

## Article

# Physical Activity and Its Relationship with Life Satisfaction among Middle School Students: A Cross-Culture Study

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**Abstract:** This study examined the association between physical activity (PA) levels and life satisfaction for middle school students from Macau, Taipei, and Qianjiang. A total of 1002 middle school students (grades 7 to 9) were recruited in 2015 from three cities (Macau,  $N = 322$ ; Taipei,  $N = 325$ ; and Qianjiang,  $N = 355$ ). Physical Activity Rank Scale-3 was used to evaluate the frequency, intensity, and duration of the PA. Further, students' PA behaviors and life satisfaction were assessed using the Multidimensional Students' Life Satisfaction Scale (MSLSS) devised by Zhang. Descriptive statistics, Pearson's correlation,  $t$ -test, and one-way ANOVA were conducted to process the data. In both Macau and Taipei, the life satisfaction of adolescents was significantly associated with adolescents' amount of PA ( $p < 0.05$ ). A significant relationship was observed between self-satisfaction and PA in students from both Macau and Taipei ( $p < 0.05$ ). The study results indicate the importance of life experience in PA. The more PA that a student engaged in, the higher the level of life satisfaction they obtained. There was a significant difference in the overall life satisfaction among adolescents in Macau, Taipei, and Qianjiang.

**Keywords:** life satisfaction; physical activity; Macau; Taipei; Qianjiang

## 1. Introduction

Quality of life is a common concern of many people due to its link with health development, personal success, and even societal wellbeing. Frisch [1] defined quality of life with an emphasis on the aspects of goodness and wellness for human survival. It involves the study of two perspectives. The objective perspective focuses on the development of different external conditions, such as friendship networks, housing quality, income levels, and recreational opportunities. In contrast, the subjective perspective focuses on internal evaluations and the satisfaction of different external conditions. In this manner, life satisfaction is the term used to describe the subjective understanding and satisfaction level toward these objective perspectives. Life satisfaction consists of two components that are affective and related to cognition [2]. Roberts and Clement shared the perspective of adopting life satisfaction as a method of measuring the quality of life [3]. In general, it assumes that the greater the life satisfaction, the higher the quality of life. A reserved situation is recognized with the association between lower life satisfaction and quality of life.

Currently, there are concerns about the adoption of physical activity (PA) as one of the criteria in the life satisfaction study. The amount of PA is directly linked to individual physical and psychological wellbeing. Poor health is directly linked to lower life satisfaction in adolescents [4]. Nevertheless, PA

benefits children's mental health by reducing depression, anxiety, psychological distress, and emotional disturbance [5]. These benefits indicate the importance of using PA as one aspect to observe the quality of life development of individuals. Adolescents reported a higher quality of life when they participated in greater levels of extracurricular activities [6]. A study exploring relationships between perceived life satisfaction and physical activity behaviors in a state-wide sample of adolescents in South Carolina has found that there was a significant, positive relationship between perceived life dissatisfaction and non-involvement in PA [7]. Similarly, Huebner et al. surveyed 5544 participants from 87 schools in the Youth Behaviour Survey and found that there was a significant relationship between non-involvement in PA and self-reported life satisfaction [8]. Moreover, an eight-week intervention experiment was conducted to examine the effect of extracurricular PA on students, and the findings suggested that participants in the intervention group reported higher scores on life satisfaction than those in the control group [9].

Since PA is beneficial to the development of life satisfaction, schools are responsible for promoting healthy living by introducing opportunities to enhance active lifestyle development. There are at least two strategies for schools to achieve this goal. One is through the effective delivery of compulsory physical education in schools, which has also been framed as formalized educational activities for students to enhance and acquire the knowledge of PA in a comprehensive and systematic manner. The other approach is the development of life experiences through extensive after-school or extracurricular programs in schools. These programs are usually implemented in an informal manner and are supported by local sports clubs or communities that have good delivery systems of weekend sports programs to students.

This research focused on youth. Being a transition time to adulthood, adolescence is a period involving dramatic physiological and psychological changes [10]. Therefore, adolescents are likely to experience a variety of stresses and challenges [11]. Participation in PA is considered as a good way to promote youth's mental health. Physically active adolescents have fewer psychological problems and enhanced cognitive function [12]. Although the positive effects of PA are well-established, the methods of participation, as well as the opportunities to engage in PA, differ.

Cities in China do not have the same physical education policies. In Macau, a compulsory curriculum time of 150 min of PA was introduced each week as part of students learning [13]. Furthermore, after-school programs were also reinforced with a compulsory timetable in Macau. In mainland China, physical education and health are one of the eight subjects in a new national curriculum, which concentrates on building and maintaining a healthy body and developing physically active lifestyles. Likewise, the health and physical education curriculum in Taipei emphasizes promoting and maintaining students' fitness and improving overall wellbeing [14]. As educational philosophies and institutions in Macau and Taipei differ from those in Mainland China, the amount of time for PA varies among these three cities. While the researchers attempt to identify proper strategies to address issues resulting from sedentary life [15,16], the investigation of cultural and social influences on PA behavior has become a predominant subject in educational studies.

Most studies agree that PA can improve life satisfaction, regardless of age. Significant research has been performed, primarily in Western countries; there are few studies of life satisfaction in the Chinese context [17]. Using Western studies will mislead us to some degree because life satisfaction is associated with various demographic and personality variables and studies from Western countries are unique to individualist cultures [18]. Therefore, it is necessary to conduct research in a Chinese population. Frameworks in previous studies of Chinese life satisfaction usually borrow directly from Western theories. The frameworks from the West are not universal due to the few available surveys of subjects from various races. To develop common theories, novel studies involving Chinese people are urgently needed.

Although researchers have started to monitor life satisfaction in China, the study of life satisfaction in adolescents is still limited. Adolescents' life satisfaction is crucial because the positive wellbeing at this age may benefit health into adulthood. Middle school students are at a transition point, where they always encounter barriers and challenges. PA is considered as one of the effective strategies to help

them become accustomed to changing lives. Thus, a study on the relationship between life satisfaction and PA among adolescents is required. Most studies performed in China have been conducted in just one place. These studies were not sufficient to generalize the overall situation in China. Given the effects of the social system and cultures on people, it is highly possible that people from diverse cultures and social spirits have different life satisfaction. Therefore, a comparison study conducted in different regions should be designed to illustrate these differences. In this study, middle school students were selected from Macau, Taipei, and Qianjiang to examine the relationship between PA and life satisfaction. The comparison of student life satisfaction in these three places can shed light on the influence of culture and social differences on individual life satisfaction.

The purpose of this study was to: (1) examine the PA levels for middle school students in Macau, Taipei, and Qianjiang; (2) determine whether there is a difference in the level of life satisfaction between boys and girls; (3) examine whether PA can influence overall life satisfaction and each component of life satisfaction in adolescents from Macau, Qianjiang, and Taipei.

In view of the research questions discussed, the following hypotheses were proposed. (1) Participation in PA would be higher in Macau and Taipei students than those in Qianjiang. Compared to Macau and Taipei, Qianjiang has lower socioeconomic status (SES). A study has found that children from lower SES home environments have fewer opportunities for PA [19]. (2) Male students would report a higher level of life satisfaction than girls. This is supported by a finding from previous research that girls reported significantly lower life satisfaction compared to boys [20]. (3) Life satisfaction among students would be significantly influenced by the PA in Macau, Taipei, and Qianjiang. The more students engage in PA, the more satisfied they are with their general lives. It has been found that participation in PA for adolescents is associated with increased quality of life/perceived life satisfaction [7].

## 2. Materials and Methods

### 2.1. Ethics

The present study was conducted for a Master's degree thesis project. Formal permission was obtained from the University of Macau, Faculty of Education, to perform the study. After that, the University arranged for the principal investigator to visit Taipei (Taiwan), Qianjiang, and Macau. Accordingly, formal permission was also obtained from two universities in these cities.

### 2.2. Participants and Procedures

Middle schools in Qianjiang, Macau, and Taipei were contacted to recruit participants. Seven schools agreed to participate in this study. In each place, two classes of each grade level were contacted to participate in this research. Written informed consent was obtained from the principals, teachers, students, and their parents prior to data collection. Before the administration of the instrument, students were informed that participation in the study was completely voluntary. The questionnaire was filled out anonymously by students. Students were invited to complete the Chinese version of the survey.

The research participants were 7th to 9th grade students, aged 12–16 years old, from Macau, Qianjiang, and Taipei. A total of 322 (three middle schools, Macau), 325 (three middle schools, Taipei), and 355 (one middle school, Qianjiang) students participated in this study. Among all participants, an approximately equal ratio of boys and girls (52.0% and 48.0%, respectively) were included. Questionnaires were distributed to approximately 1500 students from seven junior middle schools in the three cities, and a total of 1002 (66.8%) valid questionnaires were returned by the students.

Delimitations of the study: (1) research regions: this study was conducted in Macau, Taipei, and Qianjiang; (2) subjectiveness: this study surveyed middle school students in Macau, Taipei, and Qianjiang.

### 2.3. Measurements

Demographic data: based on the needs of this research, the background information obtained from the participants included age, gender, school, grade, and whether extracurricular PA had been undertaken in the past 6 months.

Physical activity was assessed by the Physical Activity Rank Scale-3 (PARS-3) [21]; the validity and reliability have been demonstrated in many studies from China [22]. This questionnaire was a self-reported assessment of PA over the past month. It had a total of three questions with one on intensity, one related to time, and one about frequency. There were five levels for the ranking of intensity, time, and frequency, and individuals' total PA was calculated as  $PA = \text{intensity (1–5)} \times \text{time (0–4)} \times \text{frequency (1–5)}$ . Therefore, the overall PA ranged from 0 to 100. The total PA was determined as low ( $\leq 19$ ), medium (20–42), or high ( $\geq 43$ ) [23]. The internal reliability of this scale (Cronbach's  $\alpha = 0.82$ ) was acceptable [21].

Life satisfaction was measured by the Chinese version of the Multidimensional Students' Life Satisfaction Scale (MSLSS), which was designed by Zhang [24]. The original version was conducted by Huebner in 1994 and consisted of 47 items using a self-reported scale to measure 5 aspects (friends, family, school, living environment, and self) of a person's life. However, Zhang's further validation used exploratory factor analysis for Chinese adolescents and retained 7 domains (i.e., friendship, self, life, schoolwork, school, freedom, and environment) with 46 items, based on a seven-point Likert scale, with responders indicating their preferences from 1 ("strongly agree") to 7 ("strongly disagree"). Studies on the reliability of the MSLSS have consistently reported Cronbach's  $\alpha$  ranging from 0.90 to 0.92 [25]. The reliability was very good in this study ( $\alpha = 0.94$ ). Negative-worded items were reverse-scored so that a higher score indicated greater life satisfaction. The scores for each item ranged from 1 to 7. Therefore, the lowest score was 46, and the highest score was 322.

### 2.4. Data Analysis

Data were analyzed by using SPSS 24.0 (SPSS Inc., Chicago, IL, USA). Descriptive analysis was conducted to examine PA participation in Macau, Taipei, and Qianjiang. Independent sample *t*-test was used to compare life satisfaction between boys and girls. Bivariate correlations and one-way ANOVA were applied to assess the relationships between PA and overall life satisfaction as well as subdomains of life satisfaction.

## 3. Results

### 3.1. Descriptive Statistics

#### 3.1.1. Participation in PA among Students in Three Cities

In general, over half of the students did not engage in sufficient PA, with 53.4% in Macau, 57.8% in Taipei, and 54.3% in Qianjiang. The smallest proportion of participants performed moderate PA in both Macau (16%) and Taipei (18.5%), whereas more students in Qianjiang (27.6%) participated in PA of a moderate level. The percentages of students involved in a large amount of PA were 30.1% (Macau), 23.7% (Taipei), and 18% (Qianjiang), respectively (Table 1).

**Table 1.** Participation in physical activity among middle school students in Macau, Taipei, and Qianjiang.

Place	Small	Moderate	High	Total
Macau	172	53	97	322
Taipei	188	60	77	325
Qianjiang	193	98	64	355

The descriptive statistics for PA levels in the three cities showed that students in Macau ( $M = 35.63 \pm 38.03$ ) were the most active, followed by Qianjiang ( $M = 32.69 \pm 27.84$ ) and Taipei

( $M = 31.86 \pm 33.90$ ) (Table 2). There was no statistically significant difference between the groups, as determined by one-way ANOVA ( $F(2, 997) = 1.14, p = 0.319$ ) (Table 3).

**Table 2.** Descriptive statistics for physical activity (PA) in the three cities.

Place	N	Mean	SD
Macau	322	35.63	38.02
Taipei	325	31.86	33.90
Qianjiang	355	33.36	27.84

**Table 3.** PA difference in Macau, Qianjiang, and Taipei.

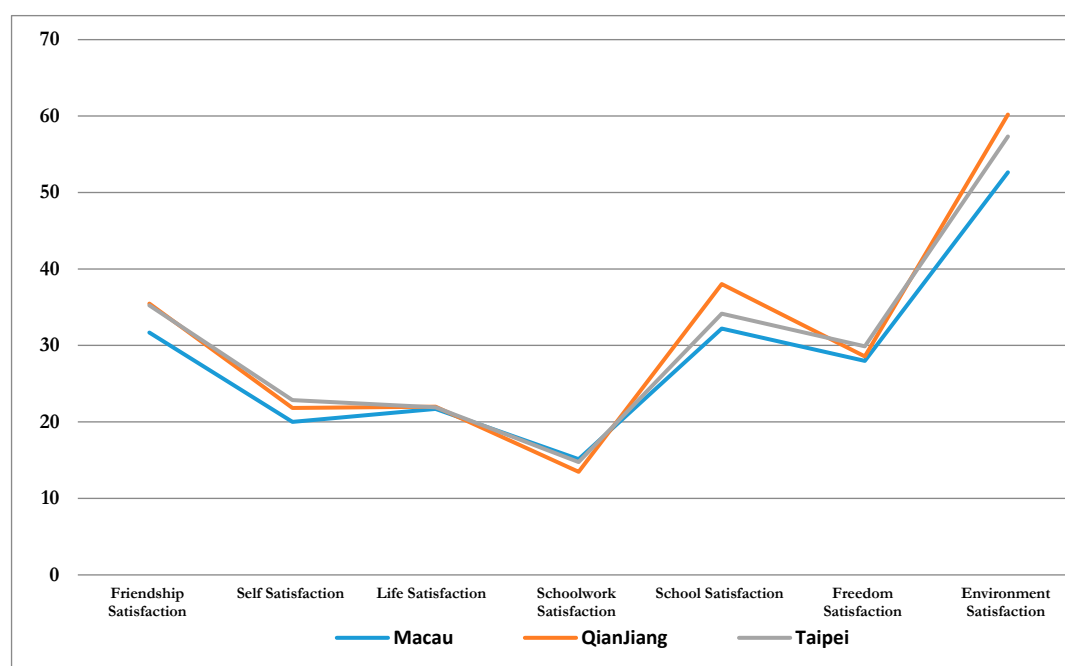
PA	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	2539.78	2	1269.89	1.14	0.319
Within Groups	1,108,203.17	997	1111.53		
Total	1,110,742.96	999			

### 3.1.2. Domains of Life Satisfaction in Different Cities

The descriptive statistics for the different life satisfaction components among the students from the three cities demonstrated that the students in Qianjiang had greater satisfaction in the following domains compared to the other cities: friendship, life, school, and environment satisfaction (Table 4). Students in Taipei showed greater self and freedom satisfaction. Macau students reported higher schoolwork satisfaction (Figure 1).

**Table 4.** Descriptive statistics for the different life satisfaction domains among students from Macau, Qianjiang, and Taipei.

Variables and Place	N	Mean	SD	Std. Error
Friendship Satisfaction (Macau)	322	31.67	6.99	0.389
Friendship Satisfaction (Qianjiang)	355	35.48	6.41	0.340
Friendship Satisfaction (Taipei)	325	35.24	7.06	0.391
Total	1002	34.18	7.02	0.222
Self Satisfaction (Macau)	322	19.99	6.26	0.349
Self Satisfaction (Qianjiang)	355	21.81	6.95	0.369
Self Satisfaction (Taipei)	325	22.85	6.39	0.354
Total	1002	21.56	6.65	0.210
Life Satisfaction (Macau)	322	21.70	5.86	0.326
Life Satisfaction (Qianjiang)	355	21.99	5.95	0.316
Life Satisfaction (Taipei)	325	21.90	5.73	0.317
Total	1002	21.87	5.85	0.184
Schoolwork Satisfaction (Macau)	322	15.13	5.93	0.330
Schoolwork Satisfaction (Qianjiang)	355	13.47	6.72	0.356
Schoolwork Satisfaction (Taipei)	325	14.76	6.38	0.354
Total	1002	14.42	6.40	0.202
School Satisfaction (Macau)	322	32.21	7.90	0.440
School Satisfaction (Qianjiang)	355	38.02	8.97	0.476
School Satisfaction (Taipei)	325	34.15	8.82	0.489
Total	1002	34.90	8.92	0.282
Freedom Satisfaction (Macau)	322	27.97	6.81	0.380
Freedom Satisfaction (Qianjiang)	355	28.56	8.77	0.465
Freedom Satisfaction (Taipei)	325	29.87	7.54	0.418
Total	1002	28.79	7.82	0.247
Environment Satisfaction (Macau)	322	52.65	11.80	0.660
Environment Satisfaction (Qianjiang)	355	60.21	12.15	0.645
Environment Satisfaction (Taipei)	325	57.34	13.11	0.727
Total	1002	56.85	12.75	0.403



**Figure 1.** Graphical representation of the means for the different domains of life satisfaction among the students from Macau, QianJiang, and Taipei.

### 3.2. Gender Differences in Overall Life Satisfaction

The independent sample *t*-test results for Macau ( $M = 27.42 \pm 30.66$ ;  $t = 0.377$ ,  $p > 0.706$ ), Taipei ( $M = 23.78 \pm 27.50$ ;  $t = 0.459$ ,  $p > 0.646$ ), and Qianjiang ( $M = 23.79 \pm 22.46$ ;  $t = 0.109$ ,  $p > 0.914$ ) were consistent, which suggests that there was no significant difference between gender and life satisfaction (Table 5).

**Table 5.** Gender differences in overall life satisfaction.

Places	<i>t</i>	Df	Sig. (2-Tailed)	MD	SED
Macau	0.377	320	0.706	1.542	4.09
Taipei	−0.459	323	0.646	−2.03	4.43
Qianjiang	0.109	353	0.914	0.472	4.35

### 3.3. Overall Life Satisfaction and PA

Pearson's correlation coefficient results indicated that the PA scores were significantly correlated with overall life satisfaction in Macau ( $r = 0.144$ ,  $p = 0.01$ ) and Taipei ( $r = 0.164$ ,  $p = 0.003$ ) (Table 6). However, no significant correlation was found between total life satisfaction and PA in Qianjiang.

**Table 6.** Correlations between overall life satisfaction and the amount of PA.

Place	Pearson Correlation	Sig. (2-Tailed)	N
Macau	0.144 **	0.010	322
Taipei	0.164 **	0.003	325
Qianjiang	0.063	0.233	355

\*\* significant at 0.05 level of confidence.

The ANOVA results showed that overall life satisfaction was significantly associated with PA levels in Macau ( $F [2319] = 3.58$ ,  $p = 0.03$ ) and Taipei ( $F [2322] = 4.71$ ,  $p = 0.01$ ) (Table 7). However, PA was not linked to overall life satisfaction in Qianjiang ( $F [2352] = 0.81$ ,  $p = 0.45$ ).



**Table 7.** Relationship between PA and overall life satisfaction in the different cities.

Place	Sum of Squares	Mean Square	df	F	Sig.
Macau	9443.632	4721.816	2	3.581	0.029 *
	420,680.579	1318.748	319		
	430,124.211		321		
Taipei	14,560.904	7280.452	2	4.712	0.010 *
	497,467.299	1544.930	322		
	512,028.203		324		
Qianjiang	2718.115	1359.058	2	0.809	0.446 *
	591,346.803	1679.963	352		
	594,064.918		354		

‘\*\*’ = significant at 0.05 level of confidence.

### 3.4. Sub-Domain of Life Satisfaction and PA

In Macau, the results indicated that PA was significantly related to friendship satisfaction ( $F [2319] = 3.77, p = 0.024$ ) and self satisfaction ( $F [2319] = 6.61, p = 0.002$ ). PA also seemed to have no relationship with life satisfaction ( $F [2319] = 2.90, p = 0.057$ ), schoolwork satisfaction ( $F [2319] = 0.21, p = 0.810$ ), school satisfaction ( $F [2319] = 0.73, p = 0.483$ ), freedom satisfaction ( $F [2319] = 1.97, p = 0.142$ ), and environment satisfaction ( $F [2319] = 2.03, p = 0.134$ ) (Table 8).

**Table 8.** Relationship between PA and different domains of satisfaction in Macau, Taipei, and Qianjiang.

Domain	Macau		Taipei		Qianjiang	
	F	Sig	F	Sig	F	Sig
Friendship Satisfaction	3.770	0.024 *	3.730	0.493	0.577	0.562
Self Satisfaction	6.613	0.002 *	6.524	0.00 *	1.877	0.155
Life Satisfaction	2.896	0.057	1.920	0.15	0.165	0.848
Schoolwork Satisfaction	0.211	0.810	0.264	0.768	0.209	0.812
School Satisfaction	0.730	0.483	6.058	0.003 *	0.878	0.417
Freedom Satisfaction	1.965	0.142	2.200	0.112	0.248	0.780
Environment Satisfaction	2.025	0.134	1.650	0.194	0.362	0.696

Macau: 2 (Between Groups), 319 (Within Groups), 321 (Total); Taipei: 2 (Between Groups), 322 (Within Groups), 324 (Total); Qianjiang: 2 (Between Groups), 352 (Within Groups), 354 (Total), ‘\*\*’ = significant at 0.05 level of confidence.

In Taipei, significant relationships were observed between PA and self satisfaction ( $F [2322] = 6.52, p < 0.001$ ) and school satisfaction ( $F [2322] = 6.06, p < 0.05$ ). In contrast, life, freedom, school, friendship, and environment satisfaction had no significant relationships with PA (Table 8).

In Qianjiang, no significant relationships were established between PA and any domains of life satisfaction (Table 8).

## 4. Discussion

### 4.1. PA in the Three Cities

Findings from this study demonstrate that over half of middle school students do not engage in enough PA. This is consistent with previous research. Data from the 2018 Chinese Taipei (Taiwan) Report Card established that PA levels remain low in children and youth [26]. Likewise, a study aimed at examining levels of PA and sedentary behavior in middle school students in Beijing, found that majority of students did not meet PA recommendations [27]. Although no significant difference was observed in PA levels from Macau, Taipei, and Qianjiang, students in Macau reported the highest amount of PA whereas participants from Taipei were involved in the lowest level of PA. The slightly more PA engagement in Macau may be explained by higher SES in Macau since Macau students

had the highest GDP per capita [28]. Youth in Taipei, however, were found to lag behind their peers elsewhere in the world [29].

#### 4.2. PA and Overall Life Satisfaction

The results from Macau and Taiwan showed that involvement in PA is positively associated with overall life satisfaction, which is in line with previous findings. Valois et al. examined the relationship between perceived life satisfaction and PA by polling 4758 adolescents in South Carolina and found that no participation in PA is positively related to dissatisfaction with life [7]. Moreover, a study in Australia revealed that participation in PA during the school day and in after-school PA was found to be associated with a higher health-related quality of life [30]. Similarly, a cross-sectional and longitudinal study showed that adolescents who were physically active over a five-year period had a higher health-related quality of life than their peers who were less active [31]. Consistently, physically active children reported a significantly higher health-related quality of life than those in the inactive group [32]. Likewise, a cross-sectional study of 1073 Spanish schoolchildren aged 11 to 13 years revealed that active adolescents generally have a better quality of life than their sedentary peers [33].

Nevertheless, results from Qianjiang did not identify a significant relationship between PA and life satisfaction, which is supported by few studies. Comparing the perceived quality of life scores among children 11–15 years old, no significant difference was observed between those who participated in suggested regular PA and those who did not [34].

#### 4.3. Gender Differences in Life Satisfaction

Results from the three places were consistent, showing that life satisfaction did not differ between girls and boys. Previous research on the relationship between gender and life satisfaction is inconsistent. An investigation of life satisfaction in adults 18–64 years old concluded that there was no difference in life satisfaction between males and females [35]. However, Valois et al. sampled public high school adolescents of different ethnicities and observed that boys scored higher on life satisfaction since male students engaged in more PA, such as endurance activities, stretching, and strength training, which are more important for mental health [7].

#### 4.4. Relationship Between PA and Each Life Satisfaction Domain

In both Macau and Taiwan, PA was significantly associated with friendship as well as self satisfaction, which is supported by prior studies. A longitudinal study exploring the role of school-based friendship networks in adolescents' engagement in PA showed that there is a mutually dependent relationship between adolescent friendship networks and PA [36]. On the one hand, involvement in PA was found to play an important role in adolescents' friendship choices, with participants tending to have friends whose activity levels were similar to their own. On the other hand, friends seemed to affect changes in adolescents' PA over the school year, evidenced by friends' involvement in leisure-time PA becoming increasingly similar [36]. Adolescent friendship builds social networks to promote PA. Adolescents' activity levels were found to be positively related to perceived social support from friends [37].

Participants' self satisfaction was found to be linked with the amount of PA. Research evidence has demonstrated the relationship between PA and self-esteem, which may explain the significant association between PA and self satisfaction. There were significant effects of PA on self-esteem in randomized controlled trials as well as non-randomized controlled trials [5]. A systematic review of the effects of PA intervention on self-esteem and self-concept in children and adolescents has provided further evidence that the intervention of PA alone can improve self-worth and self-concept among youth [38]. Likewise, participation in PA was positively related to higher levels of self-esteem [39]. Additionally, adolescents with a greater amount of PA may feel better about themselves because PA can reduce psychosocial disorders. A study from Norway indicated that low levels of PA have



been associated with symptoms of anxiety and depression among adolescents [40]. Investigating psychological distress among adolescents in relation to leisure-time physical activity, results suggest that the odds of having psychological distress were lower for those who were very physically active than those who were physically inactive [41].

#### 4.5. Strengths and Limitations

To the best of our knowledge, this is not only the first cross-cultural study regarding the relationship between PA and life satisfaction among adolescents in China but also the first one to reveal a positive association between PA and life satisfaction in Chinese middle school students. Although studies of life satisfaction have flourished in the past two decades, they have primarily focused on adults or older people, with few studies of adolescents. This study will be able to add more solid evidence to the current literature on the PA and life satisfaction relationship. Furthermore, unlike previous studies that have adopted Huebner's MSLSS, which has been widely used only in Western countries, the MSLSS in this study was demonstrated to have good reliability and validity in the Chinese context. Additionally, this study also examined several domains of life satisfaction in different cities and their association with PA levels, which showcases the components that the three cities need to improve.

However, there were still several limitations to our study. Firstly, the cross-sectional data did not allow us to infer causality for the PA and life satisfaction relationship. From the current study, it is difficult to determine whether these adolescents were satisfied with life because of participation in PA or they engaged in PA due to satisfaction with their life. Secondly, the sample is just a small portion of all middle school students in these three places, making it hard to generalize the findings to a larger population. Thirdly, the culture and educational curriculum nuance in different provinces of China. To learn about the overall quality of life in Mainland China, different cities from diverse provinces should be selected. Lastly, we used the self-reported PA rating scale instead of objective measurements that assess the time, intensity, and frequency of the PA. Nevertheless, it is common to apply self-reported questionnaires in a large-scale study. In surveys of large populations, the use of questionnaires can help researchers save much money, time, and energy.

#### 4.6. Implications for Future Research

To draw causal inference on the relationship between PA and life satisfaction, a longitudinal study needs to be conducted. This study did not look at whether certain types of PA are more beneficial to life satisfaction than others. However, Gopinath et al. [31] pointed out that associations between the type of PA and health-related quality of life differ. Therefore, future research can make a comparison of life satisfaction between individuals who engage in different types of PA. To make the sample more representative for cross-culture research, future researchers may include a larger number of participants from each subculture. Moreover, qualitative research, such as interviews and focus groups, can be performed to get a deeper understanding of the relationship between PA and life satisfaction. Since survey study cannot avoid subjective reporting bias, objective measures such as accelerometers can be used to assess PA.

### 5. Conclusions

In both Macau and Taipei, the overall life satisfaction of adolescents is significantly associated with the amount of PA; the more PA they engaged in, the higher the level of life satisfaction they had. In addition, a significant relationship was observed between self-satisfaction and PA in Taipei, as well as Macau. Adolescents' overall life satisfaction between Macau, Taipei, and Qianjiang is significant. This research demonstrated the importance of life experiences in the development of life satisfaction; more active participants are more satisfied with their life.

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Writing—original draft preparation, S.C.; Writing—Review & Editing, W.K.Y.H. and M.D.A. All authors have read and agreed to the published version of the manuscript.

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