Published in final edited form as:
J Nutr Educ Behav. 2008 ; 40(6): 385–391. doi:10.1016/j.jneb.2007.09.014.

Use of Text Messaging for Monitoring Sugar-Sweetened Beverages, Physical Activity, and Screen Time in Children: A Pilot Study

Jennifer R. Shapiro, Ph.D.[1], **Stephanie Bauer, Ph.D.**[2], **Robert M. Hamer, Ph.D.**[1,3], **Hans Kordy, Ph.D.**[2], **Dianne Ward, Ed.D.**[4], and **Cynthia M. Bulik, Ph.D.**[1,4]

1 *Department of Psychiatry, University of North Carolina at Chapel Hill*

2 *Centre for Psychotherapy Research, University of Heidelberg, Germany*

3 *Department of Biostatistics, University of North Carolina at Chapel Hill*

4 *Department of Nutrition, University of North Carolina at Chapel Hill*

Abstract

Objective—To examine acceptability, attrition, adherence, and preliminary efficacy of mobile phone short message service (SMS; text messaging) for monitoring healthy behaviors in children.

Design—All randomized children received a brief psychoeducational intervention and then either monitored target behaviors via SMS with feedback, via paper diaries (PD), or participated in a no-monitoring control (C) for 8 weeks.

Setting—University of North Carolina at Chapel Hill Hospitals

Participants—Fifty-eight children (age 5 – 13) and parents participated; 31 completed (SMS: 13/18, PD: 7/18, C: 11/22).

Intervention—Children and parents participated in a total of three group education sessions (one session weekly for three weeks) to encourage increasing physical activity and decreasing screen time and sugar sweetened beverage consumption.

Main Outcome Measures—Treatment acceptability, attrition, and adherence to self-monitoring.

Analysis—Descriptive statistics and nonparametric tests were used to analyze differences across time and group.

Results—Children in SMS had somewhat lower attrition (28%) than both PD (61%) and C (50%), and significantly greater adherence to self-monitoring than PD (43% vs 19%, $p < 0.02$).

Conclusions and Implications—SMS may be a useful tool for self-monitoring healthy behaviors in children although the efficacy of this approach needs further study. Implications suggest that novel technologies may play a role in improving health.

Address correspondence to: Jennifer R. Shapiro, Ph.D., The University of North Carolina at Chapel Hill, Department of Psychiatry, CB 7160, Chapel Hill, NC 27599; phone: (919) 966-5262; fax: (919) 966-4180; email: jshapiro@med.unc.edu.

Keywords

Children; Diet; Physical Activity; Technology; Monitoring

INTRODUCTION

Approximately 19% of youth age 6 to 11 and 17% of adolescents age 12 to 19 were overweight in 2003–2004 (1). With 80% of overweight adolescents becoming obese adults (2), early intervention is critical. Although several treatment tools exist, promising interventions for weight control in youth focus on improving nutrition (decreasing dietary fat, increasing fruit and vegetable intake) (3–5), reducing sugar-sweetened beverages (SSB) (6), decreasing screen time (television, computers, video games) (7), and increasing physical activity (8–10). Further, self-monitoring of intake, expenditure, and weight are the hallmarks of long-term weight control (11).

Despite the robust literature on the importance of monitoring for weight loss success, both adults and children often do not adhere (12–15). In the first month of a weight control intervention for morbidly overweight children, 44% self-monitored at least 3.5 days per week (14,15); however, only 25% continued at six months (14). Thus, approaches are needed to enhance adherence to self-monitoring. Modern information technology provides one such tool. Electronic diaries increase adherence by providing immediate feedback (16,17) and time stamps. In one study, personal digital assistants increased patient adherence from 11% to 94% (17).

Children use electronic devices regularly; 45% of US teenagers ages 12–17 own a mobile phone and 33% use the short message service (SMS; text messaging) (18). Grounded in behavioral theory of practice and reinforcement, SMS may be especially useful for self-monitoring because of the potential for providing both support and immediate feedback based on a patient's specific goals. According to cognitive social learning theory, health behavior will change when goals are set, and when cueing, support, and positive reinforcement is provided (19). SMS has been shown to be acceptable for providing support, effecting behavior change, and/or maintaining treatment gains in diabetes (20,21), asthma (22), smoking cessation (23,24), and bulimia nervosa (25,26). Although no study to our awareness has investigated SMS in young children, previous studies have used somewhat older children and adolescents. Automatic daily SMS (providing support, tips, and information) combined with weekly SMS reminders about personal goals resulted in increased self-efficacy and adherence to diabetes management in children aged 8–18 with type 1 diabetes compared to conventional treatment (27). Similarly, in participants over age 16 in a smoking research study, SMS messages offering support and advice resulted in more participants who quit smoking after 6 weeks compared to a control group (23). Finally, weekly SMS self-monitoring of bulimic symptoms with automatic SMS feedback resulted in good monitoring adherence and acceptability in women aged 16–44 post-discharge from inpatient treatment (25). Given these observations, SMS may be promising for self-monitoring behaviors critical to childhood weight control. We examined acceptability, attrition, and adherence to SMS self-monitoring relative to paper diaries (PD) or a no monitoring control (C) over 8 weeks. We hypothesized that SMS would be more acceptable to children and show less attrition than both PD and C, and result in better adherence to self-monitoring relative to PD. We also explored the preliminary efficacy of SMS in effecting behavior change in children.

DESCRIPTION OF THE PROCEDURE

Children were recruited through letters sent to pediatricians, home from school with children, media advertisements; and university listservs for a study of healthy behaviors. Included were children of any weight, no major metabolic problems associated with obesity, ages 5–13 years (as specified by funding mechanism), parent participation (same parent must attend each session as parents were used both as a means to help children and to acquire accurate data), and fluency in English. Although children in this wide age range may have differences in development, cognition, and abilities, the SMS system was developed to be performed with a parent such that younger children would receive assistance from their parents. Families were screened and completed questionnaires pertaining to eating and activity. Fifty-eight eligible families were randomized on a 1:1:1 basis (SMS: 18, PD: 18, C: 22) using the uniform random number generator in SAS (SAS, Version 8, Cary, NC, 1999). See Table 1 for demographics. All families participated in a total of three educational group sessions (90 minutes each) weekly, for three weeks. All groups were facilitated by the same psychologist. Members of each group met only with others in the same condition. The only material that differed across groups was that presented on Session 1, which included training in either SMS or PD, or extended overview of the program for the C condition. Session 1 provided instruction on the three targeted behaviors: pedometer usage, estimating beverage serving sizes, and estimating screen time (TV, video game, computers). Although no behavioral goals were discussed, those in the two monitoring conditions were instructed to monitor these three target behaviors before going to bed. Session 2 focused on increasing physical activity and decreasing screen time. Topics included identifying alternative behaviors to screen time and discovering physical activities that both children and parents could incorporate into their day. Given that previous studies at our institution (Maloney, personal communication) found that children do not achieve the recommended minimum 10,000 steps (10), behavioral goals for session 2 (for both the child and parent) were 5000 steps and < 60 minutes total screen time unrelated to school/work per day. Session 3 focused on the amount of sugar in SSB. The session included demonstrations of the actual amount of sugar in various SSB and the health consequences of SSB (tooth decay, weight gain, energy consequences) (28). Families then brainstormed on strategies for reducing SSB consumption. Finally, we discussed the importance of drinking water and ways of incorporating water into the diet. The goal for session 3 was zero SSB per day for both child and parent. SSB consisted of all sugary drinks (e.g., soda, Kool-aid, sports drinks, Tang, non 100% juice). Given that a moderate amount of 100% fruit juice is healthy, families were taught to differentiate between sugar-sweetened juice and 100% juice and counted anything more than 4–6 oz of 100% fruit juice per day towards their SSB intake. Although we set behavioral goals for both parents and children in order to foster a family-based approach, the purpose of this study was to explore feasibility of SMS for children. We therefore report adherence and acceptability data for both children and their parents, but behavior change data only for children.

Each family in the SMS condition was given one phone to share for the duration of the study. They were instructed not to use the phone for anything except study-related SMS. They were instructed to send two SMS per day (one for parent and one for child), daily for the full eight weeks of the study, and for each SMS sent, they would each receive an immediate, *automated* SMS feedback message from our program hosted on a secure server. The feedback message was automated to provide instant responses to the participants regardless of the time of day. Hundreds of feedback messages were developed to avoid duplicate messages; algorithms were based on 1) how many goals were met and 2) enhancement or deterioration from the previous day (e.g., “Wow, you met your step and screen time goals – Congratulations! What happened to beverages?”). According to our programming, all feedback messages were ≤ 140 characters in length. Families began monitoring on day 1 of the program. Families in the PD condition used self-monitoring forms to record the three behaviors daily for both parent

and child, turned in their forms at each session, and received weekly verbal feedback. Families were instructed to complete the forms at the end of each day and not to back-fill the forms. Families in the C condition participated in the three intervention sessions but were not expected to self-monitor. Families continued monitoring for 8 weeks and returned at week 8 for post-assessment. All parents and children received a pedometer (AE 120 YAMAX digi-walker for adults and Sportline 340 for children). The study was approved by the Biomedical Institutional Review Board at the University of North Carolina at Chapel Hill.

DESCRIPTION OF THE EVALUATION

Frequency of monitoring was measured by dividing the total number of required monitoring days by the number of days the participant monitored. Due to slight variations in the exact number of days that different waves of the study were expected to monitor, a more accurate comparison is % of total monitoring days rather than actual number of days monitored. Families in SMS and PD completed daily responses to three questions: 1) What was the number on your pedometer today? 2) How many SSB did you drink today? 3) How many minutes of screen time did you have today? Means from weeks 1 and 8 constituted baseline and post-treatment. All families also responded to the following questions at both baseline and post-treatment: "On average over the past week, for each day: 1) How many minutes did you spend exercising? 2) How many SSB did you consume? 3) How many minutes of TV did you watch? Parents answered the questions for themselves and parent and child together answered for the child. Although not validated, these questions were used to explore the preliminary efficacy of SMS in promoting behavior change. Parents and children completed treatment acceptability questions at post-treatment (Table 2). Height and weight were assessed without shoes using a digital physician's scale and stadiometer. Body Mass Index (BMI; kg/m2) was calculated for parents and BMI for age for children according to the "Centers for Disease Control and Prevention guidelines" (29). All analyses were conducted with SAS (SAS, Version 8, Cary, NC, 1999). Descriptive statistics and frequencies were used for many of the outcome measures. Given the small sample size and non-normal distributions, non-parametric tests were used; thus p-values should be interpreted with caution.

Preliminary Results

Treatment Acceptability—Prior to randomization, 100% of children hoped that they would be randomized to SMS. However, no significant differences emerged in most treatment acceptability measures across any of the groups (Table 2). The only difference was in parental reports of likelihood of participating in such a study again, with parents in the control condition being more likely to participate again.

Attrition—Completers were defined as participants who completed the 8-week post assessment *and* who attended at least two of the three educational sessions. The number of families that attended the weekly sessions were 39, 30, and 24 for the first, second, and third weeks, respectively. A total of 31 completed the study (SMS: 13/18, PD: 7/18, C: 11/22). Differences in attrition were analyzed using the Fisher Exact P-Value. Although not statistically significant ($p < 0.15$) due to the small sample size, the number of dropouts was substantially lower in SMS (n=5, 27.8%) than in PD (n=11, 61.1%) or C (n=11, 50.0%). Attrition typically occurred during the first few weeks (i.e., during the intervention sessions). Anecdotal reasons for attrition included: **SMS:** time conflict (n=2); child didn't want to use pedometer (n=1); no mobile phone coverage (n=1); did not report (n=1); **PD**: time conflict (n=5); illness (n=2); distance to travel (n=1); child did not want to participate (n=1); did not report (n=1); **C:** time conflict (n=4); illness (n=2); child did not want to participate (n=2); family making changes on own (n=1); did not report (n=2).

Adherence to Self-Monitoring—Adherence to self-monitoring was analyzed by the Wilcoxon rank-sum tests. There was a significant difference in self-monitoring with 43.0% versus 19.0% adherence to total monitoring days in children and adults in the SMS and PD conditions, respectively (two-sided Z approximation: $p < 0.02$). Although we did not require that both parent and child submit their SMS together, there was never a day in which the child submitted data without the parent (or vice versa).

Preliminary Efficacy—Preliminary efficacy was assessed in completers through self-monitoring data in SMS and PD groups and through recall of targeted behaviors for all groups (Table 3). In terms of self-monitoring data (SMS and PD), there were no within or between group differences on any targeted behavior for the children. In terms of self-reported recall, SMS was the only group that showed a significant reduction in minutes of screen time in children compared to PD or C. There were no significant between or within group differences in exercise or SSB. There were also no differences between groups in percentage of children who met each of the three recommended goals (SSB: 12 (39%); screen time: 15(48%); physical activity: 25 (81%) met goals).

DISCUSSION

This feasibility study examined SMS for self-monitoring of three target behaviors relevant to childhood weight control. Randomization to SMS was desirable to the children. Seventy-two percent in SMS completed the study versus 39% and 50% in PD and C. Although this difference was not statistically significant (most likely due to small sample size; to detect a difference between 39% and 50% with 80% power would have required a total sample size of 338 subjects), it is substantial improvement both clinically and for completion of a research study. Families in SMS completed 43% of requested self-monitoring versus only 19% in PD. Thus, children appear to prefer a technological, tailored, interactive program versus a more traditional paper diary program and when enrolled, those using SMS may have greater adherence and higher completion rates. These results are similar to previous studies using SMS for providing support and effecting behavior change, suggesting that SMS is a feasible and acceptable method for communicating with individuals (20–26,30). According to the cognitive social learning theory, perhaps the support and positive reinforcement led to adherence and acceptability of the self-monitoring program. Although parents in the control condition stated that they would be more likely to participate again, plausibly because of the exception of attending the education sessions, while no self-monitoring was expected of them. Finally, although not examined in this study, SMS has the potential to be more reliable and valid than PD given that the data are associated with a time and date stamp as opposed to back-fill, often associated with PDs (17). Our study did have several limitations in addition to the small sample, including only English speaking families, and intermittent difficulties with using SMS (e.g., phone companies merged, plans discontinued, coverage areas), which could both influence generalizability.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Results suggest that one potentially effective way of increasing self-monitoring adherence in children is to use a novel device. This could be used by both clinicians and researchers to obtain greater adherence to treatment. In particular, children of this era use technology both for education and socially and are likely to do so more than their parents, teachers, and thus researchers (31). Therefore, in order for researchers and practitioners to reach children (and even many adults), they will have to enhance their protocols in order to accommodate more modern methods of communication. A next step is to investigate children who already have a mobile phone to control for this novelty. Future studies should also control for frequency of provider contact as in this study those in SMS had daily albeit automated contact, while those

in PD had weekly verbal contact. Future planned studies include mixed methods models in which we will employ qualitative approaches to understand the advantages to and barriers to using SMS as a self-monitoring tool. Moreover, future studies should utilize a validation loop (e.g., observations recorded by a research assistant) to make sure the pedometer readings, SSB servings, and reported screen time are indeed accurate. Cost-effectiveness of traditional therapy, telephone, email, or SMS should also be examined. SMS may prove to be a cost-effective method for increasing adherence and effecting behavior change. Further, larger samples with wider recruitment are needed; a large portion of our sample came from our listserv recruitment which poses selection bias. Given that preliminary studies are finding acceptability with SMS for use with various populations (20–26,30), the efficacy of this approach with larger more controlled studies is needed.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements

Support for this research project was provided by the Ambulatory Pediatric Association: Young Investigator Award; an unrestricted gift from the Gatorade Company for the Get Kids in Action Partnership with the University of North Carolina at Chapel Hill; NIH/NIMH: Grant number: 5 T32 MH 19111-15; DK56350; and the Alexander von Humboldt Stiftung German-American Trans-Coop grant. We greatly appreciate Abby Scheer for assistance with data entry and Sue Googe, Lutfi Arikan, and Mahmut Arikan for technical support.

References

1. Ogden CLCM, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999–2004. JAMA 2006;295:1549–1555. [PubMed: 16595758]
2. Dietz WH. Overweight in childhood and adolescence. N Engl J Med 2004;350(9):855–7. [PubMed: 14985480]
3. Epstein L, Valoski A, Wing R, McCurley J. Ten-year outcomes of behavioral family-based treatment for childhood obesity. Health Psychol 1994;13:373–83. [PubMed: 7805631]
4. Epstein LH. Ten-year follow-up of behavioral, family-based treatment for obese children. JAMA 1990;264:2519–2551. [PubMed: 2232019]
5. Epstein LH, Myers MD, Raynor HA, Saelens BE. Treatment of pediatric obesity. Pediatrics 1998;101 (3 Pt 2):554–70. [PubMed: 12224662]
6. James J, Kerr D. Prevention of childhood obesity by reducing soft drinks. Int J Obes (Lond) 2005;29 (Suppl 2):S54–7. [PubMed: 16385753]
7. Robinson T. Reducing children's television viewing to prevent obesity: a randomized controlled trial. JAMA 1999;27:1561–7. [PubMed: 10546696]
8. National Association for Sport and Physical Education. Physical Activity for Children: A Statement of Guidelines for Children Ages 5–12. 2. 2005.
9. President's Council on Physical Fitness and Sports. The President's Challenge Physical Activity and Fitness Awards Program. Washington, DC: USDHHS; 2001.
10. Tudor-Locke C, Pangrazi R, Corbin C, Rutherford W, Vincent S, Raustorp A, et al. BMI-referenced standards for recommended pedometer-determined steps/day in children. Preventive Medicine 2004;38:857–64. [PubMed: 15193909]
11. Wing RR, Hill JO. Successful weight loss maintenance. Annu Rev Nutr 2001;21:323–41. [PubMed: 11375440]
12. O'Neil PM. Assessing dietary intake in the management of obesity. Obes Res 2001;9:361–6S.
13. Anderson B, Ho J, Brackett J, Finkelstein D, Laffel L. Parental involvement in diabetes management tasks: relationships to blood glucose monitoring adherence and metabolic control in young adolescents with insulin-dependent diabetes mellitus. J Pediatr 1997;130(2):257–65. [PubMed: 9042129]

14. Germann JN, Kirschenbaum DS, Rich BH. Child and parental self-monitoring as determinants of success in the treatment of morbid obesity in low-income minority children. J Pediatr Psychol 2007;32(1):111–21. [PubMed: 16775083]
15. Kirschenbaum DS, Germann JN, Rich BH. Treatment of morbid obesity in low-income adolescents: effects of parental self-monitoring. Obes Res 2005;13(9):1527–9. [PubMed: 16222054]
16. Bartlett SJ, Lukk P, Butz A, Lampros-Klein F, Rand CS. Enhancing medication adherence among inner-city children with asthma: results from pilot studies. J Asthma 2002;39(1):47–54. [PubMed: 11883739]
17. Stone AA, Shiffman S, Schwartz JE, Broderick JE, Hufford MR. Patient compliance with paper and electronic diaries. Control Clin Trials 2003;24(2):182–99. [PubMed: 12689739]
18. Pew Internet & American Life Project. Teens and Technology: Youth are leading the transition to a fully wired and mobile nation. [Accessed September 2007]. Available at: http://www.pewinternet.org/pdfs/PIP_Teens_Tech_July2005web.pdf
19. Bandura A. A social cognitive theory. Ann Child Dev 1989;6:1–60.
20. Franklin V, Waller A, Pagliari C, Greene S. “Sweet Talk”: text messaging support for intensive insulin therapy for young people with diabetes. Diabetes Technol Ther 2003;5:991–6. [PubMed: 14709202]
21. Ferrer-Roca O, Cardenas A, Diaz-Cardama A, Pulido P. Mobile phone text messaging in the management of diabetes. J Telemed Telecare 2004;10(5):282–5. [PubMed: 15494086]
22. Anhoj J, Moldrup C. Feasibility of collecting diary data from asthma patients through mobile phones and SMS (short message service): response rate analysis and focus group evaluation from a pilot study. J Med Internet Res 2004;6(4):e42. [PubMed: 15631966]
23. Rodgers A, Corbett T, Bramley D, Riddell T, Wills M, Lin RB, et al. Do u smoke after txt? Results of a randomised trial of smoking cessation using mobile phone text messaging. Tob Control 2005;14 (4):255–61. [PubMed: 16046689]
24. Obermayer JL, Riley WT, Asif O, Jean-Mary J. College smoking-cessation using cell phone text messaging. J Am Coll Health 2004;53(2):71–8. [PubMed: 15495883]
25. Bauer S, Percevic R, Okon E, Meermann R, Kordy H. Use of text messaging in the aftercare of patients with bulimia nervosa. European Eating Disorders Review 2003;11:279–290.
26. Bauer SHJ, Okon E, Meermann R, Kordy H. Erfahrungen mit dem Einsatz des Short Message Service (SMS) in der nachstationären Betreuung von Patientinnen mit Bulimia nervosa. Zeitschrift Psychodynamische Psychotherapie. in press
27. Franklin VL, Waller A, Pagliari C, Greene SA. A randomized controlled trial of Sweet Talk, a text-messaging system to support young people with diabetes. Diabet Med 2006;23:1332–8. [PubMed: 17116184]
28. Malik VS, Schulze MB, Hu FB. Intake of sugar-sweetened beverages and weight gain: a systematic review. Am J Clin Nutr 2006;84(2):274–88. [PubMed: 16895873]
29. Centers for Disease Control and Prevention. About BMI for Children and Teens. [Accessed September 27, 2007]. Available at: http://www.cdc.gov/nccdphp/dnpa/bmi/childrens_BMI/about_childrens_BMI.htm
30. Kwon HS, Cho JH, Kim HS, Lee JH, Song BR, Oh JA, et al. Development of web-based diabetic patient management system using short message service (SMS). Diabetes Res Clin Pract 2004;66 (Suppl 1):S133–7. [PubMed: 15563964]
31. Prensky M. Digital Natives, Digital Immigrants. On the Horizon (NCB University Press) 2001;9(5)

Table 1

Demographics of participants

Variable	Overall	SMS (n = 18)	PD (n = 18)	C (n = 22)	p
Female: N (%) - Parent	53 (91.0%)	17 (94.4%)	15 (83.3%)	21 (95.5%)	0.51
Female: N (%)	36 (62.0%)	13 (72.2%)	10 (56.6%)	13 (59.1%)	0.63
White: N (%)	32 (60.0%)	10 (56.6%)	9 (50.0%)	13 (59.1%)	0.99
Black: N (%)	20 (34.0%)	7 (38.9%)	6 (33.3%)	7 (31.8%)	0.94
Asian: N (%)	1 (2.0%)	0 (0%)	1 (5.6%)	0 (0%)	0.62
Hispanic/Latino: N (%)	1 (2.0%)	0 (0%)	0(0%)	1 (4.6%)	1.00
Age: M (SD)	8.7 (2.3)	8.4 (2.3)	9.3 (2.2)	8.5 (2.3)	0.39
Range	(5–13)	(5–13)	(5–13)	(5–12)	
Height (in): M (SD)	55.3 (4.6)	56.0 (4.8)	55.6 (3.5)	54.6 (5.3)	0.55
Weight (lbs): M (SD)	121.9 (46.3)	131.1 (47.2)	118.3 (42.7)	116.1 (50.1)	0.60
BMI: M (SD)	27.0 (6.5)	28.6 (6.2)	26.3 (6.7)	26.2 (6.7)	0.47
BMI %ile: M (SD)	94.8 (12.1)	96.0 (10.6)	91.9 (18.8)	96.1 (5.5)	0.30
Healthy %ile: N (%)	4 (7%)	1 (5.9%)	1 (5.6%)	2 (9.1%)	
At Risk (85 – 94%ile): N (%)	6 (11%)	0 (0%)	3 (16.7%)	3 (13.6%)	
Overweight (≥95th %ile): N (%)	47 (82%)	16 (94.1%)	14 (77.8%)	17 (77.3%)	

Note. Unless otherwise noted, all results are based on children. Continuous variables were tested using a Kruskal-Wallis Test, and categorical variables were tested using a Fisher Exact Test.

Table 2

Treatment Acceptability

Likert-Scale Item	SMS Mean (SD) Range (n = 13)	PD Mean (SD) Range (n = 8)	C Mean (SD) Range (n = 11)	K-W χ^2	P
PARENT					
1. How much did the program meet your expectations?	7.5 (1.4) 6.0 – 10.0	7.6 (2.2) 4.0 – 10.0	7.0 (2.1) 4.0 – 10.0	0.5	0.77
2. How likely would you be to recommend this program to a friend and his or her child?	8.00 (1.6) 5.0 – 10.0	8.1 (2.0) 5.0 – 10.0	8.09 (2.5) 4.0 – 10.0	0.3	0.85
3. How likely would you be to participate in this program again if necessary?	7.4 (2.1) 3.0 – 10.0	6.9 (3.5) 2.0 – 10.0	9.2 (1.8) 4.0 – 10.0	6.0	0.05
CHILD					
1. How much fun did you have doing this program with your parent?	3.3 (0.7) 2.0 – 4.0	3.4 (0.8) 2.0 – 4.0	2.9 (1.2) 0.0 – 4.0	1.1	0.59
2. How much would you tell a friend to try this with mom or dad?	3.0 (0.9) 2.0 – 4.0	2.7 (1.0) 1.0 – 4.0	2.6 (1.6) 0.0 – 4.0	0.3	0.86
3. How much would you like to do this program again?	3.1 (0.9) 2.0 – 4.0	2.6 (1.3) 1.0 – 4.0	2.5 (1.4) 1.0 – 4.0	1.6	0.45

Note: P-values are from a Kruskal-Wallis Nonparametric One-Way ANOVA. Anchors for parent: 0 = not at all; 10 = extremely. Anchors for child: 1. 0 = I hated it, not fun at all, 1 = I didn't really like it, 2 = It wasn't fun but I didn't hate it, 3 = It was a little bit fun, 4 = Lots of fun! 2. 0 = No way. I wouldn't tell any of my friends, 1 = I probably wouldn't tell my friends to do the program, 2 = I would tell them it was ok, 3 = I would tell them it was fun, 4 = I would say, "you have to do this with your mom or dad – it was great!" 3. 0 = I would never try this program again, 1 = I wouldn't really want to do this again, 2 = I might do it again – I'm not sure, 3 = I would do this again, 4 = I would definitely do this again!

Table 3

Preliminary Efficacy

Self-Monitoring	**Steps (M ± SD) Pedometer steps per day**	**SSB (M± SD) Servings per day**	**Screen Time (M ± SD) Min/day**
SMS			
Baseline	7803.9 ± 4273.3	1.5 ± 1.2	99.5 ± 91.5
Post	8187.0 ± 4536.1	0.4 ± 0.4	110.7 ± 125.5
PD			
Baseline	8589.6 ± 4224.3	2.0 ± 1.2	141.0 ± 110.6
Post	10927.4 ± 336.8	0.7 ± 0.9	48.4 ± 21.7
Self-Reported Recall	Exercise (M ± SD) Minutes per day	SSB (M± SD) Servings per day	Screen Time (M ± SD) Minutes per day
SMS			
Baseline	102.9 ± 48.5	1.8 ± 1.6	149.3 ± 90.0
Post	137.3 ± 187.7	0.9 ± 0.6	80.6 ± 47.1**
PD			
Baseline	106.4 ± 76.0	2.0 ± 1.8	200.5 ± 158.8
Post	137.1 ± 94.6	0.6 ± 0.8	102.9 ± 45.4
C			
Baseline	129.2 ± 126.3	1.5 ± 1.2	188.6 ± 197.1
Post	114.1 ± 105.4	0.6 ± 0.7	111.8 ± 87.7

** Note: = Within Group Change Over Time: Signed Rank: −26.5, $p < 0.00$