Racial Differences in Advertisement Engagement

Focus on Health-Related Research Studies

by

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Background: Social media advertisements are often used as a recruitment method for health-related research studies. Most studies under-recruit people from minority populations. Exploring the racial differences behind advertisement interactions will provide additional information as to what factors inspire research engagement and promote equity.

Objective: To identify how various advertisements differ in engagement rates based on the race of the depicted model.

Methods: Three separate advertisements that were identical except for the race of the model (Caucasian, Asian, African American) were run for two separate two-week trials with equal budgets. The advertisements were placed via Facebook and presented to a specific demographic, as determined by the Eating Behavior Treatment (EBT) study. The advertisements were recruiting for an Eating Behavior Treatment study.

Results: The advertisements depicting the Caucasian woman as well as the Asian woman were displayed to Facebook users with equivalent frequency. The advertisement depicting the African American woman yielded lower rates of engagement, producing many fewer results (clicks, page visits, reach) than the other advertisements and costing more per result.

Conclusions: This study demonstrates evidence in support of the claim that race does influence advertisement interaction. This study provides evidence that suggests that social media advertisements may be a useful tool for recruitment for health-related studies in the future.

Keywords: social media; health-related study; race; engagement; eating disorder

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Introduction

The majority of adolescents have access to and frequently use digital technologies. Recent statistics show that as many as 95% of adolescents aged 13-18 have regular access to a smartphone, with more than 45% reporting that they are online "almost constantly" (Nesi, 2021). This number has gone up 25% from three years prior to these statistics being collected, raising the possibility that it will continue to increase in the coming years. Youth in this age range are at a period of increased risk of developing a mental illness, with as many as 1 in 5 adolescents suffering from a diagnosable mental disorder (Nesi, 2021). This poses an interesting question as to whether or not exposure to social media from a young age may be increasing the rates of mental illness manifestation in youth.

Specifically related to early use of social media is the onset of eating disorders in adolescents. Social media makes it considerably easier for messages that promote eating disorders to spread. This may be in the form of encouraging toxic diet culture, posting body-checking videos or pictures, or simply speaking out in support of specific eating disorders. These "pro-ana" or "pro-ED" communities depict eating disorders as a lifestyle choice rather than a mental illness (Branley et al., 2017). There are many treatment programs and research studies aimed at helping those afflicted with eating disorders to overcome their mental illness and move towards a state of health.

A large focus of treatment programs and researchers alike is reaching those who need help either to advertise treatment options or recruit participants for research studies. The reality is that traditional recruitment methods such as paper flyers and mailings are not as effective as they could be. In addition, there is a significant lack of

psychological research that includes or focuses on minoritized populations. There are a limited number of studies about eating disorders that focus on or highlight race, despite the fact that non-white individuals are equally or more likely to suffer from eating disorders than white individuals (NEDA, 2018). Out of the existing publications about eating disorders, the majority have been edited by White editors or written by White authors. This leads to a bias in the literature, as White authors are likely to include significantly fewer participants of color (Bareket-Shavit et al., 2020).

Although social media is harmful in many ways, it may also be the most effective method of outreach to potential research participants – including participants of color - due to the fact that the people who need help the most are likely spending a great deal of time on various forms of social media. The objective of this paper is to explore existing research on recruiting for health-related studies via social media as well as to ask the following questions: *What factors increase engagement rates with advertisement-style recruitment? Do minimal changes increase/decrease engagement rates? Specifically, what role do racial depictions play in encouraging advertisement engagement among various racial/ethnic groups?*

Background

Social Media and Social Networking Sites

Social media was first conceptualized with the creation of BBS, short for Bulletin Board System. This website allowed for users to communicate about specific items of interest, sending messages back and forth and sharing games and files. This website was among the first of its kind, allowing for previously antisocial people to feel comfortable communicating amongst people with shared interests. BBS paved the way for the creation of more well-known social networking sites, such as AOL (American Online) in 1992 and SixDegrees.com in 1997. Social networking became more recognizable in 2002 with the launch of the website Friendster. This site allowed for users to create a "Circle of Friends," initiating the idea that real-world relationships could be transferred to the internet (Shah, 2016).

Social media has continued to shift over the years, with the development of a plethora of platforms, all promising various forms of communication. As of 2016, 68% of U.S. adults use Facebook, 28% use Instagram, 25% use LinkedIn, and 21% use Twitter (Greenwood et al., 2016). In addition, the number of social media users in the U.S. reached 240 million in 2020, meaning that an estimated 72.% of all Americans are active on social media sites on a monthly basis (BackLinko, 2020). It can be assumed that these numbers have increased in the subsequent years. The most popularly used social media sites are used as frequently as daily by users. See Figure 1. As of 2021, Facebook remains the most popular social media site, with no other site coming close in terms of active users (Statista, 2021). See Figure 2. Interestingly, Facebook is

increasingly popular amongst the older population, with 62% of adults with an online

presence ages 65 and older being active on the website (Greenwood et al., 2016). This

could be due in part to the easy-to-navigate aspects of the platform, making it less

intimidating for older

users.

Three-quarters of Facebook users and half of Instagram users use each site daily

Among the users of each social networking site, % who use these sites ...

Legend: ■ Daily ■ Weekly ■ Less often

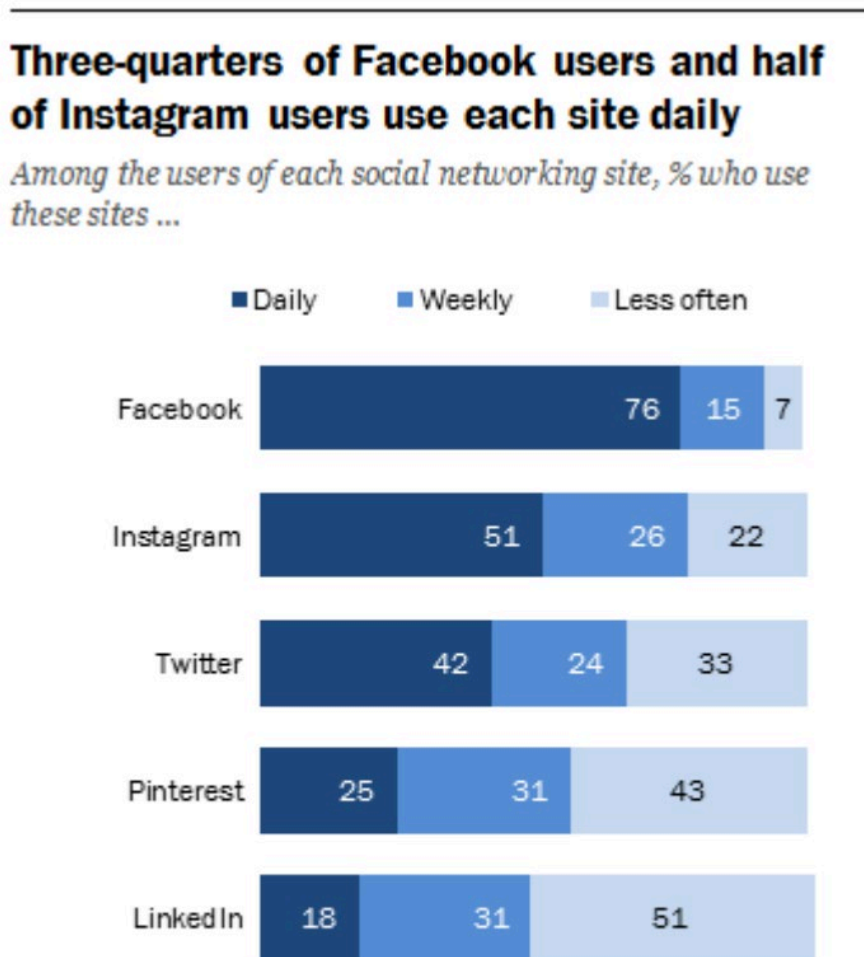| Site	Daily	Weekly	Less often
Facebook	76	15	7
Instagram	51	26	22
Twitter	42	24	33
Pinterest	25	31	43
LinkedIn	18	31	51

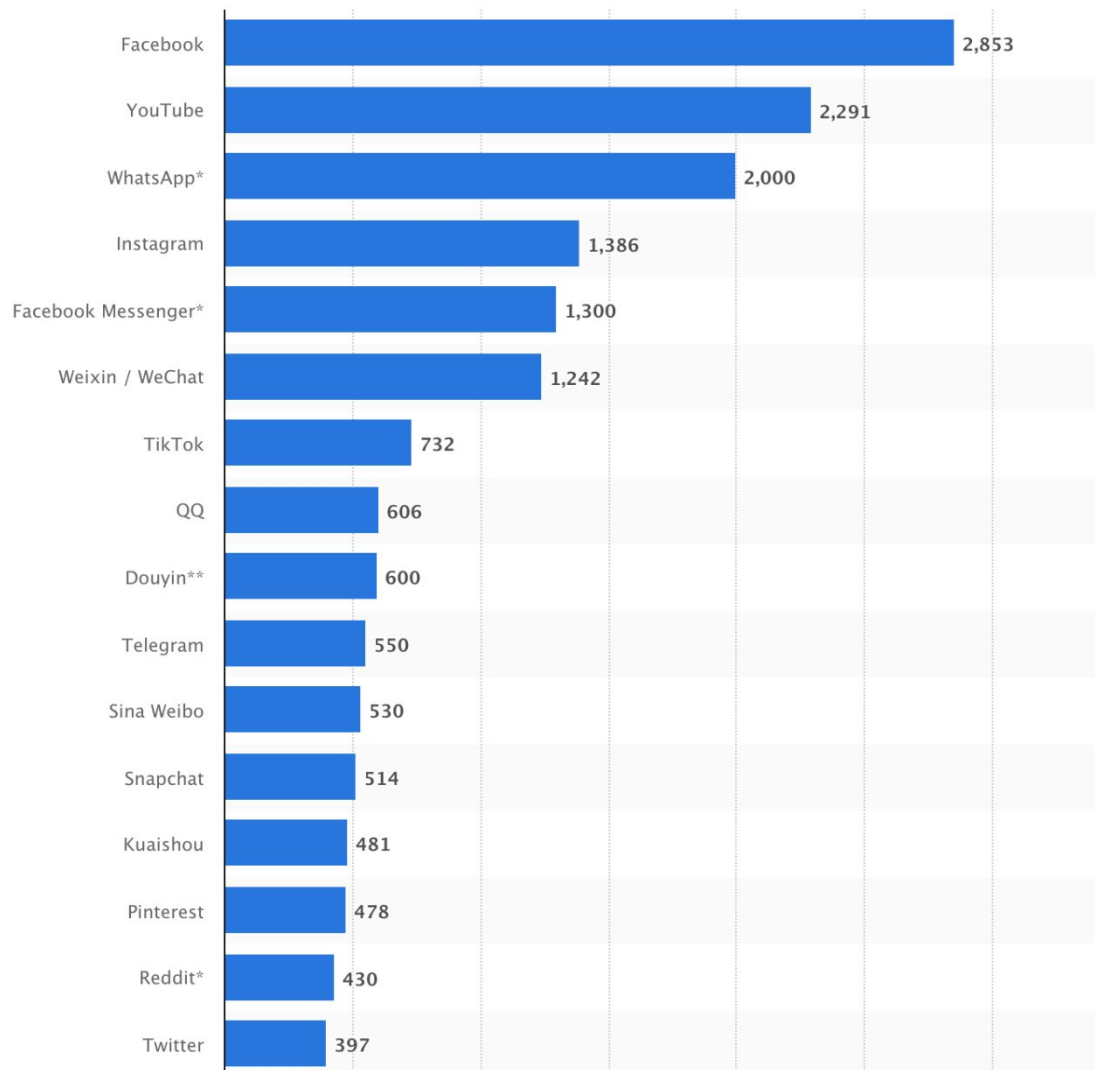Figure 1. Social media sites and frequency of use (Greenwood et al., 2016)

Figure 2. Most used social media worldwide (in millions) (Statista, 2021)

Social media continues to transition away from text and typed words and towards imagery and video. This is due in part to the release of the application Musical.ly in 2014. This media platform allowed for users to create short videos lip-syncing to popular songs, interacting with other users via comments and collaborations.

Musicaly.ly was purchased by internet technology company ByteDance in 2018, who then transitioned the app to Tiktok, as it is currently known (Smith, 2021). Tiktok quickly became one of the most downloaded applications in the world, and differs from its predecessors in a few key ways. Tiktok allows for videos up to three minutes in length to be recorded and posted, with no requirement for content and style such as the lip-syncing aspect of Musical.ly. This allows for users to create content to their heart's content. Tiktok also allows for much more interaction between users of Musical.ly, with users being able to "duet" existing videos, use sounds created by other users, and go "live," communicating with other users in real time.

This research project uses Facebook to both place and analyze our advertisements, due to both the fact that Facebook has the largest number of active users as well as utilizes advertising software that allows for advertisements to be targeted to specific interest groups. We set aside for future research to address other forms of social media, as more recent forms of social media tend to foster more toxic environments. Video-based platforms, especially, are home to pro-ED behaviors, exposing young users to unhealthy behaviors in ways that glamorize them and make them appear desirable.

Mental Disorders/Eating Disorders

This research project focuses on eating disorders, as our advertisements will be recruiting participants for an eating disorder study. Anorexia nervosa is an extremely restrictive form of eating disorder, with people who have this illness often viewing themselves as overweight even if they are severely underweight. People with this form

of eating disorder may weigh themselves repeatedly or over-exercise with the aim of further weight loss. Symptoms include restrictive eating behaviors, extreme thinness, an intense fear of gaining weight, and a distorted body image, leading sufferers to believe that they weigh much more than they do (NIH, 2016). Anorexia nervosa is present in approximately 0.5% to 1% of people and is most common among adolescent girls and young women (Clark et al., 2010). Anorexia nervosa is a very dangerous form of disease, with only a 35% to 85% recovery rate (Clark et al., 2010). It's important to note that there are often additional psychological conditions present than contribute to high mortality rates, such as suicide.

Bulimia nervosa is characterized by the consumption of excessively large quantities of food followed by compensatory behaviors such as forced vomiting or laxative use. People with this condition may be underweight, of a healthy weight, or overweight. Symptoms of bulimia nervosa include a chronically inflamed and painful throat from frequent purging (vomiting), worn tooth enamel and damaged teeth due to exposure to stomach acid, intestinal issues from laxative use and purging, and severe dehydration from fluid loss during purging (NIH, 2016). Bulimia is more common than anorexia, with a prevalence rate of 1.0%-1.5% among young women (Clark et al., 2010). However, bulimia nervosa is more likely to go undetected than anorexia nervosa. This is due to the fact that many people with this condition appear to be of a healthy weight and to be eating a normal diet. It's common for bulimia nervosa to be diagnosed due to the harmful symptoms rather than the weight loss itself (NIH, 2016).

Binge-eating disorder is the most common eating disorder in the United States, and while similar to bulimia nervosa in the way that people with this disorder will

consume excessive amounts of food, this consumption is not followed by purging. For this reason, the majority of people with binge-eating disorder are overweight. Symptoms of this condition include the consumption of unusually large quantities of food in a specific time period, eating when full or not hungry, eating alone or secretly due to feelings of shame, and eating to the point of being extremely uncomfortable (NIH, 2016). During these episodes it is extremely hard for people with this illness to slow down their rate of consumption or put a stop to it. The prevalence of binge-eating disorder in community samples is 2%-3%. However, among those who are severely obese it can be as high as 50% (Clark et al., 2010). Binge-eating disorder affects both men and women with similar frequency and is prevalent in a large age range (25-50 years).

Race and Eating Disorders

Eating disorders have often been thought of as an illness that primarily affects adult, White women. There has been some research that supports this claim. A 2018 study into the relationship between race and DSM-5 eating disorders found that out of a national sample of 36,306 U.S. adults, eating disorders including anorexia nervosa, binge eating disorder, and bulimia nervosa were most prevalent in White women (Grilo et al., 2018). There are mixed hypotheses about what could be causing this difference in prevalence, with some researchers hypothesizing that these differences can be attributed to the cultural differences in body dissatisfaction between White cultures and other cultures (O'Neill, 2003).

A more recent study, conducted in 2018, presents a contrasting account of the racial prevalence of eating disorders (Cheng et al., 2018). Using DSM-5 criteria as well as surveys and interviews, this study concluded that there are no significant differences in the prevalence or risk factors when comparing various racial and ethnic groups. This study addresses the possibility that the conclusions reached by prior research that did state a significant difference between ED prevalence by racial group may have been due to changing results throughout multiple trials, as many prior studies failed to correct for multiple testing (Cheng et al., 2018). Thus, there is conflicting evidence as to whether eating disorder prevalence varies by racial group. An additional complicating factor is that cultural norms such as considering mental illness to be a taboo topic may cause fewer people of color to pursue an eating disorder diagnosis or treatment. This could skew the recorded number of eating disorders in people of color, as fewer may be seeking a diagnosis. Further research would be beneficial in helping to clarify the presence or absence of racial disparities in ED prevalence.

Race and Advertising

While not focused specifically on race and advertising for the purpose of recruitment for health-related studies, there has been some prior research into race and advertising. Much of the existing research is quite dated, with the bulk taking place from the 1970s to the 1990s. Additionally, the majority of the existing research comes from an advertising focus rather than a psychology focus. Two separate sources, one from 1974 and one from 1992, found that Caucasian people and African American people from the United States both prefer and are more influenced by advertisements

that feature models of their own race (Bush et al., 1972; Feick et al., 1992). This is at least part of the reason for why advertising companies will "match" models in advertisements to the desired target audience. A related study found that the race of the model depicted in an advertisement may not be the most critical factor by which the advertisements are evaluated by consumers of various races. Rather, this study claims that other factors such as feelings of similarity and relatability with the model may be playing more of a role in advertisement reception (Edwards et al., 2014).

It's widely documented in the empirical literature with human subjects that minority populations are regularly under-represented in research, including psychology research as well as general medical research. For example, racial minority participation in cancer trials was 20% when compared to White participation, which was 80%. Minority participation had only increased by 2% in the two decades prior (Han et al., 2020). To identify which factors contribute to underrepresentation by minorities, researchers asked participants to identify key reasons for lack of participation in health-related research studies. Participants identified the following factors as leading to decreased participation rates: authentic care, accommodation of time, place, and transportation, financial incentives, diversity among the study team, and standardized modes of communication (which includes advertising), among others (Han et al., 2020). Advertisement methods are certainly a factor that may be preventing minority populations from participating in research. When advertisements are created using only White models, or in other ways appealing to White populations, racial minorities may be turned off from participating. As reviewed earlier, minority populations were less likely to participate in research if the research team lacked diversity (Han et al., 2020).

This could certainly translate to advertisement methods, leading minority populations to feel as if they aren't the intended target population of researchers.

Health-Related Research Studies

Our results are focused on the application of advertisements for recruitment processes specifically for health-related research studies. Research can be defined as "a systematic investigation, including research development, testing and evaluation, designed to contribute to generalizable knowledge" (HIPAA). This is a very broad definition, applying to research of any scope and specialty. The two main forms of health research are clinical trials and information-based research. This research extends to health services research, epidemiology, and public health research (Gostin et al., 2009). Health-related research is of great importance to society, providing information about patterns of care, disease prevention, and public health interventions (Gostin et al., 2009). As a whole, health-related research has led to extensive discovery, and continues to prove valuable to any and all communities.

There is a clear and apparent underrepresentation of minority populations in research. For example, Black people and Latino people make up 30% of the United States population but account for just 6% of all participants in federally funded clinical trials. This is even with knowledge of the fact that race and ethnicity play a pivotal role in disease risk (Konkel, 2015). With all of the valuable information that health-related research can provide, it's critical to include members of all populations in order to reach widely applicable conclusions. While this paper focuses on advertisement implementation as a form of clinical trial recruitment, it provides an opportunity for

social media advertisements to be adopted for use by all forms of health-related research, including community surveys and information-based research.

Existing Related Research

Several earlier studies are relevant to the present work. One is a 2016 study into the effectiveness of social media advertising (Facebook specifically) when compared to traditional advertising methods. In this study, participants were recruited to a smoking cessation clinical trial using social media (Facebook) as well as traditional methods (flyers, word of mouth, radio). The results of this study found that social media advertisements were significantly more successful than traditional recruitment methods in encouraging participation. By this, researchers mean that out of all of the potential participants that were presented with an advertisement in any form, participants were more likely to join the study if presented with the advertisement via social media.

Additionally, this study pointed out that while social media was successful in producing higher rates of recruitment, this strategy's ability to attract conscientious recruits needs further investigation. The researchers recommended the use of pre-screening questions in order to encourage involvement by the desired type of person (Ferguson et al., 2016). This study is pertinent to the present study in that it focuses on Facebook as a recruitment tool for health-related studies. The previous study differs in that its purpose was to compare social media recruitment with traditional recruitment methods, as opposed to systematically manipulating advertisements in an effort to discover what specific attributes within advertisements encourage engagement.

A similar 2019 study conducted two cross-sectional surveys of youth aged 13-20 years. Advertisements encouraging the completion of an online survey were placed on three social media platforms, Instagram, Snapchat, and Facebook. The purpose of this study was to research which social media platform is the most effective for research recruitment among youth. Ultimately, researchers found high rates of engagement with advertisements amongst each social media platform, with Facebook providing the most consistent results during both trials. The results of this study indicate that social media has the opportunity to act as a both time and cost-effective method for approaching youth about "sensitive health topics" (Albritton et al., 2019).

These results are promising, as the present study aims to engage with youth concerning eating disorders, which could certainly be classified as a sensitive health topic. This study does make note of the fact that Facebook may be a less effective recruitment tool for the younger population, as youth tend to navigate towards other social media platforms (Albritton et al., 2019).

Both of these studies concluded that social media is a significantly more effective research recruitment tool when compared to "traditional" recruitment methods such as flyers and word of mouth. This information is useful for the current study, as we will be reliant on social media advertisements in order to recruit for the Eating Behavior Treatment study. However, there appears to be a gap in the research with respect to differential effectiveness. Existing research fails to address whether the discussed methods would be equally successful across groups, particularly ethnic and racial minority groups that are underrepresented in research despite having comparable rates of eating disorders to white populations.

This gap creates the opportunity to explore whether social media recruitment for health-related studies is equally as effective among racial minority groups as it is amongst majority populations.

Methods

This study is a sub-study of a larger study on eating disorder treatment being conducted by my collaborator, Eric Stice, at Stanford. Dr. Stice is an eating disorder treatment researcher, working on developing dissonance-based treatment programs as well as programs focused on binge-eating disorder. As we brainstormed, we realized that there was some existing prior research on the topic (see *2.4 existing related research*). This study attempts to address the gaps in the prior research, investigating both effective means to recruit participants for eating disorder treatment programs as well as the effect of race and ethnicity on recruitment effectiveness. We decided to create three separate advertisements, identical in all ways except one, and run them for a set period of time on the same social media platform (Facebook).

There are several reasons for differences as related to advertisement engagement. First is the fact that minority populations are regularly underrepresented in psychological research and health-related research in general. It's quite possible that current recruitment methods are unsuccessful in recruiting minority population participants. Addressing the relationship between race and advertisement engagement could help us to understand where this lack of representation is stemming from. Second, this research is also relevant due to the current nationwide discourse about race and anti-Blackness, during which there have been discussions about Black representation in the media and body image. To address these areas of interest, I created advertisements for the ongoing eating behavior treatment (EBT) study out of the Eugene/Springfield area. Each of the advertisements contains the same information: a question, "Do you struggle with eating concerns or have serious body image issues," information on the

age range of the study and the fact that it is being facilitated by the Oregon Research Institute (ORI), and various methods of contact such as phone number, email address, and website.

These advertisements differ in that they each depict a woman of a different race. One advertisement depicts an African American woman, one depicts a Caucasian woman, and one depicts an Asian woman. See figures 3, 4, and 5. The advertisements met the following criteria. The women depicted needed to fit in our desired participant age range (18-34 years) because similarity in age between the models and the participants is assumed to increase the appeal of the study. The intent of this age restriction is to increase the relatability of the models to those who were viewing them, and potential participants are more likely to find models of a similar age to themselves relatable. Second, the women depicted needed to have neutral/positive expressions on their faces, as expressions, whether positive or negative, could influence the viewer's perceptions of the advertisement. Third, the women depicted needed to appear to be in a healthy weight range. It was critical that these women not be obviously overweight or underweight, as that could be triggering to potential participants or dissuade them from engaging with the advertisements. Though we did our best to meet all of the above criteria, we were limited to images that were freely available on the internet.

We ran these advertisements using the Facebook Ad Manager software. This software allows users to target their advertisements to certain geographical locations, demographics, and user interest groups. Our advertisement was shown to female-identifying people within the Eugene and Springfield area, as the EBT program will occur in Eugene and will require in-person attendance. We chose to target our

advertisements to people who meet our previously stated requirements as well as are involved/show interest in certain Facebook interest groups. Upon examining the various interest groups on Facebook's platform, we selected groups with a focus on diet, exercise, weight-loss, and healthy eating, as we felt that there was a decent chance that at least some members of those groups would be suffering from disordered eating habits or body image issues.

Figure 3. Advertisement depicting an African American woman

Figure 4. Advertisement depicting a Caucasian woman

Figure 5. Advertisement depicting an Asian woman

It is possible that there were racial biases present in the selection of the

Facebook interest groups, however, we are not able to access the racial demographics of

the various interest groups because this data is not reported by Facebook's advertising

manager platform. By targeting specific interest groups that may have relations to

disordered eating habits as well as Facebook users outside of the interest groups that fit

within the previously stated qualifications, we hoped to capture a sample that included

people from a wide array of racial and ethnic identities.

Each advertisement was run two separate times for a time span of two weeks per

advertisement, with a budget of $14.09 per advertisement. Each of the advertisements,

regardless of the race of the model depicted, were given the same budget. Therefore, the

null hypothesis is that each advertisement would have the same rates of engagement. At

the end of each two-week period, results were calculated using the Facebook-provided

software. Engagement was defined in specific operationalizations, including reach

(number of people who saw the content), impressions (number of times content from

EBT's page entered a viewer's screen), unique link clicks (of the EBT program

website), landing page views, cost per result, and cost per landing page view.

The formal definitions of reach and impressions appear fairly similar, so the two

terms are often confused. Reach is the total number of Facebook users who see the

advertisements. Impressions are the number of times that the advertisements are

displayed, regardless of if they are shown to different people or not. Reach is at most

one per person, but any given person can count for multiple impressions. To make this

concept easier to understand, reach can be thought of as the number of unique Facebook

users who see the advertisements. There are multiple factors that go into determining

how these values are decided. Seeing as Facebook uses an algorithm to manage nearly

every aspect of the social media platform, the advertisements that a user is presented

with are determined both by Facebook and by the user themselves. Users are more

likely to be shown advertisements that are related to content that they already interact

with. For example, if a Facebook user regularly interacts with posts about health-foods,

they might be shown an advertisement for a new healthy snack food that has come out. There are other forces at play as well, including advertisers that pay Facebook to display their advertisement to certain target populations. The advertisements in this study are included in this group. We have paid Facebook to show our advertisements to our desired demographic – which explicitly did not include race as a factor - and therefore, people may be shown our advertisements who otherwise wouldn't have been based solely on the algorithm.

Results

Each advertisement was run using Facebook's Ads Manager software for two separate two-weeks periods. For the sake of clarity of results, the two advertising sessions for each unique advertisement were combined and the resulting statistics were averaged (figure 6). This procedure resulted in one set of engagement measures for each unique advertisement. For each advertisement, engagement was operationalized in the form of reach, impressions, cost per result, unique link clicks, landing page views, and cost per landing page view. Cost per results represents a combination of cost per link click and cost per 1,000 people reached.

Facebook Ad Manager Results

ADVERTISEMENT	REACH	IMPRESSIONS	COST PER RESULT
Ad Depicting a Caucasian Woman	2,180	2,497	$2.89
Ad Depicting a Black Woman	2,054	2,228	$7.04
Ad Depicting an Asian Woman	2,236	2,402.5	$2.82

Figure 6. Averaged Facebook Ad Manager results from both 2-week trials

There are certain factors that are out of our control that may influence who is shown one of our advertisements. Facebook users have a significant amount of control over their own advertising preferences. This could influence what types of advertisements they are shown. In addition, Facebook users are able to opt-out of certain types of advertisements completely. This could prevent certain Facebook users from seeing our advertisements. However, neither of these user factors allow sufficient control to differentiate among our ads. Users would either be eligible to see our ads or could choose not to see them, but it would be difficult for users to block some of our ads and not others. However, Facebook's advertising is controlled via an opaque algorithm that could potentially discriminate among our ads. An algorithm is an elaborate set of rules developed from previous users' data that determines what types of advertisements apply and will be the most appealing to other users (Hootsuite, 2020). One implication of this is that if there are differences in the frequency with which users are shown our ads, it could be due to bias, as though Facebook's algorithm may be making preconceived notions about potential participants and barring them from seeing our advertisements.

When the resulting statistics of both two-week periods are combined, the advertisements depicting different types of women generated the results shown in Table 1.

FB RESULTS	Reach	Impressions	Cost/Result	Unique Link Clicks	Landing Page Views	Cost/Landing Page View
Caucasian Model	2,180	2,497	$2.89	13.5	6.5	$2.87
Asian Model	2,236	2,402.5	$2.82	12.5	8.5	$1.66
African American Model	2,054	2,228	$7.04	4	1	$13.82

Table 1. Facebook Ad Manager results for 3 separate advertisements

When the resulting statistics of each of the separate advertisements over a two-week period are combined, the advertisements generated the following results:

Reach: 9,084

Impressions: 14,255

Amount spent: $84.54

Unique link clicks: 59

Landing page views: 32

Cost per landing page view: $2.64 (average across each advertisement)

The results of the advertisements depicting the Caucasian woman and the Asian woman are fairly similar, with each advertisement being stronger in some categories than the other. For example, the advertisements depicting the Caucasian woman received slightly more impressions and unique link clicks than the advertisements depicting the Asian woman. However, the advertisements depicting the Asian woman reached more people and cost an average of $0.07 less per result than the advertisements depicting the Caucasian woman. Overall, these separate advertisements bear very similar results. Interestingly, the advertisements depicting the African

American woman were given less exposure by Facebook than both the advertisements

depicting the Caucasian woman and the advertisements depicting the Asian woman in

every category. Additionally, whereas the first two sets of advertisements cost an

average of $2.87 and $1.66 per landing page view, the advertisements depicting the

African American woman cost an average of $13.82. This substantial difference as well

as the other depicted statistics provides an interesting insight into the relationship

between race and advertising.

The results of a chi squared test can be seen below in Table 2.

Results						
	White	Black	Asian			Row Totals
Reach	2180 (2225.34) [0.92]	2054 (2037.40) [0.14]	2236 (2207.26) [0.37]			6470
Impressions	2497 (2451.66) [0.84]	2228 (2244.60) [0.12]	2403 (2431.74) [0.34]			7128
Column Totals	4677	4282	4639			13598 (Grand Total)

Table 2. Chi squared test contingency table

When comparing the reach and impressions for each of the advertisements, a chi

squared test concluded that the difference in results for each advertisement are not

significant at $p < .05$, $X^2 (1, N = 13598) = 2.7347$, $p = .254833$. Therefore, we fail to

reject the null hypothesis, meaning that each of the advertisements were not found to

have statistically significant differences in rate of engagement when comparing reach

and impressions data.

Discussion

This paper sought to analyze current evidence on racial differences in advertisement engagement as well as to provide new evidence on the subject. The findings of this paper are specifically focused on social media advertisements created for the purpose of recruiting participants for health-related research studies. There are two separate aspects to this research, one being the use of social media advertisements as a recruitment tool for health-related research studies and another being effects of apparent race on social media advertisement engagement.

As is seen in the prior discussed research, there has been some research into the use of social media-based advertisements for the purpose of recruitment for health-related studies. Research suggests that social media advertising strategies are significantly more effective at recruiting participants for health-related studies than traditional recruitment methods such as flyers, newspaper ads, and word of mouth (Ferguson et al., 2016). The Eating Behavior Treatment (EBT) study has previously recruited for their studies via paper postcards that were mailed to the residences of people in the study's desired demographic. Prior existing research also suggests that Facebook may be one of the most useful advertising platforms as it displays consistent results throughout multiple advertising trials (Albritton et al., 2019). Our current research concurs, as each separate trial of the same advertisement resulted in similar numbers.

What limited research exists on race and advertising shows that people from the United States are more receptive of advertisements that depict a model of their own race (Bush et al., 1972; Feick et al., 1992). This evidence suggests that race-matching may

prove to be a useful strategy to encourage advertisement engagement. However, the dated nature of the existing research on this topic begs the question as to whether or not current research would yield the same results.

Our current research demonstrates a relationship between the race of the model depicted in the advertisements and the resulting advertisement engagement, even with the fact that the results were not found to be statistically significant when considering reach and impressions. Though these results suggest a correlation between the race of the model in advertisements and engagement rate when recruiting for health-related studies, causation cannot be confirmed at this time because the assignment of advertisements to users was not random. Indeed, although all of the advertisements were allocated the same budget per day, some of them were displayed to users with much more frequency than others. What could account for these differences? We consider several possibilities.

First, when considering the reasons behind the quantity of engagement with the various advertisements, one factor is the unequal distribution of race amongst Facebook's users. According to a 2018 survey, Black people use Facebook with less frequency than White people, with 53% of Black people claiming to use the site at least once daily and 64% of White people making the same claim (Statista, 2018). Less frequent use of Facebook means less frequency of being exposed to Facebook advertisements. This could mean that fewer Black people were exposed to our advertisements as a whole. Facebook reviews advertisements prior to showing them to users, and we did not, in any way, state that the advertisements depicted people of varying races. The fact that there were fewer recorded interactions with the

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advertisement depicting a Black woman suggests that that some person or algorithm at Facebook reviewed the advertisements, determined that they depicted people of varying races, determined that the race of the person depicted in the advertisement was relevant to engagement rates, and therefore displayed some of the advertisements more than others. This is indicative of biases present in Facebook's advertising platform.

There is also racism present in Facebook's advertising algorithm. As of 2016, advertisers on the social media platform were able to exclude specific groups that Facebook referred to as "Ethnic Affinities." This allowed for advertisers to choose not to present their advertisements to specific racial and ethnic groups of their choice (Angwin et al, 2016). Advertisers are no longer able to eliminate ethnic groups in such an explicit way, but there are other methods that allow advertisers to focus their advertisements on specific ethnicities, such as the elimination of geographical regions and interest groups. It's clear that Facebook's advertising platform has a history of racial and ethnic bias, and although we made the placement of our advertisements equal to the best of our ability, it's impossible to truly eliminate biases due to the algorithmic nature of the platform. In fact, our data suggests that even if one goes out of their way to try to depict people from minoritized populations, the algorithms suppress these depictions.

This poses an additional question; if separate advertisements with White and Asian models had not been created, and only the advertisement with the Black model had been run through Facebook's advertising software, would the advertisement have had very few impressions?

Limitation and Future Directions

Due to the nature of this study, as well as the fact that the recruitment portion of the EBT research was conducted largely without the assistance of professionals, there is certainly room for improvement upon the study methods. Three main limitations come up: the limited budget under which the advertisements were run, the visuals used by the advertisements themselves, and the geographical area in which the research was conducted. Our budget of $84.54 was conservative, largely due to the fact that the EBT study already had existing research methods such as paper flyers that money had been allocated to. If this study were to be performed again, it would be useful to run the advertisements at a much larger budget. This would allow for the advertisements to have a much larger reach, increasing numbers in every category. By doing so it would be increasingly likely that differing advertisements have more similar results.

Seeing as the advertisements were not created by professionals, there is definitely room for improvement if this study were to be conducted again. Specifically, the images of the models that were used for this study could be altered to eliminate extraneous variables even further. With increased time and budget the potential to select models and conduct a photography session exists, which would allow for the selection of the clothing that the models are wearing as well as their facial expressions. Having to select already-existing images that were public domain limited our choices greatly.

The geographical location in which our study took place is also likely to have affected the results. Eugene, Oregon is 83.3% white (U.S. Census, 2020). The fact that this research was conducted using a sample frame that is not diverse means that the results were likely skewed by people's existing racial biases. This could have occurred

in a couple of manners. First, someone with racial biases may be less likely to interact with an advertisement depicting someone of a different race. This means that even if shown one of the advertisements depicting a non-white woman, people may be less likely to engage. This would decrease advertisement clicks and landing page views. Second, if previous advertising campaigns in Eugene found that advertisements depicting POC achieved lower rates of engagement than advertisements depicting White people, the Facebook algorithm may be more inclined to show the advertisements depicting White people in order to maximize engagement. This would decrease both the reach and impressions of the advertisements depicting POC. However, this would confirm that Facebook is identifying the race of the models shown on the advertisements prior to determining how to display them.

As previously discussed, there were likely additional algorithmic biases in play. In future trials, it would be useful to conduct this research in a city with a more diverse population. If the population were to be more diverse, research could investigate whether or not minoritized populations are shown advertisements that depict non-White models, or if the advertisements depicting White models are still achieving the highest levels of reach and impressions. This could further demonstrate Facebook's algorithmic racial bias. Additionally, if the advertisements weren't recruiting for an in-person research study in a solitary location, the advertisement reach could be expanded to a larger geographical location or possibly the entire United States. This would greatly increase the racial diversity of the people being presented with the advertisements. Since the age range for this study was 18-34 and it was conducted in the Eugene/Springfield area, a large portion of people shown the advertisements were likely

college students. This makes for a more white, liberal, wealthy, and educated population than the general American public.

Conducting this study again with the present limitations accounted for would provide useful information into racial motivations behind engagement with advertisements that are recruiting for health-related research studies. This information could be applied to future health-related research studies, with the potential to be used for other non-health focused studies.

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