VALIDATION OF THE CHILDREN’S OMNI PERCEIVED EXERTION SCALE FOR STEPPING EXERCISE

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Keywords: perceived exertion, OMNI scale, stepping

Introduction
This investigation validated the newly developed stepping pictorial-format of the Children’s OMNI Perceived Exertion Scale using a concurrent paradigm. The term OMNI is an acronym for the word omnibus and when defined in the context of a perceived exertion metric refers to a category scale having broadly generalizable measurement properties. The OMNI Scale has a developmentally-indexed category format that contains both pictorial and verbal descriptors positioned along a comparatively narrow numerical response range, i.e. category range 0 to 10. The “exertional meaning” of the four pictorial descriptors is consonant with corresponding verbal descriptors. In this way, the range of numerical category responses that comprises the OMNI Scale is defined by both pictorial and verbal descriptors. To be valid and functional over a wide range of physical activity and sport settings the Children’s OMNI Scale employs interchangeable sets of mode specific pictorial formats. The pictorials are arranged in ascending order of perceptual-cognitive intensity along a visually discernable response gradient, i.e. a hill. Using this psychometric concept, the basic numerical and verbal components of the standard scale format are invariant. The pictorial descriptors are interchangeable to be consistent with the exercise mode to be performed. Of practical importance in developing this scale was the expectation that the pictorial-verbal exertional format could be used by female and male children while participating in a wide range of exercise modes.

Pictorial descriptors depicting a youth cyclist and walker/runner have been developed and validated previously for use with the OMNI Scale. The present investigation validated the psychometric properties of stepping pictorials for the Children’s OMNI Scale. Stepping is a ubiquitous element of a child’s daily activities. Movements involving stepping are often part of health-fitness exercises, physical education classes and various sports. The concurrent validation of a mode specific pictorial format to assess exertional perceptions during stepping was expected to further extend the generalizability and practicality of the Children’s OMNI Scale of Perceived Exertion.

Methods
Scale validity was examined for separate groups of female (n=12) and male (n=12) children, 8 to 12 years old. Peak oxygen consumption for the combined subject group was 48.0±3.1 ml.kg⁻¹.min⁻¹. A perceptual estimation protocol employing a load incremented step test was used to establish concurrent scale validity. An electronic stepping ergometer modified for use by children was employed. Ratings of perceived exertion (RPE) were determined by the Children’s OMNI-Stepping Scale. Criterion variables were oxygen uptake (VO₂: ml.kg⁻¹.min⁻¹) and heart rate (HR: beats.min⁻¹) and concurrent variables were RPE for the overall body (RPE-O), legs (RPE-L) and chest (RPE-C). Variables were measured at the end of each continuously presented 3-min sub-peak step test stage.

Results
The range of responses over the test stages for the combined female and male sample was: VO₂: 12.0 to 43.2 ml.kg⁻¹.min⁻¹; HR 94 to 174 beats.min⁻¹ and RPE-O, RPE-L and RPE-C: 1.0 to 9.2. Correlations and linear regression analyses were performed separately for females and males and for the total sample using repeated measures over test stages. For all correlation/regression analyses, RPE-O, RPE-L and RPE-C distributed as positive linear functions of both VO₂ and HR; r = 0.82 to 0.93 p<0.05. Differences between RPE-L and RPE-C were examined with ANOVA for a repeated measures paradigm. RPE-L was higher (p<0.05) than RPE-C at all test stages.

Conclusion
The perceptual-physiological responses established concurrent validity of the Children’s OMNI-Stepping Scale over a wide metabolic intensity range. The OMNI-Stepping Scale is an effective metric to assess both undifferentiated and differentiated RPE in young children.
The aim of the present study was to investigate the effects of a 12-week randomised controlled exercise intervention programme on the psychological and physiological health of children with Type 1 diabetes. The hypotheses were that increasing physical activity would increase physical self esteem and lower body fat.

Methods

Ethical approval was obtained from three NHS Trusts in the North West of England. Participants were aged 9-15 years, diabetes duration greater than two years. Recruitment was through diabetes clinics in three hospitals, invitations to participate were sent out via the local diabetes nurse to all eligible families. Thirty-nine children participated in the study, these were randomly assigned to the experimental (n=27) and control groups (n=12). More children were assigned to the experimental group to allow for the greater expected drop out rate from this group. Of those recruited fourteen experimental and seven controls completed the study.

The experimental group participated in two exercise sessions a week for the first eight weeks of the programme and three sessions a week for the last four weeks. Sessions were designed to include high intensity activity. However, due to the low levels of vigorous physical activity found during phase 1 the intensity was increased gradually over the course of the programme. Exercise was mainly aerobic mixed with some anaerobic exercise, activities were run as games or fun type activities.

Sessions were one hour duration and ran concurrently at three locations in the North West of England. Children kept a record of the sessions attended by collecting a stamp after each session. These related to a series of prizes (e.g. baseball cap, T-shirt) that they could collect after attending a certain number of sessions. Intensity of the sessions was recorded using heart rate monitoring (Polar, Sportstester, Kempele, Finland). Two heart rate monitors were monitored at fifteen sessions, 26 data files were recorded successfully. The control group maintained their usual physical activity pattern.

Data were collected in the study laboratory for all participants before and after the intervention. Children completed the Physical Self Perception Profile for Children (Whitehead, 1995). This is a measure of physical self esteem that has been shown to have acceptable validity and reliability with healthy children in this age group from both US (Whitehead 1995) and UK (Biddle 1993) populations. It contains six subscales: global self worth, physical self worth and its subdomains perceived sport competence, perceived condition competence, perceived attractive body competence and perceived strength competence. Each subscale contains six items, these are scored from one to four, and a mean value calculated for the subscale. Body mass, stature and sum of 5 skinfolds (bicep, tricep, subscapular, supraclavicular, and calf) were measured. Two way ANOVA calculations between time and group were conducted, except where there were significant differences between the groups at time 1 when ANCOVA was conducted, or parametric assumptions were not met in which case the Wilcoxon Signed Ranks test was performed.

Results

The mean (95%CI) number of minutes spent above 75% of maximum heart rate reserve during the exercise sessions was 13.8 (10.2 to 17.5) minutes. A mean of 9.6 (7.8 to 11.4) minutes were spent between 60 and 75% of maximum heart rate reserve and mean 6.8 (5.4 to 8.2) minutes between 50 and 60% of maximum heart rate reserve.

When differences between the groups at time 1 were taken into account the only significant interaction between time and group was for BMI, this increased in the experimental group between times 1 and 2 and decreased slightly in the control group (F = 4.77, p = 0.04). Sum of skinfold measurements decreased in both groups over time, this difference approached significance (p=0.05). There was a non significant interaction between time and group in the hypothesised direction for perceived sports competence and perceived condition competence. Perceived strength competence increased significantly in both groups (p<0.05). There was no significant effect on the other subscales, data are reported in table 1. Sample size was small and therefore the results must be treated cautiously due to the possibility of Type 2 error.

Discussion

It is suggested that the increase in the BMI of the experimental group was due to an increase in the muscle mass of this group. Although this was not measured directly the decrease in skinfold thickness supports the suggestion. Increases in perceived condition and strength competence in the experimental group were encouraging as higher physical self perceptions are associated with greater physical activity and may therefore lead to long term increases in physical activity. The changes found to occur in both groups between times 1 and 2, increased strength competence and decreased skinfold thickness, were likely to have been due to maturation; mean increase in height during the study period indicates some children were going through puberty. It is suggested that an intervention programme that incorporated physical activity and an educational or cognitive component would have a greater effect on the outcomes studied.

References


Health Education Authority (1998). Young and active? Policy framework for young people and health-enhancing physical activity


Table 1: Mean values by experimental and control groups at times 1 and 2

<table>
<thead>
<tr>
<th>Variable (measurement unit)</th>
<th>Group</th>
<th>Mean (95% CI)</th>
<th>Time 1</th>
<th>Time 2</th>
<th>Group</th>
<th>Mean (95% CI)</th>
<th>Time 1</th>
<th>Time 2</th>
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<tr>
<td>BMI (kg/m2)</td>
<td>E</td>
<td>20.38 (19.64-21.10)</td>
<td>19.57 (18.93-22.05)</td>
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<td></td>
<td>C</td>
<td>20.11 (19.26-21.90)</td>
<td>20.07 (18.43-21.72)</td>
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<td>Sum of 5 skinfolds (mm)</td>
<td>E</td>
<td>63.32 (59.69-75.90)</td>
<td>69.39 (68.75-70.02)</td>
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<td></td>
<td>C</td>
<td>55.93 (50.04-61.03)</td>
<td>50.64 (50.02-66.20)</td>
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<td>Global self worth</td>
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<td>3.29 (3.05-3.60)</td>
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<td>Perceived sports competence</td>
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<td>Perceived condition competence</td>
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<td>Perceived attractive body competence</td>
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<td>Perceived strength competence</td>
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*Scale from the Physical Self Perception Profile for Children, range 1-4, 1= lowest possible competence 4= highest possible competence.
THE UTILITY OF PHYSICAL SELF-PERCEPTION IN THE PREDICTION OF ACTIVITY COUNTS IN BOYS AND GIRLS

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Keywords: physical self-perception, importance, habitual activity

Self-perception has been shown to be central to models of sport and exercise behaviour. Developments in the last decade have enabled us to assess physical self-perception sub-domains and the personal importance attached to each sub-domain within a young population. The aim of this study is to investigate whether the physical self-perception sub-domains predict activity (measured using pedometry) in boys and girls (age=9.6yrs, SD=0.7) or whether the importance attached to these physical sub-domains provides a better predictor. 21 boys and 26 girls completed the Children’s Physical Self-perception Profile (C-PSPP) and the Perceived Importance Profile (C-PIP). Habitual activity was assessed with the use of hip pedometers over a period of seven days. Analyses indicated that there was no significant difference between the number of counts recorded for the boys (M=13396, SD=4857) and girls (M=12483, SD=3872). There were differences between the C-PSPP and C-PIP for the boys and girls. Multivariate analyses indicated that boys had higher levels (P<0.01) of Sports Competence (M=19.33, SD=3.89), Physical Strength (M=17.81, SD=4.22), Sports Competence Importance (M=7.19, SD=1.20) and Physical Strength Importance (M=7.76, SD=4.21) compared to the girls (M=16.61, SD=4.22; M=15.11, SD=3.75; M=6.23, SD=1.30; and M=5.57, SD=1.47, respectively). Regression analyses indicated that the physical sub-domains predicted 51.3% of the variance in the activity counts of the boys, whilst the importance attached to the sub-domains predicted 37.6% in the girls and 59.1% in the boys. These results suggest that the physical sub-domains were a better predictor of activity count in girls but that the importance attached to each domain was a better predictor in boys. The implication of these results from an intervention perspective is that to improve the physical activity in these girls and boys it would be important to focus upon different elements of physical self-perceptions (the actual domains in girls, but the importance attached to them in boys).

ADIPOSITY LEVELS IN 9 TO 14-YEAR OLD BOYS AND GIRLS: DATA FROM THE MERSEYSIDE SPORTS-LINX PROJECT

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Keywords: obesity, social deprivation, adiposity

Obesity is characterised as a state of excessive adiposity and in recent years has been identified as an increasing public health concern in children. The aim of the current study was to identify the prevalence of obesity in children and establish if there is a relationship between adiposity and social deprivation. Participants (boys n=460, girls n=405) aged 9-14 years from 12 schools across Merseyside (UK) were included in the project. Stature (m), mass (kg) and skinfold (triceps, calf, subscapular and suprailiac) measures were recorded using standardised anthropometric procedures. The sum of triceps and calf skinfold and the sum of four skinfolds were used to identify percentage body fat and provide an adiposity rating. The Townsend Index was used to determine levels of social deprivation, it is based on census information about the area in which the individual lives and takes into account the proportion unemployed, percentage of households with no car, the percentage of households overcrowding and the proportion of non-occupied households. Descriptive statistics were used to identify the prevalence of obesity and Spearman rank correlation was performed to identify the relationship between adiposity and social deprivation. Significance was set at P<0.05. Overall only 52.5% (n=240) of the boys and 47.4% (n=192) were classified as optimal adiposity using the triceps and calf skinfold. Of the boys 20.0% (n=92) were classified as moderately high adiposity, 13.3% (n=61) as high adiposity and 14.6% (n=67) as very high adiposity. Of the girls 20.2% (n=82) were classified as moderately high adiposity, 16.3% (n=66) as high adiposity and 14.6% (n=59) as very high adiposity. In comparison to the ratings from the Northern Ireland Fitness survey 36.5% of boys and 48.9% of girls were above the 80th percentile for the sum of four skinfolds. The mean percentage body fat per age group ranged from 18.7% to 22.7% for boys with the lowest level at 14 years. The mean percentage body fat per age group ranged from 27.8% to 29.8% for girls and was similar across all age groups. These findings indicate high levels of above normal adiposity in both boys and girls, indicating high levels of obesity. Correlation coefficients between social deprivation and the adiposity measures ranged from r=-0.09 (sum of four skinfolds, p>0.05), r=-0.09 (fat percentage, p<0.05) and r=-0.08 (sum of triceps and calf skinfold, p>0.05). These indicate very slight negative relationships between adiposity and social deprivation. Overall it was concluded that obesity is a significant problem in children aged 9- to 14- years in the Merseyside region. Social deprivation showed little relationship to adiposity. Further research is needed to monitor trends in overweight and obesity, and to monitor the effectiveness of national strategies intended to alleviate this increasing problem.

RELATION OF EATING BEHAVIOUR WHILE WATCHING TELEVISION WITH ADIPOSITY IN CHILDREN FROM 8 TO 12 YEARS

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Keywords: eating behaviour, television, adiposity

Objective

To determine the eating behaviour while watching television and adiposity in children.
Material and Methods
A survey was carried out on a representative sample of children aged 8 to 12 years old (417 girls, 444 boys) in Guadalajara, Mexico, in which five skinfolds were measured. Multiple regression analysis were used for statistical purposes.

Results
We found the same pattern of increased hours of watching television as reported for an American children population (from 36.5% aged 8 years to 39.8% of 12 year olds watched television for more than 4 hrs. a day per week). There were no significant differences by sex. In general more than 85% spent 2.8 hrs. a day and about 21 hrs. per week watching television while eating different types of food (8.6% ate meals such as lunch and dinner and 86% ate snacks such as potato chips, candies and chocolates). There is a statistically significant association that shows that the children who had more adiposity were the ones that spent more time eating and watching television.

Conclusions
In comparison with other reports, the data showed that our children watched more television and snaked more while viewing TV. We concluded that the problem of watching television and eating, especially snacks, is related to the need of supervision of the children by the parents, lack of physical and recreational programs and a lack of knowledge of the benefits of doing physical activity. Finally, we believe that television has become an icon of recreation, entertainment and time to eat for children in our country, thus contributing to the development of a new society characterized by a population of fat people with all the social, health and cultural problems related to this issue.