

Parental Influences Towards Chinese Children's Physical Activity Participation

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This paper investigates the link between parents' physical activity and their children's physical activity participation. Psychological factors of both parents and children were examined to determine how parental factors affected children's corresponding constructs. A total of 748 children (430 girls, 318 boys) and their parents were examined. The questionnaire was designed in two parts, one for the parents and one for the children. Correlations and path analysis were conducted. Results suggest that parental experiences and attitudes towards physical activity are significantly but weakly associated with children's physical activity involvement. In the final model, child-perceived family environment and gender were found the most influential factors in shaping children's physical activity participation. The final model accounted for 19.7 % of the variance of children's physical activity participation. The standardized coefficients for the paths from children's attitudes, child-perceived family environment and

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child's gender to children's physical activity level were .13, .27 and .31 respectively. All parental factors exerted their respective influences to children's physical activity behaviour through children's attitude and child-perceived family environment.

Key words: parental influence; children's physical activity

The benefits of an active lifestyle for the growth and development of children are numerous (Armstrong & Mechelen, 2000; Bouchard, 2000; Kalakanis, Goldfield, Paluch, & Epstein, 2001). Reduced health risks in coronary heart disease, high blood pressure, colon cancer, obesity, diabetes, depression and anxiety, and total cholesterol were reported (Department of Health and Human Services, 1999). Although this healthy notion is widely accepted in modern countries, it is believed that less than 20% of children participated in regular physical activity in Hong Kong (Guldan, Cheung, & Chui, 1998). Furthermore, around 25% to 30% of children in the United States are obese (Parizkova & Hills, 2000). These studies reflect the fact that more attention should be paid on the physical activity socialization of children.

In the study of children's participation in physical activity, parents have been considered as important socializing agents in the physical activity socialization process. It has been reaffirmed that parents are very influential throughout the socialization process (Brustad, 1992, 1993; Duda & Hom, 1993; White, 1996). During childhood, parents have a profound effect on their children's inclinations to participate in physical activity (Higginson, 1985). The present study investigates the relationship between parents' influences and their children's physical activity participation.

Review of Literature

Parental influences have been demonstrated to be strongly associated with children's participation in physical activity in a number of studies (Biddle

& Goudas, 1996; Brustad, 1992; Coakley & White, 1992; Hill, 1993; Ommundsen & Vaglum, 1991; Seppanen, 1982; Snyder & Spreitzer, 1989; Wankel, Mummery, Stephens, & Craig, 1994). From these studies, parental beliefs and physical activity experiences, permission, and emotional involvement of parents represent a set of conditions that shape children's participation in physical activity. For example, it is believed that physically active parents offered different physical activity interest and behavioural influences to their children (Colley, Eglinton, & Elliott, 1992). A number of studies have demonstrated a strong and positive relationship between the frequency, intensity and type of physical activity between parents and their children (Freedson & Evenson, 1991; Moore, Lombardi, White, Campbell, Oliveria, & Ellison, 1991). Similarity between activity categorisation by father and mother and that of their child was found to be 67% and 73% respectively. Parents' overall intensity and frequency in physical activity makes a significant contribution and is a significant predictor to their children's physical activity participation (Kalakanis et al., 2001). This notion is consistent with previous studies that children with active parents were more likely to be active than those with inactive parents (Colley et al., 1992; Freedson & Evenson, 1991; Moore et al., 1991).

Children's physical activity socialization is crucial to the understanding of their participation process and motives. Family especially parents were the prime socializers in children's socializing processes (Estrada, Gelfand, & Hartmann, 1988; McPherson, Curtis, & Loy, 1989). In order to understand the mechanism involved in this process, influences of parental socialization patterns upon children's physical activity motivation were explored (Brustad, 1992). Brustad claimed that the nature of parental response conveyed a wealth of information to the child about their personal aptitude towards physical activity. If parental support was conveyed, children would be more inclined to develop intrinsic motivation in specific domains including physical activity. Potentially, this motivation orientation could produce greater interest in becoming involved in some form of physical activity in the future. Interestingly, it was found that lasting attitudes towards physical

activity were often established before children reached adulthood (Pease & Anderson, 1986). The reason for this appeared to be that parents were extensively involved with child management and provided the child with exposure to rules and role requirements.

Parental influences also have a crucial role in shaping children's physical activity habits. In a twelve-year longitudinal study, Yang, Telama, and Laakso (1996) examined parental influences on children's current and future physical activity participation. Result indicated that father's physical activity was related to their children's habitual physical activity during the same year, and significantly predicted their children's Physical Activity Index values twelve years later. It was also found that children's level of physical activity participation was higher in families with active parents than their counterparts with inactive parents. This finding offered a strong incentive for the present study to investigate the parent-child effect in children's physical activity socialization.

Apart from the empirical findings, Eccles' expectancy-value model provided a theoretical framework to explain the achievement choices and behaviours of children's selected domain (Eccles, 1998). According to Eccles, given similar competence levels, expectancies of success and subjective task value are the two major components influencing children's domain specific achievement choices such as participation in physical activity. Expectancies of success are akin to children's confidence in being successful in a specific task. The formation of success expectancies includes the children's self-schemata, perceived task difficulty, perceptions of socializers' beliefs and behaviours, causes of past success and failure, and gender role stereotypes of achievement activities. Subjective task value refers to the importance an individual placed on being successful in a specific domain. It consists of four components: attainment value, interest value, utility value, and perceived cost (Weiss & Ferrer-Caja, 2002).

Dempsey, Kimiecik, and Horn (1993) adopted the expectancy-value model to examine parental influence on children's physical activity participation. This model was based on the assumption that a child's activ-

ity choices were contingent on his or her expectations of success. Other factors included focal personal values such as competency needs, achievement needs, motivational orientation, personal goals, values of various activities and gender-role schemata. Parents were considered to play a crucial role in helping children interpret different activity experiences and also influencing their self-perception, value of specific activities and expectancy. It was hypothesized that the primary parental impact on children's physical activity was the effect parents had on their children's belief system. Beliefs systems of 71 primary children aged 7 to 12 and their parents were investigated by questionnaires. Results indicated a significant relationship between parents' expectancy and children's participation in physical activity ($r = .30, p < .05$).

Brustad (1993) used the expectancy-value model to investigate the family influence on children's physical activity socialization. He stipulated that the nature and extent of children's opportunities in physical activity involvement were greatly dependent upon their parents' beliefs and expectations. Children's physical activity-related motivation cognition, e.g., perceived competence and values of involvement were shaped through interactions with parents. In particular, parents were presumed to influence their children by communicating their personal values and their beliefs about their children's likelihood of success in specific areas. A model of parental influences on children's attraction to physical activity was developed. It was hypothesized that parents with favourable orientations to physical activity would provide their child with more encouragement to become involved. Greater encouragement would then be translated into a higher level of perceived competence in physical activity. In turn, higher levels of competence would be linked with greater attraction to physical activity for the child. Results of a path analysis indicated a significant relationship between parents' encouragement and children's attraction in physical activity through perceived physical competence. As anticipated, a combination of parental encouragement and children's gender explained 17.3% of the variance in perceived physical competence. Consequently, perceived physical compe-

tence explained 18.5% of the variance in children's attraction to vigorous exercise, and 41% in the perceived fun of physical activity. Parental encouragement also resulted in indirect effects (path loading) on children's attraction to physical activity (vigorous exercise = .17, liking of games = .19, fun = .18). The indirect effect was computed by multiplying the path coefficients linking two variables through one mediating variable. As a consequence, Brustad concluded that parental physical activity orientations and parental encouragement levels were important influences upon children's attraction to physical activity. This finding was further supported by Mota & Queiros (1996). A follow-up study was done by Kimiecik and Horn (1998), to re-emphasize the family influence, with regard to the role of parental beliefs in children's physical activity participation. Multiple regression analysis showed a significant relationship between parental beliefs and children's self-reported physical activity involvement (Wilk's Lambda = .44; $F(24, 142) = 1.95$; $p < .01$).

Among these studies, specific types of parent-child influence were identified in which parents could affect children's behaviour in physical activity and sport (Hill, 1993; Taylor, Baranowski, & Sallis, 1988). They were (a) parents' past experience and accomplishments in physical activity, (b) encouragement, approval and rewards from family, and (c) emotional support of parents to their child. They concluded that family influence and in particular parents, have a profound effect on shaping or facilitating children's physical activity habits.

Finally, gender role and activity stereotypes, gender-related differences, gender differentiated patterns of physical activity were regularly found in Eccles' studies (Horn, 2002) as mediators of physical activity expectancies, values and choices throughout the growth and development of children and adolescents. This gender variable was further explored and confirmed by Brustad (1993) that children's gender had significant and independent effect on the amount of parental encouragement and perceived competence of children. As a consequence, children's gender is included in the present study.

The present study primarily based upon the expectancy-value theory to explore the Chinese parental influences to their children's physical activity involvement, the objectives of the present study are to:

1. Develop a model to explain the parental influences towards their children's physical activity participation; and
2. Determine children's gender effects on their physical activity participation.

Method

Participants

A total of 748 families and their children were recruited as participants in this study. They came from secondary 1 to 3 from 10 standard schools, with average exercise facilities and similar school environment for physical activity participation. These participants were selected from physical education classes in the schools. Participants were given a consent letter, which explain to them about the aims and procedure, before the start of the study. They were also reminded that their participation in the study was voluntary and they can withdraw at any time of the survey without any prejudice. A total of 880 Chinese children and their parents were surveyed and 748 completed questionnaires were received. The response rate was 85%.

Table 1 summarizes the demographic information of the sample. The sample consisted of 318 boys and 430 girls from 12 to 15 years of age ($M = 13.27$ years; $SD = .98$) and 283 fathers and 462 mothers from 30 to 65 years of age ($M = 41.63$ years; $SD = 5.43$). Three hundred and seventeen participants (42.3 %) as well as 350 participants (46.7%) came from lower or middle socio-economic status. In the sample of our study, boys were significantly older than girls although the difference was relatively small (13.47 vs. 13.16 years of age; $t(674) = 4.152$).

Measures

Physical activity was defined as any bodily movement produced by skeletal muscles, which resulted in energy expenditure (Molnar & Livingstone, 2000).

Table 1 Demographic Information of the Participants

Demographic Variables	Total (<i>N</i> = 748)	Boys (<i>N</i> = 318) <i>N</i> (%)	Girls (<i>N</i> = 430)	Gender difference
Children's variables				<i>t</i> (674) = 4.152***
Age				Mean (<i>SD</i>)
12 years	147 (19.7)	32 (10.1)	115 (26.7)	Boys: 13.47 (1.02)
13 years	293 (39.2)	128 (40.3)	165 (38.4)	Girls: 13.16 (.93)
14 years	168 (22.4)	67 (21.1)	101 (23.5)	
15 years or above	68 (9.1)	35 (10.9)	33 (7.7)	
Missing	72 (9.6)	56 (17.6)	16 (3.7)	Overall Mean (<i>SD</i>) 13.27 (.98)
Parents' variables				
Gender				
Male (Father)	283 (37.8)	148 (46.5)	135 (31.4)	
Female (Mother)	462 (61.8)	168 (52.8)	294 (68.4)	
Missing	3 (.4)	2 (.7)	1 (.2)	
Age				Overall Mean (<i>SD</i>)
30–39 years	209 (27.9)	—	—	41.63 (5.43)
40–49 years	344 (46.0)	—	—	
50–59 years	53 (7.1)	—	—	
60–69 years	3 (.4)	—	—	
Missing	139 (18.6)	—	—	
Educational level (Years)				
Primary education (1–6 years)	249(33.4)	—	—	
Junior secondary education (7–9 years)	271(36.2)	—	—	
Senior secondary education (10–13 years)	180 (24.0)	—	—	
University or above (14 years or more)	26 (3.5)	—	—	
Missing	22 (3.0)	—	—	
Family monthly income				
Below HK\$10,000	317 (42.3)	—	—	
Between HK\$10,001 to 30,000	350 (46.7)	—	—	
Between HK\$30,001 to 50,000	34 (4.5)	—	—	
Between HK\$50,001 to 80,000	16 (2.1)	—	—	
Above HK\$80,000	7 (.9)	—	—	
Missing	25 (3.3)	—	—	

Note. Numbers in parentheses represent percentages.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Two questionnaires were used: one for parents and one for children. The items for parents and children were self-constructed, since no known valid and reliable measures of parental past physical activity experiences and encouragement to children's participation in physical activity were available for Chinese children. Focus interview was conducted to twenty pairs of parent-child families before the construction of the questionnaire. Relevant ideas were collected to construct the questionnaire items for Chinese parents and children. Constructed questionnaire items were presented and explained to the parents and children regarding the clarity and linguistics. No difficulty of understanding was encountered according to the participants' feedback.

Five physical activity-related items were included in the parents' questionnaires. Out of these five items, three of them were designed to assess past physical activity levels, e.g., "Rank your physical activity level in your childhood" and "Report the average time of your participation in physical activity in childhood" (see Table 2). One dichotomous item, i.e., "As parents, you have intentionally encourage your children to participate in physical activity?" (response with "yes" or "no"), was used to measure parental encouragement given to their children in participating in physical activity. And one continuous item, i.e., "Rank the benefit of physical activity towards children's growth" (responses from "very low" to "very high"), was used to measure positive attitude towards physical activity.

Eight physical activity-related items were included in the children's questionnaires. Out of these eight items, three of them were designed to assess their current physical activity level (CPAS) (similar to those adopted in parents' questionnaire). Two items were developed to measure their perceived family environment about physical activeness (CFE), e.g., "You consider your family as physically active family" (response with "yes" or "no") and two items were used to measure child-perceived parental encouragement for physical activity (CPE), e.g., "How often your parents encourage you to participate in physical activity?" (responses from "not at all" to "always"). Again one item (similar to the one used in parents' questionnaire)

Table 2 Descriptive Results of Items and Composite Scores for Children and Parents

Demographic Variables	Range	Frequency (%)	Mean (SD)	Reliability (α)
Children's variables				
Current school team	0-1			
Yes		288 (38.5)	—	—
No		454 (60.6)	—	—
Missing	6 (.9)	—	—	—
Current activity level (1 = Very low; 5 = Very high)	1-5	—	3.07 (.73)	—
Current exercise time (1 = Below 2 hours; 5 = Above 10 hours)	1-5	—	2.04 (1.10)	—
CPAS	2-11	—	5.5 (1.79)	.56
Family activeness	0-1			
Yes		219 (29.2)	—	—
No		504 (67.3)	—	—
Missing		25 (3.5)	—	—
Enough opportunity for physical activity	0-1			
Yes		388 (51.8)	—	—
No		339 (45.3)	—	—
Missing		21 (2.9)	—	—
CFE	0-2	—	.84 (.79)	.50
CPE (1 = Never; 5 = Always)	1-5	—	2.69 (.98)	—
CA (1 = Very low; 5 = Very high)	1-5	—	3.81 (.95)	—
Parents' variables				
Past School Team	0-1			
Yes		194 (25.9)	—	—
No		537 (71.7)	—	—
Missing		17 (2.4)	—	—
Past activity level (1 = Very low; 5 = Very high)	1-5	—	2.97 (.82)	—
Past exercise time (1 = Below 2 hours; 5 = Above 10 hours)	1-5	—	1.84 (1.14)	—
PPAS	2-11	—	5.10 (1.88)	.58
PPE	0-1			
Yes		378 (50.5)	—	—
No		367 (49.0)	—	—
Missing		3 (.5)	—	—
PA (1 = Strongly disagree; 5 = Strongly agree)	1-5	—	3.98 (.94)	—

Note. The variables in boldface are composite scores.

N = 748; CPAS = Child Physical Activity Score; CFE = Child-perceived Family Environment; CPE = Child-perceived parental Encouragement; CA = Child Attitude; PPAS = Parent Physical Activity Score; PPE = Parent-perceived Parental Encouragement; PA = Parent Attitude.

was used to measure children's positive attitude towards physical activity (CA) (see Table 2).

The reliability of the different subscales, CPAS, CFE and PPAS, was calculated. All of the scales have moderately satisfactory reliability, ranged from .58 to .50.

Procedures

On the day of data collection, the children were assigned to groups in physical education classes. The children's questionnaires were distributed to all students by the researcher and instructions were read aloud to them. All students were requested to complete the questionnaires in class. The researcher was on hand to respond to questions during the completion of the questionnaires and no difficulties were encountered. After students completed the questionnaires, they were requested to take the parental questionnaires home. Parents were asked to complete the questionnaires and had the children returned them to their physical education teacher. A total of 748 children and their parents completed and returned both parts of the questionnaires. For those questionnaires without the parents' return, their children's questionnaires were excluded from this study. The return rate for this complete set of questionnaire was 85%.

Statistical Analysis

Before more complicated statistical analysis were performed, hierarchical multiple regression analysis for demographic variables of the parents and children predicting the current physical activity level of children were conducted. This analysis enabled the researchers to evaluate the effects of these variables on the children's current physical activity level.

Path analysis involved the specification, estimation and revision of a hypothesized model. It was intended to reveal the underlying observed covariance among a set of measured independent variables and a target measured dependent variable (Wright, 1934; Bollen, 1989). The EQS 5.7 program (Bentler, 1990), using maximum likelihood estimation, was used

in the present study to conduct the path analysis. In the process of model modification, the Wald test and the Lagrange Multiplier (LM) test were consulted to exclude non-significant paths and include potential significant paths, respectively.

The chi-square value (χ^2), chi-square-degrees of freedom ratio (χ^2/df), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI), Comparative Fit Index (CFI), and root mean square error approximation (RMSEA) were selected to assess the goodness-of-fit of the model. By convention, a value of 2 or less for χ^2/df indicates reasonable fit. A value above .90 of the two fit indices (NNFI and CFI) indicated reasonable fit (Bentler, 1992). RMSEA is a measure of discrepancy of the data per degree of freedom. A value below .05 to .08 signifies a good fit (Munro, 2001; Pedhazur, 1997).

Results

Descriptive Results for the Measures of Parents and Children

About 72% of parents had not played for any school teams when they were in their primary or secondary schools. They also reported their activity levels as “low” or “very low” (60%) and spent less than 2 hours per week (53%) in physical activity in their childhood. Interestingly, although over 80% of parents agreed that physical activity could bring benefits in growth and development for their children, only half of them (51%) encouraged their children to participate in physical activity. Overall, parents were quite inactive but positively valued physical activity participation.

Results for children indicated 39% and 65% of them had been involved in school sports teams and considered themselves as average in their activity level. About 36% of the children had spent less than two hours in physical activity per week excluding the time they spent at their regular school physical education classes. Although more than half of them (52%) felt that they had enough opportunity to learn and were involved in physical activity in their family, more than two-thirds of them (67%) considered their family as inactive. More than 41% of the children thought that their parents had “few”

and even “no” positive influences on their participation in physical activities and 40% of them considered their parents “seldom” and “never” encouraged them to participate in any type of physical activity. Children considered their family as physically inactive and they reported their parents had no significant positive impact on their physical activity involvement. Table 2 summarizes the descriptive results of parent and child questionnaires.

Correlation Analysis

Correlation analysis was conducted to determine the associations within and between the children's and parents' variables. Correlation coefficients are presented in Table 3. The composite score for children's physical activity (school team, active level and duration) (CPAS) was moderately and weakly associated with child-perceived family environment (CFE), child-perceived parental encouragement (CPE) and child attitude (CA) towards physical activity respectively. CFE was also significantly and moderately correlated with CPE. That is, children found their family more active if they perceived more encouragement for participating in physical activity from their parents. On the other hand, the composite score for parental physical activity (school team, active level and duration) (PPAS) were significantly and weakly associated with parent-perceived parental encouragement (PPE) and parental attitude towards physical activity. Moreover, parental attitude towards physical activity was also significantly but weakly correlated with PPE given to the child. These correlations suggested that more experiences and positive attitudes towards physical activity of parents associated with higher encouragement given to their children in participating in physical activity.

Results related to the associations between measures of parents and children, indicate that CFE was significantly and weakly correlated with PPAS and PPE. That is, children found their family more active if parents had more past physical activity experiences in their childhood and if the parents provided more encouragement to physical activity. However, no significant association between CPAS and any parental measures was found.

Table 3 Correlation Matrix of Children's and Parents' Variables

Variable	CPAS	CFE	CPE	CA	PPAS	PPE	PA
Children's variables							
CPAS	—						
CFE†	.30**	—					
CPE	.09*	.35**	—				
CA	.14**	.07	.17**	—			
Parents' variables							
PPAS	.09*	.16**	.15**	-.01	—		
PPE†	.05	.21**	.24**	.01	.15**	—	
PA	.02	.08*	.16**	.25**	.16**	.16**	—

Note. $N = 748$; CPAS = Child Physical Activity Score; CFE = Child-perceived Family Environment; CPE = Child-perceived parental Encouragement; CA = Child Attitude; PPAS = Parent Physical Activity Score; PPE = Parent-perceived Parental Encouragement; PA = Parent Attitude; † Eta was used for estimating correlation of CFE and PPE.

* $p < .05$. ** $p < .01$.

With regard to psychological attitude, attitude of parents towards physical activity was significantly and moderately associated with that of children. The overall pattern of the correlation provided preliminary support for the theoretical relationship among the constructs and further statistical analysis was warranted.

Path Analysis

Goodness-of-fit of the model. The proposed model (Figure 1) reached statistical significance, $\chi^2(df = 17, N = 748) = 64.33, p < .001$. This might be due to the large sample size since chi-square value is very sensitive to it. However, we can still see in Table 4 that there was room for improvement for the model since the NNFI was just .80 and the RMSEA was still higher than .06.

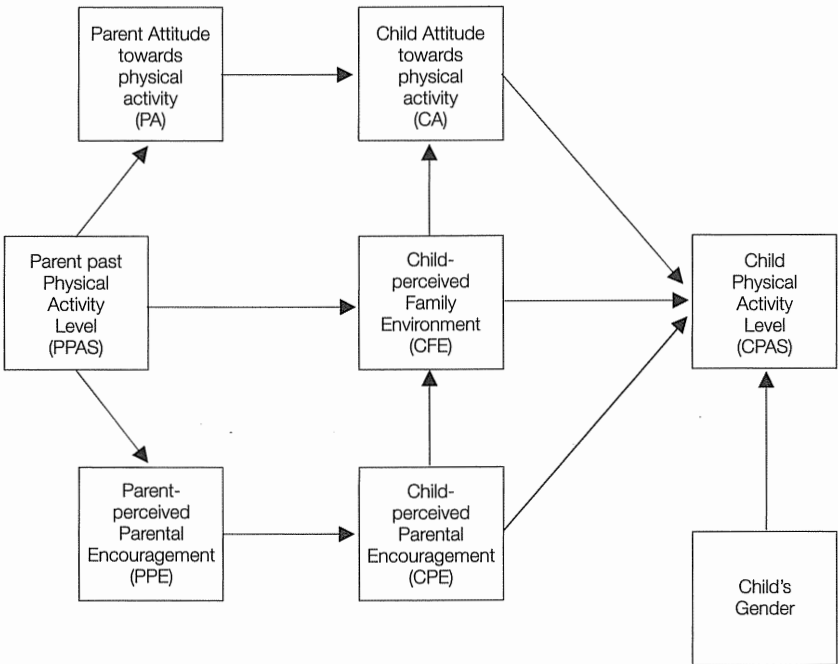
Exploratory paths. The LM test revealed that the goodness-of-fit of the base model would be significantly improved if two significant paths, that is, from PPAS to CPE and child's gender to CFE, were added. Models 2a and 2b were thus established to include these associations and the results were confirmed. The χ^2 / df value and RMSEA both dropped significantly from 3.78 to 3.27 and from .065 to .059 respectively. The fit indices, such as CFI, on the other hand, increased significantly from .88 to .91.

Table 4 Fit Indices for the Hypothesized and Final Models

Model	χ^2	χ^2 / df	$\Delta\chi^2$	Δdf	NFI	NNFI	CFI	RMSEA
Model 1 (Base model)	64.33	3.78	—	—	.846	.800	.879	.065
<i>Add significant paths</i>								
Model 2a (PPAS → CPE)	54.13	3.38	10.20	1	.870	.828	.902	.060
Model 2b (Child Gender → CFE)	49.08	3.27	5.05	1	.883	.837	.913	.059
<i>Drop non-significant paths</i>								
Model 3a (CPE → CPAS)	49.31	3.08	.23	1	.882	.851	.915	.056
Model 3b (CFE → CA)	50.96	3.00	.23	1	.878	.857	.913	.055
<i>(Final Model)</i>								

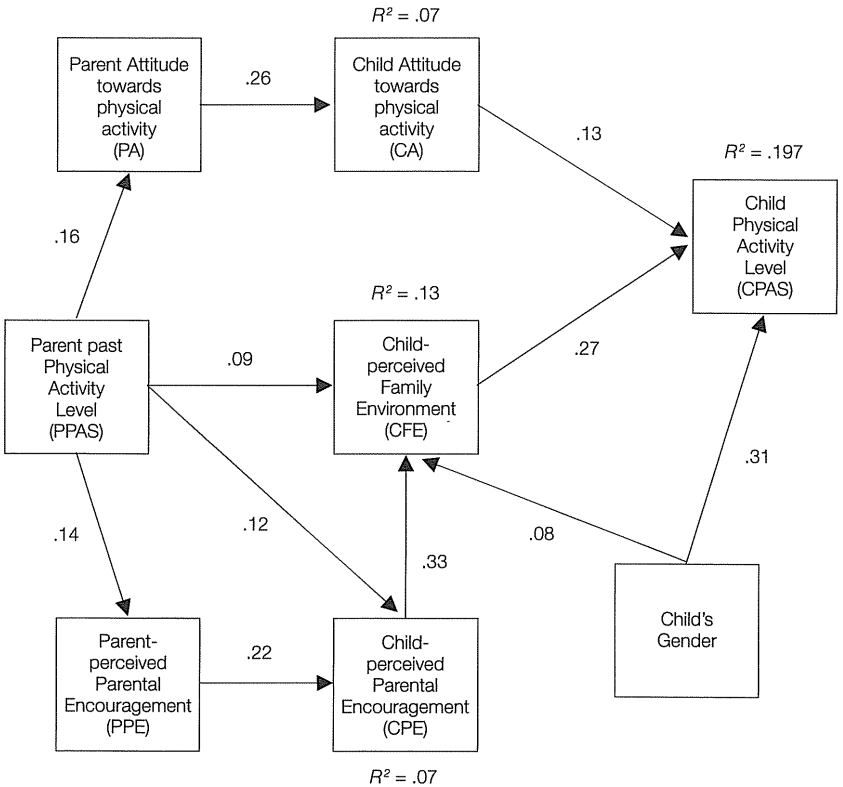
Note. NFI = Normed Fit Index; NNFI = Non-normed Fit Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error Approximation.

Figure 1 Proposed Model of Parental Influences to Children's Physical Activity Participation



Non-significant paths. The Wald test revealed that there were two non-significant paths existed in the model, that is, CPE to CPAS and CFE to CA. The goodness-of-fit of the model would be significantly improved if these two non-significant paths were dropped. Models 3a and 3b were thus established to exclude these associations and the results were confirmed. The χ^2 / df value and RMSEA both dropped slightly from 3.27 to 3.00 and from .059 to .055 respectively. The fit indices, such as NNFI, on the other hand, increased significantly from .84 to .86.

Figure 2 Final Model of Parental Influences to Children’s Physical Activity Participation



Final model. Figure 2 shows the percentage of variance accounted for the target variable, child physical activity level and the strengths of the paths in the final model. The final model accounted for 19.7 % of the variance of CPAS. The standardized coefficients for the paths from CA, CFE and child's gender to children's physical activity level were .13, .27 and .31 respectively.

Discussion

Model Structure

The final model was categorized into three main paths. The first one is from parental past physical activity level to children's physical activity level via parents' attitude and children's attitude. It reflected how psychological attitude of parents and children predicted children's physical activity participation. This path implied the influences and its mechanism of psychological attitude from parents. This process illustrated how the parental past physical activity level influenced their attitude to physical activity and transformed into psychological influences to their children's attitudes and actual participation in physical activity. This path actually offered a possible explanation of how parental physical activity experiences influenced their children's attitudes and actual participation in physical activity.

The second path is from parental past physical activity level to children's physical activity level via parental and children's perception of parental encouragement, and CFE. It represented how family environment and parental encouragement affected children's physical activity participation. The path showed different inter-relationships between prediction variables. And it also indicated the core role of CFE to the target variable in the model (path loading = .27). This factor is mainly dependent upon different direct and indirect influences from parental past physical activity level, PPE and CPE. This route formed a pathway to explain children's physical activity participation. A number of studies have stipulated the direct influences of parental encouragement to children's intended and actual physical activity involvement (Biddle & Goudas, 1996; Taylor et al., 1988). This path indeed

provided an additional consideration when analysed the linkage between encouragement and participation. This new construct has singled out its significance as an intervening factor, which might enhance an active family environment through encouragement.

The final path is from gender to children's physical activity level. It was hypothesized that gender would exert direct effects to the physical activity. The final model confirmed that gender effect was very obvious to children's physical activity participation (path loading = .31), with boys reporting higher participation than girls ($t(674) = 4.15$). Thus, gender is a main factor to be considered in children's physical activity involvement.

These three pathways embraced psychological variables and highlighted the linkage between parental past experiences in physical activity and children's participation. It also singled out the significant impacts of children's attitude towards physical activity, CFE and gender as important mediators to their participation in physical activity. Furthermore, the model indicated that the parental variables in this study played a latent role and exerted indirect effects on children's physical activity through the mediating variables of children. This two-folded structure model gives a clear understanding of how parental past experiences in physical activity influenced their own attitude and provided encouragement to their children.

Perception of Task Importance

It was found that three children's factors, namely child psychological attitude towards physical activity, CFE and gender of the child were significant and direct contributors of the target variable — children's physical activity level. Alternatively, child psychological attitude towards physical activity and CFE was found to be predicted by parental psychological attitude towards physical activity and parental past physical activity level. Moreover, CPE and PPE were both found to be significantly associated with CFE.

It was originally hypothesized that all four children constructs would influence children's participation in physical activity directly. But the final

model confirmed that children's attitude, gender and their perception in family environment were the only constructs to explain their participation directly. These relationships indicated that the interpretation or perception of task importance of children played a core role when explaining the parental influences to children's participation in physical activity. Although many previous findings showed important impacts of parents' influence, the current finding stipulated the ultra importance of how children interpret or perceive makes the difference of why they participate or not. Without considering the process of how children interpret or perceive the parental influences but only stress the parental behaviour or encouragement, the real mechanism of parental influences to children may be neglected. Children may be underestimated with their active role in decision-making through perception and also the influences of pure physical environment may be over-estimated. The expectancy-value theory clearly stressed that the subjective task importance is an influential factor when talking about an individual's decision in participation in activities. Its crucial role should be emphasised when interpreting the current finding. The current finding is not saying that parental influences are not crucial, but to stress that a mediating process exists during children's decision-making process. This is exactly why CFE was found so important and had direct contribution to children's physical activity participation. Based upon the finding, children's attitude to physical activity, gender and CFE are the interpretation of what children receive from their parents including encouragement, gender stereotyping and given family environment. These are representations of how children perceive instead of what exactly parents give to them. For example, children build up their attitudes to physical activity through parental past experience and their attitudes to physical activity, and also children's perceptions of their family environment are constituted by the parental past physical activity level and encouragement. These paths explained the latent impacts of parental influences. Only by considering the subjective perception of children on the parental influences through the external environment setting, encouragement and gender expectations, the understanding of how

and why the same external environment or encouragement creates different outcomes of children's socialization to physical activity can be better understood.

Gender Issue

The final model confirmed that gender effect was very obvious to children's physical activity participation (path loading = .31), with boys reporting higher participation than girls ($t(674) = 4.15$). Additionally, a new path was added in the final model from gender to CFE. It offered an alternative way to understand the effect of gender on children's participation in physical activity. This path indicated that the CFE in physical activity could be influenced by the gender of children. This has been a belief that parents give different messages to boys and girls regarding the socialization process into physical activity (Coakley, 2001). But this new path implied that family environment related to physical activity actually could be influenced due to the gender of children. For example, the arrangement of meal time, transportation, weekend schedules and family resources allocation might be changed according to parents' gender stereotype or expectations to boys or girls in their physical activity development. Thus, this socially defined construct, gender, gives a very concrete impact on children's perception to family environment regarding children's socialisation into physical activity.

Conclusions

To summarize, the final model have two meaningful findings. Firstly, although parental and children's variables are included in the model, parental variables can only have latent effects on children's participation in physical activity through children's perceived family environmental change indirectly. It stipulates the fact that the subjective perception of children on parental encouragement or family environment is more important than the external environment. Secondly, children's gender not only affects their physical

activity participation, but also their perception of family's physical activity environment. This finding helps to interpret the gender effect has an influential impact to both their perceived and realistic opportunities in children's physical activity participation.

It should be noted that the parental questionnaires were completed primarily by mothers (62%). Since some literature suggested that fathers are more influential in shaping children's physical activity participation, it is recommended that future research request both mothers and fathers complete the questionnaires in order to examine the relative influences on their children's physical activity involvement. Furthermore, the psychological dimensions of parent-child interaction on physical activity participation will be much more understood if the questionnaire items are more valid and reliable. The measure of this study is self-constructed items so it may need more attention to perfect these items in order to achieve better understanding of the impacts on children's physical activity participation. Thirdly, the participants of this study are mainly adolescents, no generalization can be drawn to younger children and young adults.

References

- Armstrong, N., & Mechelen, W. V. (Ed.). (2000). *Paediatric exercise science and medicine*. Oxford University Press.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238–246.
- Bentler, P. M. (1992). *EQS program manual*. Los Angeles: BMDP Statistical Software.
- Biddle, S., & Goudas, M. (1996). Analysis of children's physical activity and its association with adult encouragement and social cognitive variables. *Journal of School Health*, 66, 75–78.
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York: John Wiley & Sons.
- Bouchard, C. (Ed.). (2000). *Physical activity and obesity*. Champaign, IL: Human Kinetics.

- Brustad, R. J. (1992). Integrating socialization influences into the study of children's motivation in sport. *Journal of Sport & Exercise Psychology, 14*, 59–77.
- Brustad, R. J. (1993). Who will go out and play? Parental and psychological influences on children's attraction to physical activity. *Pediatric Exercise Science, 5*, 210–223.
- Coakley, J. J. (2001). *Sport in Society* (7th ed.). New York: McGraw-Hill.
- Coakley, J., & White, A. (1992). Making decisions: Gender and sport participation among British adolescents. *Sociology of Sport Journal, 9*, 20–35.
- Colley, A., Eglinton, E., & Elliott, E. (1992). Sport participation in middle childhood: Association with styles of play and parental participation. *International Journal of Sport Psychology, 23*, 193–206.
- Dempsey, J. M., Kimiecik, J. C., & Horn, T. S. (1993). Parental influence on children's moderate to vigorous physical activity participation: An expectancy-value approach. *Pediatric Exercise Science, 5*, 151–167.
- Department of Health and Human Services. (1999). *Promoting physical activity: A guide for community action*. Champaign, IL: Human Kinetics.
- Duda, J. L., & Hom, H. L. (1993). Interdependencies between the perceived and self-reported goal orientations of young athletes and their parents. *Pediatric Exercise Science, 5*, 234–241.
- Eccles, J. S., Wigfield, A. W., & Schiefele, U. (1998). Motivation to succeed. In W. Damon & N. Eisenberg (Eds.), *Handbook of child psychology: Vol. 3. Social, emotional and personality development* (5th ed., pp. 1017–1095). New York: Wiley.
- Estrada, A. M., Gelfand, D. M., & Hartmann, D. P. (1988). Children's sport and the development of social behaviours. In R. A. Magill, M. J. Ash, & F. L. Smoll (Eds.), *Children in sport* (3rd ed., pp. 251–262). Champaign, IL: Human Kinetics.
- Freedson, P., & Evenson, S. (1991). Familial aggregation in physical activity. *Research Quarterly in Exercise and Sport, 62*, 384–389.
- Guldan, G. S., Cheung I. L. T., & Chui, K. K. H. (1998). Childhood obesity in Hong Kong: Embracing an unhealthy lifestyle before puberty. *International Journal of Obesity and Related Metabolic Disorders, 22*(Suppl.), 16.
- Higginson, D. C. (1985). The influence of socializing agents in the female sport-participation process. *Adolescence, 20*, 73–82.

- Hill, G. M. (1993). Youth sport participation of professional baseball players. *Sociology of Sport Journal*, 10, 107–114.
- Horn, T. S. (2002). *Advances in sport psychology* (2nd ed.). Champaign, IL: Human Kinetics.
- Kalakanis, L. E., Goldfield, G. S., Paluch, R. A., & Epstein, L. H. (2001). Parental activity as a determinant of activity level and patterns of activity in obese children. *Research Quarterly for Exercise and Sport*, 72, 202–209.
- Kimiecik, J. C., & Horn, T. S. (1998). Parental beliefs and children's moderate-to-vigorous physical activity. *Research Quarterly for Exercise and Sport*, 69, 163–175.
- McPherson, B. D., Curtis, J. E., & Loy, J. W. (1989). *The social significance of sport: An introduction to the sociology of sport*. Champaign, IL: Human Kinetics Books.
- Molnar D., & Livingstone, B. (2000). Physical activity in relation to overweight and obesity in children and adolescents. *European Journal of Pediatrics*, 159 (Suppl.1), 45–55.
- Moore, L., Lombardi, D., White, M., Campbell, J., Oliveria, S., & Ellison, R. (1991). Influence of parents' physical activity levels on activity levels of young children. *Journal of Pediatrics*, 118, 215–219.
- Mota, J., & Queiros, P. (1996). Children's behaviour. Physical activity regarding parents' perception vs. children's activity. *International Review for Sociology of Sport*, 31, 173–179.
- Munro, B. H. (2001). *Statistical methods for health care and research* (4th ed.). Philadelphia, PA: Lippincott Press.
- Ommundsen, Y., & Vaglum, P. (1991). Soccer competition anxiety and enjoyment in young boy players: The influence of perceived competence and significant others' emotional involvement. *International Journal of Sport Psychology*, 22, 35–49.
- Parizkova, J., & Hills, A. (2000). *Childhood obesity: Prevention and treatment*. Boca Raton, FL: CRC Press.
- Pease, D. G., & Anderson, D. F. (1986). Longitudinal analysis of children's attitudes toward sport team involvement. *Journal of Sport Behaviour*, 9, 3–10.
- Pedhazur, E. J. (1997). *Multiple regression in behavioural research: Explanation and prediction* (3rd ed.). Fort Worth, TX: Harcourt Brace College Press.

- Seppanen, P. (1982). Sports clubs and parents as socializing agents in sport. *International Review of Sport Sociology*, 17, 79–90.
- Snyder, E. E., & Spreitzer, E. A. (1989). *Social aspects of sport* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.
- Taylor, W. C., Baranowski, T., & Sallis, J. F. (1988). Family determinants of childhood physical activity: A social-cognitive model. In R. K. Dishman (Ed.), *Advances in exercise adherence* (pp. 319–342). Champaign, IL: Human Kinetics.
- Wankel, L. M., Mummery, W. K., Stephens, T., & Craig, C. L. (1994). Prediction of physical activity intention from social psychological variables: Results from the Campbell's survey of well-being. *Journal of Sport & Exercise Psychology*, 16, 56–59.
- Weiss, M. R., & Ferrer-Caja, E. (2002). Motivational orientations and sport behavior. In T. Horn (Ed.), *Advances in sport psychology* (2nd ed., pp. 101–184). Champaign, IL: Human Kinetics.
- White, S. A. (1996). Goal orientation and perceptions of the motivational climate initiated by parents. *Pediatric Exercise Science*, 8, 122–129.
- Wright, S. (1934). The method of path coefficients. *Annals of Mathematical Statistics*, 5(3), 161–215.
- Yang, X., Telama, R., & Laakso, L. (1996). Parents' physical activity, socio-economic status and education as predictors of physical activity and sport among children and youths — A 12-year follow-up study. *International Review for Sociology of Sport*, 31, 273–289.