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BRIEF REPORT

Web-Based Program Exposure and Retention in the Families Improving Together for Weight Loss Trial

Dawn K. Wilson, PhD[1] • Allison M. Sweeney, PhD[1] • Lauren H. Law, MA[1] • Heather Kitzman-Ulrich, PhD[2] • Ken Resnicow PhD[3]

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Abstract

Background Interventions that incorporate behavioral skills training and parental involvement have been effective for promoting weight loss among middle and upper class youth; however, few studies have produced similar weight loss effects in underserved ethnic minority youth.

Purpose This study examined whether online program exposure (in both an online tailored intervention and an online health education comparison program) predicted greater retention among African American youth and their parents in the Families Improving Together (FIT) for Weight Loss trial.

Methods Parent–adolescent dyads (N = 125) were randomized to either an online tailored intervention program (n = 63) or an online health education comparison program (n = 62). Paradata including login data were used to determine the number of sessions viewed (0–8) and the number of minutes spent online per session. Study retention, defined as collection of adolescent anthropometric measures at 6 months postintervention, was the outcome.

Results Logistic regression analyses showed a significant effect for login rate on retention (OR = 1.21, 95% CI [1.04, 1.39]). Total number of sessions viewed, child age, child sex, parent age, and parent sex accounted for 11% of the variance in retention at 6 months postintervention. Participants who were retained spent a significantly greater number of minutes during each session (M = 12.99, SD = 11.63) than participants who were not retained (M = 7.77, SD = 11.19), $t(123) = 2.24$, $p = .027$, $d = 0.45$.

Conclusions The use of paradata from online interventions is a novel and feasible approach for examining exposure in web-based interventions and program retention in underserved ethnic minority families.

Trial registration ClinicalTrials.gov NCT01796067. Registered January 23, 2013.

Keywords Cultural tailoring • African Americans • Weight loss • Retention • Online interventions

Introduction

Interventions that incorporate behavioral skills training and parental involvement have been effective for promoting weight loss among middle- to upper-class youth [1–3]. However, few studies have produced similar weight loss effects in underserved ethnic minority youth [4]. Although efforts to reduce obesity in ethnic minority adolescents have become a national priority, past interventions have shown that attendance, retention, and weight loss are low among African Americans [5–7]. Thus, more research is needed to understand how to best enhance program retention among African American families.

Lower rates of engagement and retention among African American adolescents may be due, in part, to the lack of integrating cultural, social, and intrapersonal factors to increase motivation for sustained weight loss effects [8]. Recent research has shown that interventions that are culturally targeted (e.g., incorporate cultural foods/physical activities, include staff from the target group) lead to improved health outcomes among minority youth [9–11]. For example, the Behavior

✉ Dawn K. Wilson
wilsondk@mailbox.sc.edu

1 Department of Psychology, Barnwell College, University of South Carolina, Columbia, SC 29201, USA

2 Diabetes Health and Wellness Institute, Baylor Scott and White Health, Dallas, TX, USA

3 Department of Health Behavior and Health Education, School of Public Health, University of Michigan, Ann Arbor, MI, USA

Opportunities Uniting in Nutrition, Counseling, and Exercise (BOUNCE) intervention showed that a culturally targeted health promotion program was effective at reducing percent body fat among ethnic and racial minority youth [12]. The Hip-Hop to Health Jr. program, a preschool-based weight control intervention for African American preschoolers [13], found that a culturally targeted diet and physical activity intervention led to a greater increase in physical activity and reduced screen time (relative to controls).

Whereas cultural targeting focuses on increasing cultural appropriateness by matching intervention materials to the interests of a specific ethnic/racial group, cultural tailoring assumes that although culture is shared, people within a racial/ethnic group vary in the extent to which they endorse certain cultural or personal values. A culturally tailored intervention approach involves measuring an individual's personal and cultural values and then delivering intervention materials that are tailored to match that individual's specific values. Although culturally targeted interventions have been shown to benefit minority youth [12, 13], culturally tailored interventions embrace the considerable heterogeneity that exists within ethnic/racial groups, and, therefore, should be more effective at engaging African American parents and adolescents.

The present study expands upon past cultural tailoring approaches by implementing an online weight-loss program that integrates individual differences in cultural beliefs, as well as parenting style and communication. Distinct parenting styles include authoritative (moderate control and monitoring, shared-decision making), authoritarian (high control and monitoring, rigid and inflexible), and permissive (low control and monitoring) [14]. Children in authoritative households have healthier diets, are more physically active, and have lower body mass index (BMI), than youth in authoritarian or permissive households [15]. One meta-analytic review found that interventions that target authoritative parenting styles and positive parenting strategies (e.g., monitoring, limit-setting) had the greatest success in producing adolescent weight loss [16].

Numerous studies have shown that dose and exposure during an online intervention is associated with improved program effectiveness [17–23] and retention [18, 24]. However, the relationship between online intervention exposure and retention has not been extensively examined in weight loss programs, among adolescents, or in minority populations [25–27]. This study presents data from the Families Improving Together (FIT) for Weight Loss trial, which compares an online tailored intervention and an online health education program (comparison group) in the second phase of the trial. The primary aim of the current study is to test whether online program exposure (login rates, length of sessions) predicts greater participant retention. Although we expect that the online tailored program should facilitate greater changes in weight-related outcomes, we designed the program to have equivalent levels of dose and retention across treatment groups. We hypothesized that login rates and duration of sessions would predict greater retention in both the online tailored and health education programs. A second aim of the present study was to provide a descriptive overview of the content viewed by families in the online tailored program. To gain further insight into which tailored content sessions families found most engaging, we examined which sessions were selected, how long participants spent logged in to each session, and whether they accessed a given content session more than once.

Methods

Overview of FIT Trial and Current Study Design

The FIT trial is an ongoing randomized controlled trial testing the efficacy of a motivational plus family-based program (M + FML) versus a comprehensive health education (CHE) program on reducing BMI among overweight African American adolescents [28, 29]. The intervention integrated elements from family systems theory (positive parenting skills, communication skills) [30], self-determination theory (autonomy support and motivation) [31], social cognitive theory (goal-setting, self-monitoring) [32], and cultural adaptations for African Americans [28, 29]. Participants complete a 16-week intervention, which includes two phases: (i) an 8-week face-to-face group program and (ii) an 8-week online program. In both phases, the parent–adolescent dyads are randomized to the M + FWL or the CHE programs, resulting in a 2 (group treatment) × 2 (online treatment) design (see the Supplementary Material). Randomizations were conducted electronically by the University of Michigan's Center for Health Communication Research with a total of 241 family dyads as the final target study sample.

Participants

Participants were recruited through community partnerships, culturally relevant advertisements, and community events [33]. For this study, a total of 125 families (parent–youth dyads) were randomized to an online condition, with 63 randomized to the online tailored intervention and 62 to the online comparison program. Eligibility requirements include (i) being an African American adolescent (age 11–16 years) that is overweight/obese (BMI ≥ 85th percentile for age and sex), (ii) having a caregiver willing to participate, and (iii) Internet access. The University of South Carolina Institutional

Review Board approved this study. Parents signed informed consent and adolescents provided verbal assent to participate.

Online Tailored Intervention Program

The online intervention program was culturally tailored to target autonomy-supportive parenting skills using concepts from self-determination theory [31] and social cognitive theory [32]. Parents were targeted for participation because the online intervention program provided tailored feedback on parenting skills to assist adolescents with their weight loss goals. Before the online program, parents and adolescents completed a questionnaire that was used to tailor the online program to match the parent's cultural views, values, and communication style, as well as the adolescent's past and current willingness to work on specific health behaviors. The University of Michigan's Center for Health Communication Research developed the online program content and pretested the literacy of the programs for our targeted population.

During Week 1 of the online program, parents set a calorie goal for their adolescent and completed a tailored autonomy-supportive parenting exercise to assess their current skill level for autonomy parenting. During Weeks 2–7, parents reported on their adolescent's behavior in the six target areas and their progress toward meeting his or her calorie goal. This information was used to provide parents with real-time tailored feedback that highlighted both successes and areas for improvement. After receiving feedback on the adolescent's progress, parents selected one of the six weight-related behavior sessions (energy balance, fast food, fruits and vegetables, physical activity, screen time, and consumption of sweet drinks). The program tailored the order of the six core behaviors by placing the behaviors that needed the most improvement or that the adolescent was most willing to change first, followed by behaviors that needed less improvement or that the adolescent was less willing to change. This information allowed parents to choose their target behavior for that week. Parents received information on guidelines for the selected behavior and information about how their adolescent's behavior had changed throughout the program. The delivery of this information was further tailored around the parent's values and cultural beliefs.

Parents received content on specific parenting strategies that accompanied the selected behavior. The program emphasized autonomy supportive parenting strategies for six core weight-related behaviors (parenting skills shown in italics): (i) energy balance and meeting a calorie goal/*active listening*, (ii) fast food/*reverse role play*, (iii) fruits and vegetables/*increasing engagement*, (iv) physical activity/*escape hatch, volition, choice*, (v) screen time/*you provide, they decide*, (vi) sweetened drinks/*push versus pull*. The parenting strategy content was tailored to overcome communication barriers and to increase parental autonomy support and social support. Parents received information about how to incorporate the selected parenting strategy into a motivational interviewing-inspired conversation with their adolescent. At the end of each session, parents completed a weekly action plan for applying the skills related to the selected behavior and parenting strategy. The final week of the program reviewed ways in which parents could continue to support their adolescent. Parents completed a final check-in and received feedback on their adolescent's progress throughout the intervention program.

The sessions integrated cultural issues that the parent's had previously reported as important, including discussion of cultural foods, spirituality, values, and ethnic identity. Cultural values (e.g., self-respect) were integrated throughout the online sessions. For example, the introduction session incorporated parents' cultural and personal values, and discussion of barriers around providing autonomous support and incorporated spirituality and ethnic identity.

Health Education Comparison Online Program

The comparison program provided content on a variety of health topics: tobacco prevention, social media, bullying, oral hygiene, nutrition, depression, sleep, and family stress. Parents did not have the option of selecting which content to view, parenting strategies were not addressed, and content was not tailored to each individual.

Online Paradata Measures

A variety of paradata (program usage data) were examined in the current study, including the total number of sessions viewed and average login duration. For intervention participants only, we quantified which content sessions were selected, how long participants spent logged in to each session, and the number of times a given session was accessed.

Study Retention Measure

The outcome measure was retention at 6 months postintervention (where 0 = nonretained, 1 = retained). Families were considered retained based on whether adolescent height and weight measurements were obtained at 6 months postintervention, given that adolescent BMI is the primary outcome for the overall trial. The a priori goal for the trial was to retain 75% of participants at the 6-month follow-up. Retention across both groups was 73.6%.

Statistical Analysis

Child and parent demographics are presented in the Supplementary Material. A logistic regression was used to examine whether number of viewed sessions predicted retention at 6-month postintervention follow-up using SPSS (V 24). Covariates (child age, child sex, parent age, and parent sex) and online treatment condition were included in the model. Age and sex were included as covariates because we reasoned that these variables might relate to login rates and willingness to engage with the online program. Second, we examined whether average login duration varied between retained versus nonretained participants. Average login duration was calculated by summing the total minutes of login time (using time-stamps) by the number of sessions completed (0–8). Third, we examined the content selected by the tailored online participants, including the percentage of parents who accessed a given session, average login duration per content session, and the number of times a given session was accessed.

Results

Login Rates and Retention

Participants viewed an average of 4.29 sessions (SD = 3.01) in the online tailored group and 5.00 (SD = 3.07) in the comparison group, $t(123) = 1.31$, $p = 0.19$, indicating that intervention dose was similar across groups. A logistic regression controlling for demographics and online treatment condition, showed a significant effect for login rate on retention (OR = 1.21, 95% CI[1.04, 1.40]), and accounted for 11% of the variance (see Supplementary Material). Participants were more likely to be retained with the viewing of each additional online session. Although the retention rate was in the direction of being higher in the online tailored intervention (77.8%) versus the comparison program (69.35%), the difference was not statistically significant, $\chi^2(1) = 1.12$, $p = .285$.

Login Duration

Retained participants spent a significantly greater number of minutes during each session (M = 12.99, SD = 11.63) than nonretained participants (M = 7.77, SD = 11.19), $t(123) = 2.24$, $p = .027$, $d = 0.45$. Retention status did not interact with treatment condition when predicting login duration, $F(1,121) = 0.33$, $p = .567$, indicating that across both online conditions, participants who were retained had a higher login duration than nonretained participants.

Session Content and Exposure in the Online Tailored Program

Completion of the content sessions ranged from 46% (energy balance) to 22% (fast food). Among parents who accessed the energy balance session, 62.1% revisited this session, whereas fast food was revisited by 14.3%. The duration of login time ranged from 33.87 min (energy balance) to 17.65 min (fruits/vegetable intake) (see the Supplementary Material).

Discussion

The current study tested whether online program exposure predicted greater participant retention. As hypothesized, for both online intervention and comparison participants, viewing more online sessions was associated with increased retention. Retained participants spent a greater number of minutes during each session than nonretained participants. A secondary aim of the present study was to provide a descriptive overview of the content viewed in the online tailored program. Descriptive findings regarding the behavioral content selected by tailored online participants suggested that certain topics (e.g., energy balance vs. fruit and vegetables intake), were viewed by a greater percentage of parents, for longer durations, and were likely to be viewed more than once. These findings suggest that paradata is a feasible approach for examining exposure in online interventions and program retention in African Americans.

A key finding in this study was that increased exposure during both an online tailored intervention and a general health education program predicted higher retention. This result is consistent with previous studies that have examined the overall effectiveness of online exposure (measured as number of logins) on study retention rates [18, 24]. These findings expand on past studies by focusing on African American youth at risk for developing chronic disease. Intervention studies targeting weight-related behaviors have often found differential results depending on retention and participation [5, 17, 18, 20, 21], but have not focused on underserved ethnic minorities. This study highlights the importance of participant exposure in online programs in African Americans, an understudied population.

In the present study, we found that parents were less likely to select the fruit and vegetable session but were more likely to select sweetened beverages, sedentary behaviors, and physical activity. These findings are consistent with JaKa et al. [34], which also showed that energy balance and physical activity were the most commonly discussed sessions among primarily nonethnic minorities. It may be that parents were more likely to select these behaviors because they thought their adolescents would be most receptive to these types of changes. It could also be that the cost and access associated with obtaining fresh produce are a barrier for underserved families [35], and thus they were less interested in these sessions. These findings suggest that it will be important to continue to identify methods for improving exposure

(tailoring, type of content, choice of content materials), particularly in underserved populations.

This study provides a novel methodology for individually tailoring online programs to integrate cultural constructs and parenting skills. Providing parents with feedback and allowing choice on content topics may help to keep families engaged. The descriptive findings from this study provide insight into the topics underserved families are most interested in. One limitation of this study, however, is that we cannot test whether online exposure or tailoring affects behavioral or weight-related outcomes, given that the trial is ongoing. In addition, the study has limited generalizability given that it targeted only African American families in the southeastern USA. Despite these limitations, this study is among the first to examine the relationship between paradata and retention rates in online programs in African Americans.

Supplementary Material

Supplementary material is available at *Annals of Behavioral Medicine* online.

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Compliance With Ethical Standards

Primary Data All data analyzed for the current study are part of an ongoing randomized clinical trial and will not be available until the publication of intervention outcomes.

Authors' Statement of Conflict of Interest and Adherence to Ethical Standards None declared.

References

1. Epstein LH, Paluch RA, Roemmich JN, Beecher MD. Family-based obesity treatment, then and now: Twenty-five years of pediatric obesity treatment. *Health Psychol*. 2007;26:381–391.
2. Epstein LH, Wing RR, Koeske R, Valoski A. Long-term effects of family-based treatment of childhood obesity. *J Consult Clin Psychol*. 1987;55:91–95.
3. Niemeier BS, Hektner JM, Enger KB. Parent participation in weight-related health interventions for children and adolescents: A systematic review and meta-analysis. *Prev Med*. 2012;55:3–13.
4. Barr-Anderson DJ, Adams-Wynn AW, DiSantis KI, Kumanyika S. Family-focused physical activity, diet and obesity interventions in African-American girls: A systematic review. *Obes Rev*. 2013;14:29–51.
5. Resnicow K, Taylor R, Baskin M, McCarty F. Results of go girls: A weight control program for overweight African-American adolescent females. *Obes Res*. 2005;13:1739–1748.
6. Wingo BC, Carson TL, Ard J. Differences in weight loss and health outcomes among African Americans and whites in multicentre trials. *Obes Rev*. 2014;15 (suppl 4):46–61.
7. Zeller M, Kirk S, Claytor R, et al. Predictors of attrition from a pediatric weight management program. *J Pediatr*. 2004;144:466–470.
8. Wilson DK. New perspectives on health disparities and obesity interventions in youth. *J Pediatr Psychol*. 2009;34:231–244.
9. Frenn M, Malin S, Brown RL, et al. Changing the tide: An Internet/video exercise and low-fat diet intervention with middle-school students. *Appl Nurs Res*. 2005;18:13–21.
10. Robinson TN, Killen JD, Kraemer HC, et al. Dance and reducing television viewing to prevent weight gain in African-American girls: The Stanford GEMS pilot study. *Ethn Dis*. 2003;13:S65–S77.
11. Treviño RP, Yin Z, Hernandez A, Hale DE, Garcia OA, Mobley C. Impact of the Bienestar school-based diabetes mellitus prevention program on fasting capillary glucose levels: A randomized controlled trial. *Arch Pediatr Adolesc Med*. 2004;158:911–917.
12. Olvera N, Leung P, Kellam SF, Liu J. Body fat and fitness improvements in Hispanic and African American girls. *J Pediatr Psychol*. 2013;38:987–996.
13. Fitzgibbon ML, Stolley MR, Schiffer LA, et al. Hip-Hop to Health Jr. Obesity prevention effectiveness trial: Postintervention results. *Obesity (Silver Spring)*. 2011;19:994–1003.
14. Baumrind D. Effects of authoritative parental control on child behavior. *Child Dev*. 1966;37:887–907.
15. Sleddens EFC, Gerards SMPL, Thijs C, De Vries NK, Kremers SPJ. General parenting, childhood overweight and obesity-inducing behaviors: A review. *Int J Pediatr Obes*. 2011;6:E12–E27.
16. Kitzmann KM, Dalton WT III, Stanley CM, et al. Lifestyle interventions for youth who are overweight: A meta-analytic review. *Health Psychol*. 2010;29:91–101.
17. Bennett GG, Herring SJ, Puleo E, Stein EK, Emmons KM, Gillman MW. Web-based weight loss in primary care: A randomized controlled trial. *Obesity (Silver Spring)*. 2010;18:308–313.
18. Couper MP, Alexander GL, Zhang N, et al. Engagement and retention: Measuring breadth and depth of participant use of an online intervention. *J Med Internet Res*. 2010;12:e52.
19. Donkin L, Hickie IB, Christensen H, et al. Rethinking the dose-response relationship between usage and outcome in an online intervention for depression: randomized controlled trial. *J Med Internet Res*. 2013;15:e231.
20. Glasgow RE, Christiansen SM, Kurz D, et al. Engagement in a diabetes self-management website: Usage patterns and generalizability of program use. *J Med Internet Res*. 2011;13:e9.
21. Richardson CR, Buis LR, Janney AW, et al. An online community improves adherence in an internet-mediated walking program. Part 1: results of a randomized controlled trial. *J Med Internet Res*. 2010;12:e71.
22. Strecher VJ, McClure J, Alexander G, et al. The role of engagement in a tailored web-based smoking cessation program: Randomized controlled trial. *J Med Internet Res*. 2008;10:e36.
23. Schwarzer R, Satow L. Online intervention engagement predicts smoking cessation. *Prev Med*. 2012;55:233–236.
24. Murray E, White IR, Varagunam M, Godfrey C, Khadjesari Z, McCambridge J. Attrition revisited: Adherence and retention in a web-based alcohol trial. *J Med Internet Res*. 2013;15:e162.

25. Joseph RP, Ainsworth BE, Keller C, Dodgson JE. Barriers to physical activity among African American Women: An integrative review of the literature. *Women Health*. 2015;55:679–699.
26. King AC, Castro C, Wilcox S, Eyler AA, Sallis JF, Brownson RC. Personal and environmental factors associated with physical inactivity among different racial-ethnic groups of U.S. middle-aged and older-aged women. *Health Psychol*. 2000;19:354–364.
27. Powell LM, Slater S, Chaloupka FJ, Harper D. Availability of physical activity-related facilities and neighborhood demographic and socioeconomic characteristics: A national study. *Am J Public Health*. 2006;96:1676–1680.
28. Alia KA, Wilson DK, McDaniel T, et al. Development of an innovative process evaluation approach for the families improving together (FIT) for weight loss trial in African American adolescents. *Eval Program Plann*. 2015;49:106–116.
29. Wilson DK, Kitzman-Ulrich H, Resnicow K, et al. An overview of the families improving together (FIT) for weight loss randomized controlled trial in African American families. *Contemp Clin Trials*. 2015;42:145–157.
30. Broderick CB. *Understanding Family Process: Basics of Family Systems Theory*. Thousand Oaks, CA: Sage Publications; 1993.
31. Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol*. 2000;55:68–78.
32. Bandura A. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall; 1986.
33. Huffman LE, Wilson DK, Kitzman-Ulrich H, Lyerly JE, Gause HM, Resnicow K. Associations between culturally relevant recruitment strategies and participant interest, enrollment and generalizability in a weight-loss intervention for African American families. *Ethn Dis*. 2016;26:295–304.
34. JaKa MM, French SA, Wolfson J, et al. Feasibility of standardized methods to specify behavioral pediatric obesity prevention interventions. *J Behav Med*. 2017;40:730–739.
35. Larson NI, Story MT, Nelson MC. Neighborhood environments: Disparities in access to healthy foods in the U.S. *Am J Prev Med*. 2009;36:74–81.