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Pounds Off Digitally Study: A Randomized Podcasting Weight Loss Intervention

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Abstract

Background—As obesity rates rise, new weight loss methods are needed. Little is known about the use of podcasting (audio files for a portable music player or computer) to promote weight loss, despite its growing popularity.

Design—A 12-week randomized controlled trial.

Setting/Participants—Overweight men and women (body mass index, 25–40 kg/m²) (*n*=78) in the Raleigh–Durham, NC area.

Intervention—In 2008, participants were randomly assigned to receive 24 episodes of a currently available weight loss podcast (control podcast) or a weight loss podcast based on social cognitive theory (SCT) designed by the researchers (enhanced podcast) for 12 weeks.

Main outcome measures—Weight was measured on a digital scale at baseline and follow-up. Both groups also completed questionnaires assessing demographic information, food intake, physical activity, and SCT constructs at the introductory and 12-week meetings. Additional questionnaires at the 12-week meeting assessed perceptions of the intervention.

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Results—Data collection and analysis occurred in 2008 and intention-to-treat was used. Enhanced group participants ($n=41$) had a greater decrease in weight (-2.9 ± 3.5 kg enhanced group vs -0.3 ± 2.1 control group; $P < 0.001$ between groups) and BMI (-1.0 ± 1.2 kg/m² enhanced group vs -0.1 ± 0.7 kg/m² control group; $P < 0.001$ between groups) than the control group ($n=37$) and had greater weight loss–related knowledge ($P < 0.05$), elaboration ($P < 0.001$), and user control ($P < 0.001$) and less cognitive load ($P < 0.001$).

Conclusions—The results of this study suggest that the use of behavioral, theory-based podcasting may be an effective way to promote weight loss.

Introduction

In the U.S., 66.3% of adults are either overweight or obese (Body Mass Index >25 kg/m²)¹ and are at a significantly higher risk of developing many chronic diseases.² The main treatments for overweight and obesity include dietary changes, increases in physical activity, and other behavioral modifications.³ Technology-enhanced approaches to weight loss have begun to emerge with the increased development of electronic media. Many researchers are now using the Internet to deliver interventions.⁴ These interventions, however, often lack portability, restricting where and when interventions can be delivered. Web-based interventions typically also require participants to be literate and capable of effectively processing written information.

The increased prevalence of overweight⁵ has occurred concomitantly with an increase in “screen time”—which is the use of computers, televisions, and video games—by both children and adults.⁶ In contrast, podcasts can be listened to while mobile. Since many adults and children are spending increased amounts of time in front of screens or connected to the Internet,⁷ it may be important to use portable media in weight loss interventions so as not to increase screen time further.

An emerging new portable technology is “podcasting,” a term that came into existence in 2004.⁸ Despite the growing popularity of podcasting (audio files for a portable music player or computer), little is known about its use in promoting weight loss. Podcasting represents a largely untapped conduit for providing weight loss information to people with Internet access or those who do not want to participate in face-to-face weight loss interventions, which can be seen as time consuming and often inconvenient.⁹

Theoretical Framework: Why Podcasting May Be an Effective Way to Deliver a Weight Loss Intervention

Constructs from user control theory, cognitive load theory, and the elaboration likelihood model suggest that elements of podcasting may be more effective than other media—such as print or Web—in promoting freedom in learning,¹⁰ decreasing cognitive load,¹⁰ and increasing elaboration (how much someone processes and thinks about an idea or argument).¹¹ User control theory states that an increase in freedom of learning adds to the control a user feels and therefore increases learning¹⁰ whereas cognitive load theory states that the more cognitive burden a user feels when learning, the less able they will be to retain what they learn.^{12,13} Learning through the Web can increase cognitive load and therefore some theorists have suggested that the increase in freedom to navigate (over print) is negated by an increase in cognitive load.¹⁰ Podcasting allows for mobility—since podcasts can be listened to anytime and anyplace—without increasing cognitive load, thereby possibly leading to greater learning versus Web. The elaboration likelihood model (ELM) states that there are two routes to cognitive processing: central and peripheral. The more someone is able to process and elaborate on information, the more likely they are to use the central route and adopt long-lasting changes in attitudes and behaviors.¹⁴ Research has shown that there is an increase in elaboration, and therefore learning, with Web-based interventions versus print interventions, but there is also

an increase in selective scanning. This scanning decreases overall learning as compared to other media because users tend to skip over important messages.¹¹ Podcasting does not allow selective scanning since it is an audio medium, not written; however, it may allow for selective attention.

While the above characteristics may point to podcasting as an effective way to create health behavior change, the authors hypothesize that a theory-based podcast will improve upon these attributes. Because there are weight loss podcasts already available for download, a currently available weight loss podcast was used in comparison to a theory-based podcast. Further, using a podcast as the comparison group controlled for unique factors related to the medium presented in the preceding discussion. The hypothesis of this study is that a weight loss podcast designed with health behavior theories will produce a greater weight loss than a currently available podcast that is not theory-based.

Methods

Overweight and obese men and women (body mass index, 25–40 kg/m²) were recruited through newspaper advertisements and university e-mail in the Raleigh–Durham metropolitan area for this pilot study. Exclusion criteria included an unstable medical status (conditions that the investigators felt could preclude study participation, such as cardiovascular disease), history of an eating disorder, pregnancy, alcohol or drug abuse, tobacco use, mental illness, diabetes mellitus, or an uncontrolled thyroid condition. Participants owned their own digital music player (MP3 player) and had access to a body-weight scale. The University of North Carolina at Chapel Hill Institutional Review Board approved the study on November 8, 2007, and all the participants gave written informed consent for this study. Participants received a \$20 gift card for completion of all pre- and post-intervention activities.

After a participant was accepted into the pilot study, they were randomly assigned to receive a currently available weight loss podcast (control podcast) considered to be accurate and popular based on a content analysis (GM Turner-McGrievy, University of North Carolina at Chapel Hill unpublished observations, 2008) or a theory-based weight loss podcast designed by the researchers (enhanced podcast) in 2008. They were not told the condition to which they were assigned until they arrived at the meeting. Participants were told that two different podcasts were being tested but were not told about the differences between the podcasts. Participants received 2 podcasts per week for 12 weeks. The control podcast consisted of discussions on how to lose weight conducted by 2 hosts. This podcast focused on using cognitive restructuring to avoid overeating in order to achieve a healthy weight. Sample topics included using stimulus control to limit snacking and focusing on positive thinking to change one's body image. Figure 1 describes the theoretic framework used to design the enhanced podcast. The enhanced podcast was designed using constructs from social cognitive theory (SCT)¹⁵ and table 1 outlines the intervention components and how they target the SCT constructs. The average length of each control podcast episode was 18 minutes, 34 seconds (range 7 minutes, 7 seconds to 31 minutes, 46 seconds) and the average length of each enhanced podcast was 15 minutes, 42 seconds (range 7 minutes, 7 seconds to 23 minutes, 28 seconds).

Participants attended an introductory meeting where they were weighed in light clothing with a digital scale accurate to 0.1 kg, measured for height with shoes off, completed information on baseline demographics, and learned how to download podcasts. Participants also completed questionnaires that assessed knowledge of weight loss topics (such as how to reduce calorie intake and increase exercise), food intake (PrimeScreen Questionnaire),¹⁶ physical activity (short International Physical Activity Questionnaire, IPAQ),¹⁷ and elaboration (the elaboration likelihood model—or ELM—questionnaire slightly modified for this study).¹⁸ Participants also answered questionnaires that assessed user control,¹⁹ cognitive load,¹² and social

cognitive theory constructs (self-efficacy, expectancies, and outcome expectations).¹⁵ These questionnaires were completed at 12 weeks, along with additional questionnaires which assessed perceptions of the intervention including ease of use, perceived effectiveness, likeability, place of use, and number of downloads. Weight was also measured at this time. Participants also learned about what podcasts were used in the study at this time and had access to both the enhanced and control podcasts.

Changes in fruit, vegetable, and fatty food intake were assessed using the PrimeScreen Questionnaire by averaging the consumption category reported for servings of all vegetables, all fruits, and all fatty foods. Changes in physical activity—measured by self-report (and not by an objective method such as use of a pedometer)—were assessed by examining changes on the short IPAQ in number of days and total time spent on various activities. Using a Likert scale, participants were asked pre- and post-intervention to rate their knowledge of 6 weight loss related topics such as dining out, exercise, and calorie restriction.

Elaboration was assessed using the ELM questionnaire.¹⁸ User control was assessed by asking the participants a series of 10 questions which asked the participant how much control they felt over their learning environment. Cognitive load was assessed by asking participants 2 questions about difficulty in processing the information and mental effort needed. Finally, participants were asked 3 questions about their perception of the study. These questionnaires used a 7-point Likert scale and the answers were totaled for each category to establish an overall score for each category.

Both groups were given a book with calorie and fat gram amounts of popular foods. An e-mail reminder was sent out when a new podcast was available and participants were told to log on to the study website to record how many podcasts they had listened to that week and to describe the topics covered. Participants who failed to record in their weekly online journal were contacted by e-mail and phone and encouraged to listen to the latest podcasts.

Statistical Analyses

All data collection and analyses were conducted in 2008 using intention-to-treat by bringing baseline values forward for participants who attended the introductory meeting but did not complete the study. Between-subjects *t*-tests were calculated for all measures with the exception of the baseline demographic information, which contained multiple categories (such as education). For these measures, a linear regression was used to predict follow-up weight adjusting for gender and group assignment and education and group assignment. All analyses were conducted using SPSS 16.0 for Windows software with a *p* value of 0.05 used to indicate significant differences (SPSS for Windows, 16.0.1 2007. Chicago: SPSS Inc.).

Results

The flow of participants through recruitment, intervention, and follow-up can be found in Figure 2. Of the 120 volunteers who inquired about the study between September 2007 and January 2008, 94 (78%) were enrolled in the study, 10 (8%) declined participation, and 16 (13%) did not meet inclusion criteria. Of the 94 who were accepted into the study, 16 (17%) did not show up to the introductory meeting (9 in the control group and 7 in the enhanced group) and therefore randomization was not revealed and no data were collected on these participants; thus they are not included in the intent-to-treat analysis. There were no significant differences in baseline characteristics between completers and noncompleters. Table 2 outlines baseline demographics. The control and enhanced group did not differ significantly across any of the variables except that there were a disproportionately greater number of subjects in the control group without a graduate degree. A linear regression was conducted using baseline weight to predict follow-up weight adjusting for both gender and group, as well as education

and group. There was no effect of education ($\beta = -0.03$, $P = 0.16$) or gender ($\beta = -0.19$, $P = 0.85$). Of those participants who reported having previously downloaded a podcast, only 1 participant (in the enhanced podcast group) reported being currently subscribed to a weight loss-related podcast.

Table 3 outlines the results of weight, diet, physical activity, and knowledge changes. Results below are presented as mean \pm standard deviation. Participants in the enhanced podcast group had a greater decrease in weight (-2.9 ± 3.5 kg) and BMI (-1.0 ± 1.2 kg/m²) compared to the control group (-0.3 ± 2.1 kg and -0.1 ± 0.7 kg/m²; $P < 0.001$ between groups). The enhanced group also reported greater increases in fruit (reported 0.4 ± 0.7 increase in consumption category) and vegetable (reported 0.2 ± 0.9 increase in consumption category) intake than the control group (change of 0.01 ± 0.4 for fruit and -0.2 ± 0.7 for vegetables; $P < 0.05$ for both categories for between groups). There was no change in high-fat food intake in either group. There was also no significant difference between groups with regards to reported moderate activity, walking, or sedentary behavior changes. There was, however, a difference in reported vigorous activity, with a greater increase in the number of days participants engaged in vigorous activity seen in the enhanced group (increase of 0.8 ± 0.9 days/week) as compared to the control group (decrease of -0.4 ± 1.4 days/week; $P < 0.01$ between groups). Participants in the enhanced group also saw a greater increase in the weight loss knowledge scores as compared to the control group. There were no significant differences between groups or within groups with regards to changes in the SCT constructs.

Table 4 outlines the results of hypothesized communication mediators and adherence data collected. There were significant differences between groups in all of the variables related to the hypothesized communication mediators, including greater elaboration, user control, and satisfaction with the intervention and less cognitive load (where a higher score means less cognitive load). Of the 24 episodes available, participants reported listening to an average of 16.6 ± 7.5 in the control group and 17.5 ± 8.1 episodes in the enhanced group ($P < 0.67$). Participants were asked at 12 weeks about their listening behaviors during the study. The majority of participants reported listening to podcasts at home most often (53.7%), followed by in their office/at work (20.9%), or while walking or exercising (13.4%). Most participants reported being sedentary while listening to the podcasts (either sitting at their desk at 44.8% or sitting at home at 22.4%). Slightly over half of the participants reported listening to the podcasts on their computer (52.2%) versus a portable MP3 player. The majority of participants did not listen to any other weight-loss or health-related podcasts during the study (85%). There was no significant difference between groups with regard to these variables.

Discussion

An enhanced, theory-based podcast produced greater weight loss, user control, and elaboration, and less cognitive load than a general weight loss podcast. Participants in this study were able to achieve a modest weight loss by listening to a carefully designed, theory-based podcast on weight loss. These results were achieved with minimal face-to-face interaction—participants received all their information on weight loss via the biweekly podcast. A mean 6-month weight loss of 7.9 kg was reported in a meta-analysis of 16 mostly face-to-face weight loss interventions using diet and physical activity.¹⁹ This rate of weight loss (approximately 0.3 kg/week), however, is slightly higher than the rate of weight loss seen in the present study (approximately 0.2 kg/week). Participants in the enhanced podcast group reported greater increases in fruit and vegetable intake than control participants, but no change in intake of high-fat foods. The enhanced podcast intervention emphasized reducing calories through favoring low-fat foods, fruits, and vegetables and also encouraged participants to increase physical activity—mainly through daily walking. Participants in the enhanced group reported greater vigorous activity compared to the control group; however, they did not report an increase in

walking or moderate activity. The control podcast focused mostly on cognitive restructuring and did not regularly discuss specific diet and physical activity recommendations. This may have been one of the reasons the control podcast group saw so few changes in these outcomes.

Whereas the podcast based on SCT proved to be effective in producing a weight loss of 2.9 kg, in this study, the weight loss achieved in the control podcast group was minimal (0.3 kg). Theory-based weight loss interventions using other technologies have also been shown to be effective.²⁰ Concepts from SCT, such as outcome expectations (what the participant expects will occur when they attempt to lose weight), expectancies (the value a participant places on weight loss), and self-efficacy were all used in the present study to increase weight loss and deliver health information. No differences in these constructs were seen between or within groups. These constructs were each assessed with one item and that may not have been sensitive enough to assess differential changes in the groups. In addition, 12 weeks may not have been enough time to produce significant changes in these constructs. As hypothesized, participants in the enhanced group had greater increases in reported knowledge on weight loss topics. The enhanced podcast also included a continuing soap opera, which was an entertaining way to provide additional information on healthy eating and exercise, and may have accounted for the greater participant recall.

Participants in the enhanced group reported greater elaboration, suggesting that participants used the central route to process the information in the podcasts, which should lead to an enduring behavior change.²¹ Participants also reported greater user control. Although both podcast groups accessed the audio files in similar ways (on portable MP3 players or on their computers), the enhanced group reported a greater sense of control over learning pace and navigation, which should allow for better and more effective learning.¹⁰ The enhanced podcast also produced less cognitive load than the control podcast, which should lead to participants being better able to retain the material presented in the podcasts.^{12,13} The enhanced podcast followed the same format every week and perhaps this allowed the participants to have a sense of structure in their weight loss efforts, and reduced cognitive load. The format of the control podcast varied among episodes. The enhanced podcast group also reported greater satisfaction with the intervention. This greater satisfaction could have been due to the participants in the enhanced group achieving more weight loss, however, research participants who feel more satisfaction with the intervention may achieve better weight loss.²² Thus it appears that communication variables, such as elaboration and user control, may help explain the differential effects of the two podcast interventions.

Although the majority of participants reported being sedentary—either sitting at home or at work—while listening to the podcasts, the podcasting mode of delivery at least allowed participants mobility, and in fact 13.4% were walking or exercising while listening. Over half of all participants regularly listened to the podcasts on a computer instead of a portable media player, which is a similar finding to that of a survey on podcasting behavior.²³ Desktop computers were the most common device (80%) followed by portable media players (66.1%).²³ This survey also found similar results to the present study with the majority of respondents reporting listening to podcasts mostly at home (79%).²³

There were several strengths of the present study. These included a randomized design and an intention-to-treat analysis. The results are likely to be applicable outside the research setting because participants received minimal face-to-face intervention, prepared all their own meals, and found their own ways to increase physical activity. The intervention was also very low-cost and would be easy to disseminate. There were also several limitations to the study. The participant sample for this study was mostly white and highly educated. Dietary data were measured using a brief questionnaire instead of more detailed methods, such as a 24-hour recall or food record.²⁴ Physical activity was also measured using a questionnaire when less

subjective methods, such as a pedometer, may have provided more accurate results.²⁵ Also, this was a short-term intervention with modest weight loss, and therefore, it is unknown whether the weight loss seen in this study would be maintained over the long term. Despite the use of a randomized design, the groups had unequal numbers of men and those with graduate degrees. Although this was not a significant difference, this inequality is a limitation.

Finding new and innovative ways to reach people who wish to lose weight is important. This study found that podcasting may be an effective way to deliver health interventions and produce behavior change. This study demonstrated that podcasts can be more effective when they are theory-based and carefully designed to promote cognitive processing and elaboration of information. Future studies should find ways to encourage participants to be more mobile while listening to the podcasts—such as encouraging participants to listen to the podcasts on portable players during exercise—in order to increase physical activity. Long-term studies should also be carried out to see if the podcasting of weight loss information and encouragement can produce long-lasting effects or if combining podcasts with other features of an Internet intervention (monitoring, feedback and support) might enhance weight losses of either modality alone. Finally, additional research should also be conducted to see if these results can be replicated in other populations.

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References

1. Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999–2004. *JAMA* 2006;295(13):1549–55. [PubMed: 16595758]
2. Jee SH, Kim HJ, Lee J. Obesity, insulin resistance and cancer risk. *Yonsei Med J* 2005;46(4):449–55. [PubMed: 16127767]
3. Banning M. Obesity: pathophysiology and treatment. *J R Soc Health* 2005;125(4):163–7.
4. Berkel LA, Poston WS, Reeves RS, Foreyt JP. Behavioral interventions for obesity. *J Am Diet Assoc* 2005;105(5 S1):S35–43. [PubMed: 15867894]
5. Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtin LR, Flegal KM. Prevalence of overweight and obesity among U.S. children, adolescents, and adults, 1999–2002. *JAMA* 2004;291(23):2847–50. [PubMed: 15199035]
6. Gordon-Larsen P, Nelson MC, Popkin BM. Longitudinal physical activity and sedentary behavior trends: adolescence to adulthood. *Am J Prev Med* 2004;27(4):277–83. [PubMed: 15488356]
7. Wiecha JL, Sobol AM, Peterson KE, Gortmaker SL. Household television access: associations with screen time, reading, and homework among youth. *Ambul Pediatr* 2001;1(5):244–51. [PubMed: 11888409]
8. Wikipedia. Podcasting. 2005. <http://en.wikipedia.org/wiki/Podcasting>. As cited from Searls, Doc. Sept. 28, 2004. Doc Searls' IT Garage, “DIY Radio with PODcasting.”
9. Sherwood NE, Morton N, Jeffery RW, French SA, Neumark-Sztainer D, Falkner NH. Consumer preferences in format and type of community-based weight control programs. *Am J Health Promot* 1998;13(1):12–8. [PubMed: 10186930]
10. Eveland WPJ, Dunwoody S. User control and structural isomorphism or disorientation and cognitive load? Learning from the Web versus print. *Communic Res* 2001;28(1):48–78.
11. Eveland WP Jr, Dunwoody S. An investigation of elaboration and selective scanning as mediators of learning from the web versus print. *J Broadcast Electronic Media* 2002;46(1):34–53.
12. Brunken R, Plass JL, Leutner D. Direct measurement of cognitive load in multimedia learning. *Educ Psychol* 2003;38:53–61.

13. Paas F, Tuovinen JE, Tabbers H, Van Gerven PWM. Cognitive load measurement as a means to advance cognitive load theory. *Educ Psychol* 2003;38:63–71.
14. Petty, RE.; Cacioppo, JT. *Communication and persuasion: central and peripheral route to attitude change*. New York: Springer-Verlag; 1986.
15. Bandura A. Health promotion by social cognitive means. *Health Educ Behav* 2004;31(2):143–64. [PubMed: 15090118]
16. Rifas-Shiman SL, Willett WC, Lobb R, Kotch J, Dart C, Gillman MW. PrimeScreen, a brief dietary screening tool: reproducibility and comparability with both a longer food frequency questionnaire and biomarkers. *Public Health Nutr* 2001;4(2):249–54. [PubMed: 11299098]
17. Hagstromer M, Oja P, Sjostrom M. The International Physical Activity Questionnaire (IPAQ): a study of concurrent and construct validity. *Public Health Nutr* 2006;9(6):755–62. [PubMed: 16925881]
18. Marks JT, Campbell MK, Ward DS, Ribisl KM, Wildemuth BM, Symons MJ. A comparison of Web and print media for physical activity promotion among adolescent girls. *J Adolesc Health* 2006;39(1):96–104. [PubMed: 16781967]
19. Franz MJ, VanWormer JJ, Crain AL, et al. Weight-loss outcomes: a systematic review and meta-analysis of weight-loss clinical trials with a minimum 1-year follow-up. *J Am Diet Assoc* 2007;107(10):1755–67. [PubMed: 17904936]
20. Winett RA, Tate DF, Anderson ES, Wojcik JR, Winett SG. Long-term weight gain prevention: a theoretically based Internet approach. *Prev Med* 2005;41(2):629–41. [PubMed: 15917062]
21. Cialdini RB, Petty RE, Caccioppo JT. Attitude and attitude change. *Ann Rev Psychol* 1981;32:357–404.
22. Metz JA, Stern JS, Kris-Etherton P, et al. A randomized trial of improved weight loss with a prepared meal plan in overweight and obese patients: impact on cardiovascular risk reduction. *Arch Intern Med* 2000;160(14):2150–8. [PubMed: 10904458]
23. RAJAR (Radio Joint Audience Research Limited). Podcasting and Radio Listening via the Internet Survey. www.rajar.co.uk/docs/news/2008_07_podcasting_listening_survey.pdf
24. Friedenreich CM, Slimani N, Riboli E. Measurement of past diet: review of previous and proposed methods. *Epidemiol Rev* 1992;14:177–96. [PubMed: 1289112]
25. Neilson HK, Robson PJ, Friedenreich CM, Csizmadi I. Estimating activity energy expenditure: how valid are physical activity questionnaires? *Am J Clin Nutr* 2008;87(2):279–91. [PubMed: 18258615]

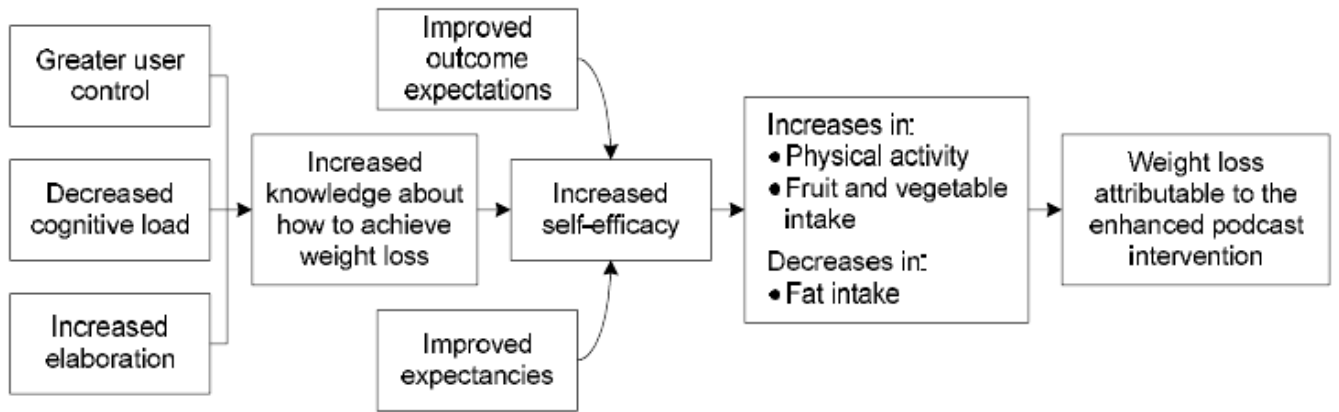


Figure 1. Theoretic framework of podcasting intervention explaining why it is hypothesized that the enhanced podcast will produce a significant weight loss

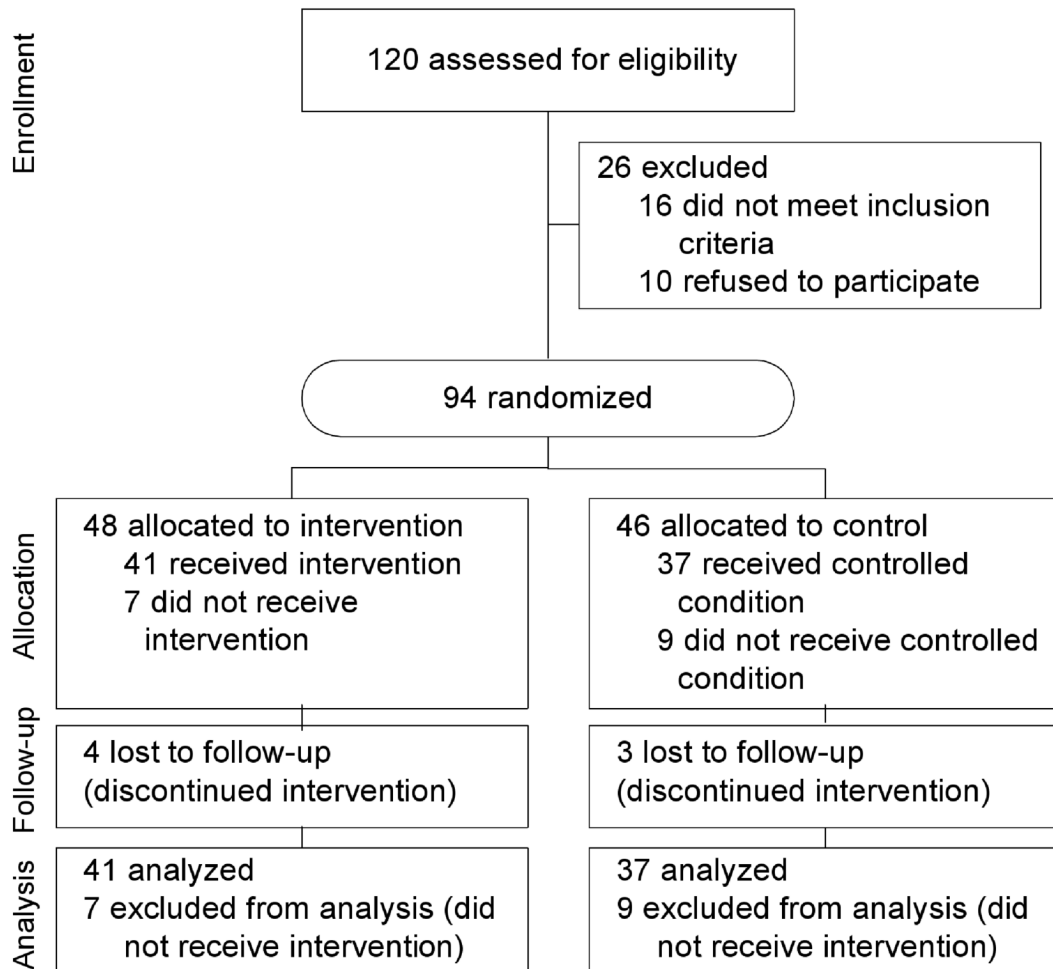


Figure 2.
Participant recruitment and analysis flow diagram

Table 1

Intervention components and how each targets the theory constructs

Theory construct	Intervention component
Expectancies	The nutrition and exercise information of each Podcast emphasized the importance of achieving a healthy weight to increase the value participants place on weight loss.
Expectations	The Audio Diary (Podcast) allowed for a firsthand experience of weight loss and informed participants about what to expect from trying to lose weight.
Self-efficacy	The end of the Podcast included a goal to achieve. Participants were encouraged to track their weight, calories, and exercise. The aim of goal achievement was to increase confidence.
Behavioral capability	Knowledge about how to lose weight, exercise, and make dietary changes was presented during the nutrition and exercise information and soap opera sections of the podcast.

Table 2

Baseline demographic data for control and enhanced podcast group participants

	Control group	Enhanced group
<i>n</i>	37	41
Age (years) (mean \pm SD)	39.6 (\pm 12.2)	37.7 (\pm 11.8)
Gender (<i>n</i> [%])		
Male	7 (19)	13 (32)
Female	29 (81)	28 (68)
Race, ethnicity (<i>N</i> [%])		
Black	6 (17)	5 (13)
White	28 (78)	35 (85)
Other	2 (5)	1 (2)
Hispanic (<i>N</i> [%])		
Yes	4 (11)	2 (5)
No	32 (89)	39 (95)
Marital status (<i>N</i> [%])		
Not married	19 (43)	19 (47)
Married	17 (47)	22 (53)
Education (<i>N</i> [%])		
High school, partial or graduate	11 (31)	8 (20)
College, partial or graduate	18 (50)	15 (37)
Graduate degree	7 (19)	18 (43)
Occupation (<i>N</i> [%])		
Unemployed	0 (0)	2 (5)
Service occupation	4 (11)	1 (2)
Technical, sales, administrative	11 (31)	8 (20)
Professional, specialty	8 (22)	14 (34)
Executive, managerial	1 (3)	6 (15)
Retired	1 (3)	1 (2)
Student	11 (31)	9 (22)
Number of years participant has owned an MP3 player (mean \pm SD)	2.0 (\pm 2.0)	1.8 (\pm 1.7)
Hours a day spent online (mean \pm SD)	4.1 (2.7)	4.7 (\pm 3.1)
Number of participants who had previously downloaded a podcast (<i>n</i> [%])	15 (42)	26 (63)
Number of podcasts to which participants are currently subscribed (mean \pm SD)	2.8 (\pm 1.8)	2.5 (\pm 1.5)

Data are mean (\pm SD) or *n* (%) unless otherwise indicated.

Table 3

Differences between groups with weight, food group intake, physical activity, and knowledge during study period

	Control group (n = 36)	Enhanced group (n = 41)	P-value for Difference Between Groups
Weight (kg)			
Baseline	89.0 ± 13.6	91.9 ± 15.0	
12 weeks	88.7 ± 13.9	89.0 ± 13.6	
Difference	-0.3 ± 2.1	-2.9 ± 3.5	<0.001
BMI (kg/m ²)			
Baseline	31.4 ± 4.1	31.8 ± 3.2	
12 weeks	31.3 ± 4.3	30.8 ± 3.4	
Difference	-0.1 ± 0.7	-1.0 ± 1.2	<0.001
Vegetables consumption category ^a			
Baseline	2.4 ± 0.6	2.3 ± 0.7	
12 weeks	2.6 ± 0.7	2.6 ± 0.7	
Difference	0.01 ± 0.4	0.4 ± 0.7	<0.05
Fruit consumption category ^a			
Baseline	2.9 ± 0.8	2.5 ± 1.0	
12 weeks	2.7 ± 0.6	2.7 ± 0.7	
Difference	-0.2 ± 0.7	0.2 ± 0.9	<0.05
Fatty foods consumption category ^a			
Baseline	2.1 ± 0.5	2.1 ± 0.5	
12 weeks	1.9 ± 0.5	1.8 ± 0.5	
Difference	-0.2 ± 0.4	-0.3 ± 0.4	0.14
Vigorous activity (days/week)			
Baseline	1.8 ± 1.8	1.2 ± 1.4	
12 weeks	1.4 ± 1.6	2.1 ± 1.9	
Difference	-0.4 ± 1.4	0.8 ± 0.9	<0.01
Moderate activity (days/week)			
Baseline	1.6 ± 1.9	1.3 ± 1.6	
12 weeks	1.9 ± 2.2	2.2 ± 2.0	
Difference	0.3 ± 2.2	0.9 ± 2.0	0.22
Walking (days/week)			
Baseline	4.3 ± 2.2	3.8 ± 2.5	
12 weeks	4.5 ± 2.3	4.6 ± 2.2	
Difference	0.2 ± 2.2	0.7 ± 2.0	0.29
Sitting (hours spent/day)			
Baseline	9.5 ± 6.1	9.0 ± 3.2	
12 weeks	9.2 ± 6.2	8.2 ± 3.8	
Difference	-0.3 ± 8.7	-0.8 ± 4.8	0.73
Knowledge score ^b			
Baseline	28.1 ± 7.3	31.3 ± 7.1	
12 weeks	30.5 ± 7.8	36.8 ± 4.7	

	Control group (n = 36)	Enhanced group (n = 41)	P-value for Difference Between Groups
Difference	2.4 ± 5.2	5.4 ± 6.5	<0.05

All data are mean ± SD

^a possible score range 1–5

^b possible score range 6–42

Table 4Differences between groups in Elaboration, User Control, Cognitive Load, and Intervention Perception at 12 weeks^a

	Control group (n=37)	Enhanced group (n=41)	P-value for difference between groups
Elaboration score ^b	24.7 ± 15.4	41.3 ± 12.3	<0.001
User control score ^c	40.6 ± 16.0	53.6 ± 12.9	<0.001
Cognitive load score ^d	6.5 ± 4.1	10.6 ± 3.1	<0.001
Intervention	11.2 ± 7.1	17.4 ± 5.1	<0.001
Perception score ^e			
Number of podcasts (of 24) participants reported they listened to during the study	16.6 ± 7.5	17.5 ± 8.1	0.67

All data are mean ± SD

^aThese questionnaires all used a 7-point Likert scale^bpossible score range 9–63^cpossible score range 10–70^dpossible score range 2–14^epossible score range 3–21