

## School Physical Activity Policy Assessment

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**Background:** Physical activity (PA) levels in schools vary widely, and there is interest in studying how student PA accrual relates to school policy and environmental conditions. School PA policy research, however, is in its infancy and generalizable measurement tools do not exist. We developed and assessed reliability of items on the School Physical Activity Policy Assessment (S-PAPA), an instrument designed to assess school PA policy related to physical education (PE), recess, and other opportunities. **Methods:** To develop items, we perused associated literature, examined existing instruments, and consulted school policy makers. For test-retest reliability assessment, 31 elementary school PE teachers completed the survey twice, 14 days apart. **Results:** S-PAPA uses open-ended, dichotomous, multichotomous, and checklist formatting and has 3 modules: 1) Physical Education (47 items), 2) Recess (27 items), and 3) Other Before, During, and After School Programs (15 items). Responses to more than 95% of items were highly related between Times 1 and 2. Generally, physical education and recess items had fair to substantial levels of agreement, and items about other school PA programs had fair to perfect agreement. **Conclusions:** Test-retest results suggest S-PAPA items are reliable and useful in assessing PA policies in elementary schools.

**Keywords:** physical education, recess, measurement

Over time, schools impact nearly the entire population, and children spend a significant proportion of their waking day on school campuses for about 13 years. Thus, schools have an enormous role to play in the effort to promote physical activity (PA)<sup>1-3</sup> and they can be viewed as an investment in public health.<sup>4-6</sup> Typical sources of PA at schools are physical education (PE), recess (elementary only), and other PA programs. Daily PE for all students and recess for elementary school students are recommended frequently by health agencies and authorities,<sup>7-9</sup> but no federal law requires them or specifies their dosage.

In the U.S., the responsibility for providing public education rests primarily with individual states. The USDHHS 2008 Physical Activity Guidelines<sup>11</sup> recommend 60 minutes of physical activity per day for children and identify PE as an important component of this time. Meanwhile, state education policy makers have responded differently to the challenge of meeting academic achievement mandates (ie, high-stakes testing)<sup>10</sup> and from state to state, from district to district, and from school to school, school PA varies.<sup>12-14</sup>

The presence or absence of PA-related policies, their nature (eg, a mandate vs. a recommendation), and the degree to which they are adhered to or enforced impacts children's PA accrual in school. Studies on school PA policies and their implication for children's PA patterns are in their infancy, but presence or absence of PA policy may have bearing on the nature of program offerings and children's access to them. In addition, school PA policies may be associated with a) funding sources and how they are allocated; b) availability of indoor and outdoor facilities, equipment, and amenities; c) program staffing and levels of monitoring and supervision (eg, number of district PE coordinators per student); d) opportunities for staff development, including frequency and duration and dollars available for registrations and travel; e) busing; and f) parent involvement (eg, PTA). Other policies, which may or may not be followed at the school or individual class levels, are more specific, such as those related to PE (eg, frequency and duration of lessons, class size, student to PE teacher ratio, and quality and preparation of teachers).

Assessing the intricacies of school PA policy at the school site level is critical to understanding how individual school PA programs function to provide PA for children.<sup>16,17</sup> The School Health Policies and Programs Study (SHPPS) provides some information on school health policies and programs in the US, however, it is only conducted every 6 years, with the latest administration done in 2012.<sup>13,14</sup> Furthermore, while SHPPS assesses

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PA programs and policies at the school site level, it does not include site level assessment of recess opportunities.

With the exception of SHPPS, information about school PA policies is typically reported at the state or district levels,<sup>12,14</sup> with less being known about policies at the individual school level, especially how on-campus PA relates to program organizational structure, practices, and outcome expectations. The *School Health Index*<sup>18</sup> (SHI), developed by the Centers for Disease Control and Prevention, is a comprehensive instrument to assess PA policies in individual elementary schools. The SHI assessment asks questions such as “Are students provided at least 20 minutes of recess during each school day, and do teachers or recess monitors encourage students to be active?” and “Do all students in each grade receive physical education for at least 150 minutes per week throughout the school year?” These questions (and their format) are cumbersome, designed specifically for school self-analysis, and are not conducive for use as a generalizable research tool. A quality, generalizable research instrument designed to assess school PA policies is needed. Our purpose was to develop such an instrument to assess individual school PA policy related to PE, recess, and other PA opportunities on school campuses and to test the reliability items.

## Methods

### Instrument

The School Physical Activity Policy Assessment (S-PAPA) instrument was designed to measure school policy and environmental variables identified in the literature as related to the quantity and quality of children’s school PA. Our intent was to use sound psychometric procedures to develop a research instrument that provides valid indication of specific district and school policy areas, as well as school practices and environmental conditions, that influence PA in PE, recess, and other school PA-related programs.

To develop the S-PAPA instrument, we focused on elementary school settings because we were interested in developing a comprehensive PA policy instrument that included recess and active transport to school, which are more common in elementary schools than other school levels. Furthermore, according to the U.S. Department of Education,<sup>10</sup> approximately 34 million children spend about 6 hours daily in elementary school settings, and therefore, examining PA policies and their relation to children’s opportunities for PA in these settings should be viewed as an important investment in furthering public health goals.<sup>1-6</sup>

Items were developed by gathering and synthesizing existing literature relative to policies and PA programming at schools, including, but not limited to, those for PE, recess, intramurals, interscholastic sports, special before, during, and after school programs (eg, activity breaks, such as “Take 10”), transport to school, use of

school facilities, availability of equipment, and storage for bicycles. Existing evaluation tools such as the Centers for Disease Control and Prevention’s School Health Index,<sup>18</sup> School Health Program Policy,<sup>13,14</sup> and Physical Education Curriculum Assessment Tool,<sup>19</sup> and the National Association Sport and Physical Education’s Checklist for Quality Physical Education<sup>20</sup> were also examined and synthesized. The qualitative approach of constant comparison was used to identify the most relevant policies for item development and the most appropriate psychometrics techniques for assessment.

### Content and Construct Validity

Based on relevant literature and existing instrumentation, we designed a draft of the instrument with individual items for review by content experts. These content experts included 2 physical education researchers, a school superintendent, a school board member, an elementary school principal, 2 elementary PE teachers, and 2 representatives from school wellness professional organizations.

Each content expert critically reviewed the instrument and provided feedback on the instrument scope and the validity of specific items. Based on this feedback, some items were edited and a few were added or deleted. The revised instrument was re-sent to the content experts for a second review and, based on their new comments, a third draft of the instrument was prepared.

Four elementary PE teachers were assembled to review this draft. They completed each item individually, and later discussed each item as a group. Specifically, they were asked about item clarity, the contextual relevance for their school, and who from their school could best respond to items. They agreed that the PE teacher would likely be the best source of information on the vast majority of items and that these individuals would be in the best position to seek answers from the most appropriate sources if they did not know the answers. A fourth revision of the instrument was then sent to these teachers once again for an additional review. Once these revisions were made, 3 school PA researchers provided a final review of the instrument.

### Instrument Description

S-PAPA was designed to be completed by school PE teachers or other appropriately designated school officials familiar with a school’s PA policies and programs. S-PAPA uses open-ended, dichotomous, multichotomous, and checklist formatting, and in addition to a Background and General Question segment (7 items), has 3 distinct modules: 1) Physical Education (47 items), 2) Recess (27 items), and 3) Other Before, During, and After School Programs (15 items).

The Background and General Question items provide a description of the respondent’s professional role (eg, position held, years in position), a brief profile of the school and student composition (eg, grade levels,

grade levels receiving PE, number of enrolled students, percent eligible for free/reduced meals), and the availability of facilities (eg, gymnasium, multipurpose room, blacktop, grass field) for specific PA programs (PE, before school, after school). We created 3 separate modules so that investigators could use specific individual modules or the entire instrument, depending upon need. Table 1 outlines the scope of items within each of the 3 modules. Total administration time for the entire instrument is approximately 30 minutes.

**Physical Education.** The Physical Education Module has 2 major components: Formal PE Policies and Profile of PE. The Formal PE Policies component has 13 items with response options of “Yes,” “No,” or “Don’t Know,” and it assesses the presence or absence of PE policy areas at both the school district and individual school levels. Example items include a) “Does your school district have a written policy that requires a specific number of minutes per week or a specific number of days per week that students will have physical education?” and b) “Does your school have a written

policy that requires your physical education program to test students’ fitness levels?” The School PE Profile is divided into sub-components that include general items, staff development, PE curriculum content and its delivery, PE time and PA levels, PE exemptions, PE teacher duties, and PE budget.

**Recess.** The Recess Module is comprised of 2 components: Formal Recess Policies and School Profile on Recess. The Formal Recess Policies component consists of 10 items with response options of “Yes,” “No,” or “Don’t Know,” and assesses the presence or absence of recess policy areas at both the school district and individual school levels. Sample items include a) “Does your school district have a written policy requiring recess supervisors to receive formal training on playground supervision?” and b) “Does your school have a written policy requiring recess supervisors to receive formal training on playground supervision?” The School Profile on Recess component is divided into subcomponents that include Frequency and Duration, Supervision, Supervisor Training/Credentialing, Access, and Equipment.

**Table 1 School PE Profile Sub-Components and Scope of Items**

Module and sub-component	General scope of items
Physical Education	
General	Number of lessons, average minutes per week, class size, teacher credentials
Staff development items	Requirements, hours per year, instruction on promotion of PA, financial support for PE professional development
PE curriculum & delivery	Curricular materials, days PE is cancelled, available facilities, PE content focus, use of PA for disciplinary purposes in PE, withholding PE for academic or disciplinary reasons, PE instructional space, PA levels in PE, exemptions from PE
Recess	
Frequency and duration	Frequency and duration of recess sessions, withholding recess policies
Recess supervision	Student to supervisor ratio, provision of organized activities, supervisor prompting of physical activity, posting of recess rules, instruction on recess rules
Supervisor training	Personnel supervising recess, supervisor training
Recess access	Facilities available during inclement weather, teacher withholding of recess for academic and disciplinary reasons
Recess equipment	Availability of a separate recess equipment budget, loose equipment access
Before, During, and After School PA Programs	
General	Programs offered, fee requirements, transportation availability
Interscholastic sport	Student eligibility for participation
Transport to school	School promotion of active transport to school, availability of storage for active transport equipment (eg, bikes), availability of crossing guards for commuters
During school programs	PA breaks in addition to PE and recess
Integration of PA into academic curriculum	Classroom teacher promotion of PA, recruitment of volunteers to help in PA programs, presence of a school wellness coordinator, wellness policies addressing PA, communication of PA to parents

**Before, During, and After School.** The Before, During, and After School Opportunities for Physical Activity Module has 3 components: a) Formal Before, During, and After School Policies, b) Profile on Before, During, and After School Programs, and c) Integration of Physical Activity into the Academic Curriculum. The Formal Before, During, and After School Policies component has 4 items with response options of “Yes,” “No,” or “Don’t Know,” and assesses the presence or absence of formal policy areas at both the school district and individual school levels. Sample items include a) “Does your school district have a written policy that encourages student walking and/or biking to school?” and b) “Does your school have a written policy that requires all school personnel to receive professional development on the promotion of physical activity?” The Profile on Before, During, and After School Programs component has 5 subcomponents that consist of General School Programs, Interscholastic Sports, Transport to School, During School Programs, and Integration of PA into Academic Curriculum.

## Data Collection

Elementary school PE teachers participating in a national summer workshop and members of a professional organization network in the southwestern U.S. were invited to participate in the test-retest of the S-PAPA survey during summer 2010. Invitations to participate were provided in person at the workshop and electronically through the professional organization network. Participation for completing the survey on 2 separate occasions, 14 days apart, was incentivized by offering a \$50 school PE equipment voucher. Thirty-five teachers agreed to participate and completed the first administration; 31 of these (88.6%) completed the second.

## Statistical Analyses

Development of internal consistency estimates was not appropriate for S-PAPA because policies and environmental factors are independent of one another. Thus, the S-PAPA does not lend itself to determination of scale reliability. Each item relates to a specific policy or environmental construct; thus, reliability was investigated for individual items. Because of the nature of the responses, analytical methods included percentage of agreement, Kappa coefficient, phi coefficient, and Chi Square tests of association. Collectively, these data provided 4 pieces of information to assess reliability of responses to individual items.

## Results

Of the 31 participants who completed both the S-PAPA both times, 29 were PE specialists, 1 was a classroom teacher, and 1 was a PE project coordinator. The amount of time employed in their current position ranged from less than 1 year to 33 years.

## Background and General Questions

Items about respondents, grade levels in the school, number of students in the school, and proportion of students receiving free and reduced meals had substantial agreement (Kappa = .65–.78). Reliabilities for 21 separate items relating to facilities available for PE, Before, and After school programs were calculated, and they ranged from perfect to fair agreement: a) perfect (2 items; Kappa = 1); b) almost perfect (6 items; Kappa = .81–.93); c) substantial (6 items; Kappa = .61–.80); d) moderate (5 items; Kappa = .45–.58); and e) fair (2 items; Kappa = .31–.35).

## Physical Education Module

Table 2 provides the results for selected Physical Education Module items. Overall, test-retest results showed agreement ranging from moderate (Kappa = .41–.60) to almost perfect agreement (Kappa = .81–.99). For the 13 Formal PE Policies items, first and second administration responses had significant  $\chi^2$  associations ( $P = .001$ –.04) with percent agreement ranging from 67%–93%. With the exception of 2 items (“Does your school district have a written policy that specifies the maximum student-to-teacher ratio for PE?”; Kappa = .35; and “Excluding teacher evaluations, does your school have a written policy that requires the PE program to be evaluated annually?”; Kappa = .14), items had moderate to almost perfect agreement (Kappa = .49–.87).

Table 3 presents test-retest reliability statistics for selected continuous items and shows positive and substantial correlations between Time 1 and 2. Responses for frequency and minutes of PE, number of students in class, and the percentage of PE taught by various professionals were all highly correlated ( $r = .70$ –1.0). Items addressing staff development had correlation coefficients ranging from  $r = .56$ –.66 while items related to student-to-teacher ratio, scheduled minutes, and actual minutes in PE ranged from  $r = .49$ –.76. Estimates of student moderate-to-vigorous PA during PE had a correlation coefficient of  $r = .78$ , but estimates of student sedentary behavior during PE had a correlation coefficient of  $r = .16$ . We chose not to test the reliability coefficients themselves as such tests are a function of sample size.<sup>22</sup>

Agreement on PE Curriculum Content and Its Delivery items (see Table 2) ranged from moderate to almost perfect agreement (Kappa = .40–.86). The item that addressed PE exemptions (“Does your school permit students to be exempt from PE for one grading period or longer for the following reasons?”) and the item that addressed PE teacher duties (“In addition to teaching classes, what extra duties are unique to the PE teacher?”), had perfect agreement. Both reliabilities for the 2 items about PE budgets had substantial agreement (Kappas = .69 and .76).

## Recess Module

Table 4 provides test-retest results for selected Recess Module items and illustrates generally high positive

**Table 2 Test-Retest Reliability of Selected Physical Education Items**

Concept	<i>P</i> for $\chi^2$	Phi	% agreement	Kappa
Availability of existing written policies				
District policy requiring schools to follow specific PE standards	<.001	.59	77%	.64
School policy requiring program to follow specific PE standards	<.001	.55	84%	.73
District policy requiring number of PE minutes or days per week	<.001	.69	71%	.55
School policy requiring number of PE minutes or days per week	<.004	.28	71%	.49
District policy specifying maximum student-to-teacher ratio for PE	<.004	.24	67%	.35
School policy specifying maximum student-to-teacher ratio for PE	<.001	.48	79%	.51
District policy requiring annual PE program evaluation	<.001	.63	83%	.54
School policy requiring annual PE program evaluation	<.040	.34	77%	.14
Requirement for PE teachers to attend staff development yearly	<.037	.37	74%	.37
PE content, curriculum, and delivery				
Provision of financial support for professional development	<.001	.56	83%	NA*
Provision of student assessment/evaluation plans	<.001	.60	67%	.50
Requirements for use of a specific curriculum	<.004	.62	79%	NA*
Using PA for disciplinary purposes	<.001	.71	87%	NA*
Withholding students from PE for academic reasons	<.001	.79	71%	NA*
Competing demands for PE space	<.001	.56	68%	.51
Availability of PE budget	<.001	.69	84%	.72
PE teacher involvement in budget decisions	<.004	.76	66%	.52

\* Kappa not calculated because of nonsymmetrical responses.

**Table 3 Test-Retest Reliability of Selected Continuous Items**

Concept	Time 1	Time 2	Pearson's correlation coefficient
	Mean (SD), n (N = 31)	Mean (SD), n (N = 31)	
Number of PE classes per week	2 (.88), n = 31	2 (.83), n = 31	.96
Total minutes of PE per week	78 (31.6), n = 31	79 (27.9), n = 30	.70
Number of students per PE class	25 (7.6), n = 31	26 (9.1), n = 30	.94
Student-to-licensed teacher ratio in PE classes	25 (10.7), n = 30	27 (13.7), n = 30	.76
Actual minutes in PE setting during class time	39 (17.5), n = 30	36 (8.7), n = 31	.51
Total minutes of recess per day	28 (11.5), n = 31	27 (11.0), n = 31	.72

correlations on all items for Time 1 and Time 2. For existing written recess policy items, agreements ranged from moderate to substantial (Kappa = .43–.76). Repeated responses to daily recess provision, number of sessions per day, and minutes per indicated positive relations and % agreement ranged from 68%–90%. Reliabilities relating to recess supervision ranged from moderate to almost perfect agreement (Kappa = .46–.81) while Access to Recess item reliabilities ranged from fair (Kappa = .33) to substantial agreement (Kappa = .79).

### Before, During, and After School Programs Module

Table 5 provides results for selected items from the Before, During, and After School Programs Module and shows Time 1 and Time 2 responses on all items were positively related. Agreement on existing policy items ranged from moderate to substantial (Kappa = .55–.61), and agreement on items related to program offerings (eg, intramural sports, interscholastic sports, physical

**Table 4 Test-Retest Reliability of Selected Recess Items**

Concept	<i>P</i> for $\chi^2$	Phi	% agreement	Kappa
Availability of existing written policies				
District policy specifying minutes per day for recess	<.001	.64	74%	.61
School policy specifying minutes per day for recess	<.001	.64	74%	.61
District policy requiring organized activities during recess	<.001	.87	90%	.73
School policy requiring organized activities during recess	<.001	.34	84%	.48
District policy requiring training for recess supervisors	<.001	.65	84%	.67
School policy requiring training for recess supervisors	<.001	.74	84%	.63
District policy specifying student-to-supervisor ratio during recess	<.001	.68	84%	.75
School policy specifying student-to-supervisor ratio during recess	<.001	.69	87%	.76
Daily provision of recess	<.034	.40	90%	NA*
Recess supervision				
Conduct organized activities	<.001	.80	97%	.78
Supervisor encouragement of PA	<.002	.28	77%	NA*
Posting of recess rules	<.001	.85	90%	.81
Recess rules taught to students	<.001	1.0	90%	.46
Training of recess supervisors	<.004	.48	84%	.48
Access to recess				
Permission for students to stay indoors	<.018	.28	71%	.33
Activity opportunities during inclement weather	<.005	.51	80%	.58
Withholding recess for academic reasons	<.001	.57	93%	.79
Withholding recess for disciplinary reasons	<.001	.81	93%	.77
Recess equipment				
Budget for recess equipment/supplies	<.001	.48	74%	.57
Loose equipment available during recess	<.001	.67	93%	NA*

\* Kappa not calculated because on nonsymmetrical responses.

activity clubs, and special activity events), fee requirements, and provision of transportation ranged from fair (Kappa = .35) to almost perfect agreement (Kappa = .82). Agreement for items related to transport to school ranged from moderate (Kappa = .46) to nearly perfect (Kappa = .88) and agreement on activity integration into school programs items ranged from fair (Kappa = .31) to substantial (Kappa = .72).

Collectively, the 4 pieces of reliability evidence in Tables 2 through 5 suggest that each of the items is consistently answered by the respondents. This reliability evidence, concurrent with the expert review of the questions and revision based on the pilot work, suggest the S-PAPA full instrument can validly represent school and district physical education and physical activity policies.

## Discussion

The S-PAPA consists of a Background and General Question segment and 3 distinct modules: 1) Physical Education, 2) Recess, and 3) Other Before, During, and After School Programs. Of the 96 items tested, there was moderate to almost perfect agreement (Kappas ranged from .42–.87) on 89 items while 7 had fair agreement (Kappas ranged from .13–.39).

Most respondents (93%) were PE teachers. In general, higher levels of agreement tended to be for survey items that were a) most related to PE teacher professional tasks and b) at the school level; items about school district policies and those related less to teaching physical education had good but reduced reliability. There were,

**Table 5 Test-Retest Reliability of Selected Before, During, and After School Program Items**

Concept	<i>P</i> for $\chi^2$	Phi	% agreement	Kappa
Availability of existing written policies				
District support for walking/biking to school	<.001	.50	80%	.55
School support for walking/biking to school	<.001	.83	61%	.57
District requirement for professional development on promotion of PA	<.005	.58	83%	NA*
School requirement for professional development on promotion of PA	<.065	.37	80%	NA*
Transport to school				
School support for walking/biking to school	<.006	.60	70%	.46
Availability of bike racks/storage	<.001	.87	93%	.84
Availability of crossing guards	<.001	.91	93%	.88
Activity integration into school programs				
Provision of PA by classroom teachers beyond PE and recess.	<.001	.37	69%	.56
School encouragement of classroom teachers for promoting PA	<.024	.26	57%	.31
School recruitment of volunteers to assist PA programs	<.001	.67	87%	.72
School provision of wellness policy addressing PA	<.001	.50	80%	.68
Availability of school wellness coordinator	<.001	.70	83%	.69

\* Kappa not calculated on nonsymmetrical responses.

however, some exceptions to this general trend; some items with lower reliabilities were about PE program evaluation and estimates of PE time allocations to subject matter content. It is interesting that reduced replication of responses to these items suggests that respondents lacked knowledge or involvement in PE program evaluation or that programs were not assessed at all. As well, inconsistent estimates of time allocations to different subject matter categories suggest a lack of use of a specific PE curriculum or written policy that had been effectively communicated to the teacher. Not using a specific PE curriculum and not evaluating PE programs are common in school settings and are barriers to having quality PE programs.<sup>15,21</sup>

Results of the test-retest reliabilities helped identify several wording or formatting challenges in the original instrument. We subsequently revised these by collapsing response categories (4 items), providing additional response options (2 items), and making wording changes (5 items). As a result reliabilities should increase during use in subsequent applications of S-PAPA.

### Study Limitations

The S-PAPA is limited by the reliance of respondent self-report data, and even though test-retest reliabilities of items were very good, there is possibility of respondent social desirability bias. Our intent, however, is that when S-PAPA is used to assess policies in future studies that it be administered in a manner that directs respondents to make inquiries with other school officials when they were uncertain about an item. This should increase the accuracy of responses and potentially curb some challenges

with social desirability bias. In the current test-retest study respondents may have been unable to complete the instrument this way because both administrations of S-PAPA occurred in the summer, and it may not have been possible to access information from district-level people. Despite this limitation, reliabilities on most items were very high, and we assume that when respondents have the opportunity to make inquiries from other key informants then item reliabilities would increase.

## Conclusions

The 3 distinct modules (ie, Physical Education; Recess; and Before, During, and After School Programs) provide researchers with the flexibility to assess 1 or all aspects of school physical activity programming and related policies. Test-retest reliability results suggest the S-PAPA items were reliable and can be useful in assessing individual school level physical activity policies. Review by content experts and revision based on pilot administrations suggest the instrument has content and construct validity.

Since most reporting on school physical activity policies is currently done at the state or district levels,<sup>12,14</sup> S-PAPA could provide beneficial information about how policies at state and district levels translate to the individual school level. For some items, response validity could also be assessed by collecting the school's actual written PA policies and if the actual written policies are collected, the strength of the written policies could be evaluated using the Rudd's WellSAT evaluation tool.<sup>23</sup>

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