

# Quantifying weight loss program preferences of men working in trade and labor occupations: A discrete choice experiment

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## Abstract

**Objective:** Men who work in skilled and unskilled trades and labor occupations (i.e., blue-collar occupations), have high rates of obesity and associated comorbidities but are underrepresented in weight loss programs. A first step in engaging this group is to better understand their preferences for weight loss programs.

**Methods:** Respondents were men working in trade and labor occupations, with overweight/obesity, and an interest in losing weight. A discrete choice experiment was developed, and the data were analyzed using mixed logit model. Respondent characteristics were tested as effect modifiers.

**Results:** Respondents ( $N = 221$ , age ( $M \pm SD$ )  $45.0 \pm 12.6$ , BMI  $33.3 \pm 6.3$ , 77% non-Hispanic white) working in a variety of occupations (construction 31%, manufacturing 30%, transportation 25%, maintenance/repair 14%) participated in this study. Results indicate preferences for programs that encourage making smaller dietary changes, are delivered online, and do not incorporate competition. Results were consistent across sensitivity analyses and most respondent groups.

**Conclusions:** The results suggest specific ways to make weight loss programs more appealing to men in trade and labor occupations. Using experimental methods to quantify preferences using larger, more representative samples would further assist in tailoring behavioral weight loss programs for under-reached populations.

## KEYWORDS

discrete choice experiment, intervention, men's health, occupation

## 1 | INTRODUCTION

Behavioral treatment for obesity is one of the first-tier recommendations to reduce the health risks associated with obesity.<sup>1,2</sup> However, behavioral weight loss programs are not accessed equally by groups who may benefit from this treatment. Although obesity impacts men and women equally (prevalence 43% for men vs. 42% for women),<sup>3</sup> estimates suggest that only 27%–38% of participants in trials of behavioral weight control programs are men.<sup>4–7</sup> Lower

participation is also found in commercial weight loss programs<sup>8</sup> and in weight loss treatments such as bariatric surgery.<sup>9</sup> Further, men who take part in behavioral interventions for obesity tend to have higher levels of education than those who do not.<sup>10–12</sup> This is problematic because men with less than a college degree have higher rates of obesity,<sup>13</sup> suggesting that the men who most need obesity treatment most are among the least likely to seek or receive it.

To make programs more accessible to underrepresented groups in need of weight control, there is a need to tailor programs to

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increase their cultural appropriateness and to increase the appeal of the programs to those groups.<sup>14</sup> To increase the involvement of men with lower education in weight loss program, one group that could be targeted is men who work in skilled and unskilled trade and labor occupations, historically referred to as “blue-collar.”<sup>15</sup> These occupations include transportation, manufacturing, farming, construction, and extraction trades (e.g., mining).<sup>16</sup> Individuals in these occupations constitute approximately one-third of men in the workforce<sup>17</sup> and the highest level of education achieved by 90% of employees in these occupations is less than bachelor's degree.<sup>18</sup> Therefore, this is a sizeable portion of the population who have largely been absent from weight control intervention and research.

One hypothesis for why men who work in these occupations are not engaging in behavioral weight loss programs is that existing programs do not match their preferences for weight loss programs. There is a small body of literature that suggests that men's preferences for weight loss programs do not match many available programs and men report feeling the programs are developed with women's needs and preferences in mind.<sup>19–22</sup> These studies are predominantly qualitative in nature, reliant on small, nonrepresentative samples often with unclear occupational representation. To tailor programs to men working in trade and labor occupations, there is a need to build on this body of work on men's preferences to focus on this occupational group specifically.

A quantitative approach to gaining a deeper understanding of preferences within a population for new programs is to conduct a discrete choice experiment. These experiments are guided by utility theory and evaluate the relative preferences respondents express for individual program components.<sup>23,24</sup> In these experiments, program attributes (e.g., mode of delivery) with varying levels (e.g., in person or online) are presented in a choice based framework to determine the relative preferences respondents have for the attributes and levels as well as the relative importance of each attribute (e.g., mode of delivery is relatively more important than inclusion of partners). Specifically, respondents are asked to complete a series of choice tasks where they are asked to select their preferred option from hypothetical combinations of levels. Efficient experimental designs are used to select optimal combinations of attributes in the survey to evaluate the respondents' preferences. While this approach has rarely been used to tailor behavioral intervention for weight control for underrepresented groups, it has been used to evaluate general preferences for inpatient weight loss programs,<sup>25</sup> community-based programs,<sup>26–28</sup> and the relative preferences for weight loss surgery.<sup>29</sup> Further, this approach is widely used in the field of health economics to evaluate of patient preferences for health policies, pharmaceuticals, and disease management (e.g., De Bekker-Grob et al.<sup>23</sup>, Regmi et al.<sup>30</sup>). Further, there is evidence to suggest that participant's responses to in these experiments predicts participation in actual programs.<sup>28,31</sup>

Using an original discrete choice experiment, this study assessed respondents preferences for components that could be incorporated into a behavioral weight loss program focused on changing diet and exercise behaviors in a sample of men working in skilled and unskilled trades and labor occupations. The study tested five attributes

(approach to calorie reduction, mode of delivery, inclusion of competition, inclusion of support partners, and inclusion of additional health topics) and hypothesized that respondents would prefer program components not typically included in standard weight loss programs (i.e., smaller dietary changes, online delivery, inclusion of competitions, partners, and additional health topics). Further, multivariate models including patient characteristics were tested to explore whether respondent characteristics were associated with program preferences. It was hypothesized that for men who had participated in an organized weight loss program previously, there would be a stronger preference for “standard” components than for men who had not previously participated in a weight loss program.

## 2 | METHODS

The design and execution of this experiment was conducted following the International Society for Pharmacogenomics Outcomes Research (ISPOR) recommendations for good research practices.<sup>24,32,33</sup>

### 2.1 | Recruitment and respondents

Respondents were recruited and compensated through Cloud Research ([www.cloudresearch.com/](http://www.cloudresearch.com/)) using multiple consumer research panels in October and November 2021. This commercial service uses an aggregation of opt-in online research panels of consumers worldwide (limited to the US for this study) to recruit and compensate participants for online survey research. Respondents recruited through this service have been shown to be more diverse and more accurate in their completion of online surveys than other approaches for recruiting online respondents.<sup>34</sup>

To be eligible for the study, respondents had to report that they worked greater than 20 h per week for pay in occupations classified as skilled or unskilled trades and labor occupations.<sup>16</sup> Respondents also were required to report a body mass index greater than 27 kg/m<sup>2</sup> and have an interest in losing weight. Interest in weight loss was assessed by asking whether participants were currently interested in weighing less, more, or staying the same. These criteria were set to produce a sample that would be interested in and appropriate for a behavioral weight loss program. Exclusions included living outside of the United States, non-English speaking, current eating disorder, and inability to listen to and view videos. Respondents were compensated using whatever format the panel platform used for compensation (e.g., points that can be redeemed for gift cards).

### 2.2 | Procedures

#### 2.2.1 | Attributes and levels

Attributes and binary levels of the experiment (Table 1) were selected based on prior interviews with men working in trade and

**TABLE 1** Attributes and levels of variables in discrete choice experiment

Attribute	"Standard" level	Comparison level
Approach	Large changes	Small changes
Delivery	In-person	Online
Competition	No	Yes
Partner	No	Yes
Other health topics	No	Yes

labor occupations<sup>22</sup> and reviewing the relevant literature.<sup>2,19</sup> For each attribute, one of the levels was a "standard" weight loss program component<sup>35</sup> which was compared to a component that was hypothesized to be more appealing to men working in trade and labor occupations (tailored level). The attributes selected were chosen because they have been varied in prior weight loss programs targeting men generally but have not been formally tested for their appeal in men working in trade and labor occupations. Further, all attributes were described in ways that mirror how the attribute levels have been operationalized in prior weight loss programs. This choice makes it impossible to separate some aspects of attribute levels (such as group focused treatment vs. individualized with delivery method) it also makes the comparisons in this experiment feasible for actual program development. All attribute levels selected are distinct and could be potentially feasible and efficacious in any combination in an actual weight loss program. No attribute levels or combinations were dominated pairings (i.e., where one hypothetical scenario is objectively better than the other) and there were no implausible combinations. Descriptions of each attribute and level were provided in videos prior to the choice tasks. Scripts for these videos are included in the Supplemental Materials.

The first attribute was the approach to calorie restriction and physical activity that would be promoted by the program (referred to as "Approach"). The standard approach, described to respondents as "large changes," has been used by many behavioral weight loss programs and centers on creating a calorie deficit sufficient to create weight loss of 1–2 pounds per week.<sup>35</sup> The tailored level was described as "smaller changes" focused on making multiple, discrete calorie reductions from typical intake, such as reducing portion sizes, to yield an overall reduction of approximately 500 calories per day from typical intake which can produce slower weight losses but also yield improvements in weight. This approach has demonstrated initial efficacy for weight loss in men.<sup>36,37</sup> Further this approach may be seen as a treatment option that is potentially less difficult to implement and aligns with men's preference for not feeling that they are "on a diet."

The second attribute was delivery of the program ("Delivery"), comparing face-to-face to online delivery. Both levels are evidenced-based approaches for delivering weight loss programs.<sup>2</sup> Both approaches were described as group based, requiring weekly engagement, and would feature information developed by experts.

The third attribute evaluated was the inclusion or exclusion of team competition ("Competition"). Most weight loss programs do not include competition as part of the intervention, however, team competitions have been used successfully to engage men in weight loss programs.<sup>38</sup> Competitions are hypothesized to be appealing based masculinity theory.<sup>39</sup> Despite this, results from a qualitative study in this population demonstrated inconsistent preferences for including competitions in a men's weight loss program.

The fourth attribute was inclusion of support partners in the weight loss program ("Partners"). Including partners has been used in some weight loss programs to assist in behavior change (e.g., Gorin et al.<sup>40</sup>). Further, involving female spouses may be advantageous for men's weight loss because women are more often responsible for food related tasks in heterosexual couples.<sup>41</sup> However, men in the interviews were again inconsistent in their support for whether partners should be included in a tailored program.

The final attribute was the topics covered in the program ("Other health topics") including a focus on only diet and physical activity alone or multiple health behaviors (e.g., stress management, sleep education). Many weight loss programs focus exclusively on behaviors related to calorie balance. However, including more behaviors in a health promotion program may be an important consideration with this population. Men in trade and labor occupations have high rates of alcohol<sup>42</sup> and tobacco use<sup>43</sup> and many report short sleep habits.<sup>44</sup> Additionally, for a population reluctant to want to focus on weight loss, including other health behaviors may be appealing. In interviews with men from this population, many reported wanting a broader focus for the program that would include health promotion behaviors beyond weight loss.

## 2.2.2 | Discrete choice experimental design

The design for the study was a standard discrete choice framework with forced choices in each question. Based on the number of independent attributes and levels as well as consideration of respondent burden, the best experimental design was determined to be an 8-choice task design. Each task consisted of two, full-profile choices where all five attributes were included in each choice task and respondents were encouraged to consider the two combinations of components presented (Figure 1; Table S1). An opt-out option was not included to maximize information about preference between program components therefore this study will assess only the relative preference between attributes and not the likelihood of engagement with the hypothetical program. Two choices were selected to minimize burden for respondents. Specifically, the design used was balanced and orthogonal, based on a Resolution V fractional factorial design.<sup>32,45,46</sup> A more statistically efficient 16 task design was considered but was not used as 16 tasks was presumed to be too many to complete without significant respondent fatigue and the limited ability to recruit the sample for an online survey precluded recruiting a sample size sufficient to divide the 16 tasks into two blocks.

7. Which program would you prefer?

	Option A	Option B
Type of Changes	Large changes	Small changes
Format	Online	In-person
Motivation	Goal setting	Goal setting
People in Program	Men plus partners	Men only
Program Topics	Multiple health behaviors	Eating & physical activity only

Need to review the instructions? [Click here to review the instruction videos](#) in a new window.

\* must provide value

Option A    Option B

reset

FIGURE 1 Example discrete choice task set as presented to participants

### 2.2.3 | Survey format

Descriptions of the attributes and levels were provided to respondents in short videos, which were used to minimize the amount of reading required to reduce respondent burden. The seven brief videos (length: 48 s–1 min 48 s) were shown within the survey window and included simple animations and stock video images with a male voiceover. They were developed to be engaging (mild humor, animations) with short statements and direct language. Using videos to introduce experiments and the attributes and levels has been shown to help aid understanding and accurate completion of choice tasks.<sup>47</sup> Respondents completed the instructional portion of the survey in about 10 min (median, mode = 10 min).

The choice tasks immediately followed the instructions and included eight choice tasks plus a repeated task to evaluate for consistency of responses. Tasks were presented one per page in the survey (Figure 1). The order of attributes did not vary across tasks. Questions were included to evaluate respondent's belief that they would respond similarly in real-life and to assess attribute non-attendance. Attribute non-attendance was assessed by asking respondents whether they made their selections based on one or two attributes versus all attributes.<sup>48,49</sup> Two questions were included to assess attention to the questions, modeled after those used in a prior study.<sup>50</sup> These included "Research has suggested that a person's favorite color can tell us a lot about the way that they think about other people. In this case, however, we would like you to please choose all of the response options provided. In other words, regardless of your actual favorite color, click all of the answers" presented with five colors and "When you were in school, how hard did you work on your studies? In answering this question, please ignore everything else and select the final option indicating that you don't really remember" with four response options. The first was after the experiment evaluation questions and the second was near the end.

Following the experiment and evaluation questions, respondents were asked to characterize their demographic information, work situation, weight loss history, highest level of education completed, and their racial and ethnic background. Race and ethnicity were

asked in separate questions matching reporting requirements of the study funders. To characterize their experience with weight loss, respondents were asked whether they had used any of 10 common approaches to weight loss in the past. Prior experience with an organized weight loss program was defined as experience with a commercial program, individual counseling, surgery, or an internet program.

### 2.2.4 | Survey pilot testing

Pretesting of the experiment and instructions were conducted in two phases. First, researchers familiar with behavioral interventions and the target population who were not part of the study team reviewed scripts of the videos and provided feedback. Scripts were edited to enhance clarity of the constructs. Next, five men who met eligibility for the study were recruited to complete the survey in-person using a think-aloud protocol as they completed the full survey (instruction videos, choice tasks, and descriptive questionnaire). The first author (MMC) took notes while the participants completed the survey and asked clarifying questions following the completion of the survey. Pretesting participants reported that the number of tasks was manageable, but that more than nine tasks in the survey would be too tiresome to complete. The survey instrument was modified to enhance usability in response to participant feedback (e.g., clarifying to choose their preferred combination of components within each pair rather than seek their preferred treatment package; more indicators of position in the survey). These clarifications were included in updated instructional videos and included in the survey. These five participants' data were included in the analysis.

## 2.3 | Statistical analysis

The experimental design and descriptive analysis were conducted using SAS and STATA (Release 13) was used for modeling. Using a rule-of-thumb estimation for sample size in discrete choice experiments,<sup>51</sup> the minimum sample needed for an 8-choice task

experiment with five attributes and two levels is 25. However, this rule of thumb does not account for measurement error. Simulated models suggest that there are diminishing benefits for including samples larger than 200 participants.<sup>32</sup> Because no prior studies have been conducted in this area, the sample size for this study was set at  $N = 200$ .

Variables were dummy coded so that positive coefficients for each attribute would correspond to the tailored level of the attribute. The values of the coefficients are not directly meaningful; instead, the focus should be on the relative magnitude of the coefficients and the direction of the effects. Data was reviewed for problematic response patterns (e.g., selecting option A only). The only concern identified were respondents who responded to all preferences questions based on a single attribute (e.g., selected the option with "online" each time it was available). No other problematic response patterns were identified.

The primary analysis of the data used a mixed logit model (mixlogit<sup>33</sup>). Although there is not an explicit test to determine a priori whether a random-parameter logit model is the best choice for analysis, significant standard deviations of effects in the random-parameter model indicated that heterogeneity of preferences was evident making the random-parameters model an appropriate choice.<sup>49</sup> Sensitivity analyses were conducted to address attribution nonattendance and instruction nonattendance. These analyses included samples that (1) completed the instructional portion of the survey in a plausible amount of time (e.g.,  $\geq 5$  min) and passed the first instructional attention task ( $n = 155$ ), (2) completed the instructional portion in a plausible time and passed both attention tasks ( $n = 83$ ), (3) demonstrated response variance on the Approach attribute ( $n = 189$ ), and (4) demonstrated response variance on the Delivery attribute ( $n = 181$ ). The results of these analyses are presented in Table S2.

Additionally, the impact of respondent characteristics on preferences were evaluated using stratified conditional logit models. Differences between models were compared using Wald tests.<sup>33,49</sup> Conditional logit models were selected for these comparisons due to small samples sizes in the stratified samples. Characteristics of interest were prior weight loss experience, age (median split at 44 years), BMI (median split at 31.6 kg/m<sup>2</sup>), education (bachelor's degree or greater vs. less), and marital status (married/partnered vs. other). All procedures were approved by the Rush University Medical Center Institutional Review Board.

### 3 | RESULTS

A total of 245 respondents qualified to complete the survey however 24 did not complete the choice tasks. The analytic sample of  $N = 221$  includes three respondents who completed the choice tasks but did not complete the full survey. Table 2 presents the respondents' characteristics. Respondents had an average age of 45.0 (SD = 12.6) with a mean BMI of 33.3 (SD = 6.3). A minority of respondents (27.5%) reported a bachelor's degree or higher. Approximately one-

TABLE 2 Respondent characteristics

	N	Mean	SD
Age	221	45.0	12.6
BMI	221	33.3	6.3
		<i>n</i>	%
Education completion	218		
High school or less		56	25.7
Some college/vocational		102	46.8
Bachelor's degree or higher		60	27.5
Race and ethnicity	216		
American Indian/Alaskan		2	0.9
Asian		4	1.9
Black/African American		19	8.8
Hispanic/Latino		22	10.2
Native Hawaiian/Pacific Islander		1	0.5
Multiracial		2	0.9
White		166	76.9
Income	218		
<\$50,000		68	31.2
50,000–75,000		59	27.1
75,000–100,000		44	20.2
100,000 +		45	20.6
Prefer not to answer		2	0.9
Relationship status	218		
Single		55	25.2
Married/Partner		138	63.3
Separated/Divorced/Widowed		25	11.5
Industry	221		
Construction, extraction		69	31.2
Installation, maintenance, repair		30	13.6
Production/Manufacturing		67	30.3
Transportation		55	24.9
Years in occupation	216		
<1 year		24	11.1
1–2 years		30	13.9
3+ years		162	75.0
Prior formal weight loss program	220		
Yes		77	34.8

third of respondents ( $n = 77$ , 34.8%) had previously engaged in an organized weight loss program.

Participant's preferences for attribute levels assessed independently are presented in Table 3. Some respondents consistently responded to the choice tasks based on a single attribute. This was

more prevalent for Approach ( $n = 32$ ) and Delivery ( $n = 40$ ) than for Partner ( $n = 17$ ), Competition ( $n = 8$ ) and Other Health Topics ( $n = 4$ ). The combined prevalence of these response patterns ( $n = 101$ , 45%) was lower than the self-reported attribute non-attendance (i.e., reported making selections based on one or two attributes  $n = 68.6\%$ ). Of note, this level of stated attribute nonattendance was within the

**TABLE 3** Respondent preferences for attributes assessed individually

	N	%
Approach		
Large	95	43.2
Small	125	56.8
Delivery		
In person	61	27.6
Online	160	72.4
Motivation		
Goals	177	80.1
Competition	44	19.9
Partner		
No partners	117	52.9
Partner	104	47.1
Other health topics		
Diet/PA only	118	53.4
Additional behaviors	103	46.6

range of what has been reported in prior studies.<sup>52</sup> Most respondents (73.8%) responded identically in the test-retest check for answer consistency. Generally, respondents (58.6%) found the choice tasks to be “easy” or “very easy” to complete and the majority (75.9%) reported they were either “quite” or “very” confident that they would make the same choices in real life. Most respondents accurately responded to the first attention checking task (74.1%) while fewer responded accurately to the second check (42.1%) indicating respondent fatigue near the completion of the survey.

Table 4 and Figure 2 show the results of the preference tasks. The mean estimates suggest that respondents prefer programs that include small changes approaches to changing eating, are delivered online, do not include competition, and focus only on eating and physical activity. No preference was detected for whether partners should be included. Of note, the strongest relative preference was observed for mode of delivery (online). In sensitivity analyses that removed data from participants who failed the attention check items or consistently responded based on one attribute, the findings were consistent except for program Other Health Topics (Table S2). For this attribute, the magnitude of preference varied across analyses but always trended towards a preference of focusing on eating and activity only. The significant standard deviation coefficients indicate that there was significant between respondent heterogeneity in preference across all attributes.

In the stratified analyses (Tables S3–S7), there were no significant differences in program preferences between those who had participated in a weight loss program before and those who had not. There were also no differences by BMI or marital status. Results varied by age group such that preferences among older respondents

**TABLE 4** Results of the mixed logit analysis

		All data (N = 221)	
		Coefficient	95% CI
Approach (large vs. small)	M	0.38	0.10 to 0.66
Delivery (in-person vs. online)	M	1.27	0.93 to 1.61
Motivation (goals vs. competition)	M	−0.55	−0.77 to −0.32
Partner (no partner vs. partner)	M	−0.10	−0.33 to 0.14
Other health topics (diet/PA only vs. additional behaviors)	M	−0.24	−0.44 to −0.32
		Coefficient	95% CI
Approach (large vs. small)	SD	1.83	1.42 to 2.24
Delivery (in-person vs. online)	SD	1.78	1.40 to 2.16
Motivation (goals vs. competition)	SD	0.98	0.68 to 1.28
Partner (no partner vs. partner)	SD	1.42	1.09 to 1.74
Other health topics (diet/PA only vs. additional behaviors)	SD	0.90	0.53 to 1.26
	Log likelihood	−1045.81	
	LR chi <sup>2</sup>	202.98	
	P chi <sup>2</sup>	<0.001	

Note: Direction for preference estimates coded such that a positive value indicates a preference for the tailored (i.e., second) level.



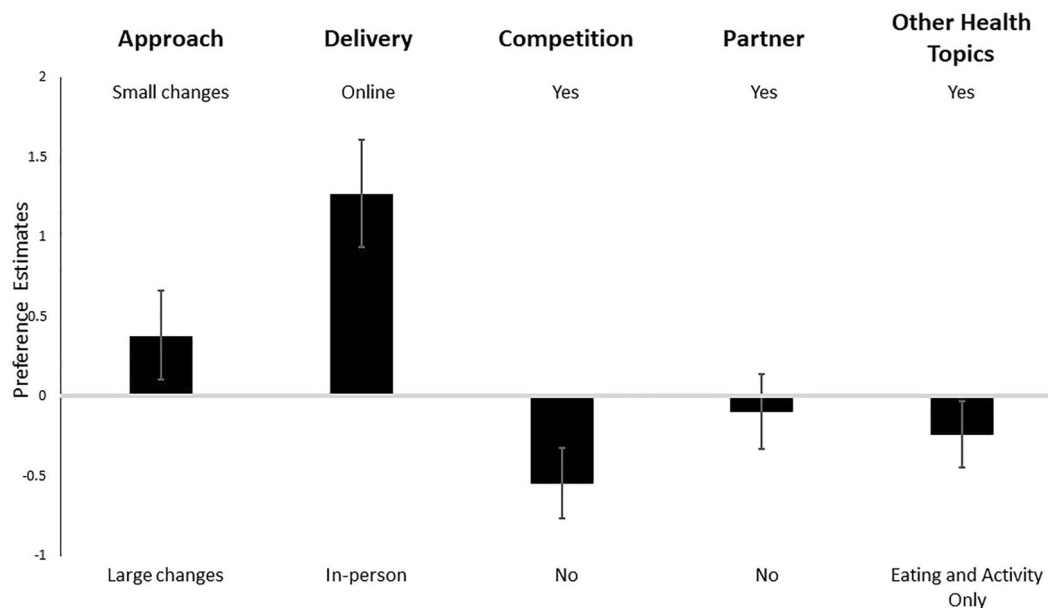


FIGURE 2 Relative preference of attributes from mixed logit analysis

closely mirror the overall sample. Among younger respondents, there was only a significant preference for Delivery with online being preferred. Finally, in analyses stratified by education status, the only difference detected was for the involvement of partner in the program. Respondents with a college degree preferred no partner involvement versus no significant preference was found for those without a college degree.

#### 4 | DISCUSSION

Quantifying respondents' preference for program components helps provide a basis for tailoring programs for underrepresented groups, though it has not been used previously to tailor behavioral weight control programs for an occupational group. In this study, using a sample of men working in trade and labor occupations, respondents chose hypothetical weight loss programs which revealed preferences for programs conducted online, using a small-changes approach to calorie reduction, and that did not include competitions. Few preferences were found either for or against programs that involved a support partner (vs. none) or programs that focused on eating and activity alone versus also including other health behavior change topics. It was hypothesized that both competition and inclusion of other health behavior topics may have increased appeal of weight loss programs, but this was not supported by the data. This failure to find support for hypotheses shows the need for studies like this one that measure preference for program components prior to program development.

The strongest preference identified was for programs delivered online. Though this is aligned with prior studies of men's preferences more generally,<sup>21</sup> this is noteworthy in this occupational group. Internet usage is lower in groups with lower levels of formal

education, including those working in trade and labor occupations. This difference was especially pronounced with regard to using the internet for health related reasons.<sup>53</sup> However, due to changes triggered by the COVID-19 pandemic, more individuals are using the internet to connect in new and different ways, including those with lower-education. For example, the majority of adults (80%) have talked with others using video calls online in 2020 or early 2021, including 73% of adults of with a high school education or less and 79% with less than a college degree.<sup>54</sup> This experimentation with new technology may have encouraged individuals previously less likely to prefer technology mediated intervention to prefer them more in the post-pandemic era. Further, online programs including the program described in this study, often offer more opportunities for individualized treatment. Individualized treatment is often preferred by men and may have contributed to the preference for online delivery.

Respondents' preferences for programs that use smaller changes for weight loss align with prior studies of men's preferences for weight loss. Specifically, men have reported wanting to have flexibility in diet plans and have expressed a strong preference to eat foods that are generally discouraged in typical weight loss programs.<sup>19–21</sup> Findings ways to incorporate preferred foods and beverages, has been central in prior successful men-only weight loss programs.<sup>36,55,56</sup> Findings from this study indicate that this approach is not only effective for men generally, but also preferred by this under-represented group of men. Together with the preference for online delivery, these findings suggest that program preferences of men working in trade and labor occupations focus on the ease of incorporating the program into their lifestyles over other factors. On the other hand, preferences for smaller change programs may represent a fear of diet diversification in this population but this study is unable to separate these potential influences.

In the past, competition has been used to engage men in weight loss programs. Competition is a characteristic of masculinity<sup>39</sup> and has been reported in some qualitative studies as an appealing approach to weight loss.<sup>19,20</sup> Based on this, competition has been used in some weight loss programs to increase engagement, especially among men.<sup>38,57</sup> Interestingly, men in this sample did not show a preference for programs that include competition. These results may be related to how the concept of competition was described in this study or it may indicate a misapplication of theory to practice. Understanding how and when competition could be used to increase program appeal should be considered in future studies.

Finally, this analysis showed significant heterogeneity in response to the hypothetical programs. Despite this, the stratified analyses suggested most of the demographic predictors were not related to preferences. This suggests that programs may not need to be tailored to these demographic subgroups to increase appeal. However, future research should assess whether other factors, such as occupational subgroups (e.g., truck drivers vs. construction workers) account for more of this variation. The heterogeneity of response may also suggest a need to tailor programs to fit individual preferences rather than to a larger population group.

The results of this study should be considered with the following limitations. First, though this study sample aligns well with the demographic characteristics of men working in trade and labor occupations, it is unclear if this sample fully represents this population. For example, because this study was conducted online, those with less familiarity or comfort with internet use may have been excluded. Further, the proportion of participants with at least a bachelor's degree was more than double the national average. Although the sensitivity analysis by education level yield similar results across educational attainment groups, the results of this study may not generalize fully to samples with lower levels of education. Second, this study only assessed preference in terms of choice between two alternatives. By not including an opt-out response option or a measure of strength of preference, this study is limited to only the relative preference strength of respondents and not the strength of the preferences overall. In other words, respondents may have selected the less aversive option rather than a strongly preferred option during the experiment. Finally, choice tasks were presented to respondents with the attributes in the same order each time. By not varying presentation order, the experiment may have influenced the amount of emphasis respondents placed on the attributes due to the order. Despite these limitations, this study applied an approach to qualifying preference used in other areas of health research to the challenge of tailoring behavioral weight loss to an under-represented occupational group for the first time. The study used a relatively large sample to assess preferences as compared to the relatively small sample sizes used in qualitative studies on similar topics. Finally, this study was conducted following all best practice recommendations for discrete choice experiments.<sup>24,32,33</sup>

## 5 | CONCLUSIONS

This study utilized discrete choice methods to evaluate the weight loss program preferences of men working in skill and unskilled trades and labor occupations to better understand how to tailor programs for this underrepresented group. The results, which supported some of the initial hypotheses suggest that combining qualitative and quantitative methods to measuring program preferences is needed during the tailoring process. Further, future research should focus on whether building a program to meet participant preferences is effective for both engagement and producing clinically significant weight loss outcomes.

### AUTHOR CONTRIBUTIONS

Melissa M. Crane, Bradley M. Appelhans, and Surrey M. Walton contributed to the study conception and design. Melissa M. Crane performed material preparation and data collection. Melissa M. Crane, Bradley M. Appelhans, Surrey M. Walton, and Sumihiro Suzuki contributed to the data analysis. The first draft of the manuscript was written by Melissa M. Crane. All authors reviewed and approved the final version of the manuscript.

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### CONFLICT OF INTEREST

The authors declared no conflict of interest.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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