

Guide on Selection of Optimal Motivational Themes for Use in a Clinical Trial Recruiting Black US Adults: A Survey Study

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Abstract

Background: Black adults in the United States (US) face significant cardiovascular health disparities, which are likely exacerbated by the underrepresentation of Black adults in cardiovascular clinical trials. The Black US population has experienced unique historical events, discriminatory practices, and practical obstacles that might contribute to this underrepresentation in clinical trials. Improved understanding of motivations that encourage or discourage participation in cardiovascular clinical trials can lead to more effective clinical trial recruitment and help mitigate these cardiovascular health disparities.

Objective: Using an online survey, determine which motivational themes in clinical trial recruitment advertisements are most effective in encouraging Black adults to participate in a hypertension-focused trial. We also explored how trust in healthcare and various demographic factors influenced their decision to participate.

Methods: We conducted an online survey with 829 self-identified Black adults in the US, using a between-subject design to test four literature-derived motivational themes in clinical trial recruitment advertisements: (1) contribution to science, (2) helping the community, (3) lowering blood pressure, and (4) access to perks (\$500 worth of groceries or an equivalent cash amount). We assessed advertisement appeal, willingness to participate, and willingness to recommend clinical trial participation to others using Cumulative Link Mixed Models (CLMM).

Results: Demographic factors played a more significant role than motivational themes in predicting advertisement effectiveness. Adults aged 40-59 and individuals diagnosed with high blood pressure were more likely to find the advertisements appealing and express willingness to participate. Urban residents engaged more with the advertisements compared to those in suburban or rural areas. Participants with liberal (OR: 1.37, 95% CI: 1.01-1.85, $p = 0.044$) and conservative (OR: 1.62, 95% CI: 1.09-2.40, $p = 0.018$) political views were more willing to participate in the clinical trial compared to those with moderate views. However, the "Lowering my blood pressure" theme was less effective among individuals who distrusted healthcare institutions (OR: 0.40, 95% CI: 0.16-0.97, $p = 0.042$) and also reduced willingness to recommend the trial (OR: 0.36, 95% CI: 0.15-0.85, $p = 0.020$). Additionally, higher trust levels were unexpectedly associated with lower willingness to participate when exposed to this theme (OR: 0.41, 95% CI: 0.17-0.98, $p = 0.044$).

Conclusions: This study contributes new empirical evidence on the science of inclusive trial recruitment and provides an evidence-based approach to using recruitment advertisements to improve clinical trial participant diversity.

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Background: Black adults in the United States (US) face significant cardiovascular health disparities, which are likely exacerbated by the underrepresentation of Black adults in cardiovascular clinical trials. The Black US population has experienced unique historical events, discriminatory practices, and practical obstacles that might contribute to this underrepresentation in clinical trials. Improved understanding of motivations that encourage or discourage participation in cardiovascular clinical trials can lead to more effective clinical trial recruitment and help mitigate these cardiovascular health disparities.

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Conclusions: This study contributes new empirical evidence on the science of inclusive trial recruitment and provides an evidence-based approach to using recruitment advertisements to improve clinical trial participant diversity.

Keywords: clinical trials; recruitment; Black adults; cardiovascular health; digital advertising; motivational themes; health disparities.

Introduction

Background

In the US, Black adults face poorer cardiovascular health outcomes compared to other groups [1], and are underrepresented in clinical trials [2] that may benefit them. The drivers of underrepresentation of Black adults in cardiovascular clinical trials are diverse. Historic events like the Tuskegee Syphilis Study [3], along with cases of discriminatory practices and physician bias based on race/ethnicity, mental health status, education or income, and sex within the US healthcare system, have led Black adults, among other groups, to distrust the system [4, 5]. Additionally, various practical obstacles to participation, like a lack of information about clinical trials, health insurance, time, and financial constraints, are significant barriers to participation [6, 7], contributing to the failure of clinical trials in the US to achieve their demographic representation goals [8, 2, 9]. Despite the federal government’s efforts to ensure inclusion in clinical trials [10], underrepresentation persists, resulting in disparities in health outcomes for minority racial and ethnic groups. Targeted advertisement may improve the recruitment of US Black adults to trials, but it is unclear what advertisement content might be most beneficial.

To support the successful recruitment of Black adults into a community-based participatory trial focused on recruiting Black urban adults (GoFresh), we conducted an online survey with 829 self-identified Black adults in the US to evaluate the effectiveness of a flier-style trial recruitment advertisement with four literature-derived motivational themes. The goal of this study is twofold: (1) to identify the optimal recruitment motivational themes for recruiting Black adults into the GoFresh Trials and (2) to examine other factors (e.g., trust in healthcare systems, demographics) that may impact Black adults' trial participation intention. In addition, this study serves as proof-of-concept for leveraging the survey methodology to quickly and inexpensively identify effective advertisement motivational themes for use in clinical trial recruitment. We hypothesized that the effectiveness of clinical trial advertisements would vary based on motivational themes, individuals' trust levels in healthcare systems, and demographic backgrounds.

We seek to answer a key research question:

RQ: *What does or does not motivate Black adults to participate in clinical trials?*

We address three hypotheses:

- There is no difference in the effectiveness of clinical trial advertisements when the advertisement uses different motivational themes.
- There is no difference in the effectiveness of clinical trial advertisements when individuals have different trust levels in healthcare systems.
- There is no difference in the effectiveness of clinical trial advertisements when individuals have different demographic backgrounds.

Since trust in healthcare systems [11, 5] and demographic backgrounds [12] impact people's willingness to participate in clinical trials, our analyses address these as important potential confounders.

Prior Work (literature review)

Clinical trials are essential for discovering new prevention, diagnostic, or treatment approaches and improving population health. Without accounting for diversity, resulting interventions may prove ineffective for broader populations, undermining trust and potentially increasing health costs [13, 14]. US clinical trials have consistently underrepresented minority groups despite government policies to improve recruitment [15]. Beyond investigator bias [16], possible reasons include lack of awareness, healthcare system mistrust due to experiences or biases, and financial and insurance-related obstacles [6, 16, 7].

Current solutions like population-specific trials and community engagement have increased participation from underrepresented groups [18]. However, these are costly in human resources, time-consuming, and risk selection bias, making them unsustainable long-term [18, 17]. Most clinical trials rely on traditional recruitment methods like recruitment by investigators, local doctors, patient databases, printed materials (e.g., flyers, posters), and community organizations with limited data on the performance of digital strategies (e.g., websites, social media marketing, online advertisements) [20]. As a result, clinical trial recruitment recommendations are primarily based on case studies and individual practitioners' experiences [20, 19]. Despite existing research on recruitment strategy effectiveness, there remains a significant gap in data-driven approaches to systematically understand what truly improves clinical trial recruitment.

Big data and web analytics have transformed advertising across industries [21, 22, 23], enabling data-driven decision-making. Initial evidence suggests these approaches can boost participation among underrepresented groups [24, 25], yet most US clinical trials fail to leverage these methods to enhance recruitment diversity [27]. Given this opportunity, clinical trial advertising can be tailored, utilizing data-driven methods, to the values and motivations of the target population. Research [27, 6, 28, 29] highlights how specific factors in individuals' lives influence their decision to participate in clinical trials. Recognizing each community's unique values allows researchers to develop resonant recruitment strategies, improving enrollment and retention [30]. Integrating big data and web analytics into clinical trial recruitment may help identify patterns and preferences among diverse populations. By analyzing this data, researchers can determine which messages and platforms most effectively reach different demographics, leading to more efficient and inclusive recruitment efforts.

This study uses known factors influencing clinical trial participation [27, 6, 28] to craft four motivational themes for the GoFresh trials, providing a strong theoretical foundation likely to resonate with potential participants.

Methods

GoFresh trials

This study is a collaboration with the GoFresh trials. The GrOceries For Black REsidents of Boston to Stop Hypertension (GoFresh) trials (ClinicalTrials.gov numbers NCT05121337 [GoFresh] and NCT05393232 [GoFreshRx]) are investigating the impact of home-delivered healthy groceries on blood pressure in Black adults with untreated and treated high blood pressure. In this study, participants are randomly assigned to receive either 12 weeks of DASH-patterned [31] grocery delivery with dietitian assistance or self-directed shopping with a monthly stipend over three months. After the intervention period, both groups are observed for nine more months to determine barriers and facilitators for maintaining the DASH diet. The ultimate goal of these trials is to improve the cardiovascular health of Black adults living in healthy food priority areas with and without treated hypertension. Findings from the trials will provide practical insights into effective and scalable strategies to prevent hypertension among Black adults [32].

Survey Design

Motivational themes pertaining to clinical trial participation were identified in a literature review [27, 6, 28]. These themes include contributing to science, helping the community, lowering my blood pressure, and accessing perks (Table 1). Flyer-style advertisements were developed for each of these motivational themes (Figures 1-4). These variations included the GoFresh logo but did not include real contact information for the trial.

GoFresh

Join our clinical trial to advance
scientific research!

*A 12-week research study investigating the
potential impact of fresh groceries on
lowering blood pressure in **Black adults***



Figure 1. Motivational theme of the advertisement variant: Contribution to science.

GoFresh

Join our clinical trial to study a way to improve the well-being of **Black communities!**

*A 12-week research study investigating the potential impact of fresh groceries on lowering blood pressure in **Black adults***

gofresh@LKMC.org | 888-302-3232 | Lula Kane Medical Center

Figure 2. Motivational

theme of the advertisement variant: Helping the community.

GoFresh

Join our clinical trial to study a dietary approach to improve your **blood pressure!**

*A 12-week research study investigating the potential impact of fresh groceries on lowering blood pressure in **Black adults***

gofresh@LKMC.org | 888-302-3232 | Lula Kane Medical Center

Figure 3. Motivational theme

of the advertisement variant: Lowering my blood pressure.

GoFresh

Join our clinical trial to receive either **free delivered fresh groceries or cash!**

*A 12-week research study investigating the potential impact of fresh groceries on lowering blood pressure in **Black adults***

gofresh@LKMC.org | 888-302-3232 | Lula Kane Medical Center

Figure 4. Motivational theme of the advertisement variant: Access to perks.

Each participant was randomly assigned to one of the four advertisements and asked to answer the same set of survey questions, rating the level of advertisement appeal, their willingness to participate in this trial, and their willingness to recommend this trial to others. The survey also collected data on participants' trust in healthcare systems using a validated scale from Rose et al. [33] and Armstrong et al. [34] and their basic demographic backgrounds. (see in Appendix 1)

Study population

We used the Prolific Platform [35] for web-based participant recruitment. Prolific is an online research platform that connects researchers with high-quality, prescreened participants for surveys and experiments, ensuring ethical standards, fair compensation, and reliable data collection. The platform's prescreening filter ensured that only individuals who self-identified as Black/African American or mixed race were recruited. Appendix 2 shows the inclusion and exclusion criteria used in the GoFresh trials. The survey was deployed on February 2, 2024, and was closed 3 days later. We targeted 1,000 respondents. Participants provided informed consent. Excluding instances of obvious survey abuse ($N = 60$), participants who provided complete responses were each compensated \$1.60 at an average rate of \$9.58/hour through the Prolific platform [35]. We anonymized participants' data before using the remaining 829 survey responses for the final analysis.

Variables and Measurements

Dependent variables

We operationalized the effectiveness of the trial recruitment advertisement as three variables: (1) the appeal of the advertisement—attractiveness of the advertisement; (2) willingness to participate—readiness to join the advertised clinical trial; and (3) willingness to recommend—likelihood of sharing the clinical trial with others.

The primary goal of advertising appeal is to effectively communicate with a target audience and motivate them to take action. It can be subjective depending on messaging, visuals, or media type (direct mail, social media, print, etc.) attractive to one's cognition, emotions, or both, which are rooted in past and present experiences [36]. In clinical trials, an effective trial advertisement motivates (appeals to) the target audience to participate or recommend the trial within their network.

Independent variables

Participants were exposed to one of four motivational appeals in recruitment advertisements, each emphasizing a distinct reason for participation: contributing to scientific research (science), helping one's community (community), improving personal health outcomes such as lowering blood pressure (blood pressure), or gaining access to tangible benefits (perks). Alongside motivation, trust in the healthcare system was considered a critical factor in recruitment engagement. Participants' trust levels were measured using the Distrust of Healthcare System Scale [33, 32] with scores ranging from 10 to 50. To ensure an even distribution, trust was categorized into three levels using tertile cutoffs calculated in RStudio software [37]: Distrust (10–30), Neutral (31–35), and Trust (36–50).

These variables provide context for differences in responses to motivational themes and trust levels, helping to refine strategies for trial recruitment. Together, motivation, trust, and demographics shape participant engagement and the overall effectiveness of recruitment advertisements.

Table 1. List of Independent Variables.

Independent Variables	Description
Motivational Themes	The four motivational themes in the trial recruitment advertisement:
	- <i>Contribution to science (science)</i> : Motivating participants to support scientific research.
	- <i>Helping the community (community)</i> : Encouraging participants to benefit their local community.
	- <i>Lowering my blood pressure (blood pressure)</i> : Promoting personal health improvement.
	- <i>Access to perks (perks)</i> : Highlighting tangible benefits for participation.
Trust Levels in Healthcare	Participants' trust levels calculated using the distrust of healthcare system scale (10–50) [33, 32]:
	- <i>Distrust (10–30)</i> : Lowest tertile of trust scores.
	- <i>Neutral (31–35)</i> : Middle tertile of trust scores.
	- <i>Trust (36–50)</i> : Highest tertile of trust scores.
Demographic Backgrounds	Potential confounding factors:
	- <i>Age group</i>
	- <i>Political view</i>
	- <i>Gender</i>
	- <i>Location (Urbanity)</i>

Statistical Analysis

Sociodemographics and model covariates were tabulated with descriptive statistics. Cumulative Link Mixed Model (CLMM), a type of multilevel ordered logistic regression model, were used in our analysis. This approach allows estimation of model effects on an ordinal dependent variable while accommodating for random effects (i.e., repeated measures). Models were adjusted for demographic factors, including age, political views, gender, and urbanity (location).

Main effect predictors: We included values for advertisement themes, trust levels, and questions of past high blood pressure diagnosis by a doctor (high blood pressure status), as well as demographic

variables like age group, income, political view, and gender.

Effect modifier: We used effect modifiers to examine the interactions among independent variables. We looked at different interaction combinations among important independent variables to address our research hypothesis. After comparing the statistical significance of these interactions, we decided to include the interactions between ad themes and trust levels (i.e, *ad theme * trust levels*) to better elucidate how the effectiveness of each advertisement theme varied among people who trust healthcare systems differently.

Predictor baselines: We set the baseline value for the motivational theme as “contribution to science” since it is the fundamental goal of clinical trials. For other predictors, we selected the neutral or the most common values as a baseline. For example, for the trust in healthcare systems predictor, we selected the “Neutral” category as the baseline, as it represented the most frequently chosen response within the trust variable. This ensures that the baseline reflects the predominant sentiment among participants, providing a solid reference point for analysis.

Data cleaning: To ensure model convergence, we performed the following steps:

(1) converted responses such as "not sure," "prefer not to answer," and uncommon responses (eg, Gender; “binary”) to the "not available (N/A)" placeholder value. This also made the data more uniform.

(2) combined categories within certain variables, like trust level in the healthcare system and political views, to simplify and standardize the data for modeling.

Final models:

We fit 18 ordered logistic regression models, six for each effectiveness metric: appeal, willingness to participate, and willingness to recommend. From these, we selected the best model for each metric (three models in total) based on a balance between predictor complexity and performance, as measured by the Akaike Information Criterion (AIC) score.

Results reporting: e.g., we report the p-values, odds ratio, and 95% confidence interval for the model.

For predictors with statistical significance ($p < 0.05$), we reported the odds ratios (OR), calculated as the exponential of the model estimate (β). We also provided the 95% confidence intervals (CI) for these ORs. We also calculated the marginal 95% confidence intervals for these interactions to evaluate their statistical significance and range of effect.

Our statistical analyses used R version 4.4.0 (R Foundation for Statistical Computing, Vienna, Austria) and the R ordinal package [38]. This study was approved by the University of Vermont Institutional Review Board. Statistical significance was determined with a P-value threshold <0.05 . We did not adjust for multiple comparisons.

Results

Analytical sample

A total of 913 surveys were started, with 897 completed (did not complete: $n=16$). After removing entries with incomplete fields ($n=44$), we retained 853 valid responses. As shown in appendix 2, we further excluded 24 participants for the following reasons: not identifying as Black, self-reporting a lack of understanding of clinical trials despite being provided with a definition, providing unreasonable or non-randomized answers, or being age outliers. This resulted in a final analytical

sample of 829 responses.

Analytical sample sociodemographics

The sociodemographics of the analytical sample appear in appendix 3. The 829 valid responses are from participants who self-identified as Black/African American on Prolific; seven of the 829 participants identified as mixed race. The average age was 40. Educational levels varied widely, and most participants earned between \$35,000 and \$129,999 (474/829). Subjects reporting female and male gender were equivalently represented (50.2% (416/829) female and 49.1% (407/829) male). Most participants lived in urban or suburban areas in the US (large city - 28.2% (234/829), city - 33.7% (279/829), town or suburb - 32.2% (267/829)) and reported liberal (54.6% (453/829)), moderate (26.8% (222/829)) or conservative (18.6% (154/829)) views.

In terms of health status, 29.6% (245/829) reported a prior diagnosis of high blood pressure. The mean score on the Distrust of the Health Care System scale was 32.7 (range 10 to 50; Distrust (10–30), Neutral (31–35), and Trust (36–50)). Responses to individual items on the scale showed that 33.4% (277/829) of participants expressed distrust, while 30.3% (251/829) expressed trust in the healthcare system.

Appeal of advertisement

As shown in Figure 5, all motivational themes had a high level of appeal, with 76%-79% (155/204 to 165/209) of respondents somewhat or strongly agreeing. Notably, the “access to perks” theme was the most appealing, with 79% (165/209) agreeing. In contrast, the “helping the community” theme had the highest level of disagreement, with 15% (31/206) of respondents somewhat or strongly disagreeing.

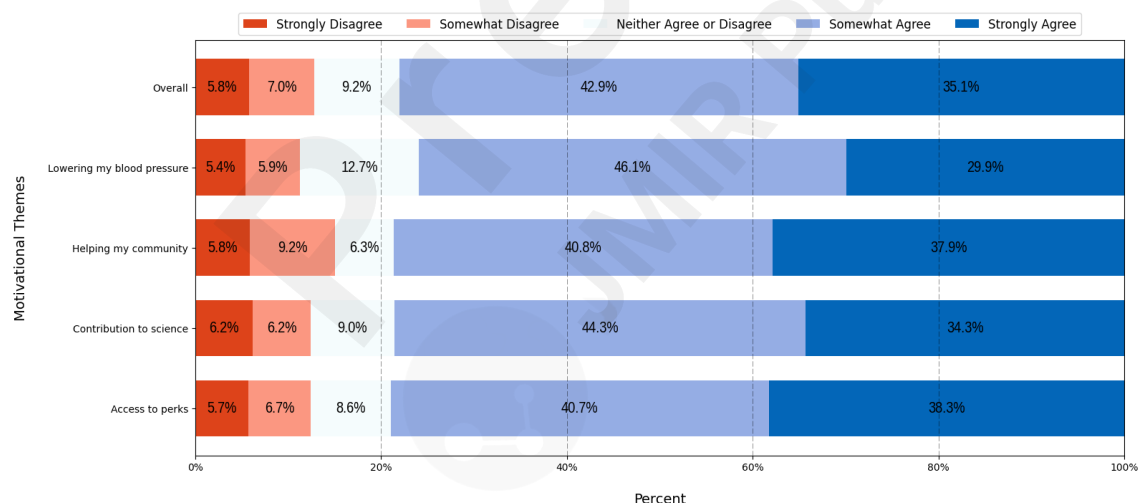


Figure 5. Percentage of participant responses to appeal of motivational themes in clinical trial advertisements.

Willingness to Participate

As shown in Figure 6, the scores for willingness to participate are lower than the appeal of advertisement, with lower overall agreement to join clinical trials across all four motivational themes, ranging from 46.6% to 62.6% (95/204 to 131/209). The "Access to perks" theme yielded the highest willingness to participate at 62.6% (131/209) and lowest level of disagreement at 23% (48/209). Alternatively, the theme "Lowering my blood pressure" had the lowest willingness at 46.6% and the highest level of disagreement, with 33.8% (69/204) strongly or somewhat disagreeing.

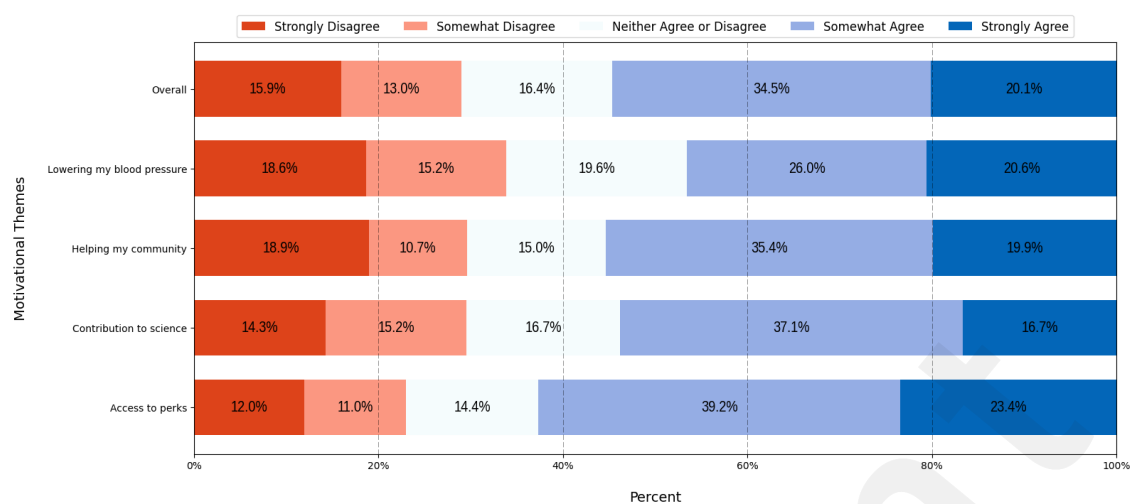


Figure 6. Percentage of participant willingness to participate in clinical trials by motivational theme.

Willingness to Recommend

As shown in Figure 7, willingness to recommend was generally higher than willingness to participate for most themes, ranging from 58.3% to 68.4% (119/204 to 143/209) of participants agreeing somewhat or strongly. Again, the highest willingness to recommend was for the "Access to perks" theme at 68.4% (143/209). On the other hand, 25% (51/204) of respondents who viewed the "Lowering my blood pressure" theme were unwilling (somewhat or strongly disagreed) to recommend the advertisement, which was the highest level of unwillingness, followed by the "Contribution to Science" theme at 21.9% (46/210).

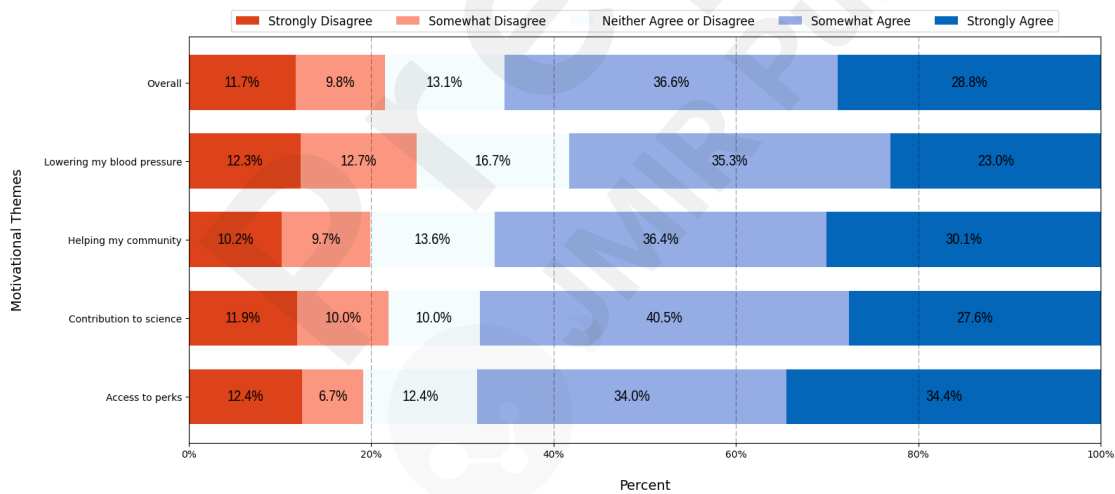


Figure 7. Percentage of

participant likelihood to recommend clinical trials by motivational theme.

Inferential Statistics

Appeal of advertisement

The model coefficients for the appeal of advertisements appear in Table 2. Although all groups were compared to each other, certain groups exhibited higher or lower odds of finding a theme appealing.

Main effects:

None of the motivational themes and trust levels had a significant effect on appeal. However, there were significant associations with appeal among certain groups. Participants who reported being diagnosed with high blood pressure had a 65% higher odds of finding the themes appealing compared to those without such a diagnosis (OR: 1.65, 95% CI: 1.20 - 2.25, $p = .002$). People aged 40-49 (OR: 1.52, 95% CI: 1.01 - 2.29, $p = 0.042$) and 50-59 (OR: 1.57, 95% CI: 1.01 - 2.43, $p = 0.044$) had 52% and 57% higher odds, respectively, of finding the themes appealing compared to those aged 18-29. Participants with liberal political views had 56% higher odds of finding the themes appealing (OR: 1.56, 95% CI: 1.14 - 2.13, $p = .005$) compared to those with moderate views. Living in a town or suburb was associated with 42% lower odds of finding the themes appealing compared to those living in large cities (OR: 0.58, 95% CI: 0.41 - 0.83, $p = 0.002$).

Interaction between Themes and Trust Levels:

While the main effects of motivational themes and trust levels were not significantly associated with appeal, their interaction was. There was a significant interaction between the 'Lowering my blood pressure' theme and the 'distrust' level (OR: 0.40, 95% CI: 0.16 - 0.97, $p = 0.042$). This indicates that individuals who viewed the 'Lowering my blood pressure' theme and expressed distrust in healthcare systems were 60% less likely to find the clinical trial advertisement appealing. Even though the interaction is statistically significant, the broad confidence interval might imply uncertainty regarding the precise magnitude of this effect.

Table 2. Model Coefficients for Appeal of Motivational Themes.

Predictors and Effect Modifiers	Estimate	Odds Ratio	95% Confidence Interval	p-value
Motivational themes				
Research	0	1	–	–
Blood Pressure	0.34	1.41	0.78 – 2.54	.253
Community	0.25	1.29	0.7 - 2.37	.413
Perks	0.05	1.05	0.57 - 1.94	.881
Trust Levels				
Neutral	0	1	–	–
Trust	0.41	1.51	0.8 - 2.84	.205
Distrust	0.52	1.68	0.9 - 3.14	.105
High Blood Pressure Diagnosis				
No	0	1	–	–
Yes	0.50	1.65	1.20 - 2.25	.002
Age				
18-29	0	1	–	–

30-39	0.09	1.09	0.76 - 1.57	.644
40-49	0.42	1.52	1.01 - 2.29	.042
50-59	0.45	1.57	1.01 - 2.43	.044
60-69	-0.10	0.91	0.51 - 1.61	.745
70+	0.10	1.1	0.44 - 2.73	.835
Political View				
Moderate	0	1	–	–
Liberal	0.45	1.56	1.14 - 2.13	.005
Conservative	0.30	1.35	0.89 - 2.03	.154
Gender				
Female	0	1	–	–
Male	-0.08	0.93	0.71 - 1.21	.583
Location				
Large City	0	1	–	–
City	-0.2	0.82	0.58 - 1.15	.244
Rural area	-0.2	0.82	0.45 - 1.50	.523
Town or suburb	-0.54	0.58	0.41 - 0.83	.002
Motivational themes * Trust Levels				
blood pressure * trust	-0.87	0.42	0.17 - 1.03	.057
community * trust	-0.73	0.48	0.19 - 1.21	.121
perks * trust	-0.15	0.86	0.34 - 2.18	.758
blood pressure * distrust	-0.92	0.40	0.16 - 0.97	.042
community * distrust	-0.15	0.86	0.35 - 2.11	.737
perks * distrust	0.30	1.35	0.56 - 3.30	.505

Willingness to Participate

The model coefficients for willingness to participate appear in Table 5. While comparing all groups to each other, certain groups exhibited higher or lower odds of participating in a clinical trial.

Main effects:

The motivational themes and trust levels did not have a significant effect on willingness to participate. There were some significant demographic associations. Participants who reported being diagnosed with high blood pressure (OR: 1.88, 95% CI: 1.39 - 2.53, $p < 0.001$) had 88% higher odds of being willing to participate in the clinical trial focused on high blood pressure compared to those who have not been diagnosed with it. Individuals aged 50-59 had 74% higher odds of willingness to participate in the clinical trial compared to those aged 18-29 (OR: 1.74, 95% CI: 1.14 - 2.65, $p = 0.010$). Participants with both liberal (OR: 1.37, 95% CI: 1.01 - 1.85, $p = 0.044$) and conservative (OR: 1.62, 95% CI: 1.09 - 2.40, $p = 0.018$) views had 37% and 62% higher odds, respectively, of being willing to participate in the clinical trial focused on high blood pressure compared to those with moderate views. Living in a town or suburb was associated with 43% lower odds of being willing to participate in clinical trials compared to those living in large cities (OR: 0.57, 95% CI: 0.41 - 0.80, $p = 0.001$).

Interaction between Themes and Trust Levels:

The interaction between the 'Lowering my blood pressure' motivational theme and trust levels was found to be significant (OR: 0.41, 95% CI: 0.17 - 0.98, $p = 0.044$), indicating that individuals who viewed the 'Lowering my blood pressure' theme and had higher trust levels were 59% less willing to participate in the clinical trial. Although the interaction is statistically significant, the wide confidence interval indicates uncertainty about the exact size of this effect.

Table 3. Model coefficients for willingness to participate in clinical trials.

Predictors and Effect Modifiers	Estimate	Odds Ratio	95% Confidence Interval	p-value
Motivational themes				
Research	0	1	–	–
Blood Pressure	0.32	1.38	0.78 - 2.44	.267
Community	0.16	1.17	0.65 - 2.1	.595
Perks	0.29	1.34	0.75 - 2.39	.329
Trust Levels				
Neutral	0	1	–	–
Trust	0.51	1.66	0.92 - 3.00	.093
Distrust	0.51	1.66	0.91 - 3.04	.098
High Blood Pressure Diagnosis				
No	0	1	–	–
Yes	0.63	1.88	1.39 - 2.53	<.001
Age				
18-29	0	1	–	–
30-39	0.11	1.11	0.78 - 1.59	.556

40-49	0.38	1.46	0.99 - 2.16	.053
50-59	0.55	1.74	1.14 - 2.65	.010
60-69	-0.14	0.87	0.50 - 1.50	.609
70+	-0.03	0.97	0.42 - 2.24	.948
Political View				
Moderate	0	1	–	–
Liberal	0.31	1.37	1.01 - 1.85	.044
Conservative	0.48	1.62	1.09 - 2.40	.018
Gender				
Female	0	1	–	–
Male	0.19	1.21	0.94 - 1.57	.144
Location				
Large City	0	1	–	–
City	-0.27	0.77	0.55 - 1.07	.115
Rural area	0.11	1.11	0.62 - 1.99	.722
Town or suburb	-0.56	0.57	0.41 - 0.80	.001
Motivational themes * Trust Levels				
blood pressure * trust	-0.88	0.41	0.17 - 0.98	.044
community * trust	-0.46	0.63	0.26 - 1.50	.297
perks * trust	-0.13	0.88	0.37 - 2.09	.772
blood pressure * distrust	-0.70	0.5	0.21 - 1.17	.111
community * distrust	-0.25	0.78	0.33 - 1.85	.567
perks * distrust	0.31	1.37	0.58 - 3.20	.472

Willingness to recommend

The model coefficients for willingness to recommend appear in Table 6. All groups were compared to each other, but certain groups exhibited higher or lower odds of recommending a clinical trial to people.

Main effects:

Motivational themes and trust levels did not have a significant effect on willingness to recommend

the advertised clinical trial, although there were other demographic associations. A diagnosis of high blood pressure was significantly associated with a 37% higher likelihood of recommending the trial, regardless of the themes (OR: 1.37, 95% CI: 1.01 - 1.85, $p = 0.042$). Living in the city (OR: 0.71, 95% CI: 0.51 - 1.00, $p = 0.049$) and in town or suburban areas (OR: 0.62, 95% CI: 0.44 - 0.88, $p = 0.006$) is associated with 29% and 38% lower odds of recommending clinical trial advertisements compared to living in large cities. While the result for individuals living in the city is statistically significant ($p = 0.049$), the upper bound of the confidence interval is 1, suggesting the effect could range from a decreased willingness to recommend to no effect at all.

Interaction between Themes and Trust Levels:

The interaction between the 'Lowering my blood pressure' theme and the 'distrust' level was statistically significant (OR: 0.36, 95% CI: 0.15 - 0.85, $p = 0.020$). This suggests that individuals who viewed the 'Lowering my blood pressure' theme and expressed distrust in healthcare systems were 64% less willing to recommend the clinical trial.

Table 4. Model coefficients for willing to recommend clinical trials.

Predictors and Effect Modifiers	Estimate	Odds Ratio	95% Confidence Interval	p-value
Motivational themes				
Research	0	1	–	–
Blood Pressure	0.19	1.21	0.68 - 2.16	0.514
Community	0.18	1.2	0.66 - 2.17	0.557
Perks	0.03	1.03	0.57 - 1.86	0.929
Trust Levels				
Neutral	0	1	–	–
Trust	0.28	1.32	0.72 - 2.42	0.37
Distrust	0.50	1.65	0.89 - 3.06	0.114
High Blood Pressure Diagnosis				
No	0	1	–	–
Yes	0.31	1.37	1.01 - 1.85	0.042
Age				
18-29	0	1	–	–
30-39	-0.09	0.92	0.64 - 1.32	0.642
40-49	0.27	1.31	0.88 - 1.95	0.187
50-59	0.28	1.32	0.87 - 2.01	0.194
60-69	-0.21	0.81	0.47 - 1.4	0.452

70+	0.44	1.55	0.64 - 3.72	0.329
Political View				
Moderate	0	1	–	–
Liberal	0.3	1.35	1.00 - 1.83	0.054
Conservative	0.38	1.46	0.99 - 2.16	0.059
Gender				
Female	0	1	–	–
Male	0.08	1.08	0.83 - 1.41	0.544
Location				
Large City	0	1	–	–
City	-0.34	0.71	0.51 - 1.00	0.049
Rural area	-0.13	0.88	0.5 - 1.57	0.668
Town or suburb	-0.48	0.62	0.44 - 0.88	0.006
Motivational themes * Trust Levels				
blood pressure * trust	-0.56	0.57	0.24 - 1.36	0.204
community * trust	-0.6	0.55	0.23 - 1.33	0.184
perks * trust	0.3	1.35	0.55 - 3.30	0.515
blood pressure * distrust	-1.03	0.36	0.15 - 0.85	0.020
community * distrust	-0.21	0.81	0.34 - 1.95	0.643
perks * distrust	0.09	1.09	0.46 - 2.61	0.841

Discussion

Targeting individuals based solely on racial identity overlooks diversity within racial groups, as factors like socioeconomic status, health conditions, geographic location, age, and political beliefs shape perspectives and motivations to enroll in clinical trials [40, 27, 41, 42]. Even within the same demographic group, individuals have different needs and motivations. Our research identifies key considerations impacting how Black adults engage with digital clinical trial advertisements: individual-level demographic influences on advertisement effectiveness and trust and information dynamics. Considering these factors can improve design and marketing strategies, increasing the likelihood that recruitment advertisements will resonate with potential participants and enhance effectiveness in clinical trial recruitment.

Demographic Influences on Advertisement Effectiveness

Demographic factors like age, health status, political views, and location significantly influence Black adults' responses to clinical trial advertisements [27, 41, 42]. Our findings show hypertension-related trial ads resonate most with 40-59 year-olds and individuals diagnosed with high blood pressure, suggesting targeted approaches based on age and relevant health conditions are effective [42]. These individuals, facing age-related health challenges, may actively seek new treatments, increasing their likelihood of participation [43].

While clinical trial advertisements appealed slightly more to Black adults with liberal views, both liberals and conservatives showed willingness to participate. This adds context to how political ideology affects participation, as prior studies [36, 37, 38] often overlooked practical considerations driving engagement in underrepresented populations. Our study demonstrates that Black adults' participation decisions are primarily influenced by pragmatic factors like incentives, safety, trust, access to treatments, and health assurances, rather than political alignment [46, 47, 7]. This suggests prioritizing tangible benefits during recruitment alongside clear, transparent, informed consent.

Black adults in suburban and rural areas are less likely to engage with clinical trial advertisements compared to those in cities, aligning with literature showing urban areas have more trial sites and healthcare facilities. Rural and suburban communities remain underrepresented, have limited trial awareness, face logistical challenges like transportation, and may harbor mistrust [48, 19, 7]. Outreach strategies in these areas should address specific access and trust-related challenges.

Trust and Information Dynamics

For clinical trial recruitment, trust fundamentally shapes how potential participants perceive trial motives and their willingness to participate. This manifests through information credibility, transparency regarding risks and benefits, and the perceived trustworthiness of sponsoring organizations [50, 51, 54]. Our study revealed that trust in the healthcare system interacted significantly with the 'Lowering my blood pressure' theme, indicating that for Black adults, trust remains a critical issue influenced by varying motivations and socioeconomic factors, compounded by historical contexts and personal healthcare experiences [3]. Given these findings, recruitment strategies should prioritize messaging that builds trust with this population.

Motivational Themes

Black adults indicated reluctance to participate in clinical trials even when they find certain themes appealing. This is reflected in the overall lower levels of agreement in willingness to participate (28.9%) and willingness to recommend (21.5%) compared to the appeal of the themes (12.8%). These results also imply that additional motivators, like tangible perks, may be necessary to boost participation, as personal health benefit themes like "Lowering My Blood Pressure" seem less motivating compared to "Access to perks," which appear to be a stronger draw than health benefits alone. Participants also showed a higher willingness to recommend clinical trials with a promise of perks than to participate themselves. This also indicates that the participants are more comfortable endorsing or suggesting trials that offer monetary incentives compared to "Lowering My Blood Pressure," indicating that personal health benefits may not be a popular reason for them to recommend clinical trials.

Notably, the low willingness to participate or recommend the "Lowering My Blood Pressure" theme may be partly due to the fact that 68.4% (567 out of 829) of participants reported never having been diagnosed with high blood pressure, compared to the 29.6% (245 out of 829) who reported having been diagnosed.

Limitations and Future Work

We recognize certain constraints in our study, which we discuss to provide context and ensure clear interpretation of our results.

This study relied on self-reported intentions rather than actual trial participation behavior. Future research incorporating observed behavioral outcomes could enhance generalizability. Our online study identified motivators for Black adults with internet access but should not be assumed to represent those with limited internet access or who don't participate in online research. The study focused specifically on dietary intervention for blood pressure, and findings may not generalize to other clinical trial types. Future research should explore a broader range of trials involving different medical conditions, interventions, and populations to strengthen applicability. Future work can compare how different audiences respond to messages directly addressing concerns versus neutral messaging to improve communication strategies. We attempted to stratify data by hypertension status, but the skewed distribution (only 245/829 (29.6%) observations for the hypertensive group) led to statistical model instability due to sparse data causing Hessian errors. Simplifying the model wouldn't fully address our research questions, as our goal was to analyze a sample representative of Black adults who might see these advertisements. Future research focused specifically on the hypertensive demographic could examine this group in greater detail, providing more reliable estimates and statistical stability.

While these limitations should be considered, they don't undermine the research validity. The study provides valuable insights that future research can build upon to further enhance the applicability and impact of these findings.

Conclusion

This study contributes new empirical evidence to the science of inclusive trial recruitment and provides an evidence-based methodology to identify effective advertisements for improving participant diversity. It emphasizes the need for thoughtful design of digital clinical trial advertisements targeting Black adults in the United States. Simply targeting individuals based on racial identity ignores diverse factors such as age, socioeconomic status, location, health conditions, and political beliefs that shape motivations. Effective advertisements must address these differences, offering broadly appealing messages that also meet specific needs. Recruitment messages should be diverse and tailored to address multiple motivations rather than seeking a single, universal driving factor. Addressing trust and cultural sensitivity in recruitment strategies can boost participation, build stronger relationships between healthcare institutions and communities, and lead to more equitable health research outcomes.

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Conflicts of Interest

None declared

Abbreviations

RQ: research question

OR: Odd Ratio

CI: Confidence Interval

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APPENDICES

Appendix 1 Survey Design

Url: <https://osf.io/hstpy/>

Appendix 2 Participant inclusion and exclusion criteria flow for this study

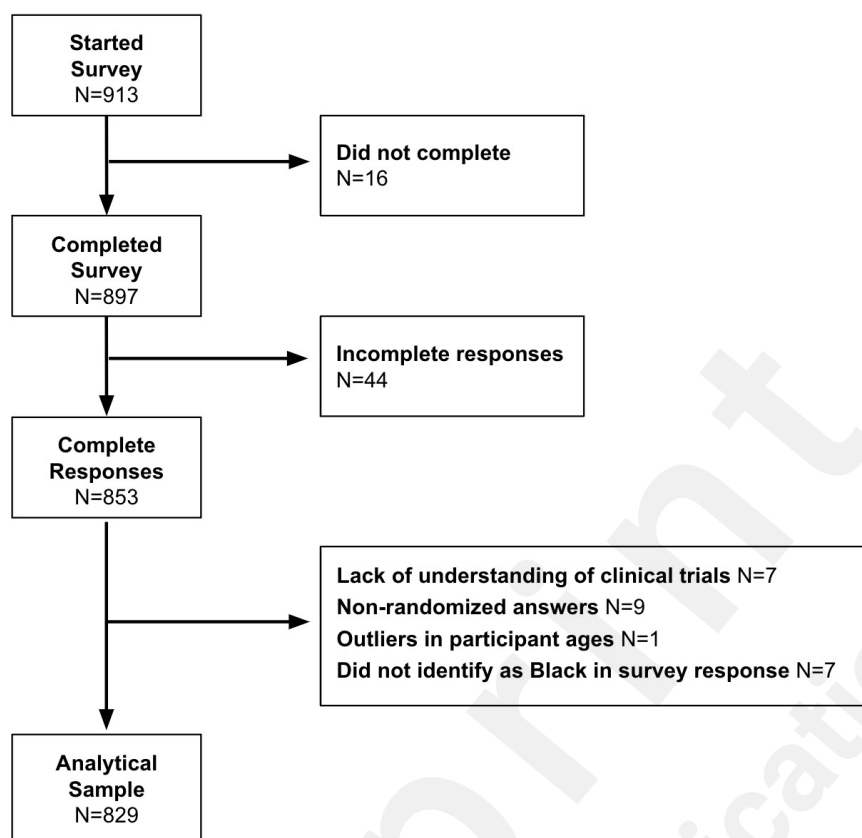


Fig. A1.

and exclusion criteria flow chart.

Participant inclusion

Appendix 3

Sociodemographics of analytical sample and distribution of motivational themes in the clinical trial advertisements by demographics

Table A1. Sociodemographics of Analytical Sample.

Demographic Variable	Count (% of sample)	Demographic Variable	Count (% of sample)
Age (y)		Race	
18 - 29	193 (23.3)	Black/African American	822 (99.2)
30 - 39	239 (28.8)	Two or more of the above	7 (0.8)
40 - 49	171 (20.6)		
50 - 59	143 (17.2)	Gender	
60 - 69	64 (7.7)	Female	416 (50.2)
70+	19 (2.3)	Male	407 (49.1)
		Others	6 (0.7)
Educational Level			
Less than high school	3 (0.4)	Location	

High school or General Education Development (GED)	77 (9.3)	Large city	234 (28.2)
Associate's degree	75 (9.0)	City	279 (33.7)
Some college	170 (20.5)	Town or suburb	267 (32.2)
Bachelor's degree	319 (38.5)	Rural area	49 (5.9)
Master's degree	157 (18.9)		
More than Master's degree	28 (3.4)	Political Views	
		Conservative	154 (18.6)
Income		Liberal	453 (54.6)
Less than \$35,000	181 (21.8)	Moderate	222 (26.8)
\$35,000 - \$69,999	237 (28.6)		
\$70,000 - \$129,999	237 (28.6)	High Blood Pressure diagnosis	
\$130,000 or more	150 (18.1)	No	567 (68.4)
I prefer not to answer	24 (2.9)	Yes	245 (29.6)
		I don't Know	11 (1.3)
		I prefer not to answer	6 (0.7)
Trust Levels			
Distrust	277 (33.4)	Motivational themes	
Neutral	301 (36.3)	Lowering blood pressure (Blood pressure)	204 (24.6)
Trust	251 (30.3)	Helping the community (Community)	206 (24.8)
		Access to perks (Perks)	209 (25.2)
		Contribution to Science (Research)	210 (25.3)

Table A2. Distribution of motivational themes in the clinical trial advertisements by demographics.

Participant Characteristics	Motivational themes			
	Lowering blood pressure (Blood pressure)	Helping the community (Community)	Access to perks (Perks)	Contribution to Science (Research)
Gender				
Female	107	107	97	105
Male	96	97	110	104
Others	1	2	2	1
Age				
18-29	50	42	49	52
30-39	58	64	57	60
40 - 49	34	41	51	45
50 - 59	44	36	30	33
60 - 69	14	16	16	18

70+	4	7	6	2
Educational Level				
Less than high school	0	3	0	0
High school or General Education Development (GED)	22	23	14	18
Associate's degree	16	20	18	21
Some college	39	41	42	48
Bachelor's degree	78	71	83	87
Master's degree	40	42	44	31
More than Master's degree	9	6	8	5
Income				
Less than \$35,000	44	52	39	46
\$35,000 - \$69,999	53	56	54	74
\$70,000 - \$129,999	69	48	68	52
\$130,000 or more	34	44	42	30
I prefer not to answer	4	6	6	8
High blood pressure diagnosis				
No	138	140	150	139
Yes	60	61	55	69
I don't know	4	3	3	1
I prefer not to answer	2	2	1	1
Political Views				
Conservative	38	45	34	37
Liberal	112	107	119	115
Moderate	54	54	56	58
Location				
Large city	60	62	58	54
City	65	74	73	67
Town or suburb	73	53	66	75
Rural area	6	17	12	14

Supplementary Files

Figures

Motivational theme of the advertisement variant: Contribution to science.



GoFresh

Join our clinical trial to advance
scientific research!

*A 12-week research study investigating the
potential impact of fresh groceries on
lowering blood pressure in **Black adults***

 gofresh@LKMC.org |  888-302-3232 |  Lula Kane Medical Center



The advertisement features a circular inset image of a Black couple in a kitchen. The woman is smiling and holding a pepper grinder, while the man is focused on chopping vegetables on a wooden cutting board. Various fresh vegetables like tomatoes, cucumbers, and bell peppers are visible on the counter.

Motivational theme of the advertisement variant: Helping the community.



GoFresh

Join our clinical trial to study a way to improve the well-being of **Black communities!**

*A 12-week research study investigating the potential impact of fresh groceries on lowering blood pressure in **Black adults***

 gofresh@LKMC.org |  888-302-3232 |  Lula Kane Medical Center



Motivational theme of the advertisement variant: Lowering my blood pressure.



Join our clinical trial to study a dietary approach to improve your **blood pressure!**

*A 12-week research study investigating the potential impact of fresh groceries on lowering blood pressure in **Black adults***



 gofresh@LKMC.org |  888-302-3232 |  Lula Kane Medical Center

Motivational theme of the advertisement variant: Access to perks.



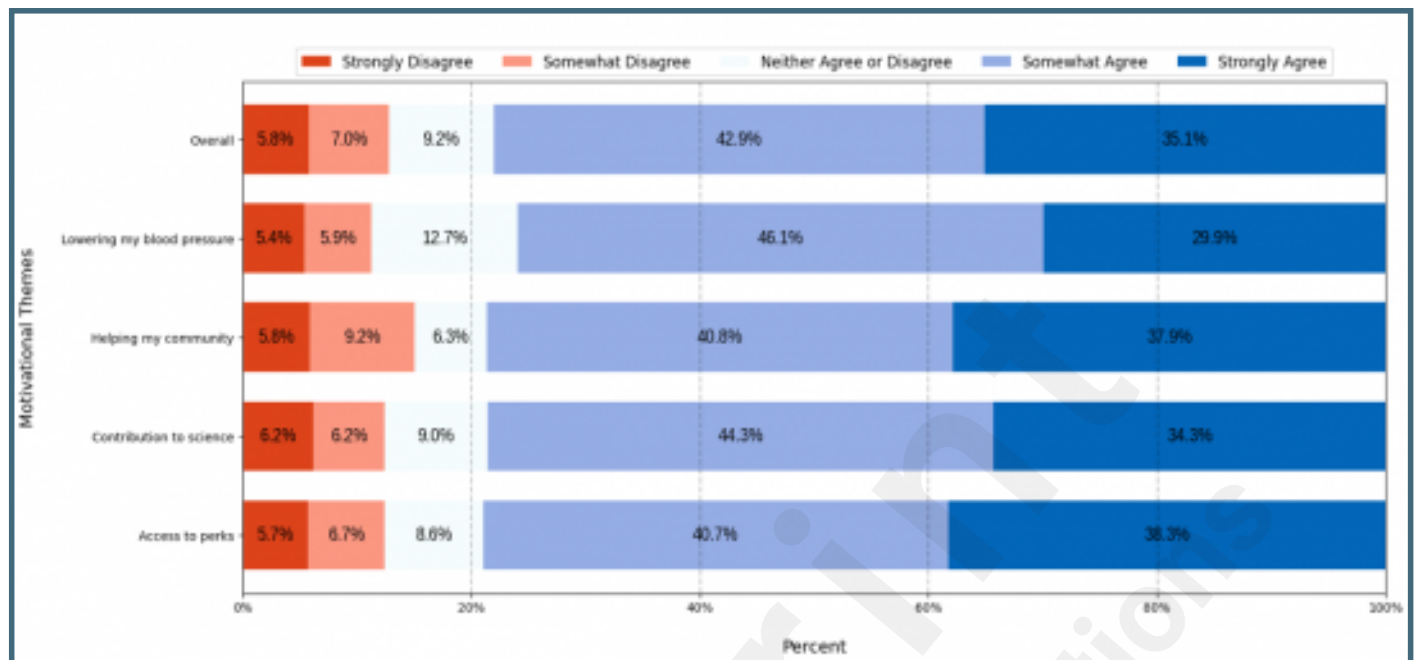
Join our clinical trial to receive either
free delivered **fresh groceries or**
cash!

*A 12-week research study investigating the
potential impact of fresh groceries on
lowering blood pressure in **Black adults***

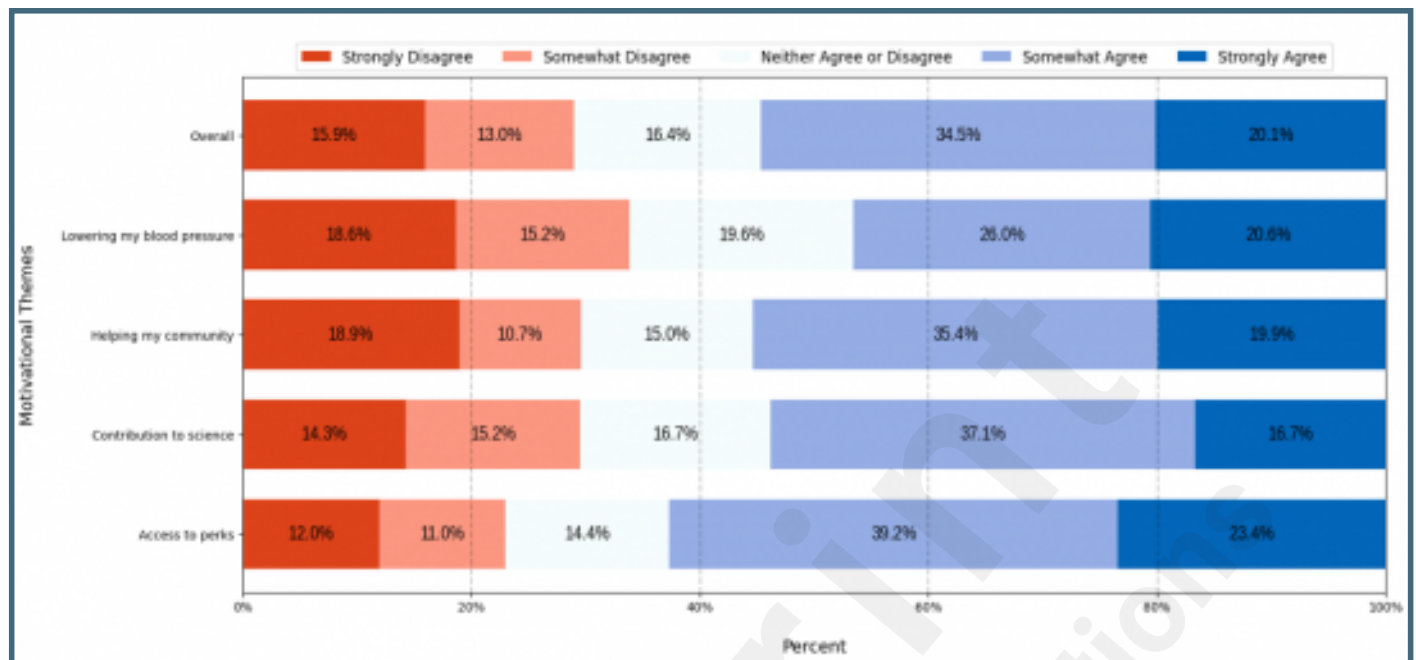


 gofresh@LKMC.org |  888-302-3232 |  Lula Kane Medical Center

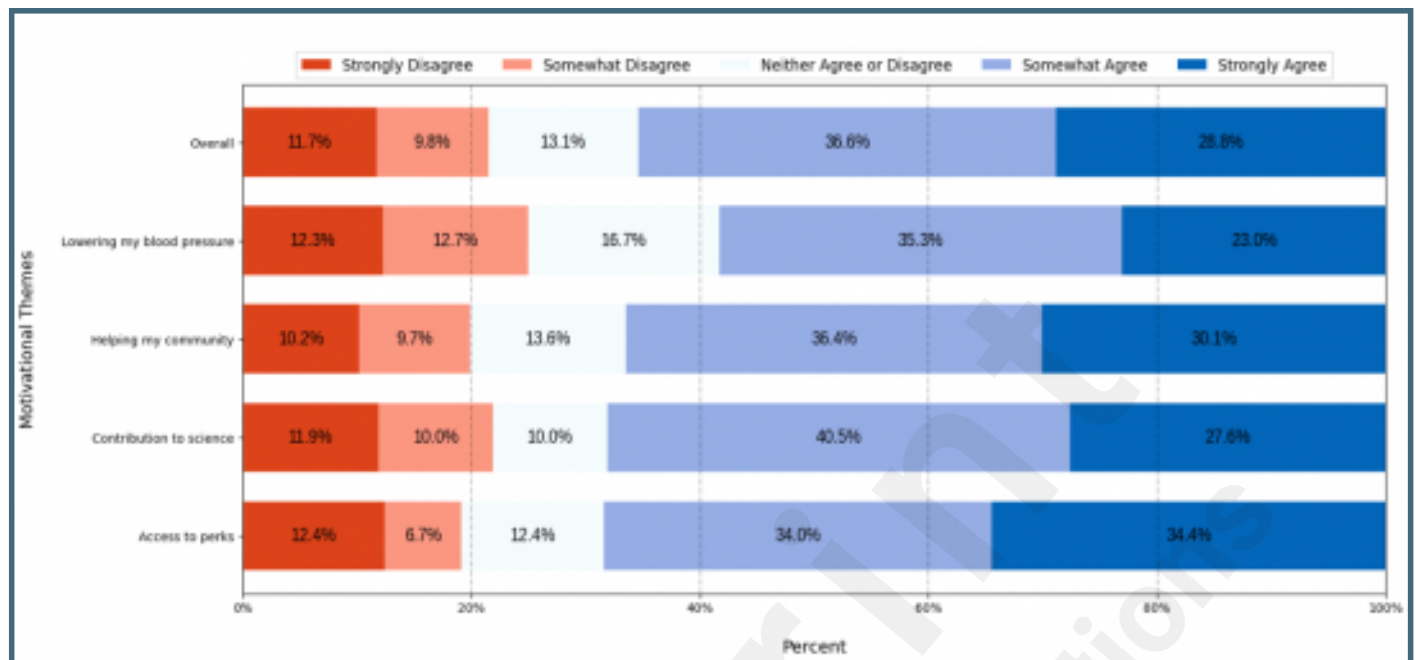
Percentage of participant responses to appeal of motivational themes in clinical trial advertisements.



Percentage of participant willingness to participate in clinical trials by motivational theme.



Percentage of participant likelihood to recommend clinical trials by motivational theme.



Multimedia Appendixes

Survey Design.

URL: <http://asset.jmir.pub/assets/e5eec2a885f9e6eb12848be5cd51e31b.docx>

Participant inclusion and exclusion criteria flowchart for this study.

URL: <http://asset.jmir.pub/assets/6e052e7ecf69f72a3f28f28c862ca5d0.png>

Sociodemographics of analytical sample and distribution of motivational themes in the clinical trial advertisements by demographics.

URL: <http://asset.jmir.pub/assets/2d0d55b8883a64b17ba3ed8f82703323.docx>

