Research Article

Validation of 5 Stage-of-Change Measures for Parental Support of Healthy Eating and Activity

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ABSTRACT

Objective: To assess the validity of 5 parental stage-of-change (SOC) measures: (1) providing 5 servings/d of fruits and vegetables (FV), (2) limiting television (TV) to 2 h/d, (3) helping children achieve 1 h/d physical activity (PA), (4) limiting sugary drinks (SD) to 1 serving/wk, and (5) limiting fruit juice (FJ) to 4–6 oz/d.

Design: Cross-sectional instrument development study. Construct validity was evaluated by examining whether parental self-efficacy, parental readiness ladder (ladder), and child's behavioral levels (eg, FV consumption) exhibited a theoretically consistent pattern across the SOC.

Setting/Participants: Convenience sample (n = 283) of parents of children aged 4–10 years.

Measures: Survey assessed SOC, ladder, and child's behavioral level score for each topic (FV, TV, PA, SD, and FJ), and parental self-efficacy for measure except TV.

Analysis: Analysis of variance with Tukey–Kramer *post hoc* tests examined whether variables differed by SOC.

Results: Percentages of parents in the pre-action SOC were 34% (PA), 39% (FV), 42% (SD), 45% (TV), and 63% (FJ). Parental self-efficacy, ladder, and child's behavioral level differed significantly by SOC for each topic area ($P < .001$). Maintenance SOC was significantly higher than pre-action SOC.

Conclusions and Implications: Measured variables exhibited a theoretically consistent pattern across SOC, suggesting construct validity and potential usefulness for obesity prevention efforts.

Key Words: readiness, measures, parents, nutrition, television, stages of change, sugar-sweetened beverage, obesity (*J Nutr Educ Behav*. 2015;47:134-142.)

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INTRODUCTION

A third of all children are either overweight or obese,[1] which puts them at risk for a range of adverse outcomes including diabetes and cardiovascular disease.[2,3] Interventions for children are needed to prevent immediate consequences of obesity (eg, type 2 diabetes) as well as its related risks in adulthood.[4] Health care providers including pediatricians, dietitians, nutrition educators, and other allied health care professionals (*providers*) have an important role in addressing this problem.[5,6] Practice recommendations put forth by the Expert Committee,[7] a panel representing major professional health organizations (eg, American Academy of Pediatrics, Academy of Nutrition and Dietetics, American College of Sports Medicine) urged providers to assess self-efficacy and readiness to change for specific dietary practices and levels of physical and sedentary activity at each well-child visit.[7] However, a lack of validated measures has been available to assess parents' readiness to support their child's healthful eating and activity behaviors.

Readiness to change a behavior, also known as stage of change (SOC), is the central organizing construct of the transtheoretical model (TTM), a behavior change framework that explains the processes and principles of health behavior change.[8,9] The TTM categorizes readiness into 5 stages: (1) precontemplation (PC), when the person is not intending to change behavior to meet a specified behavioral criterion such as consuming 5 servings of fruit and vegetables (FV) a day; (2) contemplation (C), or thinking about making a change to meet the criterion in the next 6 months; (3) preparation (PR), or intending to change and meet the criterion in the next month; (4) action (A), or meeting the health criterion but for < 6 months; and (5)

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maintenance (M), when the person meets the health criterion for > 6 months. The TTM posits that individuals progress through the stages on their way to making a long-term behavior change, and this movement is produced to a greater or lesser extent by the model's independent variables: decisional balance, self-efficacy (SE), and the processes of change.[8,9] Stage of change is often assessed repeatedly so that the intervention for a particular person is adjusted (ie, stage-based) to promote movement from the person's current stage to the next higher stage and to prevent the person from moving backward to an earlier SOC.[10,11]

The current study evaluated the validity of 5 separate SOC measures for parental readiness to help their children meet the following health recommendations[6,7]: (1) provide the child with 5 servings of FV daily; (2) limit television time (TV) to ≤ 2 h/d; (3) promote 1 hour of moderate intensity physical activity (PA) every day; (4) avoid sugary drinks (SD); and (5) limit fruit juice (FJ) to 4–6 oz/d. Four studies examined parental readiness to help children with healthful behavior changes,[12-15] none of which used validated behavioral measures to assess parent helping behaviors. This study addressed this gap.

There were 3 hypotheses for the current study based on the extant literature[8,16-22] and the theoretical framework of the TTM. The first was that parents in stages A and M report that their children engaged in healthier levels of the behavior than those in pre-action stages (PC, C, and PR). More specifically, FV and PA behaviors were hypothesized to increase across the stages whereas TV, SD, and FJ were hypothesized to decrease. The second hypothesis was that SE for meeting the criterion increases across the SOC.[8,9,18,22] The third hypothesis was that the 2 measures of parental readiness, ie, SOC and the readiness ladder, correspond to each other such that ladder scores increase across the SOC.

METHODS

Sample

The researchers used passive methods to recruit this convenience sample. Flyers were posted in health and community centers in the city of Boston and advertisements were posted in local newspapers and online on Craig's List. Parents or legal guardians (*parents*) were eligible for the study if they: (1) self-identified as the principal caregiver of a child aged 4–10 years, (2) attended the child's last 2 well-child annual exams, (3) spoke and read English, and (4) were willing to bring their child into the study office for assessments.

Overview of Procedures

The institutional review boards at the University of Massachusetts–Boston and Boston University Medical Campus approved this study. The first study procedure was to review the literature for existing SOC measures and for the researchers to develop a draft of the parental SOC measures using guidelines outlined by Reed and colleagues.[17] Six content experts were mailed the survey draft and a follow-up phone call was performed to discuss feedback. The expert feedback, including input on wording, was incorporated into the revised SOC measures and the resulting measures were pilot-tested with 6 parents of children aged 4–10 years. The parents were interviewed about their understanding of the meaning of the SOC measures. These cognitive testing results were used to maximize comprehension, through edits to the wording. The next step was a cross-sectional survey study using a convenience sample of parents with children aged 4–10 years. The authors obtained written informed consent from the parents and verbal assent from the children. Parents completed a paper-and-pencil survey that included demographics, psychosocial, PA, TV, and dietary questionnaires. Parent and child height and weight were measured. Parents received a $20 gift card incentive. Survey data were collected at research offices from August, 2009 to August, 2011.

Measures

Stage of change. The 5 SOC measures created for the study can be found in Supplemental Materials. The structure of the measure included a specific behavioral criterion based on public health guidelines.[17] A 5-item response format was used for each behavior except for SD and FJ, because content experts proposed that the survey distinguish between parents in M whose child used to consume these unhealthy beverages but stopped doing so and parents in M whose child never consumed these beverages. Each response option corresponded to a single stage: 1 = PC; 2 = C; 3 = PR; 4 = A; and 5 = M.[8]

Readiness ladder. A readiness ladder was created for each target behavior (Supplemental Materials). Readiness ladders have been used as an alternate method of assessing readiness to change.[17] These measures used the same behavioral criterion as the corresponding stage measure combined with the stem *How ready are you to …* and the response options to *on a scale from 0 to 10?* Participants were asked to circle a number from 0 (not ready) to 10 (very ready) or the option *already do [criterion behavior].* Each number was equally spaced across the page. The response *already do it* was coded as 11. The scale was divided into categories of 0–2, 3–4, 5–6, 7–8, 9–10, and 11 *(already do it)* for ease of interpretation.

Self-efficacy. Self-efficacy was defined as parents' confidence in their ability to help their child engage in the healthful behavior under a variety of difficult situations.[23] The current authors developed SE scales for FV, PA, SD, and FJ (inadvertently, a scale for TV was not developed for this study).[24] Each scale included 4 items that reflected a range of difficult situations. All scales used the same stem, *How sure are you that you could …*, followed by the criteria for the target behavior. For example, *How sure you are that you could help your child get 1 hour of moderate-intensity PA every day when there are too many other things to worry about?* Items were rated 1 = *not sure* to 5 = *extremely sure.* A sum score for each of the 4 scales was calculated. Cronbach alphas for these SE scales[24] was .80 (PA), .84 (FV), .86 (FJ), and .87 (SD), which are comparable to alphas for adolescent and adult SE scales for FV (.86)[20,21] and PA (.82)[22]