

Application of social marketing to recruitment for a digital weight management intervention for young adults

Jessica A. Whiteley,^{1*} Jamie M. Faro,² Meghan Mavredes,³ Laura L. Hayman,⁴ Melissa A. Napolitano⁵

¹Department of Exercise and Health Sciences, University of Massachusetts Boston, Boston, MA 02125-3393, USA

²Department of Population and Quantitative Health Sciences, University of Massachusetts Medical School, Worcester, MA, USA

³Department of Prevention and Community Health, The George Washington University, Washington, DC, USA

⁴Departments of Prevention and Community Health and Exercise and Nutrition Sciences, Boston, MA, USA

Correspondence to: J. A. Whiteley, Jessica.Whiteley@umb.edu

Cite this as: *TBM* 2021;11:484–494
doi: 10.1093/tbm/ibaa032

© The Author(s) 2020. Published by Oxford University Press on behalf of the Society of Behavioral Medicine. All rights reserved. For permissions, please e-mail: journals.permissions@oup.com.

Abstract

Recruiting young adults into weight loss interventions poses challenges that may be mitigated by the use of novel social marketing strategies. The purpose of this study is to describe how social marketing principles were applied to recruitment for a digitally delivered randomized controlled trial for weight management among young adults and report recruitment data and demographics on those who enrolled and did not enroll in the study. The marketing mix of the 7Ps (i.e., *product, price, place, promotion, packaging, positioning, and people*) was applied to intervention recruitment. Prior to enrollment, respondents completed a screening survey, which was examined to determine optimal strategies for study awareness and enrollment. Of the initial 5,731 who initiated a screener, 3,059 provided data on the source of where they heard about the study. Subsequently, 460 (12.5%) were enrolled in the study, 409 (51.3% non-White; 78.7% female; body mass index: 30.6 ± 4.3) provided data on recruitment source, with emails (72.5%), cited most often followed by flyers/posters (8.8%), “other” (6.7%), and multiple sources (6.6%). Although email remained the most frequently cited promotion source, Pearson’s chi-squared tests revealed that, compared to those not enrolled in the study, those who enrolled were more likely to hear about the study via flyers/posters (enrolled = 14.4%; not enrolled = 7.9%; $p < .001$) and multiple sources (enrolled = 11.7%; not enrolled 5.85%; $p < .01$) and less likely to hear via email (enrolled = 62.1%; not enrolled = 74.2%; $p < .01$). This study applied social marketing principles to successfully recruit a large and diverse group of young adults. While email emerged as the most effective source of study awareness, multiple channels and a mix of marketing principles are recommended for recruiting in university settings.

Keywords

Social marketing, Participant recruitment strategies, Emerging adults, Weight management

BACKGROUND

Emerging adulthood is a critical period of time during which a higher rate of weight gain occurs than any other period across the life course [1]. There is nearly a doubling of the prevalence of overweight/obesity from adolescence (12–19 year olds; 33.6%) to young adulthood (20–39 year olds; over 60% [2]. It is well known that overweight and obesity are associated with risk factors for cardiovascular and metabolic conditions [3]; thus, targeting this life stage for healthy weight interventions may prevent such comorbid conditions later in the life course.

Implications

Practice: When deciding how to promote a program or intervention, practitioners could apply the 7P marketing mix principles to best understand and reach a target audience.

Policy: Results from this paper suggest the importance of multidisciplinary partnerships among communication science and behavioral medicine to enhance recruitment practices

Research: Further research is needed on effective promotional strategies for recruiting participants into randomized controlled trials, which can be used for developing and evaluating frameworks for expeditious and representative enrollment into randomized controlled trials.

Young adults are less likely to participate in behavioral weight control trials [4], and recruitment into healthy weight trials may be difficult to “sell” as the health consequences of overweight and obesity are perceived as low priority for young adults [5]. Barriers specific to recruiting university students include schedules, not wanting to travel to research appointments, and lack of interest [6]. Data on recruitment and enrollment into health intervention trials are generally limited or not reported, though necessary to identify successful strategies and intervene with this at-risk population [7]. Reported recruitment strategies for health interventions in college or college-aged students and young adults commonly include traditional methods, such as flyers, posters, email blasts, and information stands [8].

Recruitment into behavior change trials has yielded varying results regarding the reach of traditional recruitment methods. For example, in a weight loss study for young adults, Tate et al. utilized passive methods (direct mailings) to reach young adults who were of differing socioeconomic levels in addition to more active methods (developing relationships with community) to engage harder to reach populations such as males and minorities [9]. Innovative recruitment methods have emerged to target young adult

populations, such as using social media advertising and commercial and social marketing. Recently, Gupta et al. reported on a recruitment model they used to recruit 18–35 year olds into a weight loss trial that incorporated information technology and marketing principles (e.g., 4P marketing mix of *product*, *price*, *place*, and *promotion*). They indicated that the mix of creating value for the customer by developing a *product* and communicating the value via multiple media channels is key to successful intervention recruitment [10]. Another area Estabrooks et al. encourage researchers to attend to is to report on the total yield from recruitment strategies, as well as the subpopulation demographics to ensure representation of underrepresented populations [11].

Unlike the main goal in commercial marketing of selling a product, with social marketing, the goal is to influence behaviors and benefit society (public health, safety, the environment, and communities) [12]. Social marketing is defined as marketing designed to influence behaviors, using a traditional marketing approach, with an intent to deliver a positive benefit to society [12]. Similarities exist between commercial and social marketing and can be used to successfully “sell” a behavior or, as is the case with an intervention study, sell an intervention, which seeks to modify behaviors. One key principle in traditional

marketing that can be applied to social marketing is to use a mix of marketing strategies in order to understand what the *product* can offer and how to plan for a successful product offering. This marketing mix, named the 4Ps, addresses *product*, *price*, *place*, and *promotion* [12,13]. Others have expanded the 4Ps to 7Ps, adding *packaging*, *positioning*, and *people* to the *product*, *price*, *place*, and *promotion* mix [13]. Taken together, the present study applied the 7Ps (*product*, *price*, *place*, *promotion*, *packaging*, *positioning*, and *people*) [13] to recruitment. As seen in Fig. 1, each of these 7Ps influence each other and can be developed to create a mix from which researchers can draw to create recruitment materials and strategies to promote their interventions. Thus, social marketing offers a framework for understanding how to develop a healthy weight intervention that is appealing to market to university students and means for recruiting those students into the research study.

This paper will describe how social marketing principles were applied to recruitment for a digitally delivered randomized controlled trial for weight management among young adults. Additionally, we examined: (a) the demographic differences between those who enrolled and did not enroll in the study, (b) the overall effectiveness of the *promotional* strategies, (c) the effectiveness of the recruitment



Fig 1 | Application of the 7P marketing mix to intervention research studies (adapted in part from Nichols et al. [15]).

strategy between those who enrolled and not enrolled, and (d) the demographic differences by promotional strategy.

METHODS

Study design

Participants were recruited to take part in Healthy Body Healthy U (HBHU), a randomized controlled trial examining the efficacy of the intervention among three 18 month groups, a targeted weight loss treatment, a tailored weight loss treatment, and a wellness contact control group. Intervention content for HBHU was delivered via Facebook and text messaging, and assessments were conducted at baseline, 6, 12, and 18 months postbaseline.

Eligibility criteria

The primary eligibility criteria for enrollment into the HBHU intervention study included: (a) aged 18–35 years, (b) body mass index [BMI]: 25–45 kg/m², (c) attended a college/university in the greater DC/Boston areas, (d) active Facebook users (logged in within past month), (e) fluent in English, and (f) regular text message access. Refer to Napolitano et al. for a detailed list of inclusion and exclusion criteria [14].

Enrollment sites

Recruitment for the HBHU randomized control trial occurred through two primary sites, a mid-sized private mid-Atlantic university ($N = 26,000$ students enrolled, with an undergraduate enrollment of approximately 12,500 and a graduate student enrollment of approximately 13,500) and a mid-sized urban public northeastern university ($N = 16,800$ students enrolled, with an undergraduate enrollment of approximately 12,800 and a graduate student enrollment of approximately 4,000). To reach additional university students local to both enrollment sites, each site contacted local colleges and universities within a 15-mile radius of their enrollment site.

Screening and enrollment

Participants interested in the HBHU study accessed the study's online eligibility survey for initial screening, which consisted of demographics (age, sex, race, ethnicity, and school status) and self-reported height and weight and other measures to assess physical and behavioral health reported elsewhere [14]. After participants entered their demographic information in the screener, they were asked how they heard about the study. Response choices included: (a) email, (b) flyer/poster, (c) Facebook ad, (d) Facebook post, (e) in-person event, (f) friend, and (g) other. Responses of "other" included an open textbox for participants to write-in how they heard about the study. Participants were able to choose all

options that applied, allowing for multiple responses to be recorded. Those appearing eligible from the initial survey received a follow-up contact for a telephone screening performed by trained HBHU study staff. Eligible participants were invited to an in-person screening visit for further eligibility verification, study explanation, and informed consent followed by a second in-person visit to collect additional baseline measures [14] for the HBHU study.

Social marketing principles

The marketing mix of the 4Ps (*product*, *price*, *place*, and *promotion*) [12] used by Gupta [10] and Nichols et al. [15] along with the additional marketing 3Ps (*packaging*, *positioning*, and *people*) [13] were used as a framework to describe aspects of the defining of the target audience's needs and the development of the *product* to meet those needs, as well as the *promotional* strategies of the HBHU intervention.

Product

As mentioned previously, in the context of research, the intervention itself is the *product* and the participants are the target audience [10] that must be identified and the *product* must meet the needs of this audience [12]. Overweight and obesity among university students was identified as the "problem" to be solved, and to meet the needs of overweight and obese university students, the solution was a digitally delivered healthy weight management intervention described in detail elsewhere [14].

Price

In social marketing, the *price* is defined as the cost to the target audience in terms of money, time, and effort [15]. This study was free for participants. Incentives are often used in randomized controlled trials and have been reported to be a reason that young adults would consider participating in weight loss studies [16]. Thus, recruitment messaging also highlighted the incentives for study participation (\$150 in e-gift cards). The assessment sessions and intervention delivery were streamlined and shortened to minimize effort and participant burden, the same study above found that convenience was a reason cited for young adults to be interested in weight loss studies.

Place

The *placement* of the intervention occurs in two ways: first, in how it is accessed by the participants and, second, where they access the *promotional* materials. To increase engagement and promote access to the intervention, program materials were offered digitally via text messaging and Facebook, platforms already well used by students [17,18] and more convenient than in-person group-based weight management programs [15–17]. To increase the accessibility of the *promotional* materials, we *placed* the materials

in multiple locations and with multiple delivery channels. High-traffic areas were defined as physical spaces the students frequented, such as campus centers, photo copiers, or tables in the cafeteria. We strategically placed flyers in high-traffic areas on campus, in residence halls, and student mailboxes, and attached flyers to study-branded pens, stress balls, and healthy snacks so that all table giveaways had the study branding and contact information. We were able to tap into the target audience through brainstorming sessions with the student research assistants (people) on the project; they offered ideas on where to place the promotions, as well as what giveaway incentives would be most appealing. We also placed flyers/posters at local public transportation train and bus stations. High-traffic areas were also defined as digital spaces the students frequented, such as email and Blackboard postings for their classes.

Promotion

Promotion is the way in which the research intervention reaches the target audience [15]. To promote effectively, it is recommended to use various communication channels to disseminate information [19]. In marketing, it is recommended that a multi-channel strategy be used [20,21], allowing for dissemination to a larger number of individuals. More recently, with the advent of sophisticated tailoring of advertisements, marketers have recommended omnichannel marketing where the consumer's viewpoint and experience are integrated across channels [22]. During the initial recruitment phase of the study, both PIs and study staff at the respective sites met with key stakeholders on campus. This included informational meetings about the study with University Health Services, Health Promotion Educators, and other campus personnel who interacted with students on a regular basis. An example outcome was a request by University Health Services personnel for prescription pads that could be used to "refer" patients to the study. Another example involved a request for a presentation to residential hall advisors about the study, after which they then provided study materials to the residents. This included placing study materials on residential hall bulletin boards and emailing healthy recipes to residents.

Researchers reported that young adults might need to be reached through less traditional recruitment channels, such as social media, and this, coupled with the idea of multichannel marketing [16] led us to target the following channels and strategies that were used to promote the study: emails, flyers/posters, Facebook posts and ads, in-person events, hearing about the study from a friend, and a combination of any of the above. In order to keep the *promotion* novel over time, new posters and taglines were developed and rotated into use. Taglines such as "Is a healthier lifestyle one of your New Year's resolutions? Then HBHU may be for U!," "Are you

looking for a healthier lifestyle?," "Are you interested in losing weight, but do not know where to begin?," "Looking for a way to stay healthy in college?," and "Don't settle for fads when it comes to your body" were developed by the research teams, including the student research staff members at the universities conducting recruitment. Examples of the logo and a flyer can be seen in Fig. 2.

Emails. Emails were a primary source of *promotion*. These emails provided a brief summary of the study, the study's contact information, a link to the online eligibility survey, and a study flyer. Personalized emails were distributed to individual professors, department heads, administrative staff, student advisors, and student groups and organizations. Mass emails also were sent through research opportunity listservs. We received confirmation from a number of contacts that flyers were posted in department lounges or distributed to students via email, online course websites, and in-class announcements; thus, exemplifying a multimodal approach whereby digital distribution led to various ways of disseminating the information including posting flyers.

Flyers/posters. Signage included flyers, table tents, residence hall bulletin boards, university closed-circuit televisions, electronic billboards, and campus shuttle buses. All *promotional* signs were designed with the study branding, text, and images that would be appealing for university students, and with messaging regarding healthy lifestyles that were consistent with what the intervention offered. Signage and *promotion* were enhanced during midterm and final exam periods by distributing healthy "study snacks" branded with the flyer and study logo.

Social media. Due to the high use of social media in this population [17,18], we made HBHU social media accounts on Instagram and Twitter. Posts were made to each of these platforms regularly, and we developed relationships with some key campus leaders to allow for retweeting and sharing of posts. Targeted ads also were posted on Facebook.

In-person events. Both campus sites hosted a number of in-person and outreach events for students specific to their site. These included attending orientation sessions for freshmen and transfer students, hosting booths at health fairs, and distributing flyers and healthy snacks before and after classes, as well as hosting table events where coffee, tea, healthy snacks, and other giveaways were provided. Additional events included cooking demonstrations in resident halls and screening events (e.g., "know your BMI" and "know your blood pressure").



Fig 2 | Healthy Body Healthy U logo and flyer sample.

Other. We also placed ads in each site's local area newspapers with an advertisement of the study. Additionally, we regularly posted our study on Craigslist in each site's local area.

Packaging

The appearance of the intervention and *promotional* materials are the *packaging* in the 7P marketing mix. As mentioned previously, the study logo was used as branding on all study materials (see Fig. 2). Branding is an important aspect of *product* marketing, which can allow for identification with the brand and enhanced need for the product and potentially behavior change [23]. The program was branded with specific colors and a logo, which were used in marketing and throughout program delivery. The colors were chosen to identify each content group and to appeal to both men and women. A "University" U block font was used on handouts, giveaways and in the HBHU logo (see Fig. 3). The look and feel of the marketing were designed with the student population in mind and is described in more detail below. The flyers, posters, table tents, bulletin board postings, and participant giveaways (keychains, post-it notes, and hand sanitizers) all used the logo, font, and color scheme to connote brand recognition.

Positioning

The way in which the thoughts and attitudes of the target audience are taken into account is the *positioning* of the *product*. These thoughts and attitudes of our student bodies were solicited via several rounds of informal qualitative sessions. In these sessions, ideas were solicited, and recruitment strategies and taglines were piloted to ensure that they were appropriate to recruit university students. Informal progress evaluations took place periodically throughout the recruitment process to assess and update study recruitment materials, taglines, and study giveaways. This iterative process allowed for the consideration of contextual factors associated with the dynamic nature of the student population within each setting.

People

The term *people*, as a 7P in the marketing mix [13], refers to the ability to select, recruit, and hire a research team to do the job of marketing. In addition to professional research staff, the study team included personable, diverse undergraduate and graduate students. These students were representative of the student body whom we were targeting for recruitment. For recruitment strategies, all staff involved in the in-person methods received training on appropriate recruitment strategies following IRB guidelines to market the study while being careful

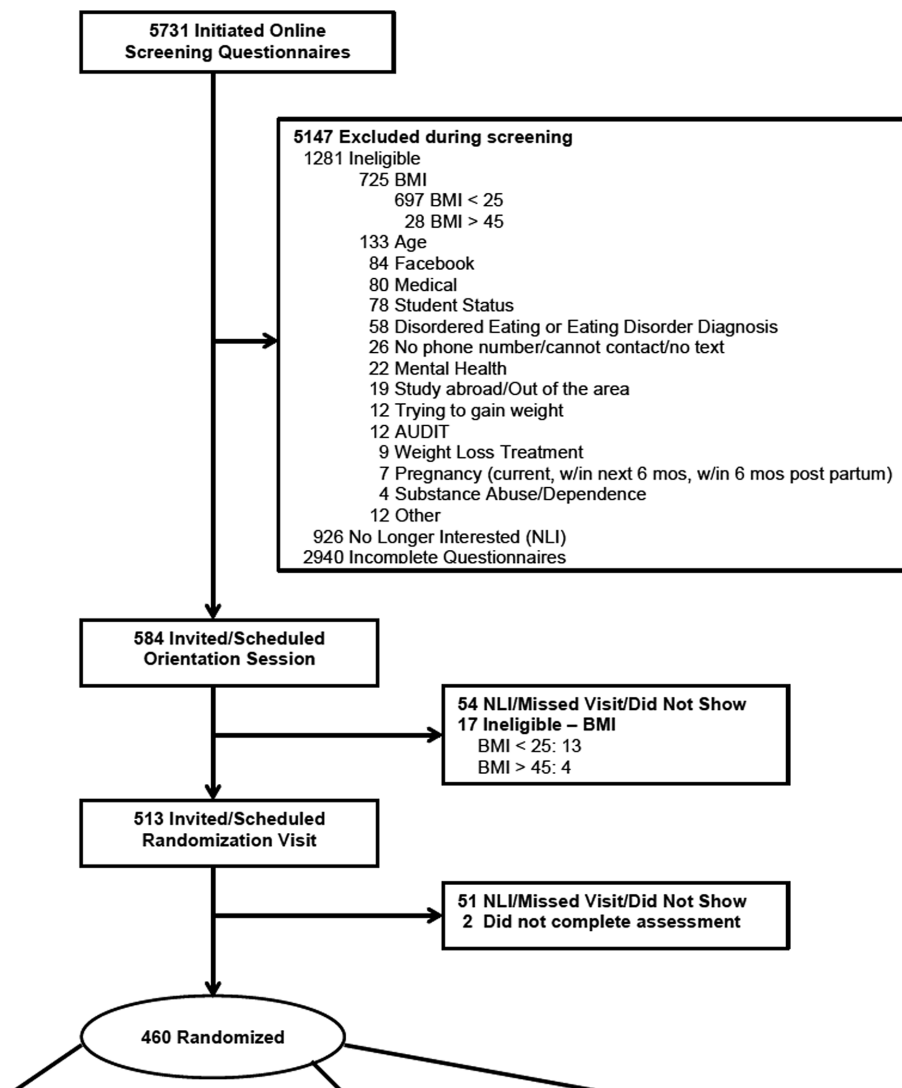


Fig 3 | CONSORT flow diagram. This study applied the 7Ps marketing principles [11,12] to behavioral intervention recruitment strategies.

not to coerce students to participate. Staff also wore HBHU-branded shirts while recruiting on campus.

Analytic plan

We examined the number of respondents who partially or fully completed the initial online eligibility survey, including completing the question “How did you hear about the study?” Responses of multiple sources are represented as an aggregate category of “multiple sources” and do not include all possible permutations. The open-text responses were analyzed and placed into emergent categories by research study team members. Responses that were included in the original options (email, flyer/poster, Facebook post, Facebook ad, in-person event, and friend) were removed from this analysis. Because some responses were vague or broad (i.e., online), we were unable to collapse responses into larger categories. Participants’ responses fell into 18 categories and counts and percentages were calculated for each. We reported on the top

three categories. To examine the awareness of the marketing and recruitment strategies, we examined the characteristics of those participants reporting various recruitment *promotional* channels, which *promotional* channels participants were most aware of and if these channels were equally reported between those interested in the study and those who ultimately enrolled. All analyses were conducted using Stata version 15. BMI was calculated using respondents’ self-reported height and weight, with lower and upper bounds set at 10 and 60kg/m², respectively. Descriptive statistics for continuous measures are described as means and standard deviations. Counts and percentages are described for categorical variables. Pearson’s chi-squared tests were used to assess differences in demographics, individual recruitment strategies, and enrollment status. Logistic regressions assessed associations among the highest reported promotional efforts and sex, age, race/ethnicity, and BMI. All statistical tests were two sided and a *p*-value <.05 was considered statistically significant.

RESULTS

Demographics

Of the 5,731 initiated screeners, 460 (12.5%; see Fig. 3) were enrolled in the study and, of those, we obtained data from 409 regarding how they heard about the study. For the 409 enrolled in the study with recruitment source data, 69% of participants were between the ages of 18 and 25, 31% were between the ages of 26 and 35; 79% were female, and they had an average BMI of 30.6 ± 4.3 . This study successfully recruited and enrolled a diverse sample of students (51.3% were non-White); 20.3% African American/Black, 9.78% Asian/Pacific Islander, 13% Hispanic, 8.31% multiracial, and 48.7% non-Hispanic White. We used Pearson's chi-squared tests to assess for differences in demographics and source of recruitment between those enrolled and not enrolled. Results showed no difference in gender between those who enrolled and did not enroll, a trend toward significance in age, with more of the 26–35 year olds enrolling ($p = .07$), a significant difference in BMIs ($p < .01$) with those enrolling having more obesity than those who did not enroll, and significant differences in race/ethnicity ($p < .01$) between those enrolled and not enrolled in the study. In the key underrepresented groups from our sample, among those who enrolled versus those who did not enroll, the proportion of Black (20.3% vs. 17.1%), Hispanic (13% vs 11%), and multiracial (8.3% vs. 7.4%) individuals remained stable from screening to enrollment (see Table 1).

Study awareness by promotional effort

Of the 3,059 respondents, when asked how they heard about the study, the *promotion* effort that

garnered the greatest study awareness was email (72.5%), followed by a flyer/poster (8.8%), an open-text response of “other” (6.7%), and multiple Sources (6.6%). Other means of hearing about the study yielded low endorsements, only totaling another 5.33%: Facebook post (1.31%), Facebook ad (0.16%), in-person Events (1.24%), and hearing from Friends (2.62%). The top three other ways respondents reported hearing about the study in the open-text responses were from a professor, instructor, or course website (92.7%), their department (3.8%), and clinicaltrials.gov (2.9%). See Table 2 for descriptive information for all sources of recruitment.

Differences in those enrolled versus not enrolled by promotional effort

We examined the source of study awareness between those enrolled and those not enrolled. Pearson's chi-squared tests revealed that, compared to those not enrolled in the study, those who enrolled were more likely to hear about the study via flyers/posters (enrolled = 14.4%; not enrolled = 7.9%; $X^2(1) = 40.6$, $p < .001$) and multiple sources (enrolled = 11.7%; not enrolled 5.85%; $X^2(1) = 8.39$, $p < .01$) and less likely to hear via email (enrolled = 62.1%; not enrolled = 74.2%; $X^2(3) = 24.6$, $p < .01$) than those not enrolled. There were no significant differences between those enrolled and not enrolled for Facebook posts, Facebook ads, in-person events, hearing from a friend, or other sources.

Yield on key demographic variables by promotional effort

Logistic regressions were performed to assess associations among the top two recruitment methods and demographic characteristics of age, sex, race/

Table 1 | Comparison of demographics between those enrolled and those not enrolled

Variable	Not enrolled (<i>n</i> = 2,650)	Enrolled (<i>n</i> = 409)	<i>p</i> -value
Age			.07
18–25 years	1,936 (73.1%)	281 (68.7%)	
26–35 years	714 (26.9%)	128 (31.3%)	
Sex			.84
Female	2,074 (78.3%)	322 (78.7%)	
Male	575 (21.7%)	87 (21.3%)	
Race/ethnicity			<.01
African American/Black	453 (17.1%)	83 (20.3%)	
Asian/Pacific Islander	451 (17%)	40 (9.8%)	
White (non-Hispanic)	1,255 (47.4%)	199 (48.7%)	
Hispanic	292 (11.0%)	53 (13.0%)	
Multiracial/Unknown	196 (7.4%)	34 (8.3%)	
BMI (self-report) ^a	27.2 ± 6.1	30.6 ± 4.3	<.01
Site			<.01
GW	1,484 (56.0%)	194 (47.4%)	
UMB	872 (32.9%)	184 (45.0%)	
Other	294 (11.1%)	31 (7.6%)	

^a*p*-value significant at <.05.

^bBMI was calculated by participant self-report height and weight. Lower-end values were limited to >10 and upper-end values to 60. Comparison is between not enrolled (*n* = 1,582) and enrolled (*n* = 409).

Table 2 | Total reported recruitment channels ($N = 3,059$) and comparison between those enrolled and not enrolled

Variable	Total surveys completed ($N = 3,059$)	Not enrolled ($n = 2,650$) n (%)	Enrolled ($n = 409$) n (%)	p -value
Email	2,219 (72.5%)	1,965 (74.2%)	254 (62.1%)	<.01
Flyer/poster	269 (8.79%)	210 (7.9%)	59 (14.4%)	<.01
Facebook post	40 (1.31%)	37 (1.40%)	3 (0.7%)	.30
Facebook ad	5 (0.16%)	5 (0.19%)	0	.75
In-person event	38 (1.24%)	32 (1.21%)	6 (1.47%)	.16
Friend	80 (2.62%)	63 (2.38%)	17 (4.16%)	.27
Other ^a	205 (6.70%)	183 (6.90%)	22 (5.38%)	.46
Multiple sources	203 (6.64%)	155 (5.85%)	48 (11.7%)	<.01

p -value significant at <.05.

^aMain source of "other" listed was professors, announcements in class, and postings on class website.

ethnicity, and BMI (calculated from clinic-measured height and weight). The open field code was not analyzed here due to the small sample within each subcode. For email, we found no significant associations among any subgroup population (all $p > .05$). For flyers/posters, we found that those aged 26–35 years were less likely to hear about the study through flyers/posters compared to those aged 18–25 years: odds ratio (OR) = 0.51 (0.29, 0.88). We found no significant associations between any other subgroup and source of recruitment of flyers/posters (all $p > .05$). For multiple sources, we found that those aged 26–35 years were more likely to hear about the study through multiple sources compared to those aged 18–25 years: OR = 2.49 (1.13, 5.49). We also found that males were more likely to hear about the study through multiple sources compared to females: OR = 3.28 (1.15, 9.41). We found no significant associations between race/ethnicity, BMI, and multiple sources of recruitment (all $p > .05$).

DISCUSSION

The principles of commercial and social marketing can be useful for developing and promoting recruitment into a randomized controlled trial. In the HBHU trial, we used the 7Ps marketing mix [13] as a framework to create *promotional* efforts, which we then mixed and matched, to promote our weight gain prevention intervention to emerging university adults. The *placement*, *packing*, and type of *promotional* strategies were done by assessing the target audiences' needs and preferences (*positioning*). Thus, for example, study colors and a logo and relevant taglines and email and poster content were developed based on student input and feedback. In this closed environment of a university setting, email, flyers, in-person *promotion*, and announcements from professors were chosen as means of promoting the study. Recruitment in a broader catchment would likely apply different *promotional* channels with different logos and wording but would also require an assessment of the target audience, that is, participant preferences and attitudes (*positioning*).

In this study in which the 7P marketing mix was applied, more than 5,700 individuals were interested enough to initiate a screener. This high rate of screener initiation is a potential indicator that our *promotional* strategies were effective in sparking interest among university students. From this initial interest, we successfully met and exceeded our recruitment goal and recruited a diverse sample. Estabrooks et al. recommend examining key subgroups in the sample [11]. When this was done, we found that Black, Hispanic, and multiracial individuals were equally represented among those who did not enroll compared to those who did enroll. Specifically, more than half of the sample who both initiated a screener (52.6%) and who enrolled into the HBHU intervention trial were non-White (51.3%). Of the *promotion* strategies used and assessed, it appears as though, for enrolled participants, emails were the most common channel reported for study awareness, followed by flyer/poster, multiple sources, and other sources (i.e., announcements in class/course website postings). The success in recruiting a diverse sample of participants is likely due to several factors: first, one of the universities is a majority–minority institution; second, the other institution specifically marketed to a historically Black college and diverse community college and partnered with multicultural student associations; and third, we hired diverse research assistants so that the *people* advertising the study at the in-person events matched the study population.

When looking at the most effective recruitment strategy in this study, it is interesting to note that, while email was reported more than four times as often as the recruitment source for those enrolled, there was a lower yield rate in that the percentage of people who heard about the study via email and enrolled was lower than the number who initiated a survey (62.1% enrolled vs. 74.2% not enrolled). Conversely, while much less frequently reported overall, the flyers/posters and hearing about the study from multiple sources led to a higher yield rate of enrolled participants compared to the number

not enrolled (14.4% enrolled vs. 7.9% not enrolled and 11.7% enrolled vs. 5.9% not enrolled, respectively). The most effective recruitment channel results give insight into the successful nature of the product, promotional channel, placement of the promotion, and the packaging of the promotion, none of which can be teased apart from these analyses. These findings for the overall response of hearing about the study through email differ from Tate et al. who identified the top two recruitment methods for those enrolled in the study as mass mailing (38.4%) and emails (23.2%) [9]. However, it is important to note that Tate did not specifically recruit through campuses, rather they sought to reach community members in the 18–35 year age range. When examining how the participants might have differed by *promotional* strategy, some *promotional* efforts were equally effective across our participants where flyers were more effective for our younger participants and hearing from multiple sources was more effective for our older participants and men. This is consistent with the premise that a mix of creating value for the customer by developing a *product* and communicating that value via multiple channels may have been key to our successful intervention recruitment [10].

Facebook ads have been shown to be a cost-effective means of advertising online health surveys to young adults [24]. Consistent with this and other previous work, we found Facebook advertising to be ineffective in the current study [25]. However, young adults recruited into a randomized weight gain intervention trial reported low likelihood of clicking on a paid advertisement to enroll in the study [9]. Only 0.16% of the entire sample reported hearing about the study through a Facebook ad, while 0% of those enrolled were recruited through Facebook ads. However, it should be noted that those who might have seen us through multiple means could have been prompted to go to the survey after seeing a social media post, as well as one of our other recruitment strategies.

To capitalize on marketing principles in research interventions, we would recommend that time is invested in marketing in several ways. Consider if elements of the 7Ps, *product*, *price*, *place*, *promotion*, *packaging*, *positioning*, and *people*, can be used to develop your product and promote your product or behavior change intervention. With respect to promoting your product, we recommend that researchers have an awareness of the competing products and develop characteristics of the intervention that will make the product desirable to the target audience or research participants. In our case, a pilot study had shown that Facebook and text messaging was a desirable delivery channel for the intervention for emerging adults. Knowing your participant population through qualitative data and pilot studies can help develop a desirable product. We

also recommend considering how the intervention will be promoted as part of design consideration for the control group's intervention. In our case, we felt strongly that we wanted the control group to receive weight-related educational content so that they would be interested in all three groups and so that we could market the intervention ethically as related to managing a healthy weight. After thinking about the target audience to create the *product*, we further recommend thinking about marketing principles for *place*, *promotion*, *packaging*, *positioning*, and *people*.

Marketing also indicates that your advertising must both fit the target audience and remain novel over time to continue to attract attention. This fit with the target audience can be achieved in matching the needs of the target audience, as well as continuing to adjust the *packaging*, *placement*, *promotion* channels, and *positioning* of the *product* over time in your study. To know what is effective, researchers can conduct qualitative research with their target population to learn what might attract their attention regarding study colors and logos (*packaging*), where are they most likely to notice an advertisement and in what form, for example, email, flyer, radio, and direct mailer (*placement and promotion* channel), and how you describe the study and why they might be interested in your intervention (*positioning*). The “why” will become the tagline. For example, during the course of conducting HBHU, we learned that students were focusing on fitness and health as outcomes from weight loss. Thus, we used this “why” in our taglines to attract the attention of our target audience. We also recommend that researchers track in real time how the participants are hearing about the study and use these data to make decisions about where to focus promotional efforts on an ongoing basis. This can help researchers make decisions about where to focus their promotional efforts.

LIMITATIONS

This study has several limitations that are important to note. The recruitment question of “how did you hear about the study?” was added to the online screener 6 months after the start of recruitment. Thus, the recruitment data were for only 409 of the 460 (89% of the total sample) enrolled in the study. While there are exclusion criteria data from those who screened ineligible, the study did not always capture explicit reasons for not participating in the study by those who did not screen out. The way in which the data were collected for study awareness had some limitations. First, the categories did not allow us to capture fine-grained details of recruitment methods, such as if the emails were from a professor, from a student organization, or a mass email. Second, although there was a twofold greater enrollment rate for those indicating seeing the study in multiple channels, we do not know which sources contributed to this finding. Future analyses will include

these examinations, as this information may be helpful in guiding decisions about maintaining some of the seemingly less effective recruitment strategies that could have had a synergistic effect. We would also recommend capturing data on reasons for not being interested in the study so that future promotions or intervention designs can be informed by these participant perceptions. We were also unable to determine the impact of the 7Ps on our recruitment outcomes, nor were we able to say if our promotional strategies for a healthy body weight intervention would generalize to other kinds of health behavior interventions. This design did not include a marketing control group against which the 7Ps could be compared. However, future studies could make that comparison; additionally, quantitative and qualitative data could be collected to learn more about what materials caught their attention (*packaging* and *positioning*), as well as details on where and how they heard about the study (*placement* and *promotion* channel) to better understand the impact of the 7Ps in promotion behavioral interventions. It is also important to factor in the cost of the recruitment strategies include the price of the materials or fees, as well as staff time into decisions. Researchers could look at the effectiveness of their strategies in reaching people relative to the cost of that method. In this study, a low-cost strategy of emailing aligned with effectiveness; however, some low-cost strategies with a low yield may still be worth trying if the cost is nominal.

CONCLUSION

In summary, it is recommended that behavioral medicine researchers can learn from and partner with communication researchers to utilize the social marketing principles of the 7P marketing mix that are typically used to sell commercial *products*. In this study, we successfully recruited a diverse group of young adults and met the target recruitment number. Emails were over four times more effective than the next most frequently cited sources of flyers/posters and multiple sources. Yet, there was some degradation in the email yield rate among those enrolled versus not enrolled, whereas flyers/posters and multiple sources had a higher yield rate among those enrolled versus not enrolled. In addition, although emails were much more effective in terms of study awareness, 38% of the sample came from other sources, including flyers, a friend, multiple sources, and notification from professors. The in-person tabling and Facebook posts and ads were less effective in this study, contributing only a little over 2% of our enrolled sample. However, we do not know if they contributed to the endorsement of “multiple” sources. It is suggested that researchers continue to refresh the *placement*, *packaging*, and *positioning* of *promotional* materials to keep the marketing as effective as possible. It is also recommended that

the new omnichannel approach [22] be attended to if at all possible by understanding the viewpoint of your participants (*positioning*) and personalizing multiple channels of *promotion* when marketing your study (*product*).

Acknowledgments: The authors would like to thank the undergraduate and graduate research assistants at both sites who worked diligently to recruit our participant sample. ClinicalTrials.gov: NCT02342912.

Compliance with Ethical Standards

Funding: This study was funded by the National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health (award number R01DK100916)

Conflicts of Interest: J.A.W., J.M.F., M.M., L.L.H., and M.A.N. declare that they have no conflicts of interest.

Authors' Contributions:

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

References

- Williamson DF, Kahn HS, Remington PL, Anda RF. The 10-year incidence of overweight and major weight gain in US adults. *Arch Intern Med*. 1990;150(3):665–672.
- Flegal KM, Carroll MD, Ogden CL, Curtin LR. Prevalence and trends in obesity among US adults, 1999–2008. *JAMA*. 2010;303(3):235–241.
- Norman GR, Sloan JA, Wyrwich KW. Interpretation of changes in health-related quality of life: The remarkable universality of half a standard deviation. *Med Care*. 2003;41(5):582–592.
- Gokee-LaRose J, Gorin AA, Raynor HA, et al. Are standard behavioral weight loss programs effective for young adults? *Int J Obes (Lond)*. 2009;33(12):1374–1380.
- Loria CM, Signore C, Arteaga SS. The need for targeted weight-control approaches in young women and men. *Am J Prev Med*. 2010;38(2):233–235.
- Bost ML. A descriptive study of barriers to enrollment in a collegiate health assessment program. *J Community Health Nurs*. 2005;22(1):15–22.
- Mapstone J. Strategies to improve recruitment to research studies. *Cochrane Database Syst Rev*. 2007(2).
- Lam E, Partridge SR, Allman-Farinelli M. Strategies for successful recruitment of young adults to healthy lifestyle programmes for the prevention of weight gain: A systematic review. *Obes Rev*. 2016;17(2):178–200.
- Tate DF, LaRose JG, Griffin LP, et al. Recruitment of young adults into a randomized controlled trial of weight gain prevention: Message development, methods, and cost. *Trials*. 2014;15:326.
- Gupta A, Calfas KJ, Marshall SJ, et al. Clinical trial management of participant recruitment, enrollment, engagement, and retention in the SMART study using a Marketing and Information Technology (MARKIT) model. *Contemp Clin Trials*. 2015;42:185–195.
- Estabrooks P, You W, Hedrick V, Reinholdt M, Dohm E, Zoellner J. A pragmatic examination of active and passive recruitment methods to improve the reach of community lifestyle programs: The talking health trial. *Int J Behav Nutr Phys Act*. 2017;14(1):7.
- Kotler P, Lee N. *Social Marketing: Influencing Behaviors For Good*. Los Angeles, CA: Sage Publications; 2008.
- Weinreich NK. *Hands-on Social Marketing: A Step-by-Step Guide to Designing Change for Good*. 2011.
- Napolitano MA, Whiteley JA, Mavredes MN, et al. Using social media to deliver weight loss programming to young adults: Design and rationale for the Healthy Body Healthy U (HBHU) trial. *Contemp Clin Trials*. 2017;60:1–13.

15. Nichols L, Martindale-Adams J, Burns R, et al. Social marketing as a framework for recruitment: Illustrations from the REACH study. *J Aging Health*. 2004;16(5 suppl):157S–176S.
16. Corsino L, Lin PH, Batch BC, et al. Recruiting young adults into a weight loss trial: Report of protocol development and recruitment results. *Contemp Clin Trials*. 2013;35(2):1–7.
17. Martínez Alemán AM, Wartman KL. *Online Social Networking on Campus: Understanding What Matters in Student Culture*. New York, NY: Routledge; 2009.
18. Pew Internet Research. *Social Media Use in 2018*. Washington, DC: Pew Research Center; 2018. Available at <https://www.pewinternet.org/2018/03/01/social-media-use-in-2018/>.
19. Evans WD. How social marketing works in health care. *BMJ*. 2006;332(7551):1207–1210.
20. Hornik R. *Public Health Communication: Evidence for Behavior Change*. Routledge; 2002.
21. Verhoef PC, Kannan PK, Inman JJ. From multi-channel retailing to omni-channel retailing: Introduction to the special issue on multi-channel retailing. *J Retailing*. 2015;91(2):174–181.
22. Manser Payne E, Peltier JW, Barger VA. Omni-channel marketing, integrated marketing communications and consumer engagement: A research agenda. *J Res Interact Mark*. 2017;11(2):185–197.
23. Evans WD, Hastings G. *Public Health Branding: Applying Marketing for Social Change*. Oxford, UK: Oxford University Press; 2008.
24. Fenner Y, Garland SM, Moore EE, et al. Web-based recruiting for health research using a social networking site: An exploratory study. *J Med Internet Res*. 2012;14(1):e20.
25. Partridge SR, Balestracci K, Wong AT, et al. Effective strategies to recruit young adults into the TXT2BFIT mHealth randomized controlled trial for weight gain prevention. *JMIR Res Protoc*. 2015;4(2):e66.