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The development of the lunchtime enjoyment of activity and play questionnaire

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The Development of the Lunchtime Enjoyment of Activity and Play (LEAP)

Questionnaire

ABSTRACT

BACKGROUND: Enjoyment of physical activity is as an important determinant of children's participation in physical activity. Despite this, there is an absence of reliable measures for assessing children's enjoyment of play activities during school lunchtime. The purpose of this study was to develop and assess the reliability of the "Lunchtime Enjoyment of Activity and Play" (LEAP) questionnaire.

METHODS: Questionnaire items were categorized employing a social-ecological framework including intrapersonal (20 items), interpersonal (2 items) and physical environment/policy (17 items) components to identify the broader influences on children's enjoyment. An identical questionnaire was administered on two occasions, 10 days apart, to 176 children aged 8-12 years, attending a government elementary school in regional Victoria, Australia. The test-retest reliability of questionnaire items were determined using a weighted kappa.

RESULTS: Test-retest reliability confirmed that 35 of 39 LEAP questionnaire items had at least moderate kappa agreement ranging from 0.44-0.78. Although four individual kappa values were low, median kappa scores for each aggregated social-ecological component reached at least moderate agreement (0.44-0.60).

CONCLUSIONS: This study confirms the LEAP questionnaire to be a reliable, context specific instrument with sound content and face validity that employs a social-ecological framework to assess children's enjoyment of school play and lunchtime activities.

Keywords: Elementary School, Measurement, Enjoyment, Active Play, Lunchtime, Social-Ecological Model

BACKGROUND

The promotion of an active lifestyle for children is important to establish foundation physical activity habits that can track into adulthood and help reduce the risk of chronic diseases.¹ Schools are now being targeted as a major setting to develop children's fitness standards and to alleviate the increasing prevalence of obesity and chronic diseases.² Many physical activity avenues are present in schools including physical and sport education programs, after school activities and play during school breaks.³ However, curriculum time allocated to physical education is declining⁴ and a number of institutional and teacher related barriers have been identified that are restricting the delivery of effective physical education.⁵ In many countries physical education doesn't provide sufficient physical activity for children to meet national physical activity guidelines.⁶ In order to reduce the demands placed on schools in reflection to the provision of physical education, sport and after school activity programs, there is a developing trend for schools to facilitate children's physical activity via non-curricular play during school breaks.⁷ Rather than relying on teachers' direct instruction to facilitate physical activity, growing evidence suggests schools should consider play during school breaks, now established as the major source for children's physical activity, supplying up to 50% of children's recommended daily physical activity.⁸ Children in some schools are engaging in up to 600 school breaks per year (3 times per day, 5 days per week, 39 weeks per year),⁹ offering significant time for children to be physically active via active play. With children estimated to be spending 30 hours per week attending school and accumulating up to 35% of school breaks engaged in moderate to vigorous physical activity (MVPA),¹⁰ developing greater knowledge and awareness of the influences on children's play during school breaks is vital.

In addition to being a major source of children's physical activity, play during school breaks has been acknowledged as an effective developmental and learning tool to

complement or supplement the curriculum.¹¹ International governments (UK, Canada, USA, Sweden) have recognised the importance of children's play during school breaks, leading to a host of policies to enhance school play areas and the quality of children's play.¹¹ Active play has been described as a major form of childhood learning and has been associated with improvements in children's physical, cognitive and social development,¹¹ yet there is a gap in the literature on reliable self-report measures to examine children's school play and lunchtime activity.

A key to ensuring schools develop children's physical activity habits is to identify the psychosocial correlates of children's physical activity.^{12,13} Recent research is beginning to recognize the important link between the psychosocial correlate of enjoyment and children's participation in physical activity.^{14,15} Enjoyment stems from kinaesthetic experiences (e.g. jumping, sliding) and the attainment of personal goals (e.g. crossing monkey bars) and is defined as "a positive affective response to an experience that reflects generalized feelings such as pleasure, liking, and fun."¹⁶ The positive association between enjoyment and behavior change is emphasized in the Youth Physical Activity Promotion (YPAP) model¹⁷ and Self-Determination Theory (SDT).¹⁸ These theoretical models outline that if children enjoy participating in a particular physical activity (e.g. intrinsic motivation) they are likely to continue to adopt and maintain participation in that activity. The YPAP and SDT theories have been used to explain the link between enjoyment and facilitating behavior change by a number of studies that have identified the association between enjoyment and involvement and participation in sport¹⁹ and physical activities.^{14,20,21} Other studies have also recognized the link between enjoyment and correlates of physical activity including self-determination,²² motor skill proficiency,²³ task orientation,²⁴ self-efficacy,²⁵ goal setting,²⁵ and perceived competence.²⁴ Children are exposed to numerous influences within school play areas during break periods (e.g. kicking a ball, chasing a friend) that can impact on children's enjoyment.

Developing a questionnaire that identifies multiple levels of influence on children's enjoyment of school play and lunchtime activities is therefore an important consideration for schools and researchers when facilitating children's physical activity (behavior change).

While studies have identified positive associations between children's physical activity enjoyment and participation,^{15,20,21} there is a lack of acceptable and reliable measures to examine children's enjoyment within the school context. Studies have developed instruments to assess the suitability of school play areas for children's physical activity via environmental audits^{26 27} or questionnaires of students.²⁸ However, none of these studies have considered children's enjoyment levels or different play and school lunchtime activities children participate in. The development of a reliable measure of children's enjoyment of school play and lunchtime activity with strong reliability, content and face validity is imperative for use in studies aiming to understand and improve children's school-based health and physical activity. The purpose of the present study was to develop the face and content validity and examine the reliability of the Lunchtime Enjoyment of Activity and Play (LEAP) Questionnaire amongst school children aged 8-12 years.

METHODS

Subjects

There were no published data available to inform the sample size calculation for our proposed study. Therefore, power calculations were based on the pilot study; a total of 107 children aged 8-12 years completed the LEAP questionnaire from the pilot study of two elementary schools in regional Victoria. The mean =3.89 and the standard deviation =0.48 were calculated from the 5-point scale (1=strongly disagree to 5=strongly agree) to calculate the effect size. The effect size = 0.23, $\beta = 0.20$ and $\alpha = 0.05$ resulting in a required sample

size of 150 children. To account for potential attrition (15%) of a questionnaire repeated 10 days apart in school children a sample of 173 participants was estimated.

In order to assess the LEAP questionnaire reliability a large government elementary school was recruited from regional Victoria, Australia. An identical questionnaire was administered on two occasions, 10 days apart, to 176 children (99 males, 77 females) aged 8-12 years. All grade 3 to 6 children were invited to participate in the study during school Term 2, 2010 (response rate: 54.3%).

Instruments

To inform the development of the LEAP questionnaire items focus group discussions examining the influences on elementary school children's physical activity, information from previous studies examining children's perceptions of the environment for physical activity,^{29,30} a review of the literature and consideration of the social-ecological model³¹ were used. Face and content validity of these items was determined through review by five physical activity experts with experience in questionnaire development, ensuring multiple levels of school play activities were represented and the questionnaire's formatting was suitable for elementary school children. After the review by physical activity experts, eight items were removed from the original 47 item LEAP questionnaire drafts. Initially, two likert scale items that examined children's enjoyment if their school increased or decreased playground items were deemed unnecessary as there was already an item examining children's enjoyment of the quantity of items within the school play area (physical environment/policy component, item 4). In addition, six non-likert scale items were excluded from the original LEAP questionnaire drafts as they examined additional play area information such as frequency or standard yes/no questions, not enjoyment. This resulted in

39 items in the final LEAP questionnaire to examine the reliability of how much children enjoy school play and lunchtime activity.

Taking into consideration children's cognitive capabilities during elementary school,³² the LEAP questionnaire items were formatted using pictorial representation (smiley faces) of the five point likert scale, underlining key words and grouping similar worded items. Item categories were tested by Cronbach's alpha for internal reliability³³ and categorized into social-ecological model levels of influence with components including: (1) intrapersonal (individual), (2) interpersonal (social) and (3) physical environment and policy/organisation variables to identify the broader influences on children's enjoyment of school play and lunchtime activities.³¹ Social-ecological models suggest that to understand children's physical activity behavior it is necessary to consider multiple factors; intrapersonal, interpersonal, physical environment and policy/organisation.³¹ To address this, the intrapersonal component included six categories (20 items) examining children's enjoyment of activity during school breaks, basic locomotion, imaginative play, play-based movements, play variations and sedentary behavior. The interpersonal component consisted of one category (two items) examining children's enjoyment of social play. The physical environment and policy/organisation component included five categories (17 items) examining children's enjoyment of climatic conditions (warm & cool), man-made items, natural items, play area size and play within sheltered areas.

All enjoyment items were rated on a five-point likert scale from very unhappy (1) to very happy (5). During pilot testing of the questionnaire the children and seven elementary teachers reported little concern or difficulty with the LEAP questionnaire, therefore no changes were necessary and face and content validity of the questionnaire were confirmed for the test-retest reliability study.

Procedure

The initial administration of the LEAP questionnaire was conducted during class time and took approximately 10 minutes. The administration of the questionnaire was via guided completion, whereby one of the investigators and teachers were present to provide assistance to children as necessary and to ensure students completed all responses. To assess the test-retest reliability of the questionnaires, the children then completed a second, identical questionnaire in class 10 days later (all participants completed both tests). The LEAP questionnaire was distributed at varying times during the baseline and retest administrations to fit in with classroom schedules.

Data Analysis

Overall, age and sex-specific reliability of the enjoyment questionnaire items were calculated using a weighted kappa (k_w^2) statistic with quadratic weights for ordinal items.³⁴ Kappa values were graded as slight agreement (0.01-0.20), fair agreement (0.21-0.40), moderate agreement (0.41-0.60), substantial agreement (0.61-0.80) and almost perfect agreement (0.81-0.99).³⁴ Cronbach's alpha was calculated to determine internal reliability for the individual items within each category with values ≥ 0.6 considered acceptable. Cronbach's alpha was also calculated to determine internal reliability between category items within the social-ecological model components with values ≥ 0.6 considered acceptable.³⁵ The Statistical Package for Social Sciences (SPSS) version 18 (SPSS Inc., Chicago, USA) was used to calculate the descriptive statistics and R version 2.12.0 (R Development Core Team, Vienna, Austria) was used for the weighted kappa statistics and 95% confidence intervals (CIs). The 95% CIs of weighted kappa was based on the empirical sampling distribution generated by the computer intensive bias corrected bootstrapping re-sampling method.³⁶

RESULTS

The mean social-ecological component, mean category scores within each component, and their internal reliability, at both questionnaire administrations are shown in Table 1. Internal reliability of social-ecological components was acceptable ($\alpha \geq 0.60$) for intrapersonal and physical environment/policy, however, the interpersonal component failed to reach acceptable internal reliability (Baseline $\alpha=0.48$; After 10 days $\alpha=0.45$). Within each social-ecological model component, nine of 13 categories reached acceptable internal reliability, although 'natural items', 'social play', 'sheltered play' and 'warm conditions' categories failed to reach an acceptable level of internal reliability ($\alpha = 0.08- 0.53$) during both test administrations. All mean scores increased during the retest after 10 days, except the 'social play' category, which remained the same. Item-specific test-retest reliability results (Figure 1) indicate that 35 of 39 items reached at least moderate kappa agreement. In addition, median kappa scores suggest moderate agreement was obtained for each aggregated social-ecological model component (0.44-0.60) and all item categories (0.44-0.75). The highest category median agreement was reached for 'imaginative play' and 'man made items' in contrast to the lowest median agreement for 'social play' and 'play variation'. Substantial agreement was obtained for 17/39 of the items, moderate agreement for 18/39 items and four LEAP questionnaire items failed to reach moderate agreement (Figure 1).

Sex-specific social-ecological component and category mean scores and median kappa (including kappa range) are displayed in Table 2. Sex-specific median kappa scores indicate acceptable agreement was reached for both male and females within all categories and aggregated social-ecological components except females for the 'Social Play' category (Interpersonal component).

Test-retest reliability results (Figure 2) indicate that substantial agreement for males was reached for 18/39 items, moderate agreement for 19/30 items and two LEAP questionnaire items failed to reach moderate agreement. Female test-retest reliability indicate that substantial agreement was reached for 17/39 items, moderate agreement for 15/39 items and seven LEAP questionnaire items failed to reach moderate agreement. There were no significant reliability differences between age groups for LEAP questionnaire items therefore this data is not reported.

DISCUSSION

The unique contribution this study makes to the international literature is that this is the first study to report the development and reliability of a questionnaire designed to assess children's enjoyment of school play and lunchtime activity. All three social-ecological model components and 13 categories within the components (including 35/39 individual items) had a median kappa that reached at least moderate test-retest reliability when administered to a large sample of elementary school children.

Many studies have measured children's enjoyment of physical activity using single item measures or scales not validated in the childhood age group,¹⁴ yet there is little research describing the development of multi-item scales to measure children's enjoyment of physical activities.¹⁴ King and colleagues developed and established the reliability of the children's activity preferences and enjoyment (CAPE) instrument in children aged six to 21 years old.³⁷ In addition, the physical activity enjoyment scale (PACES) originally designed for college students was recently simplified for younger children and was validated in 564 grade 3 students.¹⁴ However, these measures assess children's enjoyment of leisure activities (CAPE) or being physically active (PACES) in contrast to the present study where the LEAP questionnaire contextualizes children's enjoyment of play and lunchtime activity using a

multi-faceted social-ecological framework³¹ within a school setting. An enhanced understanding of the complex and multiple factors that influence children's physical activity behavior needs to be considered when developing interventions for school break periods.

Of the 39 LEAP questionnaire items, 35 displayed at least moderate reliability. Three of the four LEAP questionnaire items displayed less than moderate reliability including playing with friends at lunchtime (interpersonal component, item 13), changing play space location (intrapersonal, item 38), and playing outside (intrapersonal component, item 34) due to sex-specific reliability influences. A major sex-specific difference that could be attributed to the lower reliability for the three items could be that males are more physically active and play different activities to females during school breaks.³ If females are less physically active there could be more time to be affected by social and weather-related influences (females had low reliability for the 'Social Play' category & 'Playing Outside' item). Males' lower reliability for the changing play location item could be due to the spontaneous nature of active play and the competitive sports activities (e.g. winning & losing) that males tend to participate in.³⁸ Males are suggested to be peer pressured into playing games and sporting activities,³⁸ therefore males' enjoyment could vary between tests if friends are pressuring them to play in school play areas that the males don't enjoy. It is unclear why there was lower reliability for children's enjoyment of recess play (intrapersonal component, item 3) in comparison to lunchtime, therefore further research may be warranted to examine this and the factors contributing to sex-specific influences on children's enjoyment during different school breaks during the day.

The unpredictable nature of children's social relationships³⁹ confirms why just two items were included within the interpersonal component and that lower reliability of interpersonal items should be expected. Evidence suggests children's social relationships are relatively unstable³⁹ as children's social well-being can be influenced by a number of variables

including level of peer acceptance, victimization and popularity.³⁹ In addition, females are suggested to display more emotional behavior and participate in more social activities than males that could influence females' lower reliability for the interpersonal component.⁴⁰ Future research may be required to determine more reliable interpersonal variables before further interpersonal items are added to the LEAP questionnaire. However, despite the lower test-retest and internal reliability for the interpersonal items, the identical mean enjoyment scores between tests indicate that the group's overall enjoyment within the interpersonal component remained consistently high (mean= 4.62) over the test re-test period.

Given that this study was conducted in winter with maximum daily temperatures ranging from 8.5 to 12.5 degrees Celsius at a school with limited outdoor sheltered areas, it is not unreasonable to expect the low internal reliability for the 'play in sheltered areas' and 'warm conditions' categories. High mean enjoyment and kappa agreement scores reflect strong reliability for the 'natural items' category, however the very low internal reliability may indicate that students perceive the function of a grass oval differently to other natural features such as trees, rocks and gardens. Therefore, the internal reliability of 'natural items' may need further investigation and needs to be interpreted with caution.

Data frequencies for the other categories within the intrapersonal and physical environment and policy/organisation components indicate children may have experienced a 'learning effect' during the re-test. Rather than selecting 'not sure (3)' for certain items, more children selected 'happy/very happy (4/5)', subsequently increasing re-test enjoyment. Despite the slight increase in re-test enjoyment scores and four items that failed to reach moderate kappa agreement, findings indicate strong reliability for the remaining LEAP questionnaire items and these items should be included in future compositions of the LEAP questionnaire. The research team attempted to ensure the questionnaire was appropriate for elementary school aged children by employing a pictorial scale using developmentally

appropriate images of smiley faces and found LEAP questionnaire items to be mainly reliable with this age group, showing promise for use in longitudinal research. It is recommended that the LEAP questionnaire be considered in the development of enjoyment scales in other contexts such as community settings.

Previous physical activity literature would indicate that high levels of physical activity enjoyment could correlate with physical activity participation.^{14,15} This study identifies the high level of children's enjoyment of school play and lunchtime activities among a sample of elementary school children. Despite literature suggesting males are more physically active than females during school time,³ females' mean enjoyment was higher for most categories within the current study. Future research investigating correlations between children's enjoyment of school play and lunchtime activity and physical activity participation is therefore warranted. Given the concerns regarding the declining levels of physical activity among adolescents¹ it may also be useful to investigate adolescents' enjoyment of school play and lunchtime activity within a secondary school context.

Limitations

A limitation of the study was that due to tight curricular schedules (e.g. art, library, sport, music) and other classroom constraints (e.g. assignments, teaching/learning goals), the LEAP questionnaire was administered to individual classes during varying times of the day rather than children completing the questionnaire simultaneously. Despite the many possible influences on the reliability of children's LEAP questionnaire responses (e.g. different classes, time of day/week, 10 day retest period) the test-retest reliability and internal reliability is relatively sound. In addition to the sound reliability of the LEAP questionnaire, the large sample size and achieving sample power were strengths of the study. As this is the first questionnaire of its kind, we acknowledge that future research should be conducted to

further examine seasonal, neighbourhood, time of the day and week influences before external validity of the LEAP questionnaire is established and can be used more widely. It should also be noted that because the research was conducted within a single elementary school, any generalizing of findings are not necessarily representative of the wider population.

Conclusions

In summary, this study confirms the LEAP questionnaire to be a reliable, context specific instrument with sound content and face validity. The LEAP questionnaire employs a social-ecological framework to assess children's enjoyment of school play and lunchtime activities, including the number and type of school play activities children enjoy and the extent of his/her enjoyment. When assessing children's enjoyment of play and lunchtime activity and tailoring intervention strategies during school breaks, it is essential to ensure that measurement tools consider the multi-faceted nature of the social-ecological model. The findings suggest that sex can be an influential factor on the overall test-retest reliability of a group's enjoyment of school play and lunchtime activity.

IMPLICATIONS FOR SCHOOL HEALTH

- The psychometric evidence provided in this paper supports the research capabilities of the LEAP questionnaire as an easy to use tool. As there are few self-report measures of children's enjoyment of school play and lunchtime activities, this measure fills an important gap for researchers, teachers and service providers.
- The LEAP questionnaire is important for researchers, teachers and service providers to identify and target areas of low enjoyment within children's school lunchtime play activities. The acceptable reliability of the LEAP questionnaire confirms it's

suitability for children aged eight to 12 years, showing promise for use in longitudinal research.

- As evaluating the validity of measurement tools is an ongoing process,³⁷ the future use of the LEAP questionnaire will provide more information about the external validity of the measure as well as its suitability as a research tool.
- This study highlights a need to further investigate the sex-specific influences on children's behavior during school breaks to allow researchers and practitioners to address these differences when developing tools to examine school play and lunchtime activity.

Human Subjects Approval Statement

Children received a plain language statement outlining the research, along with a participant and parental consent form. Ethical approval for the study was obtained from the University Human Research Ethics Committee, the Department of Education and Early Childhood Development (DEECD) and permission was gained from the school Principal.

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