

TOWARDS UNDERSTANDING THE NEW PRODUCT ATTITUDES OF YOUNG MANUAL WHEELCHAIR USERS

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OBJECTIVE

The Youth Evaluation of Products (YEP) scale is a new measure of the attitudes and preferences of school-age children toward durable products. The purpose of this study was to assess the content validity and face validity of the YEP scale constructs and items when used to measure the attitudes of children who tested a new pushrim-activated power-assisted manual wheelchair (PAPAW) on an indoor obstacle course.

BACKGROUND

Wheelchairs enhance functioning in children by providing the mobility needed to access and explore their home, school, and community environments. When selecting a new wheelchair, children typically share decision making with their parents, assistive technology (AT) practitioners, and rehabilitation technology suppliers. This decision is shared because the variety of commercial options is great and complexity of these products can be high. However, when children and families do not share their preferences and needs during the assessment and prescription process, they may experience device dissatisfaction, intermittent use of the device, or device abandonment.¹⁻⁴

These are significant problems considering that the cost of an AT intervention includes the clinical assessment, procurement, and technical support needed to assemble, fabricate, and customize the wheelchair. Indeed, AT service teams and researchers need to understand and consider the product attitudes and preferences of consumers from the initial identification of product need to the evaluation of device effectiveness in the environments that children frequent.⁵

Although measurement scales are available to assess the match among the user, device, and environment,⁶ satisfaction of assistive technology devices and services,⁷ and the psychosocial impact of technologies⁸ for adults with physical disabilities, little progress has been made in assessing the product attitudes of children with disabilities. AT authorities contend this is because the “conceptual theory underlying [AT device] outcomes for children is not yet well developed.”^{9, p.9}

We created the generic YEP Scale¹⁰ to measure the attitudes of children, aged 8 to 14 years, toward durable consumer products – including AT devices. The YEP scale is a multi-dimensional measure that has 22 items in the form of opinion statements. Children rate how much they agree with a statement using a 7-point rating scale. Item ratings range from 1 (‘really disagree’) to 7 (‘really agree’). The overall score is determined by the mean of all 22 item ratings. Higher mean scores suggest that children have a more positive view of a product.

We created the YEP scale in consultation with clinicians, product specialists, and school-age children to show that the scale’s coverage of content and items were acceptable for common consumer durable products.¹⁰ With direction provided by content experts, we generated a pool of items for the YEP scale to tap children’s product attitudes in three areas: acceptability, practicality, and value (Table 1).

The reliability of YEP scale was estimated by involving 25 typically-developing children, between the ages of 8 and 13 years, in the evaluation of four different commercial bicycle helmets.¹¹ The internal consistency for the scale

ranged from $\alpha = .92$ to $.94$ and intra-rater reliability exceeded an intraclass correlation coefficient of $.80$. Both levels suggest acceptable reliabilities for the YEP scale for research applications.¹²

Table 1: YEP scale content areas and sample items

Content Area	Definition	Sample Item on YEP scale
Acceptability	degree to which the product is aesthetically pleasing and socially acceptable	I would use this product around my friends.
Practicality	degree to which the product is functional	This product does the things I need it to do.
Value	degree to which the product meets the users own needs and wants	I like this product better than other ones I've tried.

In a second study, 37 typically-developing 10- and 11-year-olds used the YEP scale and a ranking scale to evaluate four different school chair designs to explore its predictive validity.¹⁰ We found moderate-to-high positive correlations between the rankings and those predicted using the children's YEP ratings.

In the following study, we explored the content validity of the YEP scale constructs and face validity of the items when used to investigate the wheelchair preferences of 11 to 14 year-olds with mobility impairments. The study received ethical clearance from the Research Ethics Board at Holland Bloorview Kids Rehabilitation Hospital in Toronto, Canada.

METHODS

Participants

A purposeful sample of 6 wheelchair users (median age = 13 years; range 11-14 years; 3 boys/3 girls) participated. Children were eligible if they used a manual wheelchair for everyday activities for more than one year; were independent in their wheelchair use; were able to do independent standing transfers; and,

were able to engage in discussion about their product preferences in an interview.

Protocol

We conducted the study in two stages: individual interviews (Stage 1) and a focus group (Stage 2). We used this two-stage approach to look for consistency in children's responses within stages rather than between stages. We expected to use the data collected to strengthen (weaken) support for existing constructs and items, and uncover new dimensions.

During Stage 1, a research team member introduced the YEP scale and taught the child how to use it to indicate her product preferences. The child then used her own wheelchair to navigate through an indoor 60 m long circuit that included wheeling along a smooth, tiled hallway, over a short-pile carpet and gym mat, along a serpentine path, and over a 4 cm high doorsill. This first trip through the course allowed the child to become familiar with the circuit tasks.

Next, the researcher demonstrated the features and operation of an Alber eMotion PAPA W. The child transferred to the test wheelchair that was fitted with a 40 cm x 40 cm x 7.5 cm planar foam seat cushion. No wheelchair customizations were made other than tightening the pelvic belt for safety and adjusting the footrest height to support the feet.

The child wheeled through the course a second time using the PAPA W. After completing the circuit, the child used the YEP scale to rate the test wheelchair. An interview was then conducted with the child. The researcher identified 2-4 items from each domain that received higher/lower ratings relative to the ratings of other items. The researcher asked the child to discuss her ratings for each item selected.

All participants from the first stage were invited to return 2-3 weeks later to take part in a single 30-minute focus group in Stage 2. The session was organized to encourage children to share their views and attitudes toward wheelchairs in general. In this way, we could

explore how well the content areas of the YEP scale represented what children thought about wheelchairs. The focus group facilitator followed a semi-structured guide to encourage discussion of similarities and differences of product views among the children. The facilitator encouraged discussion beyond the bounds of the YEP domains to allow new dimensions to emerge.

Analysis

All interview and focus group discussions were audiotaped and later transcribed. Another researcher, who was neither involved in the interviews nor aware of the YEP ratings, analyzed the item-associated comments to judge the valence of the participants' rationale for selecting a rating. Valence was judged using a 3-point ordinal scale of 'negative', 'neutral', and 'positive'. We converted the children's YEP ratings for these items to one of these three ordinal categories. Item ratings from 1-3 were considered 'negative', a rating of 4 was 'neutral', and ratings from 5-7 were 'positive'. Weighted Kappa and percent agreement were calculated to assess concordance between the valence assigned by the researcher and the converted YEP scale ratings.

Two researchers independently analyzed the focus group transcript. Transcript passages where children shared their product attitudes were highlighted then assigned to either one of the three YEP scale constructs or a new dimension, if appropriate. The two researchers then met to discuss and resolve differences, and create a single consensus version of the dimension assignments.

RESULTS

In Stage 1, the mean YEP scale ratings for each of the 6 participants ranged from 3.6 to 6.9 on the 7-point scale. A total of 57 distinct item-associated comments were discussed with the children during the individual interviews. Weighted Kappa and agreement between participants' ratings and the researcher's valence categories were .88 and 80%, respectively.

In Stage 2, three children participated in the focus group. Eighty percent of the group discussion related to attitudes toward their own

wheelchairs, the PAPA, or wheelchairs in general. Of this, 70% of the discussion dealt with functional aspects of wheelchairs including comfort, safety, ease of operation, versatility, and size (practicality); 15% dealt with issues of the look and social acceptance of the wheelchair (acceptability); and 15% dealt with their own wheelchair needs and wants (value). The researchers did not identify any new dimensions.

DISCUSSION

This is the first study where we explored the validity of the YEP Scale when used to measure the attitudes of youth toward a new wheelchair. As suggested by Fuhrer and colleagues,⁵ AT outcomes are moderated temporally by many contextual factors. However, participants in our study had limited exposure to the features and operation of the PAPA and we controlled many factors that could influence the product attitudes of the child and the everyday use of the test wheelchair. As such, we did not design the study to predict whether the wheelchair was a good match for each child user. Rather, we allowed participants to become acquainted with the functioning of the new chair in a familiar indoor environment so they could offer their perspectives based on their limited exposure.

Unlike their own wheelchair, few adjustments were made to customize the product's fit for each participant. Consequently, some children struggled more with the operation of the new chair because of their own impairments, the basic training offered, and the short familiarization period.

Despite this, the children who participated were able to provide ratings for all items on the YEP scale. They appeared able to understand and appreciate the meaning of the selected items and the YEP rating scale as evidenced by the high concordance between the valence of their comments and the child's own ratings.

Our descriptive analysis of the focus group transcript suggested that the YEP scale taps into what kids generally think about wheelchairs. Participants focused mainly on the functional aspects of the wheelchair (practicality) and less time on the appearance and social acceptability of the device. Although

less time was spent on the assessment of the wheelchair's value, participants mentioned factors from the other two domains that influenced their views on whether a new wheelchair was right for them. Interestingly, these findings are consistent with consumer socialization theory that has school-aged children reaching an analytic stage whereby they can thoughtfully analyze a consumer product's value based on multiple dimensions.¹³

Clearly, the meaning of the YEP scale dimensions are interconnected and complex when used to assess the product attitudes of youth who use wheelchairs. Both interviews and focus group discussions helped to unravel the meaning of these constructs in more detail than the use of the questionnaire would allow on its own. Mixed methods such as these may be used to get a fuller understanding of the product attitudes of young wheelchair users, yet the time needed to acquire and interpret this information may be more than the time available to AT service teams.

CONCLUSIONS

This is first study of the YEP scale as a measure of the attitudes of youth with disabilities toward AT devices. The items and dimensions seem to correspond well to children's views about new wheelchair products. As such, this study provided additional evidence of the validity of the YEP scale as a measure of the product attitudes and preferences of young consumers. Further study of the measurement properties of the YEP scale for different AT interventions and users is recommended to strengthen the evidence for its adoption as a measure in clinical settings.

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