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Development and Initial Validation of the Support for Healthy Lifestyle (SHeL) Questionnaire for Adolescents

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Abstract

This study developed and provided initial validation for the Support for Healthy Lifestyle (SHeL), a set of scales designed to measure adolescent-perceived social support of healthy eating and physical activity. Item pool development utilized a prior focus group study of adolescents' perceptions of socially supportive behavior and a review of the literature on social support for health behavior change in adolescents. Exploratory factor analysis of the item pool completed by 220 adolescents, internal consistency estimates, and expert review of items and consensus resulted in 9 scales for the SHeL: Family Healthy Eating Support, Family Physical Activity Support, Family Hypocritical Control, Peer Health Eating Support, Peer Physical Activity Support, Peer Undermining, Professional Healthy Eating Support, Professional Physical Activity Support, and Professional General Support. Scale internal reliability estimates were $\alpha = .73-.96$. Supporting construct validity, the SHeL showed a pattern of stronger correlations between measures of the same source (parent/peer) and target behavior (healthy eating/physical activity) and stronger correlations with corresponding Sallis scales vis-à-vis other Sallis scales, with exceptions related to peer support for healthy eating. Divergent validity was somewhat limited, including in two instances, the SHeL scale was more strongly correlated with another SHeL scale. Supporting criterion validity, often the SHeL scales were correlated with related health behaviors. This study

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provided important psychometric information for a new measurement of social support for health behavior for adolescents. Further research with larger, more diverse, and treatment-seeking populations is needed to provide further validation of the SHeL and to begin to establish normative scores.

Keywords

Measurement; Social Support; Eating Habits; Physical Activity; Health Promotion; Adolescence

The high prevalence of pediatric obesity and the associated health problems are well documented. The role of social influences on young people's weight-related health behaviors pervades the literature on pediatric and adolescent obesity (Birch & Davison, 2001; Salvy, de la Haye, Bowker, & Hermans, 2012). In fact, the most effective lifestyle interventions for childhood obesity are family-based, typically including parents or similar caregivers as key agents of health behavior change in children, and use approaches rooted in social cognitive theory (SCT; e.g., goal-setting, reward, stimulus control) (Altman & Wilfley, 2015; Kitzmann et al., 2010). SCT posits that social context can facilitate or hinder the development of self-efficacy and behavior change and suggests that supportive relationships are necessary facilitators of health behavior change in youth (Bandura, 2004). Considering that no adolescent lifestyle obesity interventions are yet considered well-established (Altman & Wilfley, 2015), there is a need to better understand and target the influences on adolescent health behaviors. Recent developments in adolescent obesity interventions have recognized the importance of social influences and have aimed to improve outcomes through meeting the unique social support needs of adolescents through teaching parents autonomy support and communication skills (Wilson, Alia, Kitzman-Ulrich, & Resnicow, 2014; Wilson et al., 2011) and enhancing peer support (Jelalian et al., 2010; Kulik et al., 2014). Given the focus on social facilitators of health behavior change in adolescent obesity interventions and developmental shifts in social relationships to increased interactions with peers and extra-familial adults that occur during adolescence, Stronger understanding of the types and sources of support for adolescent health habits and means to measure social support received by adolescents are needed to study influences on weight-related behaviors, tailoring weight management interventions, and testing mediators of intervention outcomes for this developmental period (Draper, Grobler, Micklesfield, & Norris, 2015).

The study of social support for adult weight management has typically focused on *functional support*, defined as individuals' perception that individuals within their social network facilitate their health-promoting behavior. Descriptions of functional support commonly include emotional (e.g., encouraging), instrumental (e.g., practical help), informational (e.g., useful knowledge), and companionship (e.g., activity partner). This conceptualization of support is consistent with the pediatric literature for adherence to medical regimens, which commonly references similar types of functional support (DiMatteo, 2004). To date, there has been limited study of social support for weight management behaviors among adolescents, and explicit conceptual definitions of social support for adolescent weight-related behaviors are rare. Much of the empirical study of social support and adolescent

weight-related health behaviors to date has utilized a set of scales developed by Sallis and colleagues (Norman et al., 2010; Sallis, Grossman, Pinski, Patterson, & Nader, 1987). Research with these instruments has supported the notion that family and peer support of physical activity is positively associated with adolescents' engagement in physical activity (Kelly, Melnyk, & Belyea, 2012; Prochaska, Rodgers, & Sallis, 2002; Sallis, Taylor, Dowda, Freedson, & Pate, 2002). Unfortunately, the study of social support for healthy eating has been limited by poor internal consistency of the healthy eating social support scales (Jelalian et al., 2008) and complications of interpreting findings across studies that have used various measurement adaptations (Hagler, Norman, Radick, Calfas, & Sallis, 2005; Prochaska et al., 2002; Sallis et al., 2002). Further limitations of these scales for studying adolescent health behaviors are the use of focus groups with *adults* for item development (Sallis et al., 1987) and validation with a young adult sample (Norman et al., 2010), making the developmental appropriateness of this operationalization of support unclear.

Improvements in construct conceptualization and measurement are needed to advance this important area of inquiry. A recent focus group study (Biggs et al., 2014) advanced the definition of social support for healthy eating and physical activity pertinent to adolescents. In this study, adolescents—all of whom had a recent body mass index (BMI) qualifying as overweight or obese—readily named family and friends as desired sources of support for health behavior and also discussed types of support desired from professionals. Themes overlapped with types of functional support identified in the broader literature (e.g., instrumental, emotional, informational, companionship) as well as constructs from SCT (e.g., modeling) and SDT (e.g., supporting autonomy, monitoring). Notably, descriptions of desired support were characteristic of adolescence. For example, desire for autonomy was evident in descriptions of desired encouragement from parents and professionals in the form of conversations rather than directives and in the desire for professionals to get to know the adolescent and her goals before providing advice. Also, parents' engagement in healthy behaviors was viewed less as a model to emulate and more as making parents' encouragement genuine and not hypocritical. Both family and peers were described as unhelpful when they engaged in or otherwise encouraged unhealthy behaviors or were critical (family) or teasing/negative (peers) around the adolescents' behaviors. Although this study made an important contribution to defining social support of adolescents' health behaviors, there is no published empirical measure developed to capture this construct description.

The goals of the current study were (1) to create measures of social support with a focus on content validity specific to adolescents' desired support from family, peers, and professionals for physical activity and healthy eating and (2) to provide preliminary psychometrics for the measures. The intended purpose for scale development was to support the empirical study of the construct of social support as it relates to adolescent weight status, health behaviors, and behavior change with distinct scales by relationship type, i.e., family, peers, and professionals. A more distal aim was to create a set of instruments that could be clinically useful pending further evaluation of the measures relevant to clinical practice (e.g., sensitivity to change, predictive validity). Consistent with published guidelines for measurement development (Holmbeck & Devine, 2009; Worthington & Whittaker, 2006), this study aimed to provide data on (1) scale structure, (2) internal consistency, (3)

convergent and divergent validity, and (4) concurrent criterion-related validity. The study hypothesized that the Support for Healthy Lifestyle (SHeL) would consist of distinct scales for support of each type of target behavior (healthy eating, physical activity) within each relationship type (family, peer, professional) and that the scales would demonstrate acceptable internal consistency. The study hypothesized construct validity would be further supported in that the SHeL scales would be moderately correlated with each other and moderately correlated with the existing Sallis measures of social support, with a pattern of stronger correlations between measures of the same source (parent/peer) and target behavior (healthy eating/physical activity) and weaker correlations among measures of differing sources and/or target behaviors.. Finally, the study hypothesized concurrent criterion-related validity would be supported by positive correlations between SHeL scales for support for healthy eating with reports of healthy eating behaviors (i.e., eating habits, fruit and vegetable intake, intuitive eating), positive/negative correlations between SHeL scales for support for physical activity with engagement in physical activity, and sedentary activity, respectively.

Methods

Participants

Data from two samples were combined to have an adequate sample size for exploratory factor analysis (Mundfrom, Shaw, & Ke, 2005; Worthington & Whittaker, 2006). Both samples were identified through an electronic medical record search, drawing from the full practice of a large, multi-site Midwestern medical practice that includes primary and specialty care. For both samples, inclusion criteria were age 13-18 years, and exclusion criteria were current or past diagnosis of anorexia nervosa, bulimia nervosa, or eating disorder not otherwise specified. The Body Mass Index criterion for Sample 1 was a BMI at or above the 85th percentile within the previous two years, and the BMI criteria for Sample 2 was a BMI at or above the 95th percentile within the last year, i.e., overweight and obese ranges, respectively, per established definitions (Barlow and the Expert Committee, 2007). In selecting these criteria, we considered best practice guidelines that recommend further assessment of health risk for BMI at or greater than 85th percentile and targeted interventions when BMI is at or above the 95th percentile (Barlow et al., 2007). The purpose of differing BMI criteria for the two samples was to arrive at a sample of adolescents that included individuals with recent BMIs that could trigger evaluation of health risk and lifestyle recommendations and to oversample individuals with BMIs that would trigger intervention including lifestyle modification.

For Sample 1, of the 1,996 unique cases identified, 1,025 were screened, with 803 meeting inclusion criteria. Of the 706 contacted, 143 provided consent and assent, and 120 completed the study. For Sample 2, all 1310 adolescents identified and their parents were mailed an invitation letter. A total of 116 parents provided consent, 6 were withdrawn due to not meeting study criteria, and 100 adolescents completed the survey, of which 97 had a parent complete the parent survey.

Procedures

Item generation followed multiple methods suggested for establishing content validity (Holmbeck & Devine, 2009; Worthington & Whittaker, 2006): (1) Co-authors who had participated in the formative focus group study (BB, JL, and KH) (Biggs et al., 2014) created items that covered the study themes and the types of support identified in the literature, drawing from transcript verbiage as much as possible. Specifically, the team ensured that family support items covered themes of practical assistance (instrumental), encouraging and recognizing efforts (emotional), avoiding negativity (emotional), leading by example (modeling), and not ignoring or colluding with unhealthy behaviors. Peer support items covered themes of encouraging and recognizing efforts (emotional), engaging in healthy behaviors together (companionship), not encouraging unhealthy behaviors (companionship), and avoiding negativity/teasing. Professional support items covered themes of informed guidance (informational), encouraging and recognizing efforts (emotional), building rapport/knowing the adolescent (supporting autonomy), and encouraging accountability (monitoring). (2) A review panel with expertise in obesity treatment and health promotion (BKB, KG, KVR, MMC) and patient health literacy (KV) reviewed and revised the item pool and questionnaire instructions for clarity, content coverage, and reading level, resulting in a pilot version of the SHeL. The Mayo Clinic Institutional Review Board approved all study procedures and materials. Participants from both samples provided written informed consent/assent by mail after discussing the study with a study coordinator and subsequently completed questionnaires via a secure Internet link and received a small monetary remuneration.

Measures

Demographic and Health Perceptions Questionnaire.—Adolescents in both samples responded to questions about their gender, racial, and ethnic identification; perceived weight status (underweight, overweight, about right); current height and weight; and desire to gain, lose, or maintain weight. Parents responded to demographic questions and similar questions about their perceptions of the adolescents' weight status. Sample 2 parents responded to additional questions not included in these analyses.

Support for Healthy Lifestyle (SHeL).—Assessment of family support used the item stem, “In the last month, how often has a member of your family, such as a parent, brother, sister, or grandparent,...” followed by 31 family support items. The response set was a Likert-type scale ranging from *Never* (0), to *Almost Always* (4). The peer support item stem, “In the last month, how often has a friend or other peer, such as a classmate, teammate, boyfriend, or girlfriend,...” was followed by 32 items with the same frequency response set. For professional support, adolescents first responded to the question, “With which of the following professionals have you had contact?” with a response set of doctor/physician, fitness trainer, sports coach, dietitian/nutritionist, teacher, therapist/psychologist, activity leader (e.g., scouts, clubs, dance), school counselor, and prompts to indicate the amount of time in years and months since their last contact. Next came the item stem, “In the last month, how often has a professional, such as a doctor, trainer, coach, dietitian, teacher, therapist, or activity leader,...” and 31 items with the same frequency response set as the other scales. The supplemental provides information about the full item pool.

Body mass index (BMI).—Study staff recorded each adolescent’s height, weight, BMI, and BMI percentile from their electronic medical record, using the measurement closest to the adolescent’s survey participation date.

Convergent validity measures—Sallis social support scales.—Adolescents in Sample 1 completed the 4-item Physical Activity Family Support (PA Family), 5-item Physical Activity Friend Support (PA Friend) scales (Norman, Sallis, & Gaskins, 2005), the 4-item Fruits and Vegetable Family Support (FV Family), and 3-item Fruits and Vegetable Friend Support (FV Friend) scales (Hagler et al., 2005). For each item, participants rated the frequency of supportive behavior from *Never* (1) to *Every day* (5). Concurrent validity for the PA Family, PA Friend scales (Kelly et al., 2012), and the FV Family scale has been supported, but not the FV Friend scale (Zabinski et al., 2006). In the current study, internal consistency was $\alpha = 0.73$ and $\alpha = 0.74$ for the PA and FV Family scales, respectively, and $\alpha = 0.69$ for the PA Friend scale. FV Friend scale internal consistency was incalculable due to negative average covariance.

Criterion validity measures--dietary habits.—Adolescents in Sample 1 completed the 2- item PACE+ Fruit and Vegetable Measure to report servings of fruits and vegetables consumed in a typical day from *None* (0) to *Four or more* (4). (Prochaska & Sallis, 2004) Internal consistency in the current sample was $\alpha = 0.69$. They also completed the 13-item dietary subscale of the HABITS questionnaire to report frequency of healthy and unhealthy eating habits (e.g., regular meals, fruit and vegetable consumption, consumption of calorically dense foods and beverages) ranging from *Never* (0) to *Twice/day* (3). (Wright et al., 2011)

Adolescents in Sample 2 responded to 3 items assessing their responsivity to satiety cues, with higher scores indicating higher levels of intuitive eating (Denny, Loth, Eisenberg, & Neumark-Sztainer, 2013); internal consistency in this sample was $\alpha = .60$.

Criterion validity measures--physical and sedentary activity.—Adolescents in Sample 1 completed the Self-Administered Physical Activity Checklist (SAPAC) (Sallis et al., 1996), which assesses minutes spent in physical and sedentary activity. Scores were calculated by averaging total minutes of physical/sedentary activity across three days.

Criterion validity measures—healthy weight management strategies.—Adolescents in Sample 2 reported frequency they engaged in healthy behaviors to manage their weight in the last year, including exercise, eating more fruits and vegetables, eating less high-fat foods, eating less sweets, drinking less soda pop, and watching portion sizes (Neumark-Sztainer, Story, Hannan, Perry, & Irving, 2002). Response options were modified from the original (yes/no) to indicate frequency: ranging from *never* (0), to *on a regular basis* (3). Internal consistency for the scale in this sample was $\alpha = .78$.

Scale Content Selection and Statistical Analysis Plan

Item analysis was conducted, which excluded three family support and three peer support (six items total) from the item pool based upon item discrimination <0.2 and a higher “alpha if deleted” than the total Cronbach’s alpha. Exploratory factor analysis (EFA), using oblique

rotation in the R (version 9.4.1) package *psych*, run separately for each source of support (family, peer, professional) using 28/31, 29/31, and 31/31 items respectively, identified the underlying factors of the SHeL. Examination of Eigenvalues, scree plots, parallel analysis, cumulative variance, factor interpretability, and reproducibility determined the number of factors after examining 2-, 3-, and 4-factor structures for each source of support. Adequately loading items were defined at the ≥ 0.4 level, and there were no cross-loading items using the same cut off. A review panel with expertise in behavioral interventions for weight management (MMC, KG, MC, BKB), adolescent health promotion (BKB, MC, MTO), and measurement development related to health behavior change (MMC), independently ranked items within each category (family/peer/professional x healthy eating/physical activity/general) according to relevance of that item for the construct. Final scale content was determined by panel consensus, which considered results from factor analyses, item content (i.e., type of support reflected), and expert item rankings. To maintain reasonable scale length, items reflecting duplicate content were culled. Bivariate correlations (calculated with SPSSv22) tested study hypotheses regarding SHeL inter-correlations and correlations with the corresponding Sallis social support measures (i.e., convergent validity) and measures of adolescent health behaviors (i.e., concurrent criterion validity).

Results

Participant characteristics

Demographic, BMI, and weight perception information for the two samples are summarized in Table 1. As intended, most of the participating adolescents had a BMI in the overweight/obese range, with two thirds in the obese range. Most participants and their parents wanted the adolescent to lose weight.

Subscale creation

Six items were removed based on item-level descriptive information. Examination of Eigenvalues, scree plots, and factor interpretability identified a two-factor solution for the family support scale, a three-factor solution for the peer support scale, and a three-factor solution for the professional support scale. Total number of items was reduced from 94 (minus 6 excluded items) to 59. Table 2 lists the final item selections for each subscale as well as factor loadings, item descriptives (means, standard deviations, range, item-total correlations), scale descriptive (alpha, average inter-item correlation and range), and relative expert item rankings. Of note, all scale alphas were >0.7 . EFA was rerun with the reduced final scale which confirmed identical factor structure and reproducible loading levels >0.4 . Although factor analysis of the family support items resulted in a 2-factor solution that combined positive support for healthy eating and physical activity in the same factor, expert panel consensus was to divide positive support into two scales to distinguish support for healthy eating and physical activity, given that the target health behaviors are typically studied separately. Subscale reading levels ranged from the fifth- to seventh-grade. Scale scores were calculated as the mean across items, with negatively loading items reverse-scored.

Adolescents reported contact with a number of professional adults: doctor/physician (91% Sample 1, 74% Sample 2), dietitian/nutritionist (20%, 34%), fitness trainer (22%, 18%), sports coach (67%, 23%), psychologist/therapist (28%, 29%), school counselor (39%, 18%), activity leader (41%, 12%), and teacher (70%, 29%).

Convergent/Divergent Validity

Interscale correlations.—Table 3 lists bivariate correlations among the SHeL subscales. Scales sharing source of support were correlated in the expected directions, with the exception of a positive association between Peer PA Support and Peer Undermining. Correlations among subscales suggested related but distinct subscales, with the highest association between Family HE and PA Support, consistent with factor analysis result of a single family positive support factor. As expected, correlations of the support scales were stronger within source than between sources of support and between shared behavioral targets than across sources and targets; some of the lowest correlations were observed between the support scales and Family Hypocritical Control and Peer Undermining scales. Although convergent validity was largely supported, divergent validity was less clear in that many of the correlations between measures of different sources and types of support were statistically significant although smaller than the convergent correlations. In two instances, there was a higher correlation of the SHeL support scale with another SHeL support scale compared to its correlation with its corresponding Sallis scale (i.e., the SHeL Family HE Support scale with the SHeL Family PA Support and the SHeL Peer HE Support scale with the SHeL Peer PA Support scale). Interestingly, Family Hypocritical Control was *positively* correlated with Professional Healthy Eating Support, Professional General Support and was positively correlated with Peer Undermining, and Peer Undermining was *positively* correlated with Peer PA Support.

Correlations with existing Sallis measures of social support.—The SHeL scales were correlated with existing measures of social support as expected, with the exception of the correlation between the SHeL and Sallis measures of peer support of healthy eating (Table 3). As expected the largest correlations occurred between scales measuring the same source and target behavior (e.g., SHeL Family HE Support with Sallis Family Fruit and Vegetable Support) and were medium to large in size. Regarding divergent validity, correlations between SHeL and Sallis scales measuring different sources and targets were smaller than those measuring the same constructs; however, many of the divergent validity correlations were statistically significant.

Criterion Validity

Correlations of the SHeL scales with adolescent-reported weight management strategies, eating behaviors, and time spent in physical and sedentary activity were generally in expected directions with a number of these hypothesized associations reaching statistical significance (Table 4). Each of the SHeL scales was significantly correlated with at least one related criterion variables with the exception of the Peer Healthy Eating Support scale. Of particular relevance to hypotheses, expected statistically significant correlations occurred for Family HE Support with fruit and vegetable intake, eating habits, intuitive eating, and healthy weight management strategies; Family PA Support was correlated with healthy

weight management practices. Family PA Support was not correlated with physical activity or sedentary activity. Peer PA support with physical activity and healthy weight management strategies; Professional HE Support with healthy weight management strategies; Professional PA support with physical activity and healthy weight management practices. Although hypotheses focused on associations with supportive behaviors, notable significant correlations occurred with unsupportive behaviors; specifically, Family Hypocritical Control was associated with less fruit and vegetable intake, poorer eating habits, and sedentary activity, and Peer Undermining was associated with less intuitive eating and greater sedentary activity.

Discussion

Results of this study of the questionnaire, Support for Healthy Lifestyle (SHeL) provide initial evidence of its ability to provide reliable and valid assessment of adolescent perceptions of support from family, peers, and professionals around healthy eating and physical activity. The current study has several important strengths. First, the measurement development supported strong *content validity* by utilizing information from focus groups with adolescents, expert review of the item pool, and attention to the published literature on functional social support for health behaviors. Second, the SHeL includes measures of supportive behavior from *professionals*, an important but unrepresented source of support in existing measures of support for adolescent health behavior. Third, *internal consistency* was found to be at a level of good to excellent across subscales. Fourth, the study provided important information regarding the SHeL's *construct validity* through results of EFAs and convergent and divergent patterns of associations of the SHeL subscales with one another and the widely used Sallis measures of social support. Finally, the study found initial support for *concurrent criterion-related validity* in that most of the scales were related in expected directions with corresponding health behaviors.

Exceptions to hypothesized results occurred with the SHeL Peer Healthy Eating Support scale, as it was not significantly correlated with the corresponding Sallis Peer Fruit and Vegetable Support scale nor was it correlated with any of the criterion variables and it was more strongly correlated with the SHeL Peer PA Support scale than its corresponding Sallis scale. It is possible that the lack of support for convergent validity was influenced by poor internal consistency of the Sallis healthy eating scales found in this and prior studies (e.g., Jelalian et al., 2008) as well as content validity issues. It is notable that the Sallis Peer FV Support scale includes items of both supportive and undermining behaviors. This study's findings that supportive and undermining behaviors are distinct constructs might explain the poor (in this case incalculable) internal consistency of the Sallis Peer FV Support scale. Another possible interpretation of these findings is that they reflect a method factor, as there was one other SHeL scale (Family HE Support) that was more strongly correlated with another SHeL scale (Family PA Support) than with its corresponding Sallis support measure. Yet another possible interpretation of these results is that peers are not a typically strong influence on *healthy* eating despite indications in this study that peer *undermining* behaviors are associated with less intuitive eating and more sedentary activity. Further study is needed to understand the psychometrics of the SHeL Peer Healthy Eating Support scale.

Although convergent validity was largely supported, divergent validity was less clear in that many of the correlations between measures of different sources and types of support were statistically significant although smaller than the convergent correlations and, as noted above, two scales were more strongly correlated with a SHeL scale than with its corresponding Sallis scale. These findings might reflect a method factor. It is also conceivable that the modest divergent validity correlations could reflect common influences of sources of support on different health behaviors (e.g., families influencing both eating and physical activity) and influences of one source on other sources of support (e.g., families who support physical activity might, in doing so, facilitate access to peers who support physical activity, e.g. sports teams). Nonetheless, these modest correlations indicate the need to examine further the degree to which the SHeL scales measure distinct constructs that could have unique influences on adolescents' health behaviors.

Although results from the EFAs largely resulted in factors reflecting expected distinctions between support of healthy eating and support of physical activity, some interesting patterns emerged. While not expected a priori, the separation of the family support items into two factors, one factor reflecting positive support (e.g., encouragement, practical assistance, setting a positive example) of healthy eating and physical activity and one factor reflecting negative behaviors (e.g., nagging, modeling less healthy behaviors) suggests that family members exert similar levels of support and/or control across health behaviors, whereas peer and professional support may be more context/relationship-specific (e.g., sports teams, dietary counseling). Construct validity for maintaining distinct family support scales for healthy eating and physical activity was supported by the patterns of correlations of these scales with existing measures of familial social support (i.e., convergent and divergent validity). The emergence of a distinct Hypocritical Control scale, which was modestly correlated with the family support scales, suggests that it is important to consider familial nagging, controlling, and poor modeling/undermining separately from positive support. The construct of Hypocritical Control further fits with literature that suggests parental dietary over-control can lead to difficulties with dietary self-regulation and overeating (Savage, Fisher, & Birch, 2007) and with the literature on autonomy-supportive parenting, which posits parents positively influence adolescents' health behaviors when they encourage autonomous decision-making within supportive limits (Joussemet, Landry, & Koestner, 2008).

For peer support, a Peer Undermining scale emerged that was distinct from the Peer HE and PA Support scales. Correlations between Peer Undermining and the Support scales suggest that the constructs of peer support and undermining are largely orthogonal; adolescents may face barriers to healthy habits even in the context of positive support of healthy eating and physical activity. In fact, our results indicate peer undermining behaviors are more likely to occur when support for physical activity is relatively high. The importance of examining peer undermining separately from HE and PA support was underscored by our findings that Peer HE Support was not significantly associated with adolescents' health behaviors, including eating, but Peer Undermining was associated with lower intuitive eating and engagement in sedentary activity.

The study provided support for criterion validity, specifically concurrent associations of social support with adolescent-reported healthy weight management strategies, eating habits, and physical activity levels. Interestingly, no source of positive support was significantly related to sedentary activity; however, controlling and undermining behavior from family and peers, respectively, were related to sedentary activity and peer undermining was further associated with less intuitive eating. One implication of these findings is that interventions should not only aim to increase support for healthy behaviors but should also aim to replace controlling and undermining behaviors with positive forms of support and/or empower adolescents to more effectively navigate relationships in which unhealthy habits are encouraged. Another interesting pattern of results was that healthy eating behaviors were more consistently associated with familial support, and that peer and professional support were more consistently related to physical activity. This pattern of findings may reflect that families' influence over eating habits is sustained through adolescence (Videon & Manning, 2003), whereas their influence over physical activity weakens (Gustafson & Rhodes, 2006) and the role of friends and peers in physical activity increases in the transition from childhood to adolescence (Fitzgerald, Fitzgerald, & Aherne, 2012).

The constructs of extra-familial adult support for weight-related health behaviors is novel to this study. On a positive note, the more support adolescents reported from professionals across categories, the more likely they were to report healthy weight management practices. Of course, direction of effects cannot be determined in a cross-sectional study. Aside from healthy weight management, globally speaking, the most notable associations between professional support and adolescent weight-related behaviors revolved around physical activity. Professional PA Support was also positively associated with intuitive eating. Further, Professional HE Support had a small positive association with physical activity. Associations of professional HE support and eating behaviors were not well supported in this study. "Professional" was broadly defined in this study. It is possible that the associations were driven by adolescents with greater involvement in sports or working with a trainer on being more active and by more active adolescents being more likely to report extra-familial adult support. In contrast, associations between professional support and health behaviors may be attenuated in the context of working with medical professionals and dietitians, as low physical activity and/or poor diet might trigger these contacts. Future studies investigating extra-familial adult support from more specifically defined sources might provide greater clarity of the role of professional support in adolescent healthy weight behaviors.

Limitations and Future Directions

This study has several important limitations. Due to fairly low response rate, there was potential for response bias such as potentially greater inclusion of adolescents interested in the topic and high representation of White, non-Hispanic adolescents; thus, further study of the SHeL with youth from diverse backgrounds and recruitment methods that may yield higher response rates (e.g., face-to-face approach in a clinic setting) would be informative. It would also be interesting to explore whether aspects of social support and/or the relations of social support with health behaviors differ by adolescent weight status. Although criterion validity was supported with self-report measures of weight-related behaviors, inclusion of

objective measures of physical activity (e.g., activity meters) and eating habits (e.g., dietary recall) would provide a stronger evaluation. This initial measure development and validation study did not address all aspects of measurement reliability and validity. Subsequent studies should confirm the scales' factor structures, test the SHeL's temporal stability, further evaluate validity using an independent and more diverse sample, and evaluate clinical and incremental utility. Suggested future directions to support clinical use of the SHeL include examination of perceived usefulness versus participant burden, sensitivity of the scales to change, and predictive criterion validity (e.g., does the degree of social support predict changes in health behaviors or engagement in intervention?).

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

References

- Altman M, & Wilfley DE (2015). Evidence update on the treatment of overweight and obesity in children and adolescents. *J Clin Child Adolesc Psychol*, 44(4), 521–537. [PubMed: 25496471]
- Biggs BK, Lebow J, Smith CM, Harper KL, Patten CA, Sim LA, & Kumar S (2014). Adolescents' preferences for social support for healthful eating and physical activity. *Journal of Developmental & Behavioral Pediatrics*, 35(8), 494–509. [PubMed: 25229275]
- Birch LL, & Davison KK (2001). Family environmental factors influencing the developing behavioral controls of food intake and childhood overweight. *Pediatric Clinics of North America*, 48(4), 893–907. [PubMed: 11494642]
- Cohen S, Underwood LG, & Gottlieb BH (2000). Social support measurement and intervention: A Guide for health and social scientists. In Cohen S, Underwood LG, & Gottlieb BH (Eds.). New York, NY, US: Oxford University Press.
- Denny KN, Loth K, Eisenberg ME, & Neumark-Sztainer D (2013). Intuitive eating in young adults: Who is doing it, and how is it related to disordered eating behaviors? *Appetite*, 60(1), 13–19. [PubMed: 23063606]
- DiMatteo MR (2004). Social support and patient adherence to medical treatment: a meta-analysis. *Health Psychology*, 23 (2), 207–218. [PubMed: 15008666]
- Draper CE, Grobler L, Micklesfield LK, & Norris SA (2015). Impact of social norms and social support on diet, physical activity and sedentary behaviour of adolescents: a scoping review. *Child care, health and development*, 41(5), 654–667.
- Fitzgerald A, Fitzgerald N, & Aherne C (2012). Do peers matter? A review of peer and/or friends' influence on physical activity among American adolescents. *Journal of Adolescence*, 35(4), 941–958. [PubMed: 22285398]
- Gustafson SL, & Rhodes RE (2006). Parental correlates of physical activity in children and early adolescents. *Sports Medicine*, 36(1), 79–97. [PubMed: 16445312]
- Hagler AS, Norman GJ, Radick LR, Calfas KJ, & Sallis JF (2005). Comparability and reliability of paper-and computer-based measures of psychosocial constructs for adolescent fruit and vegetable and dietary fat intake. *Journal of the American Dietetic Association*, 705(11), 1758–1764.
- Holmbeck GN, & Devine KA (2009). An author's checklist for measure development and validation manuscripts. *Journal of Pediatric Psychology*, 34(7), 691–696. [PubMed: 19487232]
- Jelalian E, Hart CN, Mehlenbeck RS, Lloyd-Richardson EE, Kaplan JD, Flynn-O'Brien KT, & Wing RR (2008). Predictors of attrition and weight loss in an adolescent weight control program. *Obesity*, 16(6), 1318–1323. [PubMed: 18356834]
- Jelalian E, Lloyd-Richardson EE, Mehlenbeck RS, Hart CN, Flynn-O'Brien K, Kaplan J, et al. (2010). Behavioral weight control treatment with supervised exercise or peer-enhanced adventure for overweight adolescents. *The Journal of Pediatrics*, 157(6), 923–928 e921. [PubMed: 20655544]

- Joussemet M, Landry R, & Koestner R (2008). A self-determination theory perspective on parenting. *Canadian Psychology Psychologie canadienne*, 49(3), 194–200.
- Kelly S, Melnyk BM, & Belyea M (2012). Predicting physical activity and fruit and vegetable intake in adolescents: A test of the information, motivation, behavioral skills model. *Research in Nursing & Health*, 35(2), 146–163. [PubMed: 22262049]
- Kitzmann KM, Dalton WT 3rd, Stanley CM, Beech BM, Reeves TP, Buscemi J, . . . Midgett EL (2010). Lifestyle interventions for youth who are overweight: a meta-analytic review. *Health Psychology*, 29(1), 91–101. [PubMed: 20063940]
- Kulik NL, Fisher EB, Ward DS, Ennett ST, Bowling JM, & Tate DF (2014). Peer support enhanced social support in adolescent females during weight loss. *American journal of health behavior*, 38(5), 789–800. [PubMed: 24933148]
- Kumar S, & Kelly AS (2017). Review of Childhood Obesity: From Epidemiology, Etiology, and Comorbidities to Clinical Assessment and Treatment. *Mayo Clinic Proceedings*, 92(2), 251–265. [PubMed: 28065514]
- Mundfrom DJ, Shaw DG, & Ke TL (2005). Minimum sample size recommendations for conducting factor analyses. *International Journal of Testing*, 5(2), 159–168.
- Neumark-Sztainer D, Story M, Hannan PJ, Perry CL, & Irving LM (2002). Weight-related concerns and behaviors among overweight and nonoverweight adolescents: implications for preventing weight-related disorders. *Archives of Pediatric and Adolescent Medicine*, 156(2), 171–178.
- Norman GJ, Carlson JA, Sallis JF, Wagner N, Calfas KJ, & Patrick K (2010). Reliability and validity of brief psychosocial measures related to dietary behaviors. *The International Journal of Behavioral Nutrition and Physical Activity*, 7, 56. [PubMed: 20594360]
- Norman GJ, Sallis JF, & Gaskins R (2005). Comparability and reliability of paper-and computer-based measures of psychosocial constructs for adolescent physical activity and sedentary behaviors. *Research quarterly for exercise and sport*, 76(3), 315–323. [PubMed: 16270708]
- Prochaska JJ, Rodgers MW, & Sallis JF (2002). Association of parent and peer support with adolescent physical activity. *Research quarterly for exercise and sport*, 73(2), 206–210. [PubMed: 12092896]
- Prochaska JJ, & Sallis JF (2004). Reliability and validity of a fruit and vegetable screening measure for adolescents. *Journal of Adolescent Health*, 34(3), 163–165. [PubMed: 14967337]
- Sallis JF, Grossman RM, Pinski RB, Patterson TL, & Nader PR (1987). The development of scales to measure social support for diet and exercise behaviors. *Preventive Medicine*, 16(6), 825–836. [PubMed: 3432232]
- Sallis JF, Strikmiller PK, Harsha DW, Feldman HA, Ehlinger S, Stone EJ, . . . Woods S (1996). Validation of interviewer-and self-administered physical activity checklists for fifth grade students. *Medicine & Science in Sports & Exercise* 28(7):840–51. [PubMed: 8832538]
- Sallis JF, Taylor WC, Dowda M, Freedson PS, & Pate RR (2002). Correlates of vigorous physical activity for children in grades 1 through 12: comparing parent-reported and objectively measured physical activity. *Pediatric Exercise Science*, 14(1), 30–44.
- Salvy SJ, de la Haye K, Bowker JC, & Hermans RC (2012). Influence of peers and friends on children's and adolescents' eating and activity behaviors. *Physiology Behavior*, 106(3), 369–378. [PubMed: 22480733]
- Savage JS, Fisher JO, & Birch LL (2007). Parental influence on eating behavior: conception to adolescence. *Journal of Law, Medicine, & Ethics*, 35(1), 22–34.
- Videon TM, & Manning CK (2003). Influences on adolescent eating patterns: the importance of family meals. *Journal of Adolescent Health*, 32(5), 365–373. [PubMed: 12729986]
- Wilson DK, Alia KA, Kitzman-Ulrich H, & Resnicow K (2014). A pilot study of the effects of a tailored web-based intervention on promoting fruit and vegetable intake in African American families. *Child Obesity*, 10(1), 77–84.
- Wilson DK, Van Horn ML, Kitzman-Ulrich H, Saunders R, Pate R, Lawman HG, et al. (2011). Results of the "Active by Choice Today" (ACT) randomized trial for increasing physical activity in low-income and minority adolescents. *Health Psychology*, 30(4), 463–471. [PubMed: 21534677]
- Worthington RL, & Whittaker TA (2006). Scale development research: A content analysis and recommendations for best practices. *The Counseling Psychologist*, 34, 806–838.

- Wright ND, Groisman-Perelstein AE, Wylie-Rosett J, Vernon N, Diamantis PM, & Isasi CR (2011). A lifestyle assessment and intervention tool for pediatric weight management: the HABITS questionnaire. *Journal of human nutrition and dietetics*, 24(1), 96–100. [PubMed: 21210873]
- Zabinski MF, Daly T, Norman GJ, Rupp JW, Calfas KJ, Sallis JF, & Patrick K (2006). Psychosocial correlates of fruit, vegetable, and dietary fat intake among adolescent boys and girls. *Journal of the American Dietetic Association*, 106(6), 814–821. [PubMed: 16720122]

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Highlights

- Assessment of social support is vital to advancing science aimed at promoting healthy weight management behaviors during adolescence, a time of shifts in autonomy and relationships.
- Findings support a new questionnaire, the Support for Healthy Lifestyle (SHeL) to assess adolescent-perceived support from family (domains: Healthy Eating, Physical Activity, and Hypocritical Control), from peers (domains: Healthy Eating, Physical Activity, and Undermining), and professionals (domains: Healthy Eating, Physical Activity, and General Support).

This study provides important information about the SHeL scales' internal consistency, construct validity, and concurrent criterion validity.

Table 1:

Demographic Characteristics of Samples 1 and 2

	Sample 1 (n = 120)	Sample 2 (n = 100)	Combined (n = 220)
Age in Years (Mean, SD)	15.87 (1.13)	15.51 (1.60)	15.70 (1.37)
Self-Reported Gender			
Female (n, %)	75 (63%)	42 (42%)	117 (53%)
Male (n, %)	45 (38%)	56 (56%)	101 (46%)
Transgender or different gender than sex at birth (n, %)	Not asked	3 (3%)	--
BMI Classification at Time of Survey			
Obese (n, %)	49 (41%)	98 (100%) ^a	147 (67%)
Overweight (n, %)	46 (38%)	0 (0.0%)	46 (21%)
Normal (n, %)	25 (21%)	0 (0.0%)	25 (11%)
Self-Reported Desire to Lose Weight	88 (73%)	72 (72%)	160 (73%)
Parent Perceived Adolescent as Overweight	58 (51%) ^b	90 (93%) ^c	148 (67%)
Parent-Reported Desire for Adolescent to Lose Weight	49 (43%) ^b	84 (87%) ^c	133 (60%)
Self-Reported Race/Ethnicity (non-exclusive categories)			
White/Caucasian (n, %)	110 (91.7%)	93 (93%)	203 (92%)
Asian/Asian American (n, %)	2 (2%)	0 (0%)	2 (1%)
African American/Black (n, %)	3 (3%)	10 (10%)	13 (6%)
American Indian/Native American (n, %)	3 (3%)	3 (3%)	6 (3%)
Other (n, %)	7 (6%)	2 (2%)	9 (4%)
Hispanic/Latinx (n, %)	4 (3%)	3 (3%)	7 (3%)
Parent-Reported Married & Living with Other			139 (63%)
Parent(n, %)	82 (73%) ^b	57 (59%) ^c	
Parent-Reported Highest Parental Education			
Some high school (n, %)	0 (0%)	2 (2%)	2 (1%)
High school graduate (n, %)	8 (7%)	15 (16%)	23 (10%)
Associate's/Vocational degree (n, %)	28 (25%)	28 (29%)	56 (25%)
Bachelor's degree (n, %)	44 (39%)	33 (34%)	77 (35%)
Graduate degree (n, %)	31 (28%)	19 (20%)	50 (23%)

^aBMI data missing for 2 participants in Sample 2; percent of valid data is listed.

^bParent-report data available for 113/120 of Sample 1; percent of valid data is listed. Participating parents were mostly mothers, 89%.

^cParent-report data available for 97/100 of Sample 2; percent of valid data is listed. Participating parents were mostly mothers, 96%.

Table 2:

SHeL Scale Descriptives and Item Descriptives, Factor Loadings, and Relative Expert Rankings

SUBSCALE/Item	Mean (SD)	Range	Item - Total	F1 Loading	F2 Loading	Relative Expert Rank ^a
FAMILY HEALTHY EATING SUPPORT 7 items, $\alpha = .87$, Inter-item correlation (range) = .48 (.33-71)						
Acted as a good role model by eating healthy	2.50 (1.07)	0-4	.70	0.71	-0.12	0.53
Given you good ideas or helped you find information about eating healthy	2.08 (1.13)	0-4	.68	0.69	0.02	0.70
Complimented or praised you on your efforts to eat healthier	2.17 (1.30)	0-4	.65	0.69	-0.04	0.29
Made you a healthy meal	2.75 (1.05)	0-4	.71	0.68	-0.13	0.31
Eaten healthy meals or snacks with you	2.35 (1.10)	0-4	.71	0.67	-0.17	0.27
Encouraged you to eat healthy	2.92 (1.03)	0-4	.56	0.65	0.28	0.56
Ignored your unhealthy eating (reverse scored)	2.76 (1.06)	0-4	.48	-0.49	0.21	0.96
FAMILY PHYSICAL ACTIVITY SUPPORT 7 items, $\alpha = .86$, Inter-item correlation (range) = .47 (.25-63)						
Encouraged you to exercise or do something active	2.61 (1.07)	0-4	.73	0.80	0.28	0.41
Complimented or praised you on your efforts to be more active	2.30 (1.21)	0-4	.70	0.76	-0.09	0.24
Given you good ideas or helped you find information about being active	2.08 (1.13)	0-4	.58	0.75	0.05	0.73
Made sure you could get someplace to exercise or do something active	1.86 (1.26)	0-4	.70	0.72	-0.03	0.20
Exercised or been active with you	2.14 (1.28)	0-4	.68	0.70	-0.04	0.30
Acted as a good role model by exercising or being active	2.85 (1.28)	0-4	.64	0.68	-0.05	0.56
Ignored your lack of activity or exercise (reverse scored)	2.85 (1.02)	0-4	.41	-0.46	0.13	0.83
FAMILY HYPOCRITICAL CONTROL 6 items, $\alpha = .76$, Inter-item correlation (range) = .35 (.23-58)						
Nagged or criticized you for sitting around or not exercising	1.72 (1.23)	0-4	.53	0.12	0.69	0.58
Told you to do something active while he or she sat around	1.42 (1.20)	0-4	.53	-0.03	0.62	0.77
Nagged or criticized you about your eating	1.46 (1.21)	0-4	.56	-0.03	0.62	0.54
Told you to eat something healthy while s/he ate junk food	1.39 (1.18)	0-4	.52	0.03	0.59	0.71
Eaten junk food around you or with you	1.99 (0.90)	0-4	.48	-0.25	0.51	0.60

SUBSCALE/Item	Mean (SD)	Range	Item - Total	F1 Loading	F2 Loading	Relative Expert Rank ^a	
Brought junk food into the home	2.35 (0.96)	0-4	.42	-0.32	0.46	0.30	
SUBSCALE/Item	Mean (SD)	Range	Item - Total	F1 Loading	F2 Loading	Relative Expert Rank	
PEER HEALTHY EATING SUPPORT 7 items, $\alpha = .92$, Inter-item correlation (range) = .62 (.45-72)							
Suggested healthy meals or snacks	1.46 (1.18)	0-4	.84	0.87	-0.04	0.01	0.46
Complimented or praised you on your efforts to eat healthy	1.44 (1.30)	0-4	.75	0.85	-0.04	-0.03	0.43
Encouraged you to eat healthier	1.30 (1.28)	0-4	.74	0.84	-0.10	-0.07	0.80
Given you good ideas for healthy eating	1.46 (1.21)	0-4	.81	0.81	0.06	-0.07	0.82
Listened to you when you wanted to talk about your efforts to eat healthy	1.70 (1.41)	0-4	.71	0.74	0.03	0.03	0.66
Eaten healthy foods with you	1.85 (1.19)	0-4	.74	0.71	0.10	0.10	0.28
Prepared (or their parents or siblings prepared) a healthy meal or snack for you	1.34 (1.22)	0-4	.68	0.66	0.05	-0.08	0.57
PEER PHYSICAL ACTIVITY SUPPORT 7 items, $\alpha = .89$, Inter-item correlation (range) = .55 (.38-71)							
Made exercise or physical activities fun	2.41 (1.32)	0-4	.76	-0.10	0.89	-0.03	0.16
Exercised or been active with you	2.30 (1.25)	0-4	.63	-0.12	0.77	-0.02	0.11
Made you feel good about exercising or being active	2.16 (1.26)	0-4	.78	0.18	0.75	-0.02	0.40
Encouraged you to exercise or do something active	1.79 (1.25)	0-4	.70	0.19	0.68	-0.03	0.72
Told you about an exercise program or class	1.50 (1.29)	0-4	.69	0.05	0.67	0.10	0.69
Been someone you want to impress in a sport or physical activity	1.83 (1.34)	0-4	.63	0.01	0.63	0.23	0.79
Provided (or their parents or sibling provided) transportation to exercise or a physical activity	1.59 (1.47)	0-4	.66	0.25	0.54	0.04	0.50
PEER UNDERMINING 7 items, $\alpha = .82$, Inter-item correlation (range) = .38 (.23-72)							
Suggested getting fast food or an unhealthy meal or snack	1.75 (1.15)	0-4	.70	-0.02	-0.03	0.82	0.49
Gave you junk food or sweets	1.92 (1.05)	0-4	.70	-0.09	0.07	0.78	0.48
Eaten junk foods around you or with you	2.29 (1.10)	0-4	.64	0.03	-0.11	0.76	0.41
Encouraged you to go to an event that involves eating a lot of junk food, such as pizza parties	1.57 (1.22)	0-4	.58	0.00	0.08	0.63	0.65
Goofed around or did not take working out seriously	1.45 (1.13)	0-4	.49	-0.09	0.20	0.49	0.86

SUBSCALE/Item	Mean (SD)	Range	Item - Total	F1 Loading	F2 Loading	Relative Expert Rank ^a	
Made you feel bad when doing physical activities because he or she is more fit than you	0.87 (1.05)	0-4	.42	0.00	-0.05	0.45	0.78
Made you feel uncomfortable about eating healthy	0.62 (0.92)	0-4	.35	0.18	-0.03	0.42	0.32
	Mean	Min-Max	Item-Total	F1 Loading	F2 Loading	F3 Loading	Relative Expert Rank
PROFESSIONAL HEALTHY EATING SUPPORT 7 items, $\alpha = .94$, Inter-item correlation (range) = .69 (.56-80)							
Helped you create a healthy eating plan	1.23 (1.29)	0-4	.75	0.05	0.89	-0.21	0.63
Helped you set realistic eating goals that you were excited about	1.48 (1.35)	0-4	.83	0.07	0.85	-0.04	0.42
Given you ideas or tools to eat healthy	1.77 (1.35)	0-4	.85	-0.02	0.83	0.06	0.57
Helped you work through any challenges you had with eating healthy	1.36 (1.29)	0-4	.83	0.06	0.79	0.06	0.56
Complimented or praised you on your efforts to eat healthier	1.66 (1.35)	0-4	.79	0.06	0.77	0.04	0.35
Encouraged you to eat healthier	1.93 (1.35)	0-4	.79	-0.01	0.74	0.12	0.64
Understood and respected your goals related to healthy eating	1.86 (1.36)	0-4	.77	0.11	0.68	0.09	0.17
PROFESSIONAL PHYSICAL ACTIVITY SUPPORT 7 items, $\alpha = .95$, Inter-item correlation (range) = .73 (.64-87)							
Taught you exercise or sport techniques	1.93 (1.45)	0-4	.83	1.00^b	-0.08	-0.13	0.80
Cheered or pushed you in a way that motivated you during exercise or a sport	1.86 (1.46)	0-4	.86	0.96	-0.03	-0.10	0.49
Given you ideas or tools to be physically active	1.78 (1.33)	0-4	.86	0.80	0.08	0.05	0.51
Helped you work through any challenges you had with exercising and being active	1.51 (1.30)	0-4	.80	0.74	0.03	0.16	0.51
Complimented you on your efforts to be more active or push yourself in work-outs	1.89 (1.38)	0-4	.83	0.73	0.12	0.09	0.24
Understood and respected you and your fitness goals	1.96 (1.37)	0-4	.82	0.73	0.07	0.14	0.12
Helped you set realistic physical activity goals that you are excited about	1.70 (1.34)	0-4	.80	0.67	0.23	0.05	0.37
PROFESSIONAL GENERAL HEALTH SUPPORT 4 items, $\alpha = .93$, Inter-item correlation (range) = .77 (.70-83).							
Talked with you about your current health	1.91 (1.38)	0-4	.83	-0.02	0.09	0.91	0.33
Shown you charts or test results about your current health	1.66 (1.40)	0-4	.82	0.10	-0.07	0.84	0.50
Talked with you about your height and weight	1.92 (1.39)	0-4	.91	0.04	0.03	0.83	0.88

SUBSCALE/Item		Mean (SD)	Range	Item - Total	F1 Loading	F2 Loading	Relative Expert Rank ^a
Offered advice on how to improve your health	1.91 (1.40)	0-4	.81	0.11	0.25	0.63	0.79

^aRelative Expert Rank was calculated by averaging the item rankings across experts and dividing by the number of items included in the ranking pool; lower average item rankings correspond to higher perceived relevance. The ranking pools consisted of 16 items for family healthy eating, 15 items for family physical activity, 15 items for peer healthy eating, 16 items for peer physical activity, 12 items for professional healthy eating, 15 items for professional physical activity, and 4 items for professional general support.

^bThis factor had a unrounded loading <1.00

Table 3:

Convergent/Divergent Validity: Means, Standard Deviations, and Bivariate Correlations among the SHeL Scales and with Existing Sallis Social Support Scales

	<i>M</i> (<i>SD</i>)	1	2	3	4	5	6	7	8	9	10	11	12
1. SHeL Family HE Support	2.50 (0.83)	-											
2. SHeL Family PA Support	2.31 (0.90)	.77**	-										
3. SHeL Family Hypocritical Control	1.72 (0.76)	-.21**	-.18**	-									
4. SHeL Peer HE Support	1.51 (1.03)	.45**	.39**	.06	-								
5. SHeL Peer PA Support	1.94 (1.02)	.34**	.45**	.07	.52**	-							
6. SHeL Peer Undermining	1.50 (0.75)	-.07	-.11	.28**	-.08	.20**	-						
7. SHeL Professional HE Support	1.61 (1.14)	.35**	.26**	.15*	.35**	.21**	-.04	-					
8. SHeL Professional PA Support	1.80 (1.20)	.33**	.40**	.02	.30**	.54**	.04	.61**	-				
9. SHeL Professional General Support	1.85 (1.27)	.15*	.22*	.22*	.22**	.21**	.01	.68**	.55**	-			
10. Sallis Family F&V Support	2.04 (1.11)	.57**	.48**	-.35**	.30**	.27**	-.08	.13	.18*	.08	-		
11. Sallis Family PA Support	1.47 (0.98)	.40**	.54**	-.02	.27**	.56**	.01	.24**	.46**	.14	.31**	-	
12. Sallis Peer F&V Support	1.95 (0.45)	.42**	.35**	-.29**	.16	.12	.01	.08	.06	.01	.58**	.21*	-
13. Sallis Peer PA Support	1.76 (0.79)	.29**	.41**	-.12	.29**	.63**	-.05	.27**	.54**	.14	.17	.58**	.09

Note. *M* = Mean; *SD* = Standard Deviation; HE = Healthy Eating; PA = Physical Activity; F&V Fruit and vegetable consumption. Convergent validity correlations are shown in bold.

* $p < .05$,

** $p < .01$. $n = 220$ for correlations between SHeL scores; $n = 120$ for correlations between and with Sallis scores.

Table 4:

Results of Tests of Criterion Validity: Means, Standard Deviations, and Bivariate Correlations of Self-Reported Health Behaviors with the SHeL Scale Scores

	Fruit & Vegetable Intake ^a	Eating Habits ^a	Intuitive Eating ^b	Physical Activity ^a	Sedentary Activity ^a	Healthy Weight Management Strategies ^b
<i>M</i> (<i>SD</i>)	1.91 (0.90)	2.00 (0.32)	4.94 (2.01)	162.13 (136.91)	214.43 (153.12)	1.92 (.61)
Family HE Support	.36**	.38**	.27*	.04	-.19*	.34**
Family PA Support	.25**	.30**	.26**	.08	-.17	.35**
Family Hypocritical Control	-.21*	-.26**	-.16	.03	.30**	.10
Peer HE Support	.15	.15	.11	.14	-.13	.17
Peer PA Support	.25**	.14	.04	.21*	-.02	.25*
Peer Undermining	.03	-.08	-.35**	-.01	.30**	-.10
Professional HE Support	.04	.04	.18	.20*	-.00	.31**
Professional PA Support	.07	-.02	.20	.23*	-.01	.30**
Professional General Support	.03	.03	.18	.07	.08	.21*

Note. *M* = Mean; *SD* = Standard Deviation; HE = Healthy Eating; PA = Physical Activity.

* $p < .05$,

** $p < .01$.

^aVariable assessed in Sample 1 ($n = 120$).

^bVariable assessed in Sample 2 ($n = 100$).