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# Significant others and students' leisure-time physical activity intention: A prospective test of the social influence in sport model<sup>☆</sup>

Diana L.Y. Su<sup>a</sup>, Alfred S.Y. Lee<sup>a</sup>, Joan S.K. Chung<sup>a</sup>, Tracy C.W. Tang<sup>a</sup>,  
Catherine M. Capio<sup>a,c</sup>, Lei Zhang<sup>b,\*</sup>, Derwin K.C. Chan<sup>a,\*\*</sup>

<sup>a</sup> The Education University of Hong Kong, Hong Kong, China

<sup>b</sup> Renmin University of China, China

<sup>c</sup> Ateneo de Manila University, Quezon City, Philippines

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## ABSTRACT

This two-wave prospective study applied the Social Influence in Sport Model to investigate whether the social influences of parents, physical education (PE) teachers, and peers were predictive of students' intention to engage in leisure-time physical activity (PA). Participants were 2,484 secondary school students (11–18 years old) who completed a questionnaire assessing positive influence, punishment, and dysfunction from the three social agents (parents, PE teachers, and peers) at baseline, and PA intention at a 1-month follow-up. Structural equation modelling (SEM) yielded excellent goodness-of-fit and consistent pathways between the three social agents. Students' leisure-time PA intention ( $R^2 = .103$  to  $0.112$ ) was positively associated with positive influence ( $\beta = .223$  to  $0.236$ ,  $p < .001$ ) and punishment ( $\beta = .214$  to  $0.256$ ,  $p < .01$ ), and negatively associated with dysfunction ( $\beta = -0.281$  to  $-.335$ ,  $p < .001$ ). Multi-group SEM showed that the predictions were invariant between parents, PE teachers, and peers. Furthermore, no significant differences in students' gender were found between perceived social influence and PA intention. The findings supported the application of the Social Influence in Sport Model in explaining the role of significant others on students' intention to take part in leisure-time PA.

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In sport and exercise psychology literature, there has been extensive research on the role of social agents in youth sport participation. Parents, coaches, physical education (PE) teachers and peers are commonly regarded as significant others whose feedback and interpersonal interactions have a prime impact on children's and adolescents' behavior and experiences in a sporting environment.<sup>1,2</sup> Over the years, researchers have applied various psychological frameworks (e.g., Achievement Goal Theory;<sup>3</sup> Self-Determination Theory<sup>4</sup>), to explain how social influences from significant others are related to children's and adolescents' participation and experience in sports.<sup>1</sup> Despite the differences in the

theoretical frameworks, the social influences fostered by significant others have been linked to various motivational and behavioural outcomes of children and adolescents in sports such as effort, competence, enjoyment, and anxiety.<sup>1</sup> In this study, we applied the Social Influence in Sport Model (SISM) to examine the relative role of parents, PE teachers and peers on the sporting experience of secondary school students' participation in leisure-time physical activity (PA).

## 1. Social influence in sport model

The SISM is derived from the basis of Perceived Social Influence in Sport Scale-2 (PSISS-2);<sup>1</sup> In the model, the social influence of significant others is conceptualised into three dimensions. The first factor of the model is a positive social influence that involves positive reinforcement (praises and rewards for good performance) and affiliation (e.g., respect, support, and understanding). Punishment (punishment/criticisms for errors and mistakes) and dysfunction (e.g., conflicts and negative emotions/behaviours that

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\* Corresponding author. Renmin University of China, China

\*\* Corresponding author. The Education University of Hong Kong, China.

E-mail addresses: [zl2005@ruc.edu.cn](mailto:zl2005@ruc.edu.cn) (L. Zhang), [derwin@eduhk.hk](mailto:derwin@eduhk.hk) (D.K.C. Chan).

impair interpersonal relationships and harmony) are two negative factors of the model where social influences are respectively conditional or unconditional on sports performance. These three factors have been shown to be robust dimensions of social influences that reflect how significant others apply social support/verbalisation/behaviour in the context of youth sports<sup>1</sup>, and have been predictive of child and adolescent effort (as well as competence, enjoyment, and anxiety) in sports. The findings showed that children and adolescents placed more effort in sports when their significant others (i.e., coaches, parents, and peers) exerted more positive influence, and less punishment and dysfunction in the social environment. Researchers have also found that students' intention, experience, or performance in leisure-time PA may be hampered by controlling behaviors (i.e., punishment, dysfunction) from PE teachers<sup>5,6</sup> and parents<sup>7</sup>, as well as by verbal victimization from peers.<sup>8,9</sup>

It is important to note that sports are a form of structured PA.<sup>10</sup> However, whether the findings of Chan and colleagues (2019) could be generalised to individuals' participation in PA remained unknown because the sample of their study consisted of young athletes (aged 9 to 18) who competed and regularly trained in sports. Their findings might not be representative of sport participants at recreational levels or young people who do not regularly engage in leisure-time PA. Current research about the relationship between social influence and students' PA intention has primarily focused on positive or adaptive social influences (e.g., Refs. 11–13, but very few empirical studies have investigated the role of negative social influence (i.e., punishment, dysfunction) on students' behavioural patterns in PA.<sup>14</sup> As the SISM has integrated the elements of positive and negative social influence into a unified psychological framework, it is worthwhile to apply the SISM to reveal the extent to which positive and negative social influences of significant others (e.g., PE teachers, parents, and peers) are predictive of students' intention to engage in leisure-time PA.

## 2. Present study

The present study examined the SISM as a framework to explain how the social influence of parents, PE teachers, and peers is predictive of secondary school students' intention to engage in leisure-time PA. We preliminarily tested this model with a two-wave prospective design such that the findings could provide more robust evidence about the temporal relationship between the social influence of significant others and leisure-time PA intention, as compared to previous studies of the model using cross-sectional designs.<sup>1,15</sup>

Based on the findings of the SISM<sup>1,15</sup>, we hypothesised that.

- Students' leisure-time PA intention would be positively associated with positive influence (H1), and negatively associated with punishment (H2) and dysfunction (H3).
- The relationships of H1, H2, and H3 would be consistent between social influences created by PE teachers, parents, and peers (H4).

## 3. Methods

### 3.1. Procedures and participants

The study protocol was designed to obtain data from 7 secondary schools that were distributed in various regions in Beijing, China. Recruitment of participants was performed by distributing our survey to the network of PE teachers and school principals in the region. Upon ethics approval from the Institutional Review

Board of [institution blinded from masked review], we recruited 2,484 students (M age = 13.96, SD = .817; age range = 11–18 years; 2,043 students aged 11–14, 439 students aged 15–18, 2 students data were missing; female = 50%) who were able to understand the questionnaire and without any disability/disease that prevents them from participating in leisure-time PA. Parents or legal guardians of the participants and the participants signed informed consent forms to ensure they understood the rights of their children's participation. Participants were asked to complete an online survey comprising measures of PSISS-2 and leisure-time PA intention at T1 (baseline), and T2 (1-month follow-up). Follow-up responses were matched using subject identifiers of the school and student ID of the participants. The retention rate at follow-up was satisfactory (96.7%).

### 3.2. Measures

**Social Influence.** The 16-item PSISS-2 was adapted for a leisure-time PA setting to measure the social influence of PE teachers, parents, and peers. The development of the PSISS-2 has undergone through rigorous validation procedures. Robust psychometric properties and predictive power of this scale were reported in sports settings.<sup>1,15</sup> An example item was “When I take part in leisure-time PA, my PE teachers/parents/peers make me feel good”. Participants completed three ratings in terms of PE teachers, parents, and peers for each of the PSISS-2 items, and responded to each item on a 5-point Likert-scale with anchors ranging from “not at all true” (1) to “very true” (5) for each social agent. Participants were instructed to skip the items for the social agents that did not apply to them. The percentages of participants who skipped the items of PE teachers, parents, and peers were 0.04%, 0.04%, and 0.04% respectively. The Cronbach's alphas of the PSISS-2 constructs at T1 ranged between 0.800 and 0.928.

**PA Intention.** PA intention was measured by the three items adopted from the subscale of the PA version of the Theory of Planned Behaviour Scale.<sup>16</sup> Intention, according to the Theory of Planned Behaviour<sup>17</sup>, is the most proximal predictor of individual future engagement in a given behaviour. An example item was “I plan to do PA in my leisure time in the forthcoming month”. Participants responded on a 7-point scale with anchors ranging from “not at all true” (1) to “very true” (7). The Cronbach's alpha of leisure-time PA intention at T2 was 0.943.

### 3.3. Analysis

Structural equation modelling (SEM) analysis was conducted using a Maximum likelihood with robust standard errors (MLR) in Mplus version 8.1.<sup>18</sup> To test the hypotheses (H1, H2 and H3), we ran three separate models respectively for parents, PE teachers and peers in the relationship between social influence at T1 and leisure-time PA intention at T2. To test H4, multigroup analysis was conducted to test the invariance of the predictive pathways in the three models. We used Wald tests to examine whether the pathways were consistent across parents, PE teachers, and peers. In all models, age and gender were inserted as control variables. Multiple goodness-of-fit indices (i.e., Comparative fit index (CFI), the Tucker-Lewis Index (TLI), the root mean square error of approximation (RMSEA), and the standardised root mean square residual (SRMR)) were used to assess the overall fit of the proposed mediation models. Models were regarded to have acceptable goodness-of-fit if CFI and TLI values neared or surpassed .90, with RMSEA and SRMR values less than 0.08.<sup>19</sup>

#### 4. Results

The models respectively for parents ( $\chi^2 = 1474.235$ ,  $df = 155$ , CFI = .935, TLI = .912, RMSEA = .059 [90% CI = .056 to 0.061], SRMR = .065), PE teachers ( $\chi^2 = 1350.718$ ,  $df = 155$ , CFI = .940, TLI = .919, RMSEA = .056 [90% CI = .053 to 0.059]), and peers ( $\chi^2 = 1346.349$ ,  $df = 155$ , CFI = .949, TLI = .931, RMSEA = .056 [90% CI = .053 to 0.058], SRMR = .064) yielded excellent fit indices. The three models had highly consistent pathways and explained variances in the prediction of leisure-time PA intention. In particular, leisure-time PA intention ( $R^2 = .103$  to 0.112) was positively associated with positive influence (supported H1;  $\beta = .223$  to 0.236,  $p < .001$ ), and positively associated with punishment (in contrast to H2;  $\beta = .214$  to 0.256,  $p < .01$ ), but negatively associated with dysfunction (supported H3;  $\beta = -0.281$  to  $-0.335$ ,  $p < .001$ ) (see the full standardised parameter estimates in Table 1). In the multi-group analysis, both configural model and constrained model yielded acceptable goodness-of-fit ( $\chi^2 = 4735.193$ ,  $df = 525$ , CFI = .934, TLI = .921, RMSEA = .057 [90% CI = .055 to 0.058], SRMR = .072;  $\chi^2 = 4735.193$ ,  $df = 525$ , CFI = .934, TLI = .921, RMSEA = .057 [90% CI = .055 to 0.058], SRMR = .072) and Wald's test showed that the strengths of the relationship between perceived social influence and leisure-time PA intention were not statistically different among parents, PE teachers, and peers (see the full standardised parameter estimates in Table 2), supporting the H4. The zero-order correlation matrix and descriptive statistics of the study variables are available in [OSF link blinded for masked review].

#### 5. Discussion

This prospective study preliminarily applied the SISM<sup>1,15</sup> to explain how parents, PE teachers, and peers exert their social influences on secondary school students' intention to participate in leisure-time PA. Our findings generally supported our hypotheses regarding the predictive power of the SISM<sup>1,15</sup> on students' leisure-time PA intention, and the predictions were shown to be consistent among parents, PE teachers and peers.

##### 5.1. Positive influence

In support of H1, positive influence established a relationship with leisure-time PA intention. This pattern of results is in agreement with previous studies about how significant others may support students' commitment/intention to general sport<sup>20,21</sup> and exercise activities<sup>22</sup> and the findings of SISM.<sup>1,15</sup> The present finding may suggest that students are more likely to have a higher intention to take part in leisure-time PA when their significant others exert positive social influence in PA environments. According to the SISM<sup>1,15</sup>, positive social influences may involve positive reinforcement (e.g., praise, encouragement, and reward for good performance) or affiliation (e.g., respect, understanding and affection) from significant others.

**Table 1**  
Standardised Parameter Estimates for Parent, PE teacher and Peer Influence SEM Analysis.

	Parent			PE teacher			Peer		
	$\beta$	95% CI	$R^2$	$\beta$	95% CI	$R^2$	$\beta$	95% CI	$R^2$
Positive influence → Intention	.226***	.179, .273	.103***	.223***	.176, .270	.112***	.236***	.192, .281	.108***
Punishment → Intention	.214**	.099, .329		.254**	.129, .380		.256**	.112, .401	
Dysfunction → Intention	-.281***	-.411, -.152		-.335**	-.474, -.196		-.324**	-.483, -.166	

Notes. Parameter estimates of parent, PE teacher and peer influence SEM controlling for participants' age and gender. \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

##### 5.2. Punishment and dysfunction

Punishment (H2) and dysfunction (H3) were hypothesised to be negative predictors of leisure-time PA intention. However, only H3 was supported by having a negative relationship between dysfunction and intention. The findings in relation to H3 were supportive of the tenet of the SISM<sup>1,15</sup> and aligned with the existing literature about the maladaptive roles of negative social influence (e.g., bullying and victimization) on general PA<sup>8,22</sup>, swimming<sup>23</sup> or competitive sports<sup>24</sup> of children and adolescents. Unexpectedly, the relationship between punishment and intention was positive, in contrast to H2. A previous study also reported similar research findings regarding the positive predictive effects of punishment on effort and competence in the context of competitive swimming.<sup>15</sup> However, such findings were only exclusive to adolescent athletes and specific social agents (i.e., mother and peers). Accordingly, punishment is a conditional social influence involving penalty, criticism, or negative reaction against poor performance or mistakes in sport, whereas dysfunction is an unconditional social influence involving conflicts and negative emotions/behaviours that would impair interpersonal relationships.<sup>1</sup> The contradictory predictions of punishment and dysfunction may suggest that negative behaviours or verbalisation could be viewed as constructive criticisms as soon as individuals understand that the negative social influences from significant others serve good purposes.<sup>25</sup> When significant others react or respond to students' poor performance or mistakes in PA contexts, they should be more explicit in explaining the rationales behind their criticisms and suggest ways for improvement.

##### 5.3. Parents, PE teachers, and peers

In support of H4, the relationships between social influences and leisure-time PA intention were consistent among parents, PE teachers and peers. Our findings might indicate that the role of these three social agents in students' intention to engage in leisure-time PA could be equally vital, in line with previous studies.<sup>26–28</sup> Thus, parents, PE teachers and peers may be seen as important social agents and important sources of social influences of leisure-time PA in adolescents. However, this pattern of findings appeared to be incongruent with previous studies that suggested parents or PE teachers were more important than peers.<sup>29,30</sup> Indeed, the inconsistent findings might be due to differences in the applications of theoretical frameworks of social influences or the variations in the assessments of sport-related outcomes (e.g. competence, enjoyment, and anxiety)<sup>1,25</sup> or cultural variations.<sup>31</sup> For example, varying levels of collectivism or individualism supported by different cultures will lead to different sorts of motivation and social influences on decision-making.<sup>32</sup> In addition, our current study focused on PA intention among secondary school students' leisure-time PA instead of elite athletes<sup>1,15</sup>, so the differences in participants' demographic backgrounds and the nature of the behavioural contexts could also explain the unique findings of our study. It is recognised that sport is a form of structured PA.<sup>10</sup> Future

**Table 2**  
Standardised parameter estimates for multi-group analysis of social agents.

	Parent		PE teachers		Peer	
	$\beta$	95%CI	$\beta$	95%CI	$\beta$	95%CI
Positive influence → Intention	.226***	.181, .272	.224***	.178, .271	.236***	.192, .281
Punishment → Intention	.206**	.094, .319	.257**	.135, .379	.265**	.124, .406
Dysfunction → Intention	-.274***	-.402, -.146	-.338***	-.474, -.202	-.331**	-.486, -.175

Notes. Parameter estimates of the multiple-group SEM controlling for participants' age and gender. \*\* $p < .01$  \*\*\* $p < .001$ .

studies should formally compare the predictive power of the SISM on PA outcomes between sport participants at different sport levels and age groups.<sup>14</sup>

## 6. Limitations and future directions

Despite the strengths of the sample size, the prospective design, the unique theoretical and practical implications of our study, we have to point out a few of our study limitations that may be important to addressed in future studies. First, a prospective design with correlational analysis precluded our findings to draw any causal inference. Second, the exclusive use of self-reported scales for measuring intention and other study variables could lead to issues of social desirability and consistency tendency, which could confound the response patterns.<sup>16</sup> Third, we only examined the social influences from parents, PE teachers and peers, so our findings cannot be generalised to other significant social agents (e.g., siblings, grandparents, and sports stars) who might also be important to students' leisure-time PA. Additionally, we only collected data from Beijing, China, and measured age and gender as covariate variables. Other variables such as socioeconomic factors, accessibility of sports facilities, and environmental factors, were not taken into consideration. Future studies may address these limitations by improving the study design (e.g., randomised controlled intervention) and measurement (i.e., objective measures of PA level, including the use of accelerometer). Finally, we encourage further studies to take more consideration of social and environmental factors related to leisure-time PA intention, and include broader coverage of social agents (i.e., sibling, grandparents) and multi-cultural samples (i.e., collectivism vs. individualism)<sup>33</sup> so that the evidence of the SISM could be examined and generalised to children and adolescents with diverse backgrounds.<sup>1,15</sup>

## 7. Conclusion and implication

Our prospective study provided initial evidence that the social influences of parents, PE teachers, and peers were equally important to students' intention to take part in leisure-time PA based on the framework of SISM. Students reported higher leisure-time PA intention when the social influence of these significant others was high in positive influence and punishment, and low in dysfunction. To promote students' engagement in leisure-time PA, significant others are recommended to be more cautious about the valence and conditionality of social influence. Significant others' behaviours and verbalisation on promoting PA are recommended to be more positive; otherwise, they should consider providing more explicit rationales behind negative feedback. In this case, students are more likely to interpret negative responses as constructive criticisms that might be helpful to their participation in leisure-time PA.

## CRediT authorship contribution statement

**Diana L.Y. Su:** Methodology, Formal analysis, Project administration, Writing – original draft, Revising the manuscript, Approval

of the version of the manuscript to be published. **Alfred S.Y. Lee:** Methodology, Formal analysis, and/or interpretation of data, Approval of the version of the manuscript to be published. **Joan S.K. Chung:** Writing – original draft, Revising the manuscript, Approval of the version of the manuscript to be published. **Tracy C.W. Tang:** Revising the manuscript. **Catherine M. Capio:** Approval of the version of the manuscript to be published. **Lei Zhang:** Conceptualization, Funding acquisition, of data, Project administration, Funding acquisition, Approval of the version of the manuscript to be published. **Derwin K.C. Chan:** Conceptualization, Funding acquisition, of data, Methodology, Formal analysis, and/or interpretation of data, Project administration, Revising the manuscript, Approval of the version of the manuscript to be published.

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