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Factors that Influence Schoolchildren's Willingness to Participate in Leisure-Time Physical Activities: Questionnaire Development and Content Validity Testing

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Abstract:

Leisure-time physical activities (LTPA) can improve children's physical fitness, their ability to control negative emotions, even their school performances. As the factors that influence schoolchildren's willingness to participate in LTPA are multifaceted, an appropriate and valid measurement tool is critical for advancing the discussion of this topic. The purpose of this study is to develop a questionnaire about schoolchildren's willingness to participate in LTPA and to verify its content validity and potential user validity. The research procedures involved three stages. The first stage was the development of the questionnaire. The questionnaire items were developed through systematic collection, review, and summary of the literature. The second stage involved eight experts in testing the content validity of the questionnaire. The third stage was to test the potential user validity with eight upper-grade students as questionnaire respondents. The systematic collection, review, and summary of the literature resulted in five factors: individual, interpersonal interactions, parents, environment, and school policies. Based on these, 36 items were drafted for the questionnaire, named "Influences on Schoolchildren's Willingness to Participate in LTPA." The questionnaire was validated by the eight experts. The item-content validity indexes (I-CVI) ranged between .88 and 1.0, and the summative content validity index (S-CVI) was .9. As for the items' wording appropriateness, the I-CVI ranged between .75 and 1, while the S-CVI was .96. For potential user validity, the students rated the comprehensibility of the 36 items. Their responses fell between 3 (mostly understandable) and 4 (completely understandable). In conclusion, the expert content validity and potential user validity testing confirmed that the questionnaire has good content validity. In the future, the questionnaire will be administered to a large sample of schoolchildren to verify its construct validity and reliability.

Keywords:school-age, leisure-time physical activity, content validity, potential user

1. INTRODUCTION

Leisure-time physical activity (LTPA) refers to all behaviors related to mid- and high-level physical activities in free time [1]. These are usually unstructured physical activities such as rope jumping, swimming, running, and playingball games [2]. The World Health Organization (WHO) recommends children between ages 5 and 17 get a total of 60

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minutes of mid- or high-level physical activities daily [3]. LTPA can increase schoolchildren's physical fitness, reduce their body mass index (BMI), prevent obesity [4], and help control depressions or other negative emotions [5]. There is evidence that physical activities can have a positive effect on math performance [6]. LTPA can improve health in terms of physical, emotional, social, and school-related functions[7]. Therefore, increasing schoolchildren's willingness to participate in LTPA is an important issue [2].

A meta-analysis found that the most popular leisure activities among schoolchildren in western countries are soccer, swimming, and running[8]. Astudy commissioned by the WHO collected data from 1.6 million 11 to 17 year-olds around the globe to investigate theprevalence of insufficient physical activities[9-10]. The results showed that regardless of the income level, all participating countries' prevalence was more than 77%. This indicates that the ratio of children engaging in physical activities is less than desirable in most countries [11]. Clearly, schoolchildren's willingness to participate in LTPA is an issue that must be taken seriously and explored carefully to bring forth effective healthpromotion strategies to increase the quantity and quality of children's LTPA.

Regarding the influences onschoolchildren's willingness to participate in LTPA, research has pointed to individual factors (e.g., genetics, gender, health status, self-efficacy, school pressure, leisure activity preferences), interpersonal interaction factors,parental factors (e.g., safety concerns) [12 -15], and environmental factors (e.g., weather, time, suitability of the activity space, activity-related safety, and school policies)[13-17]. Most of these studies focus ona single factorsuch as motivations, obstacles, or facilitatorswithout utilizingany multi-dimensional influencing factor measurement tools to explore the influences onschoolchildren's willingness to participate in LTPA.

The purpose of this studywas to systematically review and summarize the relevant literature fordevelopping a multi-factors questionnaire about the influencesonschoolchildren's willingness to participate in LTPA.Further,wetestedits content validity and thefacevalidity. It is expectedthat the developed questionnaire can be used to explore from many anglesthe relevant factors of children's willingness to participate in LPTA.Morover,itcanoffer specificinformationto school professionalsas areference whentheydesigned appropriate intervention programs.

2. METHODS

For the purpose of this study, the research procedures were divided into three stages. The first stage involved reviewing and summarizing the content of the relevant literature, followed by drafting the questionnaire items based on the findings. The second stage was testing the content validity. The third was testing the potential user validity (face validity).

2.1 First Stage: Developing the Questionnaire

A rapid review was conducted by searching through electronic databases such as Cochrane Library, PubMed (MEDLINE), CINAHL Plus with Full Text [EBSCOhost], Chinese electronic journals, and Chinese electronic dissertations. Research studies published between 2006 and 2016 were selected if theirmaindiscussion is related to the factors of schoolchildren's LTPA.

The keywords used in the search included "schoolchildren,""leisure-time physical activity,""influencing factors," etc. A total of 845 correlational, qualitative, or systematic review articles were collected. Then, 66 duplicates were excluded. The next step was reviewing the title and abstract and removing 373 articles that were not related to children

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between ages 7 and 12, as well as 276 articles that did not match the topic at hand, and 110 articles about children with chronic diseases and physical disabilities. Finally, after reviewing and analyzing the articles' quality with our peers, 20 articles that matched our research topic and met the Critical Appraisal Skills Programme criteria were selected[18]. The variables and their descriptions from these 20 articleswere organized based on their statistical significance and then consolidated and classified according to thecommon attributes, which became the basisfor formulating the questionnaire items.

2.2 Second Stage: Testing the Content Validity

2.2.1 Expert Validity

To test the content validity of the questionnaire "Influences on Schoolchildren's Willingness to Participate in LTPA," eight experts were invited to participate. These included six experts from nursing and athletics fields and two school nurses. These experts rated each item in terms of "importance" and "appropriateness" and revised the items accordingly.

The content validity analysis was conducted with the content validity index (CVI). A 4-point rating scale was used to rate the items' importance, with 1 being *very unimportant and should be removed*and 4 being *very important*. Similarly, the items' appropriateness was rated from 1 (*inappropriate and not suitable for the research topic and should be removed*) to 4 (*very appropriate and error-free*) [19].

Regarding the calculation method of the item-level content validity index (I-CVI), The scores were divided into two categories: those that wereat least 3 and those that were less than 3. For each item, the I-CVI was calculated by dividing the number of experts who scored a 3 or above by the total number of experts (eight).The scale-level content validity index (S-CVI) was calculated by dividing the number of items rated a 3 or above by the total number of items.It has been suggested thatgood content validity is reflected by I-CVIsof at least 0.78 andanS-CVI of at least 0.8 [20, 21].

2.2.2 Potential User-FaceValidity

This study has been reviewed and approved by the university Institutional Review Board Committee (KAFGH107-002). The informed consent form was published on the first page of the questionnaire. The form was required from all eligible participants prior their participation in this survey. Eight upper-grade students were invited to serve as potential users and score the difficulty level of understanding the wording of each item. After the parents and the children received an explanation of the purpose and methods of the research, the parents or guardians and the children were asked to sign the informed consent form before proceeding to score the items.

The scoring is based on the readability and comprehensibility of the items. Readability refers to how easy it is to understand the item, ranging from 1 (*completely not understandable*)to4 (*completely understandable*). Comprehensibility refers to the difficultyof the meaning, from 1 (*very difficult*) to 4 (*very easy*). In addition, the potential users were also asked to indicate their willingness to participate in LTPA, using a 5-point Likert scale, from 1 (*never willing to participate)* to 5 (*always willing to participate*). In other words,a higher score indicateda higher willingness to participate in LTPA.

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2.3 Statistical Analysis

In this study, SPSS 24.0 was used for data processing and statistical analysis. Descriptive statistics summarized the demographic variables of the research participants, as well as the distribution (i.e., frequency and percentage) of the children's willingness to participate in LTPA, the experts' validity scores, and the potential user validity scores.

3. RESULTS

3.1 Drafting the Questionnaire Items

The questionnaire items were drafted based on the results of the 20 research articles by first listing the statistically significant variables and their descriptions,then analyzing and summarizingthose descriptions. This inductive classification process was carried out separately by two nursing experts, followed by a comparison of their classificationsagainst each other. The results were consistent, and five categories were found in the literature: individual, interpersonal interactions, parents, environment, and school policies. These five categories are in line with the five levels of the social ecology model[22] (Figure 1). Subsequently, the questionnaire items were drafted, and the naming of the categories and analysis of the structure were conducted according to the levels of the social-ecological model (Figure 1). The classification analysis results show that 12 items are related to the individual;four items, interpersonal interaction;eight items, parents;eight items, school environment; and four items, school policies. These add up to a total of 36 questions (Table 1). Each category is described below, including the number and citation of the pertinent research articles, the corresponding subcategory, and the number of questionnaire items.

1. Individual (I): Nine articles [12, 13, 15, 23-28] provided 12 findings that were related to the individual. They were further classified into five subcategories: health benefit, health limits, physical discomfort, learning new technical skills, and emotions. Twelve items were drafted based on the characteristics of these subcategories.

2. Interpersonal interactions (IP): Seven articles [13, 23-25, 27, 29, 30] provided four findings that were related to interpersonal interactions. They were further classified into two subcategories: positive emotional and perceived pressure. Four items were drafted based on the characteristics of these subcategories.

3. Parents (P): Six articles [12, 14, 26, 28, 31, 32] provided eight findings that were related to parents. They were further classified into four subcategories: parental encouragement, parental participation, parental requests, and financial concerns. Eight items were drafted based on the characteristics of these subcategories.

4. Environment (E): Ten articles [11-15, 25, 30, 33-35] provided eight findings that were related to the environment or activity space. They were further classified into six subcategories: equipment availability, equipment diversity, space accessibility, space safety, space area, and weather. Eight items were drafted based on the characteristics of these subcategories.

5. School Policies (SP): Six articles [24, 25, 28, 35-37] provided four findings that were related to school policies. They were further classified into four subcategories: scheduling enough leisure time, availability of professionals who provide guidance, the variety of leisure activities, and the use of electronic devices outside of the classroom. Four items were drafted based on the characteristics of these subcategories.

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3.2 Content Validity Analysis

3.2.1 Expert Validity

In terms of "importance," the content validity of the 36-item questionnaire was verified; the I-CVI values fell between .88 and 1.0 and the S-CVI was .9. In terms of "appropriateness," the interpersonal interaction factor had slightly lower I-CVIs (between .75 and 1.0), with the items IPP1 and IPP2 having the lowest I-CVI of .75. The other four factors' items all had I-CVIsbetween .88 and 1.0 and an S-CVI of .96. Consequently, the experts revised the wordings of IPP1 and IPP2 to improve these interpersonal interaction factor items.

3.2.2Potential User- FaceValidity

Using convenience sampling, seven fifth graders and one sixth grader in a southern Taiwan elementary school were invited to participate in the potential userstotestthefacevalidity forthe questionnairewithreadnessand. The children completed the questionnaire within 10 minutes. The distribution of their basic data is as follows. Their BMI ranged from 14.84 to 23.78, and no one was obese or overweight. Riding bicycle was the preferred LTPA with the highest frequency, followed by rope jumping and running. The occupations of the fathers were laborers or service industry workers, with the more frequent education level being middle school, followed by highschool. The mothers' occupations were mostly in business or service industries,and mosthad a high school education level.

The eight children's responses to the LTPA questionnaire indicated that every item under each factor was scored as a 4 or a 5by at least 50% of the children. In other words, a majority of the children always or often believed that their willingness to participate in LTPA was affected by the items listed under the five factors.

As for the potential user validity, in terms ofthe readability and comprehensibility, the 36 items were scored as either a 3 (*mostly understandable*) or a 4 (*completely understandable*). Most of the items were rated by 87.5% to 100% of the children as easy to read and easy to understand.

4. DISCUSSION

The purpose of this study is to develop a questionnaire about the influences on schoolchildren's willingness to participate in LTPA and to verify the questionnaire's content validity and potential user validity. Through a systematic collection of the 20 relevant research articles and the review and summary of the findings, five major categories were found, and a 36-item questionnaire was developed. The scores fromthe eight experts and eight schoolchildren showed that this questionnaire has good content validity and potential user validity.

The questionnaire about schoolchildren's willingness to participate in LTPA was developed by identifying the statistically significant variables from 20 research articles. The findings on these variables were consolidated into major factors: individual, interpersonal interactions, parents, environment, and school policies. Thus, the questionnaire items formulated in this study are multi-faceted, which is different from other studies. For example, Brockman et al. [13] interviewed schoolchildren through focus groups and found that motivation, barriers, and facilitators are factors that affect schoolchildren's participation in LTPA. In another study, Bentley et al. [14] explored the

perspective of parents through telephone interviews. Their analysis showed that environmental considerations, parental support, and children's positive perception of physical activity are important facilitators of children's participation in physical activities. The currentstudy uses a social-ecological research framework to develop the questionnaire. The proposed items are multi-faceted, and various potential factors were collected more exhaustively, and our discussion goes beyond motivation, barriers, facilitators [13],sense of achievement,and self-confidence [17].

Regarding the content validity, the appropriateness of the questionnaire was verified, and most of the I-CVIs were above .80, indicating that the experts agreed that the items indeedreflect the characteristics of children's willingness to participate in LTPA. However, two items related to interpersonal interactions and interpersonal pressure (IPP1 and IPP2, respectively) hadan I-CVI of .75 for the "appropriateness" score,clearly lower than the I-CVIs of the other items. A possible reason is that the original wording did not fully express the meaningof psychological threat, so the experts modified it to "competitive gamescause conflicts among players; this makes me less willing to do LTPA" and "encountering groups of older teenagers during LTPA makes me anxious; this makes me less willing to do LTPA." The revised items are more in line with the research results found in the relevant literature.

The literature on interpersonal interactions' effects on schoolchildren's willingness to participate in LTPA concludes that the psychological threat that comes with participating in activities alongside older children can affect their willingness to participate. A qualitative study has found that when schoolchildren participate in more intense outdoor LTPA, they often feel threatened by the gathering of teenagers, thus limitingthe younger children'soutdoor LTPA opportunities[13].An Australian studyhas also shown that when younger children participate in LTPAs alongsideteenagers, conflicts and the risk of bullying are likely to arise. This is an important reason for schoolchildrenwho limit their LTPA [38]. Another qualitative study has pointed out a different phenomenon: Conflicts often break out among children because they are overly focused on winning competitive games, which reduces their willingness to participate in LTPA[25]. These findings supportthe inclusion of interpersonal interaction items in our questionnaire.

The questionnaire developed in this study is still limited in the scope of application. Through a systematic search of the literature, relevant results were classified into five major factors. Based on this framework, items were drafted for the questionnaire "Influences on Schoolchildren's Willingness to Participate in LTPA."As this study has only verified the questionnaire'scontent validity and potential user validity, it is still necessary to conduct additional tests with a large sample to verify the construct validity and reliability of this social ecology-based measurement tool.

5. CONCLUSION

This study conducted a systematic search of relevant literature and consolidated the findings into five factors: individual, interpersonal interactions, parents, environment, and school policies. Based on these factors, a 36-item questionnaire, "Influences on Schoolchildren's Willingness to Participate in LTPA," was developed. Both the expert-tested validity and the potential user-tested face validityresults confirmed that the questionnaire has good content validity. It is recommended to use a large sample in the future to verify the construct validity and reliability, allowingthe questionnaire to be used in the future to effectively collect dataon influences on children's willingness to participate in LTPA. These data can then be used to produce effective intervention plans to increase children's willingness to participate in outdoor LTPA.

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DECLARATION OF INTEREST STATEMENT

The Authors declare that there is no conflict of interest.

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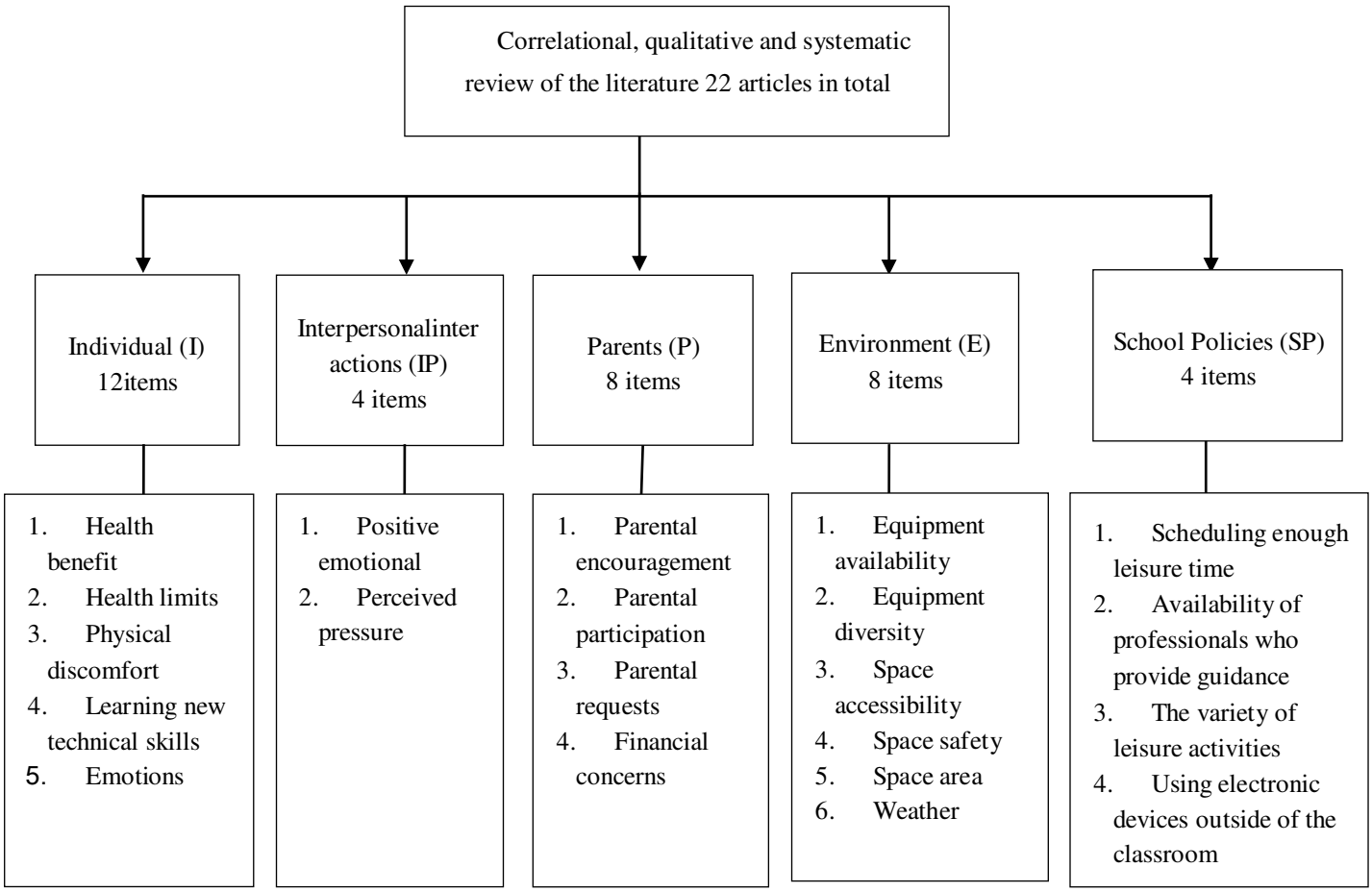

Figure 1 The framework of the questionnaire

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Table 1 The items in the questionnaire "Influences on Schoolchildren's Willingness to Participate in LTPA"

Please mark how often each situationbelow influences your willingness to participate in LTPA.		5	4	3	2	1
INDIVIDUAL (I)						
1	IHB1. LTPA helps me grow more muscles and get stronger; this makes me more willing to do LTPA.					
2	IHB2. LTPA helps to strengthen my body; this makes me more willing to do LTPA.					
3	IHL1. Being sick or feeling unwell makes me less willing to do LTPA.					
4	IPD1. Doing LTPA makes my muscles sore or uncomfortable; this makes me less willing to do LTPA.					
5	IPD2. I don't like sweating a lot when exercising; this makes me less willing to do LTPA.					
6	ITA1. LTPA can improve my performance in sports.					
7	ITA2. LTPA can improve my sports skills, for example, running faster or getting better at shooting basketball.					
8	ITA3. LTPA makes me want to learn new skills.					
9	ITA4. I'm not good at certain sports skills in LTPA, like swimming, dancing, or soccer; this affects my willingness to participate in LTPA.					
10	IE1. I like meeting goals through physical activities; it gives me a sense of achievement and self-confidence.					
11	IE2. LTPA makes me feel free; this makes me more willing to do LTPA.					
12	IE3. LTPA can keep me from getting bored; this makes me more willing to do LTPA.					
INTERPERSONAL INTERACTION (IP)						
1	IPE1. LTPA allows me to chat and laugh loudly with my friends, it's a lot of fun for me.					
2	IPE2. LTPA is fun for me, I feel happy and get to meet new friends; this makes me more willing to do LTPA.					
3	IPP1. Competitive games cause conflicts between players; this makes me less willing to do LTPA.					
4	IPP2. Encountering groups of older teenagers during LTPA makes me anxious; this makes me less willing to do LTPA.					
PARENTS (P)						
1	PE1. My parents encourage me to do LTPA when the weather is nice; this makes me more willing to do LTPA.					
2	PE2. My parents encourage me to do LTPA every day in schools or parks that are close to my home; this makes me more willing to do LTPA.					
3	PE3. My parents encourage me to do outdoor LTPA when the weather is nice; this makes me more willing to do LTPA.					
4	PP1. My parents walk or bike with me in the community's open areas.					
5	PR1. My parents think safety is a concern and says to keep a distance from strangers and not to interact with them when doing LTPA.					
6	PR2.My parents schedule too many daytime learning activities for me, so I don't have enough time to do LTPA.					
7	PR3. Because of my parents' work hours, they ask me to spend time with them, cutting into my LTPA time.					
8	PFC. My parents are concerned about our family's financial situation and can't afford LTPAs that require payment, like skating or soccer lessons.					

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Table 1 (Cont.)The items in the questionnaire "Influences on Schoolchildren's Willingness to Participate in LTPA"

Please mark how often each situationbelow influences your willingness to participate in LTPA.		5	4	3	2	1
ENVIRONMENT (E)						
1	EA1. If I have access to enough equipment, I will be willing to do LTPA.					
2	ED1. If I have access to a variety of equipment, I will be motivated to spend more time doing LTPA.					
3	SA1. If there is a leisure activity space near my home, I will be willing to do LTPA.					
4	SS1. If there is a safe leisure activity space near my home, I will be willing to do LTPA.					
5	SAr1. If my school has a lot of space for leisure activities, I will be willing to do LTPA.					
6	SAr2. If there is a place for LTPA, like a big lawn, I will be willing to do LTPA.					
7	EW1. When it rains, it affects my going out to do LTPA.					
8	EW2. When it is cold, it affects my willingness to do LTPA.					
SCHOOL POLICIES (SP)						
1	SPET1. My school gives me more leisure activity time, so I have more time to do LTPA.					
2	SPP1. My school has professionals who give us guidance; this makes me more willing to do LTPA.					
3	SPDA1. My school offers a variety of activities, increasing the different types of physical activities that I do.					
4	SPED1. If my school allows us to use electronic devices during leisure time, like cell phones, it will affect my willingness to do LTPA.					

Note,5:Always,4:Often,3:Sometimes,2:Seldom,1:Never