lives (Laursen & Collins, 2009; Smetana, Campione-Barr, & Metzger, 2006).

Vallerand's (1997) hierarchical model of intrinsic and extrinsic motivation provides a way of looking at how such pervasive influence of parents can affect a child's motivation. According to this model, motivation exists within the individual at three hierarchical levels of generality (global, contextual, situational). Motivation at a higher level of generality has a top-down effect on motivation at the next level. This means that global motivation resulting from general parenting styles or dimensions can affect contextual level motivation across various domains such as academic or sports. The impetus for the current study stemmed from the interest to investigate how SDT-based parenting dimensions (a global level factor) influence student athletes' motivation at the contextual level, and other outcomes which may lie either on the global or contextual level. To our best knowledge, there is little research conducted in this area. In order to carry out such investigations, we recognised the need to identify parenting dimensions that are associated with effective parenting and are relevant to SDT. In addition, a measure suitable for assessing these parenting dimensions should be validated for its applicability in the Singapore context prior to its use in subsequent studies.

## **Parenting Dimensions**

In a recent historical review on parenting, Skinner, Johnson, and Snyder (2005) identified six core parenting dimensions important for facilitating positive child outcomes. In line with SDT, three so-called positive parenting dimensions (autonomy support, structure, warmth) were postulated to promote the satisfaction of innate psychological needs while three conceptually opposite parenting dimensions (coercion, chaos, rejection) were labelled as negative parenting dimensions and were posited to undermine the fulfilment of these needs. These positive parenting dimensions are similar to those SDT-based dimensions (i.e., autonomy support, structure, involvement) claimed by Grolnick and colleagues to be critical in enhancing positive child outcomes (Grolnick & Ryan, 1989; Ryan, Stiller, & Lynch, 1994). Furthermore, these parenting dimensions are aligned with Baumrind's (1971) authoritative parenting style which has been shown to be an effective parenting style linked to positive child outcomes. Baumrind (2005) has also pointed out that the salutary effect of authoritative parenting on adolescent psychosocial and other outcomes is likely due to the unique configuration of high autonomy support, behavioural control (which is closely associated with structure), warmth, and low psychological control (i.e., coercion).

In this section, we briefly describe the six parenting dimensions as defined by Skinner et al. (2005). In alignment with the SDT perspective, autonomy supportive parents allow the child to have freedom of choice, expression and action. They

encourage the child to attend to, value, and express their own views and opinions. In accord with the SDT view, structure provided by parents refers to the provision of information about pathways to reach the desired outcomes. Such parents are consistent and predictable, have clear expectations, and emphasise firm maturity demands. According to Skinner and colleagues, warmth, which is often labelled as acceptance, “refers to the expression of affection, love, appreciation, kindness, and regard; it includes emotional availability, support, and genuine care” (p. 185). The conceptual opposite of autonomy support is coercion. Coercion refers to the restrictive, over-controlling, intrusive autocratic style where strict obedience is demanded. Chaos, in contrast to structure, refers to parenting behaviours that are non-contingent, inconsistent, erratic, unpredictable, arbitrary, or undependable. Such parenting behaviours tend to interfere or obscure the pathways to achieving desired goals. Skinner and colleagues identified rejection as the conceptual opposite of warmth. “Parents are rejecting when they actively dislike their children. Expressions of rejection include aversion, hostility, harshness, overreactivity, irritability, and explosiveness; they also include overt communication of negative feelings for the child, such as criticism, derision, and disapproval” (p. 185).

### **Factor Structure of the Parenting Dimensions Scale**

The Parent as Social Context Questionnaire (PASCQ; Skinner et al., 2005) was developed to measure the six core parenting dimensions (autonomy support, structure, warmth, coercion, chaos, rejection). While parenting dimension scales are widely used, researchers including Barber et al. (2005) and Soenens and Vansteenkiste (2010) have expressed concerns regarding the measurement of parenting dimensions. In particular, this concern lies with the dimensionality underlying these assessments. Specifically, the issue concerns whether conceptually opposite dimensions should be represented as bipolar constructs (e.g., autonomy support versus coercion) along a single continuum or as distinct, unipolar constructs (e.g., autonomy support, coercion). One common rationale for combining conceptually opposite constructs into bipolar constructs is that of parsimony of the measurement model. However, Skinner et al. (2005), through confirmatory factor analyses (CFAs), showed that the data fitted the six-factor unipolar model better than the three-factor bipolar model. The extent to which the results are generalisable to other contexts has not been fully determined.

### **Present Study**

The aim of the present study was to validate factor structure and construct validity of the PASCQ with a Singapore sample. The justification for this analysis is that Singapore is unique in that it is a multi-racial and multi-cultural Asian society where English is the language of instruction in schools and is the main language of commerce. The Singapore resident population of 3.84 million comprises Chinese (74.22%), Malays (13.34%), Indians (9.15%), and other races (3.29%) are mainly of Asian descent and are considered to be more collectivistic in outlook (Singapore Department of Statistics, 2013). Sport plays an important role in nation-building in terms of enhancing social cohesion, contribution to economic growth, and bringing national pride. Recent government funding and support to sport resulted in greater emphasis on, and prominence of, youths in sports. Youths in schools are targeted by sports officials and national sport associations (NSAs), not only to promote the popularity of their sports, but also to recruit athletes to potentially represent the nation. School sports programmes constitute an important fundamental component of the

sports delivery and talent development system. In the recent 27th South East Asian Games, more than 50 per cent of the Singapore contingent were young debutants, 141 of whom are below 21 years old. Ninety-two of these young athletes contributed 52 of the Singapore's medal haul of 108 (AsiaOne, 2013).

Parent's interest and involvement in their child's sports pursuit is heightened by the growing prominence accorded to youth sports, and by the establishment of various initiatives that are aimed at recognising and enhancing their child's sports performance. One such initiative is the schools admission policy that grants priority to incoming students with good sporting achievements. This policy applies to admissions to secondary schools, junior colleges, and polytechnics (Ministry of Education, 2010). In Singapore where gaining admission to the top schools through good grades is highly competitive, parents recognise that this policy provides an alternative avenue for their child to get into their school of choice. Often, this means that young athletes in schools face strong pressure to perform well in both their sports and studies. In working with young athletes to sustain their motivation in pursuing their sports, optimise their performance, and enhance their well-being, the role and involvement of parents cannot be ignored.

Using CFAs, the strategy was to test the six-factor unipolar model against the highly plausible competing measurement model—the three-factor bipolar model—and assess the measurement model validity of both models by examining the goodness-of-fit of the models to the data, and the construct validity of the models. Based on past findings and theoretical assertions by researchers (Barber et al., 2005; Skinner et al., 2005), it was hypothesised that the data will fit a six-factor model better than a three-factor model, where conceptually opposite parenting dimensions are best represented as two distinct unipolar factors (e.g., autonomy support and coercion) rather than one bipolar factor (e.g., autonomy support versus coercion), respectively.

## Method

**Participants and procedure.** The participants were secondary school athletes (N = 258, 119 males, 139 females) whose ages ranged from 13 to 18 years (M = 14.54, SD = 0.94). These students were all in the training squads of a variety of sports from nine schools recognised for their sporting achievements. All participants came from intact families with a mother and a father. Approval from the relevant school authorities and informed consent were obtained prior to the administration of the questionnaires, and the research protocol was approved by the institutional review board of the university.

**Measures.** The 24-item child-report version of the PASCQ (Skinner et al., 2005) was used to measure the six parenting dimensions. In this original version, the string “my parents” is used. Skinner et al. (2005) acknowledged that assessing perceptions of parenting dimensions as a joint unit (rather than obtaining perceptions of mothers and fathers separately) was a limitation. Their concern has been supported by extant research that has shown that mothers and fathers differ across a variety of parenting characteristics (e.g., McKinney & Renk, 2008; Ong, 1999). By consequence, in this study the participants' perceptions of both mothers and fathers' parenting dimensions were measured separately using two versions of the scale (maternal and paternal) that refer to “my mother” and “my father” respectively. Data was collected on a seven-point Likert scale.

***Model Specification and Identification.*** The substantive basis for the measurement model is anchored on the SDT framework. Separate measurement models for the perceived maternal and paternal parenting dimensions were constructed.

***Hypothesised six-factor model.*** For the unipolar, six-factor model, each of the parenting dimension latent variables was indexed by four PASCQ scale items. There were 24 indicators in total for each of the maternal and paternal models. As the indicators were supposed to be unidimensional, all cross-loadings were hypothesised to be zero. The covariances among the error terms were also hypothesised to be zero. As in any standard CFA model, all six latent variables were allowed to covary among themselves (Kline, 2005). The metric of the latent factors was set automatically by the Mplus 6 (Muthén & Muthén, 2010) statistical program by selecting the first indicator of each latent factor to be the reference indicator and fixing the first factor loading for each latent factor to 1. The six-factor model was overidentified with 237 degrees of freedom.

***Alternative three-factor model.*** Based on theoretical rationale and previous empirical evidence (Skinner et al., 2005), the factor structure of the hypothesised six-factor model was tested against the most plausible alternative model, i.e., the bipolar three-factor model. For the three-factor model, each bipolar factor with both positive and negative features of the conceptually opposite parenting dimensions was indexed by eight PASCQ scale items; four for the positive parenting dimension (e.g., autonomy support) and four for the negative parenting dimension (e.g., coercion). All other aspects of the model specifications were similar to the six-factor model. This three-factor model with 249 degrees of freedom met the necessary model identification requirement for the conduct of a confirmatory factor analysis.

## **Data Analyses**

For each set of observed indicators for both maternal and paternal parenting dimensions, data screening, using Prelis 8.8, revealed data non-normality, both at the univariate and at the multivariate levels. Subsequent confirmatory factor analyses of the models using the Mplus 6 statistical software (Muthén & Muthén, 2010) were thus conducted using the maximum likelihood (ML) minimisation function but with the Satorra–Bentler scaled chi-square ( $SB\chi^2$ ) that is robust to non-normality (Satorra & Bentler, 1994). A series of four CFAs were conducted using Mplus 6 (Muthén & Muthén, 2010) to test the hypothesised model and the alternative model separately, first with maternal parenting dimensions and then with paternal parenting dimensions. Goodness of fit was evaluated by inspecting the  $SB\chi^2$ . Fit indices used to evaluate model fit were Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), root mean squared error of approximation (RMSEA), and standardised root mean squared residual (SRMR). According Hu and Bentler (1999), the combined cut-off values of close to .95 for CFI and TLI, a cut-off value of close to .06 for RMSEA, and a cut-off value of close to .08 for SRMR, indicate good fit. For CFI and TLI, values over .90 represent an adequate fit (Keith, 2006), and can be viewed as a lower bound of good fit while the .95 criterion signifies the high confidence of good fit (Vandenberg & Lance, 2000).

## Results

***Comparing the Overall Model Fit of the Three- and Six-Factor Models.*** The results of the CFAs are presented in table 1.

Table I

*Fit indices of PASCQ for maternal and paternal models*

	$SB\chi^2$	<i>df</i>	CFI	TLI	RMSEA	SRMR
<b>Maternal</b>						
Three-factor model	930.76	249	.73	.70	.103	.097
Six-factor model	466.41	237	.91	.89	.061	.059
Higher-order, six-factor model	522.06	245	.89	.88	.066	.070
<b>Paternal</b>						
Three-factor model	1115.21	249	.71	.68	.116	.131
Six-factor model	456.35	237	.93	.92	.060	.058
Higher-order, six-factor model	492.17	245	.92	.91	.063	.066

As expected, all models had significant chi-squares. However, for both maternal and paternal models, all other fit indices indicated that the three-factor models had a poor fit to the data. More detailed interpretations of the results are reported below. The rationale for conducting the additional CFAs for the higher-order six-factor models is explained in the later section on discriminant validity of the models.

***Evaluation of the maternal and paternal three-factor models.*** CFAs conducted on the maternal and paternal three-factor models yielded a poor fit of the measurement models to the data. None of the goodness of fit indices met the cut-off criteria for a good model fit. The factor loading estimates of all scale items indexing positive features of the parenting dimensions ranged from .37 to .85 for the maternal model, and from .46 to .85 for the paternal model. Factor loadings indexing negative features of parenting dimensions ranged from -.22 to -.67 for the maternal model, and from -.21 to -.74 for the paternal model. Some of these factor loadings failed to demonstrate convergent reliability. Based on a .05 significance level ( $\alpha$ ), statistical power level of 80 per cent, and standard errors assumed to be twice those of conventional correlation coefficients, the standardised factor loading estimates should be .35 or higher for a sample size of at least 250 (Hair, Black, Babin, & Anderson, 2010).

Evaluation of the hypothesised maternal and paternal six-factor models. The means, standard deviations, and intercorrelations of the observed maternal and paternal parenting dimensions are displayed in tables 2 and 3 respectively. Participants perceived higher levels of positive parenting dimensions than negative parenting dimensions for both mothers and fathers. As expected, positive parenting dimensions (autonomy support, structure, warmth) were positively intercorrelated. Similarly, the correlations among the negative parenting dimensions (coercion, chaos, rejection) were positive. The intercorrelations between the positive parenting dimensions and negative parenting dimensions were negative.

Table II

*Standardised Factor Correlation Estimates, Zero-Order Correlations, Means, Standard Deviations, and construct reliabilities for Scores on the PASCQ for the Maternal Six-Factor Model*

Variable	1	2	3	4	5	6	<i>M</i>	<i>SD</i>	<i>CR</i>
1. Autonomy Support	—	.76**	.82**	-.64**	-.65**	-.75**	5.28	1.06	.78
2. Structure	.57*	—	.74**	-.35**	-.33**	-.46**	4.55	1.08	.75
3. Warmth	.69*	.59*	—	-.44**	-.51**	-.71**	5.26	1.11	.88
4. Coercion	-.45*	-.21*	-.32*	—	.94**	.79**	3.06	1.10	.74
5. Chaos	-.47*	-.23*	-.39*	.65*	—	.85**	2.89	1.10	.70
6. Rejection	-.58*	-.30*	-.58*	.60*	.62*	—	2.24	1.04	.78

*Note.* Values below the diagonal are zero-order correlations. Values above the diagonal are factor correlation estimates.

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

Table III

*Standardised factor correlation estimates, zero-order correlations, means and standard deviations, and construct reliabilities for scores on the PASCQ for the paternal six-factor model*

Variable	1	2	3	4	5	6	<i>M</i>	<i>SD</i>	<i>CR</i>
1. Autonomy Support	—	.63**	.85**	-.61**	-.60**	-.75**	5.34	1.06	.84
2. Structure	.52*	—	.59**	-.23*	-.29**	-.38**	4.56	1.08	.82
3. Warmth	.71*	.51*	—	-.43**	-.48**	-.67**	5.13	1.11	.90
4. Coercion	-.49*	-.12	-.34*	—	.90**	.85**	2.70	1.10	.78
5. Chaos	-.43*	-.25*	-.37*	.61*	—	.86**	2.78	1.11	.67
6. Rejection	-.61*	-.29*	-.57*	.68*	.64*	—	2.27	1.04	.84

*Note.* Values below the diagonal are zero-order correlations. Values above the diagonal are factor correlations.

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

Results of the CFAs for the maternal and paternal six-factor models were similar. Fit indices showed that both models had an adequate fit to the data. Localised areas of strain (Brown, 2006) that might have contributed to the specific areas of misfit in the CFA solution were inspected.

Table IV

*Factor loading estimates for the maternal and paternal six-factor models*

Question No.	Dimension/Item	Maternal Model	Paternal Model
Autonomy Support			
2	My mother/father trusts me.	.70	.78
7	My mother/father accepts me for myself.	.70	.77
18	My mother/father lets me do the things I think are important.	.60	.70
23	My mother/father tries to understand my point of view.	.75	.75
Structure			
4	When I want to do something, my mother/father shows me how.	.52	.82
9	When I want to understand how something works, my mother/father explains it to me.	.73	.82
14	If I ever have a problem, my mother/father helps me to figure out what to do about it.	.76	.76
19	My mother/father explains the reasons for our family rules.	.59	.48
Warmth			
6	My mother/father lets me know she loves me.	.71	.78
11	My mother/father enjoys being with me.	.86	.92
16	My mother/father is always glad to see me.	.89	.87
21	My mother/father thinks I'm special.	.73	.74
Coercion			
1	My mother/father is always telling me what to do.	.43	.55
12	My mother/father bosses me.	.70	.74
17	My mother/father think there is only one right way to do things—her way.	.72	.79
22	My mother/father says “no” to everything.	.69	.66
Chaos			
3	When my mother/father makes a promise, I don't know if she will keep it.	.61	.48
8	When my mother/father says she will do something, sometimes she doesn't really do it.	.50	.54
13	My mother/father keeps changing the rules on me.	.64	.70
24	My mother/father gets mad at me with no warning.	.67	.61
Rejection			
5	Sometimes I wonder if my mother/father likes me.	.75	.81
10	My mother/father thinks I'm always in the way.	.48	.61
15	My mother/father makes me feel like I'm not wanted.	.80	.82
20	Nothing I do is good enough for my mother/father.	.68	.75

All standardised residuals were below the recommended cut-off value of  $\pm 2.5$  (Hair et al., 2010). Re-specification of the model was not justified by any substantive reasons based on the modification indices and their associated completely standardised expected parameter change values. All estimated parameters were statistically significant, it was concluded that both estimated models had attained its best model fit. Completely standardised factor loading estimates from the CFA solutions for the maternal and paternal models are presented in table 4. The factor correlation estimates among the six parenting dimensions for the maternal and paternal models are located in Tables 2 and 3 respectively. Three main aspects of construct validity, i.e., convergent validity, discriminant validity, and nomological validity (see Hair et al., 2010), of the proposed measurement theory represented by the hypothesised model were also evaluated.

***Convergent validity.*** Convergent validity of the model is indicated by the standardised factor loading estimates and the reliability estimates. For both CFA solutions for the six-factor models, all factor loading estimates were above the criterion ( $> .35$ ), and all indicators had significant ( $p < .001$ ) factor loading estimates on their respective latent variables. We calculated the construct reliability (CR) estimate that is recommended for use in conjunction with structured equation modelling by researchers (Brown, 2006; Hair et al., 2010). A CR value of .70 and above suggests good reliability (Hair et al., 2010). CR estimates (see Tables 2 and 3) for all latent variables, except for one variable (chaos) in the paternal model, indicated good reliability.

***Discriminant validity.*** In CFA, the discriminant validity of the latent factors can be evaluated by examining the size and statistical significance of the factor correlations. High factor correlations ( $> .85$ ) suggest that the latent factors may not represent distinct constructs (Brown, 2006; Hair et al., 2010). In both CFA solutions for the maternal and paternal six-factor models, the factor intercorrelations (see Tables 2 and 3) indicate that all parenting dimensions were distinguishable as unique constructs. The only exception is that the high factor correlations between chaos and coercion (.94 in the maternal model and .90 in the paternal model) suggest that these constructs might not be perceived as distinct by the participants. High factor correlations might be due to other reasons.

First, the high correlations might either be due to sampling error or to the nature of the sample. As such, the scale items indexing these latent factors were inspected for cultural bias or content overlap. However, the analysis did not reveal any bias, ambiguity or overlap in the content of the items to warrant revision of the items. With English being their first language, it is not surprising that participants did not report any problems understanding and interpreting these items.

Second, it is possible that these different constructs, although distinctive conceptually by their definitions, may be highly correlated because they are associated conceptually with the negative aspects of parenting. The high correlations among the factors may indicate that their relationships could be explained by a higher-order factor. A similar pattern of factor correlations were also observed for the positive parenting dimensions in both models. The tenability of a model with two second-order factors was examined by conducting an additional CFA for each of the models. The two second-order factors, labelled as Positive Parenting and Negative Parenting, were indexed by two sets of first-order factor indicators, i.e., autonomy support, structure and warmth, and coercion, chaos and rejection, respectively. The higher-order factor

models for both the maternal and paternal CFA solutions showed significantly poorer fit to the data (see Table 1) than the hypothesised six-factor models. This was evident by the scaled difference chi-square test statistic (Satorra & Bentler, 2001),  $\Delta SB\chi^2(8) = 59.23$ ,  $p < .001$  and  $\Delta SB\chi^2(8) = 36.40$ ,  $p < .001$  for the maternal and paternal model comparisons respectively.

**Nomological validity.** The hypothesised maternal and paternal six-factor models were also examined for meaningfulness from a substantive perspective. As expected, all three positive parenting dimensions, and all three negative parenting dimensions were significantly positively intercorrelated amongst each of these two sets (see Tables 2 and 3). Also as expected, all positive parenting dimensions were negatively correlated with all negative parenting dimensions. Of greater interest were the factor correlations between the positive and negative conceptually corresponding parenting dimensions (e.g., warmth and rejection). As hypothesised, based on the substantive theory that they were conceptual opposites, all three pairs (autonomy support/coercion, structure/chaos, and warmth/rejection) were negatively correlated at  $-.64$ ,  $-.33$ , and  $-.71$  respectively for the maternal model, and at  $-.61$ ,  $-.29$ , and  $-.67$  respectively for the paternal model.

## Discussion

Results showed that the six-factor unipolar model attained a significantly better fit to the data than the three-factor bipolar model. This was the case for both maternal and paternal models. These findings demonstrated that the six-factor structure of the PASCQ was replicated with the Singapore sample. In addition, the construct validity of the measurement theory represented by the six-factor model was also shown to be adequate on the whole, and therefore indicated that the PASCQ can be used for future studies investigating the influence of SDT-based parenting dimensions on adolescent athlete outcomes to be conducted in Singapore. Researchers interested in understanding how these parenting dimensions, that are theoretically associated with the satisfaction of the athlete's basic psychological needs, influence athlete outcomes can employ SDT as the theoretical framework for their studies. Investigators will be able to examine the combined and independent effects of each of the parenting dimensions on any measured athlete outcomes (e.g., motivation, well-being).

Since the CFAs for both the maternal and paternal models showed that the hypothesised unipolar six-factor measurement model were significantly better fitting to the data than the bipolar three-factor model, indicating that these parenting dimensions are unipolar factors, the correlations between the pairs of conceptually opposite parenting dimensions are not expected to come close to  $-1.00$  (indicating bipolarity). Consistent with the results from the CFAs, the correlations between the pairs of parenting dimensions (ranged from  $-.23$  to  $-.58$ ) were not high enough to indicate that each pair of the parenting dimensions was opposite poles of bipolar dimensions. These results mirrored those reported by Skinner et al. (2005). In their study, the correlations of these same pairs of parenting dimensions (ranged from  $-.43$  to  $-.66$ ) and similarly did not come close to  $-1.00$ .

The findings indicating that parenting dimensions are unipolar make sense in terms of what is commonly observed in actual parenting situations. While parents may exhibit dominant or more pronounced levels of a particular parenting dimension in certain specific situations or events, parents are likely to adopt other parenting

dimensions in the entire diverse range of parent-child interactions. For example, the presence of parental autonomy support in some situations does not mean the absence of parental coercion in other instances. To illustrate, it is possible that a parent can be autonomy supportive in trusting the child to choose whatever the child thinks is beneficial for enhancing performance from a range of given range of foods as part of the sport nutrition diet plan. This same parent can also be coercive by insisting and telling the child that the only way for him or her to achieve improvements in performance in competitions is to attend additional training sessions with another coach. In discussing closely related constructs, Barber, Bean and Erickson (2002), citing previous research, also maintained that such ecological realities exist in terms of parents showing both psychological autonomy and psychological control. In fact, they also contend that parents could possibly vacillate between both psychological autonomy and psychological control. The findings indicating that autonomy support and coercion are unipolar constructs aligned with what other researchers have asserted that parents who do not psychologically control their children do not necessarily provide autonomy support to them (Barber et al., 2005), and that autonomy support and psychological control are not binary opposites on a single continuum (Baumrind, 2005).

One implication of the finding that the six core parenting dimensions are unipolar constructs is that researchers should consider looking at the independent effects of each of these dimensions. Another implication pertains to the way that researchers should analyse the scores from the PASCQ. Scores from the autonomy support and coercion subscales should not be aggregated to give a combined score representing parental autonomy support versus coercion.

The construct validity of both maternal and paternal six-factor parenting dimensions measurement models was satisfactorily evident from the assessments of its convergent validity, and nomological validity. However, two factors, chaos, and coercion, did not seem to be distinguished by the participants as shown by the high factor correlations. When examined against the zero-correlations (see Tables 2 and 3), the high factor correlations reflected the sensitivity of structural equation modelling in accounting for measurement errors. The zero-correlation between chaos and coercion was moderately high registering .65 and .61 for the maternal and paternal models respectively. Constructs with zero-order correlations of similar magnitudes as those found in the present study have been considered to be not equivalent. In the study conducted by Skinner et al. (2005), the zero-order correlation for the same pair of parenting dimensions in question, i.e., between chaos and coercion ranged from .68 to .70 for the three subsamples analysed.

There are a few limitations of the study. While the sample comprising Singapore student athletes (13 to 18 years old) is appropriate for the purpose of validating the PASCQ for future use in youth sport research, generalising the results of the study to other contexts should be made with caution. Also, the relatively small sample size, although adequate for the present study, further limits the generalisability of the results. Finally, even though the results of the CFAs did not require any re-specifications to be made to the models, having a replication sample for confirming the CFA solutions would have provided greater certainty to the solutions.

In summary, this study validated the unipolar, multidimensional structure of the PASCQ. This established six-factor structure was evident in the measurement models

for both maternal and paternal parenting dimensions, thus indicating stability, and provides assurance for its application among adolescent athletes in the Singapore context. However, it is recommended that the measures for the parenting dimensions of chaos and coercion be closely examined in future use of the PASCQ. Recognising that scale validation is an ongoing process, and that the current study represents a part of such an endeavour, future testing can investigate these aspects of the PASCQ and include invariance testing of groups (e.g., gender, age, sporting background).

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