

MEASURING THE EDUCATIONAL IMPACT OF PROMOTING ENVIRONMENTAL AWARENESS IN KIDS (PEAK): THE DEVELOPMENT AND IMPLEMENTATION OF A NEW SCALE

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Abstract.—The Leave No Trace Center for Outdoor Ethics (LNT) is a nonprofit educational organization that teaches skills and values for recreating responsibly in the out-of-doors. LNT developed Promoting Environmental Awareness in Kids (PEAK), based on seven ethical principles. The PEAK program provides a pack that contains several interactive activities specifically designed to educate children about the outdoors and the responsible use of shared public lands. While the PEAK program has been in existence for a number of years, the program's effectiveness has not been empirically tested. Moreover, there is limited data regarding responsible environmental attitudes and behavior in elementary school-aged children. The focus of this study was to develop a scale to assess the educational impact of the PEAK program on children. The PEAK Assessment Scale (PAS) was pilot tested in the spring of 2010 to assess the psychometric properties. Results of the analysis indicated the scale was reliable (.77) and evidence supports that the scale is unidimensional.

1.0 INTRODUCTION

The Promoting Environmental Awareness in Kids (PEAK) program is designed to teach children about the environment and how to recreate responsibly in the out-of-doors. In partnership with Recreational Equipment Inc. (REI), the Leave No Trace Center for Outdoor Ethics (LNT) developed the PEAK program to help youth learn environmentally responsible behaviors while participating in outdoor activities. The seven "kid friendly" principles, based on the original seven principles of Leave No Trace, include:

- (1) Know Before You Go: teaching children to prepare prior to recreating outside;
- (2) Choose the Right Path: teaching techniques and knowledge about how to protect different environments by making decisions that have less impact on the environment;
- (3) Trash Your Trash: teaching children to keep the environment clean from litter and other waste;
- (4) Leave What You Find: teaching the importance of leaving artifacts and other natural items behind for the next person to enjoy;
- (5) Be Careful With Fire: teaching the techniques for making responsible decisions about how, when, and where to have a fire;
- (6) Respect Wildlife: teaching children how our behavior can affect wildlife and how to appreciate wildlife from a distance;
- (7) Be Kind to Other Visitors: teaching kids how to be respectful of others.

The primary goals of the program are to:

- (a) increase awareness of Leave No Trace;
- (b) promote stewardship of public lands; (c) meet the demands of diverse youth population; and (d) to have fun (Leave No Trace Center for Outdoor Ethics 2010).

1.1 Purpose

According to Louv (2008), researchers recognize the need to connect children and nature in order to alleviate what he has identified as “nature-deficit disorder.” With the increase in technology, media-driven awareness of “stranger danger”, and an increase in fear of the outdoors, children are becoming disconnected from nature. Louv asserts that this disconnect is negatively affecting the physical and mental health of children and leading to a lack of stewardship for the environment.

With the relatively recent No Child Left Inside movement aimed at reconnecting children with nature, programs such as PEAK are trying to teach young people to make environmentally responsible decisions when recreating outdoors—whether they are in a backyard or on a camping trip. However, the effectiveness of these programs is presently unknown.

Baldwin et al. (2005) emphasize that it is critical to create evaluations and surveys to help programs determine the effectiveness of their curricula and to determine if their intended goals have been met. LNT, Old Dominion University, and SUNY Cortland collaborated to develop a reliable and valid scale to measure the effectiveness of the PEAK program.

2.0 METHODS

The first step was to determine what type of scale would be best to collect the data. Since the main goals of LNT are to increase awareness of the Leave No Trace principles and to promote stewardship of public lands, the objective of the scale was to assess young people’s attitudes and opinions regarding their behaviors in the natural environment. Researchers have used Likert-type scales to measure attitudes for many years because of their ease of use (Friedman et al. 1993). Measuring the attitudes of children before and after they participated in the PEAK program was determined to be an effective way to measure the knowledge gained. Prior to using the scale as a pre- and post-assessment, the scale was tested to ensure that each item measured what it was intended to measure. For the pilot studies reported here, the

scale was only administered once, as the goal was to evaluate the psychometric properties of the scale.

During the initial design, a 40-item Likert-type scale was constructed based on the stated goals of the PEAK program and specific material in the PEAK Pack activities. The PEAK Assessment Scale (PAS) had five items per principle and five items to measure overall stewardship. Response options ranged from 1 = strongly agree to 4 = strongly disagree. According to Friedman et al. (1993), when participants are given a Likert-type scale and asked to choose a response, they tend to choose the left-hand column of the scales. To ensure that PAS respondents read each item carefully, seven reverse-coded items were embedded in the scale. The scale was reviewed and updated based on feedback from a panel of educational experts, including an education administrator from the LNT. The scale was then administered to 25 fifth- and sixth-graders in an afterschool program in central New York to determine the approximate amount of time it would take them to complete it and to assess if its reading level was appropriate for the target audience.

Based on the results of that pilot study, the following revisions were made to the scale. The Flesch-Kincaid Grade Level assessment indicated that the wording for many of the items was too complex; therefore, the wording was changed to a more appropriate reading level for fifth- and sixth-graders (Kincaid et al. 1975). Two of the seven reverse-coded items were deleted because the readability level was too difficult. Additional feedback suggested that it was necessary to include a “Don’t Know” option because the children may lack knowledge about the LNT key principles prior to participating in the PEAK program. The revised PAS contained 36 items, 5 of which were reverse-coded.

The PEAK Assessment Scale was piloted a second time in the spring of 2010 at an elementary school in central New York to determine the reliability and validity of the scale, and to determine if each item was measuring the correct principle. The scale was administered again to fifth- and sixth-graders. The

researchers instructed the classroom teachers on how to administer the survey to the students.

3.0 RESULTS

A total of 109 assessments were collected in the second pilot study. After the data were cleaned and screened for outliers, four of the surveys were excluded due to insufficient data.

A confirmatory factor analysis was conducted on the data to determine the validity of each subscale. The sampling adequacy was evaluated by running the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity on each of the constructs. Constructs with a KMO greater than 0.60 and a significant Bartlett's Test of Sphericity ($p < 0.05$) were accepted as meeting the minimum requirements for sampling adequacy in order to perform validity and reliability analyses (Tabachnick and Fidell 1996).

After the confirmatory factor analysis, each subscale was subjected to a reliability test. The number of items that held and the Cronbach's Alpha for each subscale are as follows:

Know Before You Go: based on factor loadings, five items were removed, producing a reliability coefficient of .41.

Choose the Right Path: based on factor loadings, three of the five items were removed, producing a reliability of .56.

Trash Your Trash: during the factor analysis all items held, producing a reliability of .62.

Leave What You Find: based on factor loadings one of the three items was removed, producing a reliability coefficient of .40.

Be Careful With Fire: during the factor analysis all items held, producing a reliability coefficient of .54.

Respect Wildlife: based on factor loadings, one of the three items was removed, producing a reliability coefficient of .59.

Be Kind to Other Visitors: based on factor loadings three of the five items were removed, producing a reliability coefficient of .45.

Overall Stewardship: during the factor analysis all items held, producing a reliability coefficient of .63 (Table 1).

After the deletion of 12 items, the remaining 24 items were then subjected to an Exploratory Factor Analysis. The overall reliability of the scale was .77.

4.0 DISCUSSION AND CONCLUSION

The results indicate that further refinement of the PAS is needed before it will be ready for widespread use. Items found to be unreliable will need to be changed, and the scale will need be restructured for a third to fourth grade reading level because not all fifth and sixth graders read at a fifth grade reading level. We intend to change the response options to 5 = very often, 4 = often, 3 = it depends, 2 = sometimes, and 1 = never and to include an option for "I don't know." We may also administer the PAS electronically to allow students to complete the survey as part of a computer/technology assignment. The revised scale will be tested with a larger sample size. The PAS will be reanalyzed to determine the psychometric properties of the revised form. When the scale is complete, LNT intends to use it nationally with the PEAK Program.

In the future, having an electronic version of the survey will make it easier for LNT and SUNY Cortland to collect and analyze the results over time, and to collect results from multiple locations via a centralized database. For example, using SUNY Cortland's on-line survey software, Select Survey,

Table 1.—Subscale reliabilities for each principle

Subscales	α – Reliability
Know Before You Go	.41
Choose the Right Path	.56
Trash Your Trash	.62
Leave What You Find	.40
Be Careful With Fire	.54
Respect Wildlife	.59
Be Kind to Other Visitors	.45
General Environmental	.63

we could create a link for any organization that would like to assess the effectiveness of the PEAK Program with their population. Data collection through this system would eliminate human error introduced when manually entering respondents' answers for each item into the database. The electronic PAS may help LNT collect data that can support the goals of the program and will help LNT promote the PEAK Pack, potentially leading to a higher level of environmental awareness in children.

5.0 LITERATURE CITED

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