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FOOD INDUSTRY FRAMING STUDY

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Adapting anti-tobacco messages to ultra-processed food: message framing's impact on attitudes towards the food industry

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Keywords: food industry, tobacco industry, countermarketing, food addiction, obesity, stigma, food policy

Word Count: 4,086

Funding: Financial support for participant recruitment and data analysis came from the University of Michigan Honors Department as well as the University of Michigan Food Addiction Science and Treatment Lab.

Disclosures: JRC has received funding from the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development Intramural Research Program and received support from the University of Liverpool for meeting attendance and travel. The authors have no other disclosures to report.

Author Contributions: KEG, LP, JRC, and ANG contributed to the design and implementation of the research. KEG and LP contributed equally to the statistical analyses and drafting of the manuscript. All authors have approved the final manuscript.

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1002/oby.24272

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Required Checklists: CONSORT

Study Importance

1. *What is already known about this subject?*
    a. The rise in overconsumption of ultra-processed foods has been associated with global increases in obesity and diet-related diseases. Ultra-processed food companies use similar marketing and production strategies as tobacco companies during peak consumption of tobacco products, before the harms of tobacco consumption were well-known by the public.
    b. Public health campaigns to combat obesity have been largely ineffective.
2. *What are the new findings in your manuscript?*
    a. Messaging that emphasized the role of the food industry in creating and marketing addictive products was most effective at eliciting negative attitudes toward the food industry.
    b. Messaging that emphasized the role of the food industry in creating and marketing addictive products or products that contribute to general health harms was associated with more negative beliefs about food industry practices than messaging that emphasized individual food choices.
3. *How might your results change the direction of research or the focus of clinical practice?*
    a. These findings may encourage public health researchers to shift public health messaging aimed at improving eating behavior and obesity from a focus on individual behavior to emphasizing the manipulative tactics of the food industry.

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Abstract

Objective

Ultra-processed food (UPF) consumption is associated with worse health. UPF companies apply production and advertising tactics used for tobacco products. Anti-tobacco campaigns that highlighted industry manipulation reduced youth tobacco use and increased support for tobacco-related policies. This study explored whether similar messaging affected attitudes and beliefs toward the food industry, support for obesity-related policies, and weight stigma.

Methods

Participants aged 18-25 were randomized to watch presentations emphasizing 1) food industry manipulation and product addictiveness, 2) food industry manipulation and product health harms, 3) individual choices and food addiction, 4) individual choices and health harms, or 5) a control. Participants completed questionnaires regarding attitudes and beliefs toward the food industry, support for obesity-related policies, and weight stigma.

Results

Messages that emphasized food industry manipulation and product addictiveness were associated with increased negative attitudes toward the food industry versus control. Industry-focused messages were associated with increased negative beliefs about industry practices versus control. No significant effects were observed on support for obesity-related policies and weight stigma.

Conclusion

Emphasizing food industry manipulation and product addictiveness appears promising for shifting youth attitudes toward the food industry without increasing weight stigma. Further research is needed to identify messages that shift support for obesity-related policies.

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Introduction

Advances in food mechanization, packaging, and preservation have enabled the food industry to produce thousands of convenient, hyperpalatable, ultra-processed foods (UPFs).[1–3] UPFs are designed to be particularly rewarding and are typically high in refined carbohydrates, fats, and salt.[3] As of 2017, UPFs provide 58% of energy intake in the United States.[2,4] As UPF consumption has risen globally, so have rates of obesity and diet-related disease..[5,6]

Public health campaigns targeting UPF consumption and obesity have mostly failed to promote behavior change.[7] Campaigns have focused on individual behavior or basic health education, rarely acknowledge the food environment, and imply that weight is controlled by individual choices.[7] Despite significant time and financial investment, exposure to these campaigns has not led to substantial improvements in diet quality or weight management, has been criticized as stigmatizing, and has been associated with lower self-efficacy and lifestyle change intentions.[8,9] In contrast, public health messaging was an important tool in reducing tobacco use and may highlight novel approaches to address UPF consumption.[10]

There are striking similarities between tobacco and UPF industries.[6,10,11] Tobacco companies (e.g., Philip Morris) dominated the UPF market from the 1970s-2000s.[11] These companies applied strategies that increased the profitability of cigarettes to UPFs, including adding flavor enhancers used in cigarettes to sugar-sweetened beverages (SSBs) and increasing youth-targeted marketing. Tobacco and UPF companies deflect criticism of industry practices by emphasizing personal responsibility.[10,11] Given similarities between tobacco and UPF industries, efforts used to reduce tobacco use may be effective for reducing UPF intake.

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Youth-focused public health campaigns contributed to population reductions in tobacco use.[12] One of the largest campaigns, "truth," was created in 1997 as a countermarketing campaign challenging the tobacco industry.[13-15] It portrayed the tobacco industry as manipulating young people into using addictive tobacco products to increase profits. Research on "truth" found that exposing deceptive tobacco industry practices most effectively denormalized tobacco use and shifted guilt about smoking to anger toward the industry.[15,16] Advertising focused on tobacco as an addictive drug effectively angered smokers and deterred non-smokers from initiating tobacco use.[12] Addiction-focused advertisements that emphasized industry manipulation were most effective in denormalizing and reducing smoking.[12]

Anti-industry, addiction-focused, and health-harm-focused anti-smoking advertisements have been associated with increased support for anti-tobacco policies including indoor smoking bans.[17] However, demographic characteristics including political affiliation and gender appear to impact individuals' receptivity. Compared to those who identified as politically moderate, liberal participants were more likely to support limiting tobacco advertising and adding warning labels on cigarette packs.[18] Individuals who identified as conservative opposed evidence-based tobacco control measures.[18] Women cite more social, psychological, and physical reasons for smoking, including coping with anxiety and preventing weight gain, compared to men.[19,20] Thus, it is important to consider how public health messages may be received based on individual differences, which could inform targeted campaigns.

Similar to anti-tobacco campaigns, research considers the impact of public health messaging frames in the domain of food.[21-24] Compared to control, messaging focused on the environmental and health harms of red meat reduced the likelihood of selecting meals containing red meat from an online restaurant menu.[21] A mass-media campaign highlighting health risks of

SSBs resulted in increased endorsement of the health risks of SSBs and lower sales in the intervention area.[22] Young adults reported lower intentions to consume SSBs after viewing countermarketing and health education messaging compared to control.[23] While research has examined the impact of countermarketing on susceptibility to front-of-package UPF promotions, limited research has examined whether messaging tactics directly inspired by anti-tobacco campaigns impact attitudes and beliefs related to UPF consumption more broadly in young adults.[24]

Despite their success, evidence is mixed regarding the effect of anti-tobacco campaigns on tobacco-related stigma.[25] Patients with tobacco-related diseases reported that anti-tobacco advertisements increased internalized stigma, which contributes to delayed diagnoses and worse quality of life.[25] Given that many obesity-focused public health campaigns have increased external and internalized weight stigma, it is important to review the impact of food addiction-focused messaging on experiences of stigma for individuals in larger bodies.[7,8,9] Results from experiments of addiction-based explanations for obesity have been mixed; some report no impact on internalized weight stigma[26] while others show increased external weight stigma, perhaps due to interpretations of food addiction as a personal choice.[27] Further research surrounding food addiction messaging and stigma is warranted to create non-stigmatizing public health campaigns.

This study compared effects of public health messages about UPFs on attitudes and beliefs about the food industry and support for obesity-related policies. Messages describing UPF consumption as a result of food industry practices and marketing or individual choices were paired with messages describing the health harms or addictiveness of UPFs. We hypothesized that exposure to industry-focused messaging would be associated with more negative attitudes

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and beliefs toward the food industry and more support for obesity-related policies than individual-focused messaging and control. Given mixed results of prior research, we had no a priori hypotheses regarding the effect of food addiction-focused messaging compared to health harm-focused messaging and a control condition.[3,27,28] As exploratory analyses, we compared effects of messaging approaches on outcomes moderated by gender and political affiliation, and effects on external and internalized weight stigma, perceived health harms of UPF, motivation to change eating behavior, and belief that UPF could be addictive.

Methods

Participants

Participants completed a survey via the University of Michigan Psychology Subject Pool from January 6th, 2023 to November 28th, 2023. A power analysis in G*Power 3.1.9 yielded a sample size of 1,302 with the following parameters: one-way Analysis of Variance (ANOVA), power = 0.95, $\alpha = 0.05$, and expected $f = 0.1$.[29] We recruited an initial sample size of ~1,540, with a final sample of 1,160 participants (exclusions detailed in **Figure 1)**. All procedures were reviewed and exempted by the University's Institutional Review Board. Recruitment ended when the subject pool closed for the semester.

Procedure

Following informed consent, eligible participants were randomly assigned to watch presentations emphasizing: 1) food industry manipulation and product addictiveness (i.e., how Big Food--described to participants as "the major companies that create and market the majority of junk food in our food environment"--creates and markets addictive products to hook consumers), 2) food industry manipulation and product health harms (i.e., how Big Food creates

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and markets products with health harms), 3) individual choices and food addiction (i.e., how food choices can lead to food addiction), 4) individual choices and health harms (i.e., how food choices can lead to health harms), or 5) control (i.e., health benefits of reading). See **Supporting Information** for full presentations. Presentations were ~one-minute-long video recordings of slideshows with messaging, mimicking the average duration of past "truth" campaign advertisements. Messaging was designed to elicit an affective response, as confirmed via participant responses (see **Supporting Information** for analysis of affective responses). Presentations contained the same number of images and slides with similar sentence structure and syntax. Slides were presented for 10 seconds each, and participants could stop/start the presentation if needed. Participants were unable to continue the survey until presentations were completed. Participants completed attention checks to confirm awareness of presentation content (e.g., "What was the presentation you just watched about?" and "Which of the following pictures was in the presentation you just watched?"), then completed measures of dependent and exploratory variables. Lastly, they reported their eating behaviors and demographic information (see https://osf.io/75xpy for a list of all measures). A simple randomization procedure via Qualtrics was followed.

Dependent Variables

Legacy Media Tracking Survey-Adapted (LMTS-A)

According to the Theory of Planned Behavior, beliefs about and attitudes toward a behavior influence intentions to engage in, and ultimately complete the behavior.[30] We therefore aimed to assess participants' attitudes toward and beliefs about the food industry after watching the presentations. As no validated scale existed to measure attitudes and beliefs toward the food

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industry, we adapted the LMTS. The original LMTS is a 19-item questionnaire assessing participants' agreement to statements about the tobacco industry including "Attitude Toward the Tobacco Industry" and "Beliefs About Industry Practices."[31] Items within the "Attitude" dimension ask participants to rate their agreement with statements about cigarette companies (i.e. "The government should let companies sell cigarettes"). Items within the "Beliefs" dimension ask participants to rate their agreement with statements about actions of cigarette companies, such as lying or targeting youth (i.e. "Cigarette companies try to get young people to start smoking.")

Participants rated agreement to LMTS-A statements on a 5-point Likert Scale, from 1, *strongly disagree* to 5, *strongly agree.*[31] Phrases related to cigarette products, use, and advertising were replaced with UPF-related terminology (e.g. "junk food", "anti-junk food ads"). An additional statement was added at the end of the survey: "Big Food companies make junk food that is addictive." A factor analysis on the LMTS-A (see **Supporting Information**) supported retaining the two-factor solution. Both the "Attitude" ($\alpha = .75$) and "Beliefs" ($\alpha = .84$) subscales had good internal consistency.

Support for Obesity-Related Policy Initiatives Questionnaire - Updated (SOPI-U)

Previous research suggests that denormalizing health-compromising behaviors may increase support for health-related policy.[17] To investigate whether proposed health messages impacted policy support, a 22-item questionnaire was developed to assess participants' obesity-related policy support by combining the 13-item SOPI questionnaire[3] with an additional 8-item food-related policy questionnaire.[32] Sample policies include "I believe there should be restrictions on the type of foods that can be advertised to children" and "I support schools not allowing sugary drinks, such as soda, to be sold in their vending machines or in their cafeterias."[3,32] A final policy

proposal was added: "I support warning labels on junk food that warn consumers of junk food's addictive potential." Participants rated their agreement using a 6-point Likert scale from 1, *strongly disagree* to 6, *strongly agree*. Higher scores indicated stronger support for obesity-related policies. A factor analysis on the SOPI-U (see **Supporting Information**) supported a one-factor solution with good internal consistency (α = .75).

Exploratory Variables

Anti-Fat Attitudes Questionnaire (AFA)

To assess message impacts on external weight stigma, participants completed the AFA.[33] Participants rated their agreement with 13 statements using a 9-point Likert scale from 1, *very strongly disagree*, to 9, *very strongly agree.*[33] Higher scores indicated more external weight stigma. The AFA demonstrated good internal consistency in this sample (α = 0.88).

Modified Weight Bias Internalization Scale (WBIS-M)

To assess message impacts on internalized weight stigma, participants completed the WBIS-M,[34,35] which includes 11 statements for which participants rate their agreement using a 7-point Likert scale from 1, *strongly disagree* to 7, *strongly agree*.[34,35] Higher scores indicated higher internalized weight stigma. The WBIS-M demonstrated excellent internal consistency in this sample (α = 0.92).

Perceived health harms of UPF, motivation to change eating behavior, and belief that UPF could be addictive

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The Health Belief Model posits that individuals are more likely to change their behavior when they perceive greater susceptibility to health harms.[36] Thus, we adapted a questionnaire administered by Grummon et. al.[21] to assess four potential considerations for participants when preparing to change their UPF consumption.. Participants were asked about how much the presentation made them think of 1) health harms of "junk food", 2) desire to reduce "junk food" intake, 3) the addictiveness of "junk food" and 4) beliefs that some people can get addicted to "junk food". Participants responded using a 5-point Likert scale from 1, *not at all*, to 5, *a great deal* or dichotomously, *yes/no*. 98.9% endorsed the belief that "some people can get addicted to junk food."

Demographic Variables

Participants reported their age, gender, race and ethnicity, political orientation, and education level. A full list of measures (including those not used to test the current hypotheses) is available on the Open Science Framework: https://osf.io/75xpy.

Data Analytic Plan

Statistical analyses were performed using SPSS Statistics version 29.0.[37] Variables were assessed for normality and outliers; none were found. Study methods, hypotheses, and analyses were preregistered at Open Science Framework: https://osf.io/75xpy. We note the following deviations. To test Hypothesis 1, two separate one-way ANOVAs were conducted with condition as the independent variable, and the LMTS-A Attitude toward the Food Industry and Beliefs about Industry Practices subscales as the dependent variables. To test exploratory moderation, separate factorial ANOVAs were conducted to examine main effects of gender/political party and their interactions with condition on LMTS-A "Attitude" dimension, LMTS-A "Beliefs" dimension, and SOPI-U total scores. Given that very few participants

identified outside of the gender binary, only participants who identified as cisgender were included in moderation analyses. Political party categories were collapsed into Democrat, Republican, and Independent. Additional exploratory outcomes were tested via a separate one-way ANOVA with condition as the independent variable and participants' response to presentations as the dependent variable.

Results

Demographics

Average participant age was 18.76 years old (SD = 0.90). Of the final sample, 62.8% of participants identified as cisgender women, 34.5% as cisgender men, and 3.7% as another gender identity. Racial/ethnic group(s) were as follows: 63.3% White,19.6% Asian, 5.0% Black or African American, and 0.3% American Indian or Alaskan Native. **Table 1** presents sample demographics by condition.

Correlations

Table 2 presents means, standard deviations, and zero-order correlations between dependent and exploratory variables.

Hypothesis 1: Food Industry Attitudes and Beliefs

There was an effect of condition on attitude toward the food industry [$F(4, 1155) = 10.27$, $p < 0.001$, $\eta 2 = .03$]. Post-hoc comparisons indicated messaging emphasizing food industry manipulation and product addictiveness was associated with significantly higher negative attitudes toward the food industry versus control (see **Figure 2**). Individually-focused food-addiction messaging was associated with significantly lower negative attitudes relative to other intervention conditions (but did not significantly differ from control).

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There was a significant main effect of gender on attitudes toward the food industry such that women (M = 2.49, SD = .80) expressed more negative attitudes than men (M = 2.06, SD = .70; F(1, 1119) = 98.13, p < .001). Additionally, there was a significant interaction between condition and gender [F(1, 1119) = 4.60, p = .001], such that women endorsed more negative attitudes in response to industry-focused messaging (see **Figure 3).** There was a significant main effect of political party on attitudes towards the food industry, such that Democrats (M = 2.42, SD = .78) expressed more negative attitudes than Independents (M = 2.35, SD = .82), and Republicans [M = 2.10; SD = .80; F(2,1071) = 14.63, p <.001]. However, the interaction between condition and political party was non-significant (p = .63).

There was an effect of condition on beliefs about food industry practices [F(4, 1155) = 3.73, p = .005, η2 = .01]. Post-hoc comparisons indicated industry-focused messaging (emphasizing product addictiveness or health harms) was associated with more negative beliefs versus control (see **Figure 4**), but there were no other significant differences.

There was a significant main effect of gender on beliefs about food industry practices, such that women (M = 3.82, SD = .61) expressed more negative beliefs than men [M = 3.71, SD = .62; F(1, 1119) = 8.84, p = .003]. However, the interaction between condition and gender was non-significant (p = .46). There was a significant main effect of political party on beliefs about food industry practices, such that Democrats (M = 3.86, SD = .59) expressed more negative beliefs than Independents (M = 3.74, SD = .68), and Republicans [M = 3.60, SD = .61; F(2,1071) = 15.96, p <.001]. However, the interaction between condition and political party was non-significant (p = .07).

Hypothesis 2: Obesity-related policy support

There was no significant effect of condition on obesity-related policy support [F(4, 1155) = 0.29, p = .88, η2 =.001]. There was a significant main effect of gender on policy support, such that women (M = 71.87, SD = 11.21) expressed more support for obesity-related policies than men [M = 67.67, SD = 12.39; F(1, 1119) = 32.02, p < .001]. However, the interaction between condition and gender was non-significant (p = .31). There was a significant main effect of political party on policy support, such that Democrats (M = 71.80, SD = 11.07) expressed more support for obesity-related policies than Independents (M = 70.14, SD = 11.86), and Republicans [M = 66.59, SD = 12.88; F(2,1071) = 16.52, p < .001]. However, the interaction between condition and political party was non-significant (p = .37).

Exploratory Hypothesis: Weight Stigma

There was no significant effect of condition on average AFA scores [F(4, 1155) = 1.41, p = .23, η2 = .005] or average WBIS-M scores [F(4, 1155) = 0.33, p = .86, η2 = .001].

Exploratory Hypothesis: Perceived health harms of UPF, motivation to change eating behavior, and belief that UPF could be addictive

Table 3 presents exploratory findings related to participants' responses. Conditions differed by the degree to which participants reported that presentations made them think about health harms of "junk food" [F(4, 1155) = 36.37, p < .001, η2 = .11] and desire to reduce "junk food" intake [F(4, 1155) = 23.51, p < .001, η2 = .08]. Intervention conditions were associated with greater thoughts about the health harms of eating "junk food" and a greater desire to reduce "junk food" intake versus control (ps < .05) but did not significantly differ from each other.

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Conditions also differed in the degree to which presentations made participants think about the addictiveness of "junk food" ($F(4, 1155) = 41.92$, $p < .001$, $\eta 2 = .13$). Intervention conditions were associated with greater thoughts about "junk food" addictiveness versus control (ps < .001). Individuals who watched either industry- or individually-focused presentations emphasizing addiction reported thinking more about the "junk food" addictiveness compared to presentations emphasizing health harms (ps < .05).

Finally, conditions did not differ on the degree to which participants believed that people can get addicted to "junk food" ($p = .5$), likely due to a ceiling effect.

Discussion

This was among the first studies to examine whether applying elements from the "truth" anti-tobacco campaign in the context of UPF shifted youth attitudes toward the food industry and support for obesity-related policies.[23,24] Only participants who viewed presentations that combined industry and addiction-focused messages reported more negative overall attitudes about the food industry versus control. This suggests messages emphasizing the food industry's role in creating and marketing addictive foods shift youth's general attitudes about the food industry more effectively than messages emphasizing individual responsibility and general health harms of unhealthy food. This matches findings on the most effective public health messaging against tobacco use.[12]

When considering beliefs about food industry practices, messages discussing the food industry's role in creating and marketing addictive products or products with health harms effectively increased participants' negative opinions versus control. Consistent with prior research, emphasizing individual responsibility for health harms did not impact beliefs about

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harmful industry practices.[10] Thus, solely focusing on individual responsibility is unlikely to change public opinion about the food industry's role in obesity. Tobacco companies were once viewed favorably by the American public and the shift to more negative attitudes about this industry was essential for garnering public support for regulation and litigation.[38] Public health messaging targeting UPF-related food industry practices may bolster similar efforts to improve the healthfulness of the food environment.[23,24] Repeatedly using the same public health message can lead to message fatigue, reducing its persuasive power.[39] Alternating between messages that highlight the industry's role in worse health and addiction to UPFs may help maintain youth engagement and reinforce beliefs.

Obesity-Related Policy Support

Contrary to hypotheses, experimental conditions were not associated with differences in obesity-related policy support, suggesting a single exposure to public health messaging may not be adequate to shift policy support among youth. However, the messages in this study did alter attitudes toward the food industry and beliefs about industry practices, which were moderately correlated with policy support (r = .37 and .48, respectively). Previous research on public support of health-related policies highlights the difficulties of increasing policy support and the importance of communicating policy effectiveness for increasing acceptance of food policy interventions.[40,41] Repeated or stronger messages that shift attitudes and beliefs about the food industry may ultimately contribute to greater support for obesity-related policies, but future research is needed.

Individual Differences

There were individual differences in how participants responded to messages. Consistent with prior tobacco research,[42] women, relative to men, endorsed more negative attitudes toward

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the food industry in response to industry-focused messaging. Women may be more receptive to public health messaging about food, given that US women experience more weight discrimination than men, increasingly so with greater BMI.[43] Women also appear to be negatively impacted by UPFs, as they are almost twice as likely to experience severe obesity (BMI $\geq$ 40.0)[44] and are far more likely to endorse binge eating.[45] These messages' increased effectiveness for women may be particularly important for public health.

Consistent with prior research on public health messaging regarding tobacco and UPF,[18,45] Democrats endorsed more negative attitudes toward the food industry, more negative beliefs about industry practices, and more support for obesity-related policies than Independents or Republicans. However, political party did not interact with condition to predict variables of interest, suggesting that the intervention was effective regardless of political party. Recently, the Republican party has emphasized negative health impacts of UPFs (e.g., Make America Healthy Again), suggesting this may become a less partisan issue. Since the current study was conducted before new Republican messaging, future research can explore how differing political messages may affect receptivity to food industry-focused public health campaigns.

Weight Stigma

The current study did not find evidence that intervention conditions affected external or internalized weight stigma. This is consistent with prior research that found no differences in weight stigma from addiction-focused messaging,[26] which contrasts with findings that some anti-tobacco campaigns increased stigma among tobacco users.[25] These findings suggest messages used in this study may shift attitudes without increasing stigma. However, repeated exposure to similar messages could potentially impact weight stigma. It is important to monitor for such effects while developing future public health campaigns to reduce UPF consumption.

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Responses to the Presentation

All interventions versus control effectively increased desire to change eating among participants. Participants who viewed addiction-focused messages had more thoughts about the "addictiveness of junk food" than those viewing health-focused messages. This indicates explicitly mentioning addiction in public health messaging may be crucial to shifting attitudes about UPF's addictive potential. Tobacco was considered harmful but not addictive for decades, which the tobacco industry used to avoid accountability for creating addictive products.[10] Directly acknowledging the addictiveness of food industry-created UPFs counters this mindset and may shift the focus from individual choice to industry culpability. Belief that "junk food" could be addictive was very high (>98% endorsement), regardless of condition, adding to research supporting wide adoption of the construct among the lay public.[28] Support for labels that warn consumers that "junk food" is addictive was high in this sample (participants selected between "somewhat agree" and "agree" on average), suggesting addiction-related policies may already have more public support than anticipated.

Limitations and Future Directions

This study was subject to several limitations. While presentations were designed to mimic the "truth" campaign's structure and messaging, they lacked its extensive funding, production value, and reach.[13] Notably, significant effects were still found with a one-time, brief message not created by communication experts. However, this may have limited the experimental manipulation's strength, and repeated exposure or higher production value could yield better results. Future studies should test more potent versions of these public health messages. Additionally, the sample was older than the target audience for the "truth" campaign, which targets adolescents aged 12-17. Participants were mostly White undergraduates from a

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large public university, limiting the generalizability of findings. Future research should include more diverse youth. Finally, given the lack of a validated measure of individual attitudes toward the food industry, we adapted a validated measure of attitudes toward the tobacco industry. Factor analyses on the LMTS-A and SOPI-U demonstrated clear factor structures and good internal consistency, but future research should further examine their psychometric properties.

Conclusion

This study provides promising evidence that even brief messages highlighting the food industry's role in creating and marketing addictive foods can influence emerging adults' attitudes without increasing weight stigma. These messages resonate with politically diverse youth and are particularly effective for young women. Further research is needed to identify the most effective types and formats of public health messaging for shifting obesity-related policy support and changing eating among youth. Utilizing successful strategies from public health campaigns to reduce youth tobacco use may be crucial in changing public attitudes and behaviors regarding UPF consumption. Observed effects were modest, but significant given the brief, one-time exposure to a PowerPoint message. This suggests greater impacts could be achieved with repeated, professionally delivered exposures. As was instrumental in addressing tobacco industry practices, highlighting both health harms and potential addiction is important.

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Table 1. *Participant Demographic Characteristics and Between-Group Differences*

Variable		Total	Industry x Food Addiction	Industry x Health Harms	Individual Choice x Food Addiction	Individual Choice x Health Harms	Control
n		1160	223	227	248	232	230
Gender Identity	Cisgender Woman	729 (62.8%)	121	144	166	145	153
	Cisgender Man	400 (34.5%)	93	77	80	82	68
	Transgender/Genderqueer/ Nonbinary/Agender/Other Gender	31 (3.7%)	9	6	2	5	9
Race/Ethnicity[a]	White	734 (63.3%)	152	138	153	142	149
	Asian	227 (19.6%)	34	45	57	47	44
	Black/African American	58 (5.0%)	10	13	13	10	12
	American Indian/Alaskan Native	4 (0.3%)	0	2	1	0	1
	Hawaiian/Pacific Islander	3 (0.3%)	0	1	1	1	0
	Middle Eastern	15 (1.3%)	3	1	4	5	2
	Hispanic/Latina/o/x	28 (2.4%)	6	5	9	5	3
	More than one race	78 (6.7%)	15	17	8	21	17
	Other	13 (1.1%)	3	5	2	1	2
Income	Less than $10,000	79 (6.8%)	13	16	18	15	17
	$10,000 - $19,999	23 (2.0%)	3	5	2	9	4
	$20,000 - $29,999	39 (3.4%)	6	7	8	7	11
	$30,000 - $39,999	49 (4.2%)	7	10	10	13	9
	$40,000 - $49,999	37 (3.2%)	10	9	4	7	7
	$50,000 - $59,999	46 (4.0%)	9	8	6	12	11
	$60,000 - $69,999	34 (2.9%)	9	5	11	5	4
	$70,000 - $79,999	35 (3.0%)	7	6	4	9	9
	$80,000 - $89,999	39 (3.4%)	8	7	10	7	7
	$90,000 - $99,999	52 (4.5%)	12	11	12	7	10
	$100,000 - $149,999	200 (17.2%)	36	43	47	34	40
	$150,000 or more	525 (45.2%)	103	100	116	105	101
Political Party	Strong Democrat	183 (15.8%)	32	37	42	33	39
	Moderate Democrat	323 (27.8%)	63	58	65	61	76
	Lean Democrat	186 (16.0%)	37	35	41	43	30
	Independent	181 (15.6%)	39	37	40	33	32
	Lean Republican	100 (8.6%)	16	20	20	23	21
	Moderate Republican	85 (7.3%)	18	21	18	15	13
	Strong Republican	28 (2.4%)	2	7	6	6	7
	Something Else	72 (6.2%)	16	12	16	16	12

Note. N = 1160. Participants were on average 18.76 years old (SD = 0.90).

[a] Percentages for Race / Ethnicity exceed 100% because of the option to select multiple response options.

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Table 2. Zero-order Correlations between Dependent and Exploratory Variables

Variable	1	2	3	4	5	6	7	8	Mean	SD
1. LMTS-A Attitude Toward the Food Industry Subscore	–								2.34	.80
2. LMTS-A Beliefs about Food Industry Practices Subscore	.26**	–							3.79	.62
3. SOPI-U Total Score	.37**	.48**	–						70.74	11.78
4. AFA Mean Score	.16**	-.03	-.06	–					3.38	1.51
5. WBIS-M Mean Score	.13**	.12**	.06	.13**	–				3.19	1.28
6. Degree to which participants thought about the health harms of eating “junk food”	.17**	.18**	.22**	.00	.09**	–			3.31	1.14
7. Degree to which participants experienced desire to reduce “junk food” intake	.23**	.20**	.27**	.05	.11**	.77**	–		2.89	1.12
8. Degree to which participants thought about addictiveness of “junk food”	.16**	.21**	.25**	.02	.11**	.82**	.73**	–	3.33	1.19

*p < .05. **p < .01

Table 3. Participants’ Responses to the Presentations; mean score and standard deviation by condition

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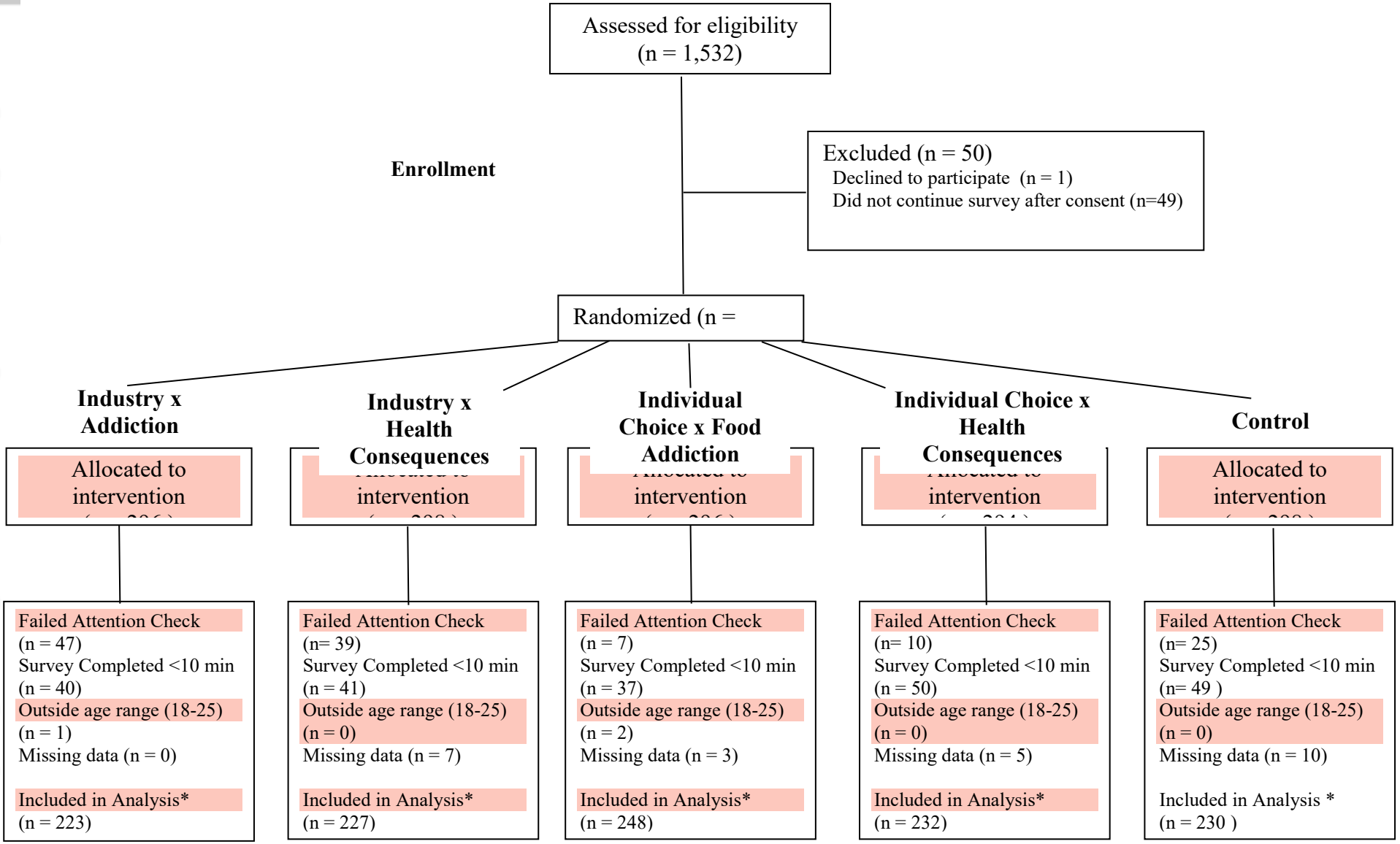
Condition	Industry x Addiction		Industry x Health		Individual x Addiction		Individual x Health		Control		F(4,1155)	η^2
	M	SD	M	SD	M	SD	M	SD	M	SD		
Degree to which the presentation made participants think about the health harms of eating "junk food"	3.59	0.97[a]	3.49	0.93[a]	3.48	0.97[a]	3.44	0.96[a]	2.55	1.46	36.37	0.11
Degree to which the presentation made participants desire to reduce "junk food" intake	3.21	0.98[a]	2.95	0.99[a]	2.97	1.02[a]	3.03	1.01[a]	2.30	1.34	23.51	0.08
Degree to which the presentation made participants think about the addictiveness of "junk food"	3.66	1.00[ab]	3.37	1.07[a]	3.68	1.00[ab]	3.44	0.99[a]	2.52	1.45	41.92	0.13

Note. Scores reflect responses using a 5-point Likert scale from 1, *not at all*, to 5, *a great deal*. [a] Denotes a mean score that significantly differed from the control condition. [b] Denotes a mean score that significantly differed from Industry x Health condition.

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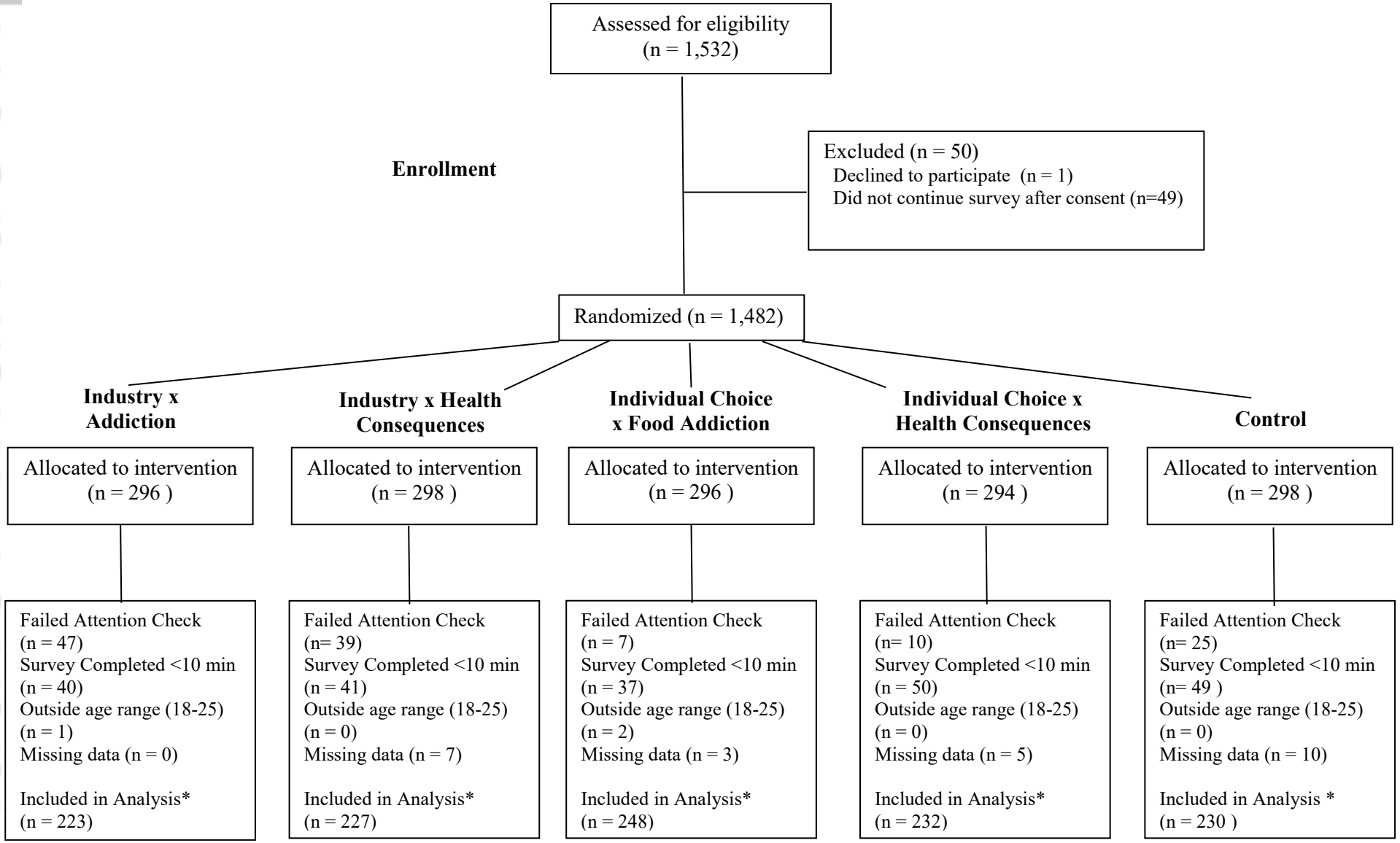
Figure 1. CONSORT Diagram



*Participants could be excluded from analysis for multiple criteria

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Figure 1. CONSORT Diagram



*Participants could be excluded from analysis for multiple criteria

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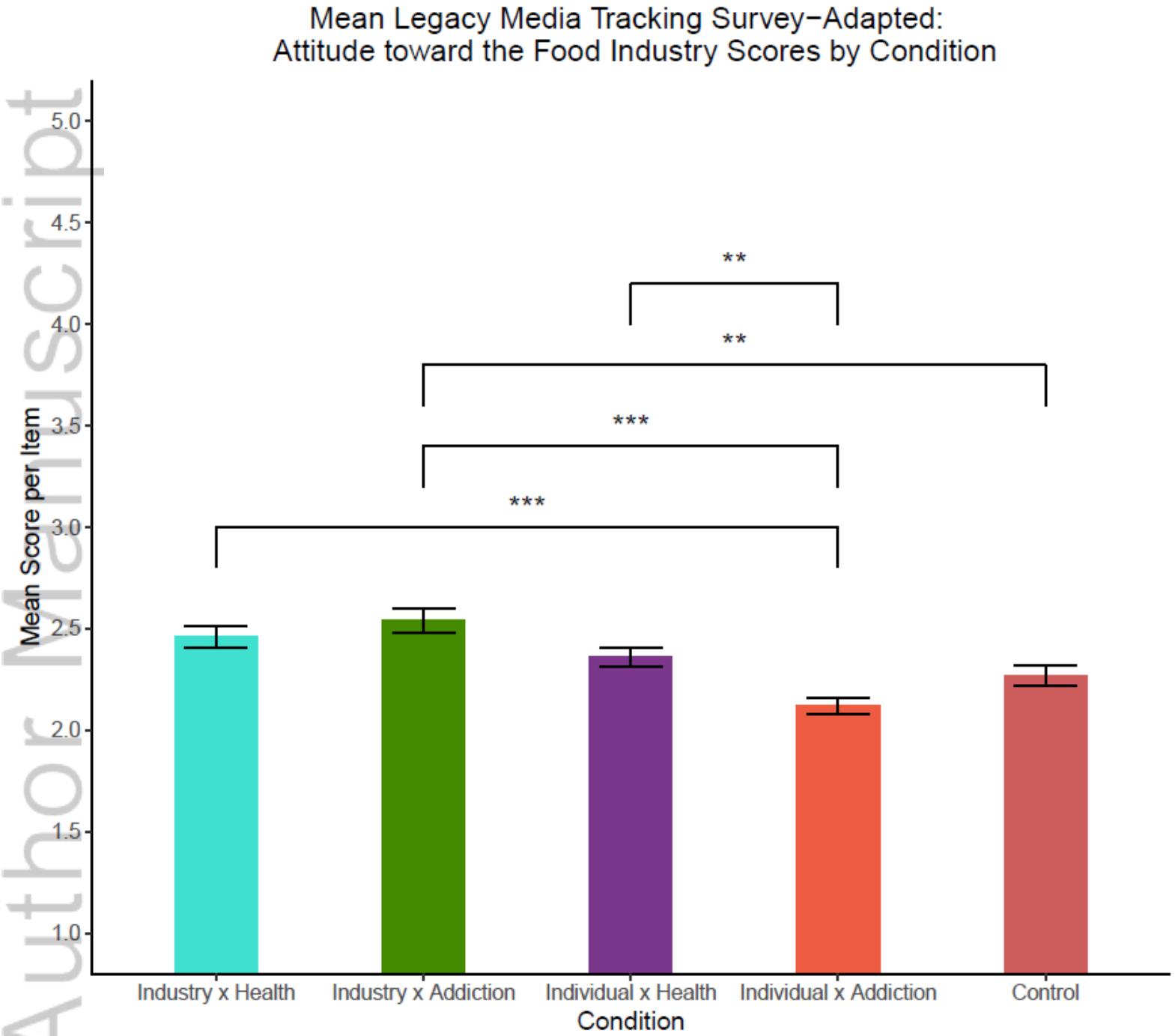


Figure 2. Pairwise comparisons are indicated with horizontal brackets. P−values are indicated by asteriks (**<.008, ***<.001). No significant differences in mean Legacy Media Tracking Survey−Adapted: Attitudes Toward to the Industry scores were found between Industry−focused conditions, between Industry−focused conditions and the Individual x Health condition, or between Individual−focused conditions, the Industry x Health condition and the Control condition.

OBY_24272_f2_Good-IndustryAddictionFraming- Figure2R2.png

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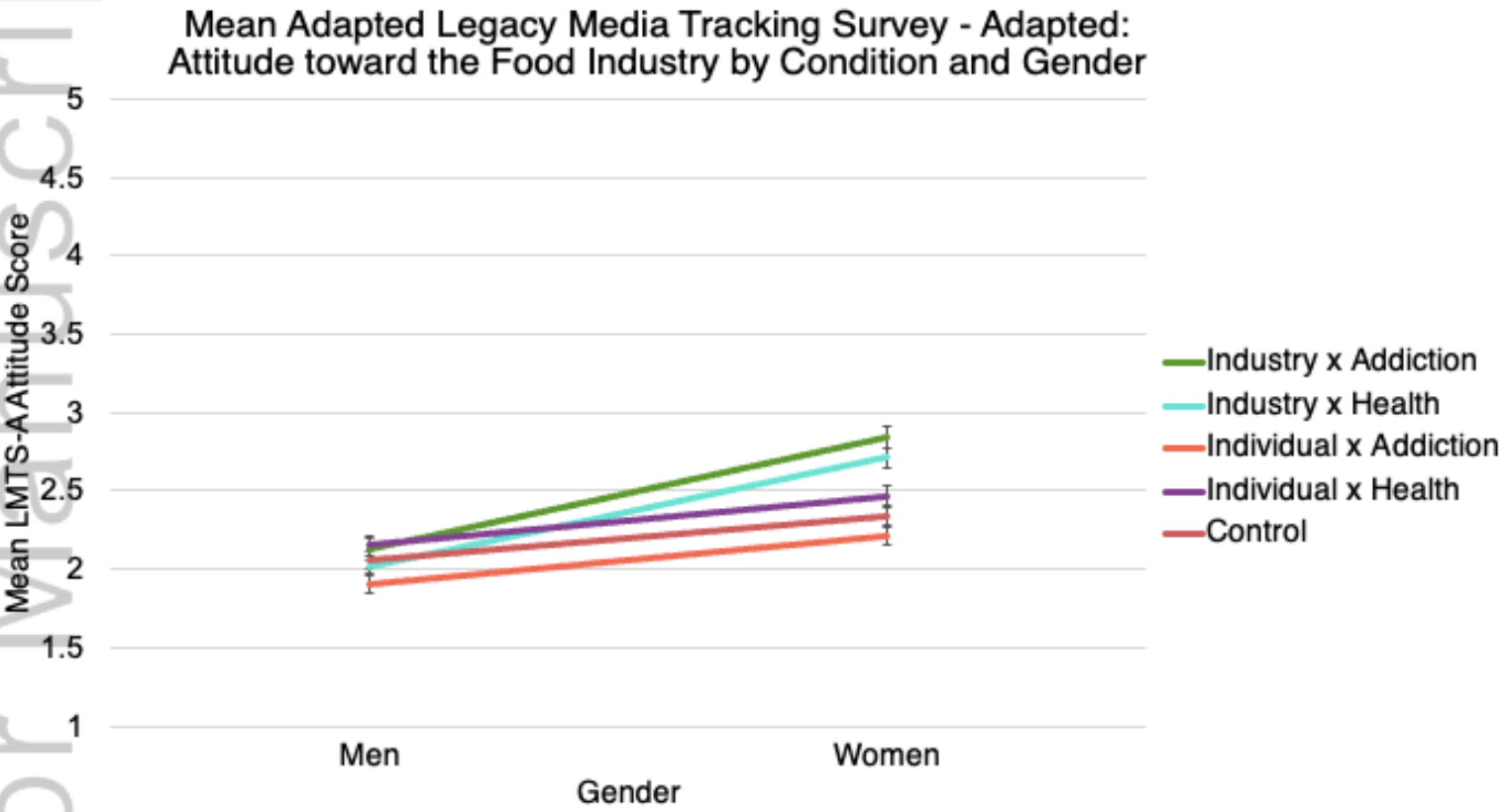


Figure 3. The figure demonstrates how mean Legacy Media Tracking Survey-Adapted (LMTS-A) scores varied by experimental condition, indcated by colored lines, and participant gender, indicated on the horizontal axis. There was a significant interaction effect between condition and gender [$F(1, 1119) = 4.60$, $p = .001$], such that women endorsed more negative attitudes toward the food industry in response to industry-focused messaging.

OBY_24272_f3_Good-IndustryAddictionFraming-Figure3R2.png

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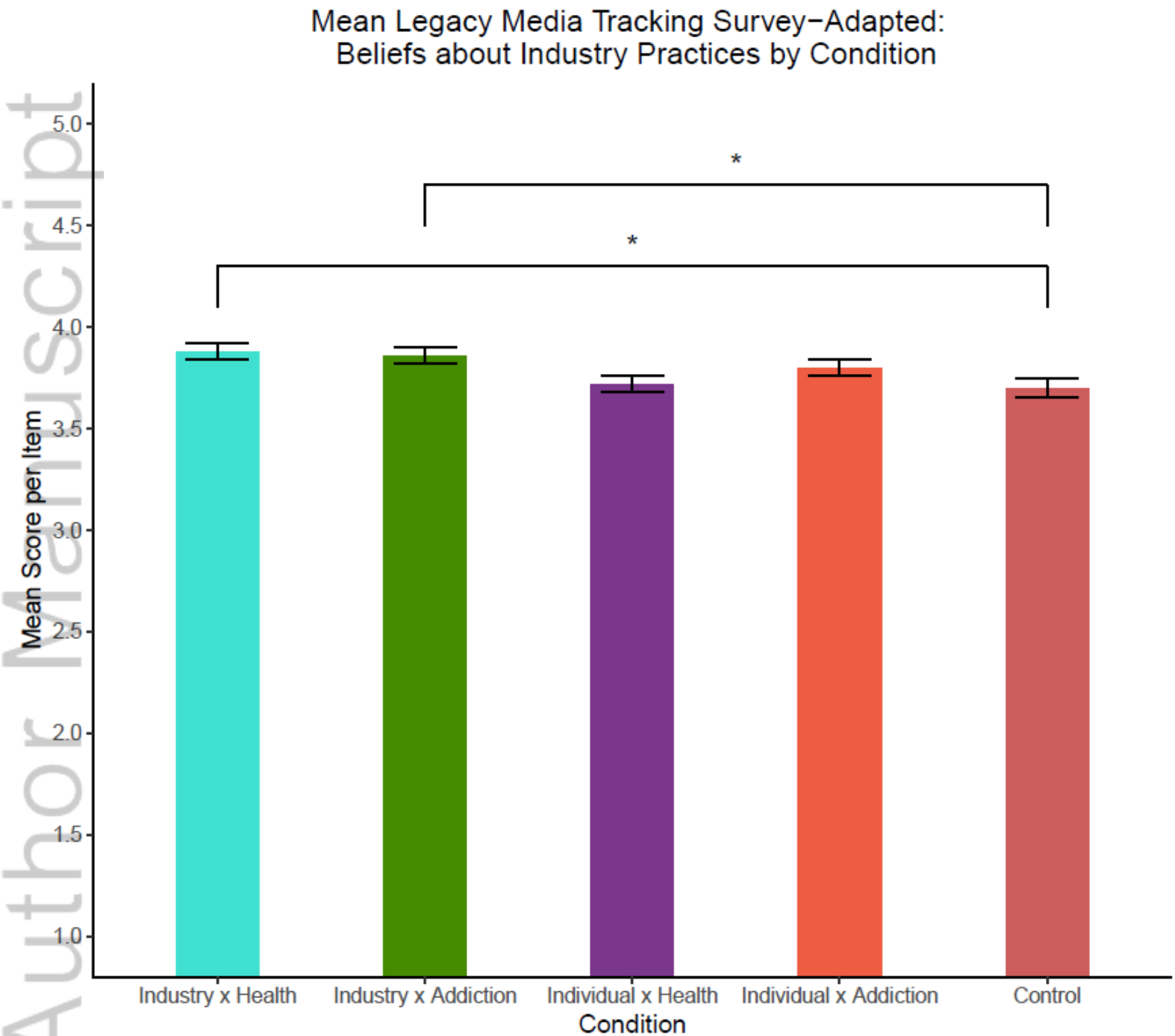


Figure 4. Pairwise comparisons are indicated with horizontal brackets. P−values are indicated by asteriks (*<0.05). No significant differences in mean Legacy Media Tracking Survey−Adapted: Beliefs about Industry Practices scores were found between Industry−focused conditions, between Individual−focused conditions, between Industry and Individual−focused conditions, or between Individual−focused conditions and the control condition.

OBY_24272_f4_Good-IndustryAddictionFraming-Figure4R2.png