**Message-Elicited Brain Response Moderates the Relationship Between Opportunities for Exposure to Anti-Smoking Messages and Message Recall**
**Supplemental Materials**

## The Real Cost Campaign

*The Real Cost*, a national public education campaign designed to reduce tobacco use among U.S. youth aged 12 to 17, commenced in February 2014. The aim of the campaign was to prevent smoking initiation among susceptible youth who have never smoked and discourage smoking progression among youth who have experimented with smoking in the past (Duke et al., 2015). Informed by the Theory of Reasoned Action (Fishbein & Ajzen, 2011) and Social Cognitive Theory (Bandura, 1998), which suggest that intentions to smoke or abstain from smoking are influenced by behavioral, normative, and efficacy beliefs surrounding the behavior, the campaign sought to influence anti-smoking beliefs (and, subsequently, anti-smoking intentions and behaviors) through creative messaging (Duke et al., 2015).

Prior to message development, formative campaign research was conducted to identify the most promising themes for anti-smoking campaigns targeting youth (Brennan, Gibson, Kybert-Momjian, Liu, & Hornik, 2017). This research demonstrated several classes of beliefs that were correlated with youth non-intention to smoke—beliefs about the health consequences of tobacco use, tobacco use leading to a loss of control and independence, and the dangerous chemicals in cigarettes—which formed the basis of many of the campaign messages. Evaluative research suggests the campaign has elicited positive effects (Duke et al., 2017; Farrelly et al., 2017; Huang et al., 2017; [Author et al., 2017]). In particular, findings from one evaluation demonstrate that high levels of campaign exposure are associated with an estimated 348,398 youths (aged 11-18 years) who did not initiate smoking during the first two years of the campaign (Farrelly et al., 2017).

## Methods for National Survey

The Survey dataset reflects results from a national observational survey of youth and young adults, undertaken by [Research Center at Name of University]. This 20-minute telephone survey was administered as part of a larger project to examine whether population-level exposure to tobacco-relevant content in the public communication environment predicts subsequent tobacco-related beliefs, attitudes and use behavior. The survey measured knowledge, beliefs, intentions, and behaviors related to tobacco products and tobacco product use, media use patterns, tobacco use risk factors, and key sociodemographic characteristics, among other variables.

Survey data were collected from June 18, 2014 to June 20, 2017, administered to a nationally-representative sample of 13- to 25-year-olds. Study respondents were recruited by research firm Social Science Research Solutions (SSRS) through random digit dial (RDD) and list assisted sampling of both landline and cell phone samples. A total sample of 11,847 respondents completed the survey (American Association of Public Opinion Research response rate #3 = 22%).

Throughout the survey administration period, campaign ads were aired consistently, however ads were flighted on and off in multiweek blocks (e.g., a given ad would air for 3 weeks straight, then be off-air for the next 3 weeks), with new ads rolled out at various points throughout the 3-year survey administration period. For the first 4 weeks of survey administration, respondents were asked about all ads currently airing in random order. Due to periodic changes in the number and type of ads aired (which resulted in an increasingly larger pool of ads to which survey respondents could have been exposed throughout the course of the campaign) and limited space on the survey instrument, the survey was revised after the first 4 weeks of administration to measure cued recall of a random sample of all ads currently airing. For the remainder of the data collection period, respondents were asked about 2–3 ads randomly selected from a pool of ads that included the larger set of The Real Cost ads that were currently airing. Ads were removed from the pool of ads once they were continuously off-air for 3 months and were not scheduled to be rebroadcast.

Of the variables measured in the Survey dataset, we used the following in our analyses: unique respondent ID, interview date (June 18, 2014 – June 20, 2017), past 30-day cued recall for each Real Cost ad assessed (0-100), age (13-17 years), sex, race (non-Hispanic White/Caucasian, non-Hispanic Black/African-American, Hispanic, and multiple races/other), sensation seeking (1-4, where 1 = low sensation seeker and 4 = high sensation seeker) (Zuckerman, 2007), parental disapproval of smoking with different response items for users and non-users (1 = don't/wouldn't mind, 2 = would/disapprove a little, and 3 = would/disapprove a lot), household cigarette use, parent education (less than high school, high school, some college, college degree, and completed graduate school), past 7-day TV watching (0-168 hours), and interview week (as determined by interview date).

Table S1

*Names and descriptions of 12 advertisements from The Real Cost campaign*

| **Ad name** | **Ad description** |
|---|---|
| Alison | A girl in a cafeteria complains about cigarettes being so bossy. |
| Any Reason | A girl won't smoke because she doesn't want to break up her finger puppets. |
| Band | A tiny bully drags a drummer away from band practice to smoke. |
| Bully | A tiny man bullies young people into smoking cigarettes. |
| Dance | A tiny bully makes a teen leave his prom date for a smoke. |
| Found It | A disgusting creature crawls into a teen's mouth before hiding in a cigarette pack. |
| #ReasonsNotToSmoke | A skater doesn't smoke because he can't fit a pack of cigarettes in his skinny jeans. |
| Science Class | A disgusting creature escapes while being dissected in a science class and crawls into a cigarette pack. |
| Stay in Control | A girl gives up her freedom by signing a contract that turns into a cigarette. |
| The 7,000 | Swamp creatures turn into 7,000 toxic chemicals as a guy inhales cigarette smoke. |
| Your Skin | A girl tears off a piece of her skin to pay for a pack of cigarettes. |
| Your Teeth | A guy yanks out a tooth to pay for a pack of cigarettes. |

*Note.* These descriptions were used to assess past 30-day cued ad recall in both the Survey dataset and fMRI dataset. Survey respondents and study participants were instructed to indicate how many times in past 30 days they had seen or heard each television ad and were provided ad descriptions. Adapted from "Adolescent neural responses to anti-smoking messages, perceived effectiveness, and sharing intention," by E.C. Kranzler, R. Schmälzle, M.B. O'Donnell, R. Pei, & E.B. Falk, 2019, *Media Psychology, 22*(2), p. 333.

## Methods for fMRI Study

### fMRI Data Acquisition

All neuroimaging data were acquired using a 3 Tesla Siemens Magnetom MRI scanner equipped with a 32-channel head coil at the [Name of Center at University]. One functional run consisting of 735 volumes was acquired for each participant during exposure to the Real Cost campaign ads. Functional images were recorded using a multiband sequence (TR = 1000 ms, TE = 32 ms, flip angle = 60 deg, 56 axial slices, FOV = 208 mm, slice thickness = 2.5 mm; voxel size = 2.5 x 2.5 x 2.5 mm; Multiband Acceleration Factor = 4). We also acquired a high-resolution T1-weighted image using an MP-RAGE sequence (TR = 1850.0 ms, 160 slices, voxel size = 0.9 x 0.9 x 1.0 mm) for use in coregistration and normalization. To allow for the stabilization of the BOLD signal, the first 6 volumes of each run were immediately discarded during the scan.

### Post-Scan Questionnaire

After the fMRI scanning session, participants completed a brief web-based questionnaire to assess behavioral, normative, and efficacy beliefs about smoking, smoking intentions and behavior, and perceived effectiveness items for the 12 Real Cost ads shown in the scanner.

First, participants completed questions to assess past smoking behavior and future intentions to smoke in the next 6 months. Next, to measure behavioral beliefs about smoking, they were asked to indicate the extent to which they agree or disagree on a 4-point scale (1 = *strongly disagree*, 4 = *strongly agree*) with a series of negative and positive statements about daily smoking (e.g., negative belief: “If I smoke every day, I will get cancer,” positive belief: “If I smoke every day, I will feel relaxed”). Subsequently, to assess efficacy beliefs about smoking, participants were asked to indicate how sure they are that they can say no to smoking given a series of hypothetical situations (e.g., “You are at a party where most people smoke”) on a 5-point scale (1= *not at all sure*, 5 = *completely sure*). Lastly, participants completed 3 closed-ended questions to measure normative beliefs about smoking (e.g., How many of your four closest friends smoke cigarettes?).

In the next section of the questionnaire, participants completed perceived effectiveness items for the 12 Real Cost ads shown in the scanner. For each ad, participants were shown three screenshots of the ad and asked to indicate their level of agreement with six statements pertinent to ad effectiveness. Participants were shown each of the following statements and asked to indicate their agreement on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*): “This ad is worth remembering,” “This ad grabbed my attention,” “This ad is powerful,” “This ad is informative,” “This ad is meaningful,” “This ad is convincing,” and “This ad is terrible.” Participants completed this task in random order for all 12 ads from The Real Cost campaign.

**fMRI Data Preprocessing**

Functional data were pre-processed and analyzed using tools from the FSL and Statistical Parametric Mapping packages (SPM12, Wellcome Department of Cognitive Neurology, Institute of Neurology, London, UK) via the nipype framework (Gorgolewski et al., 2011). Data were corrected for differences in the time of slice acquisition using sinc interpolation, spatially realigned to correct for head motion, and co-registered to the structural image. Data were then normalized into the MNI space using the SPM12 normalization, which included reslicing to 2*2*2mm. Finally, the preprocessed functional images were smoothed using an 8mm Gaussian kernel.

**fMRI Data Extraction and Analyses**

We adopted a region of interest approach to examine parameter estimates of neural activity during ad exposure. Analyses were conducted using sets of a priori theory-driven regions of interest implicated in social processing and memory encoding (Figure S1). The social processing and memory encoding regions were identified using the Neurosynth database (http://neurosynth.org) using association test brain maps that correspond with the occurrence of the word "mentalizing" and the phrase "memory encoding," respectively. The masks extracted from Neurosynth were treated as binary masks for the purpose of extraction.

The fMRI data were modeled using the general linear model (GLM) as implemented in SPM8 (SPM8, Wellcome Department of Cognitive Neurology, Institute of Neurology, London, UK). At the first level, a separate regressor was defined during the viewing period (30 seconds) for each of the 12 ads, resulting in 12 ad-specific regressors for each participant. The same procedure was employed during the reimagine period (11 seconds), resulting in an additional 12 ad-specific regressors for each participant. The preparation countdown task period was captured in a single regressor. The six rigid-body translation and rotation parameters derived from spatial realignment were also included as nuisance regressors in all first-level models.

We extracted parameter estimates from these regions during the viewing period using the MarsBar toolkit from SPM (Brett, Anton, Valabregue, & Poline, 2002) and converted them to percent signal change, resulting in 12 values each for (1) social processing and (2) memory encoding regions for each participant. When calculating percent signal change, our baseline was a rest period between ad tasks, during which participants were not instructed to engage in specific cognitive tasks, given that our main comparison of interest is between ads. We also tested whether an alternative baseline measure produced significantly different neural activation values. We extracted BOLD signal change using a 3-second countdown, prior to each task, as baseline, then examined the correlation between BOLD signal change as calculated separately from each of these baseline measures (rest period versus countdown). These values were extremely highly correlated ($r = .99$, $p < .001$), suggesting that either period could be used as a baseline with similar results. Although the rest period would not be an optimal baseline for a traditional subtraction analysis, given that our goal in this study is to compare the ads to one another (similar to a parametric modulation analysis), the resting baseline is an appropriate choice. Prior to analyses, we standardized (z-scored) mean neural activity across subjects.

To account for variability across participants in the fMRI dataset, we tested whether standardizing neural activation values within participants (across ads) prior to averaging these values across participants (within ads) produced similar results. For neural response in the social processing regions, we standardized the 12 ad-specific values within each fMRI participant, then calculated the mean standardized value in the social processing regions for each ad. This resulted in 12 standardized social processing values, one for each ad. We then calculated the correlation between these standardized social processing values and the original values. We completed the same procedure with neural parameters from the memory encoding regions, then again with residualized scores from the social processing and memory encoding regions (for a total of 4 correlations). All correlations between original and standardized values were very high ($r > .93$, $p < .001$), suggesting that accounting for individual variability in neural response does not influence results. Furthermore, we conducted chi-square tests to compare regression models with (1) standardized neural response values and (2) original neural response values for both (1) social processing regions and (2) memory encoding regions. Results indicated no significant differences in model fit, suggesting that accounting for individual variability in neural response does not influence results.

**Assessment of Cued Recall in Survey and fMRI Samples**

Both survey respondents and fMRI participants completed the same cued ad recall items (see Table S1 for details). Survey respondents completed a random subset of cued recall items over the phone as part of the 20-minute phone survey, as described on pages S2-S3. FMRI participants completed cued recall items as part of a web-based survey prior to the fMRI scan, to assess baseline levels of ad recall (whether participants had previously seen any of the ads). The fMRI study took place before all of the ads studied were on the air, and hence most of the fMRI participants had not had substantial exposure to the ads (mean past 30-day recall in fMRI sample = 2.4 exposures; mean past 30-day recall in Survey sample = 4.9 exposures).

After completing the baseline survey to assess prior cued recall, the fMRI participants completed the fMRI task, during which they viewed the actual Real Cost ads in the scanner. Though it is possible that there is a conflict in outcomes due to the ads being described verbally (in the Survey dataset) versus shown visually (in the fMRI dataset), we would expect this to lead to a more conservative estimate of the relationship between neural response to ads and self-reported cued recall, and so if anything, we may underestimate the magnitude of our focal effects.

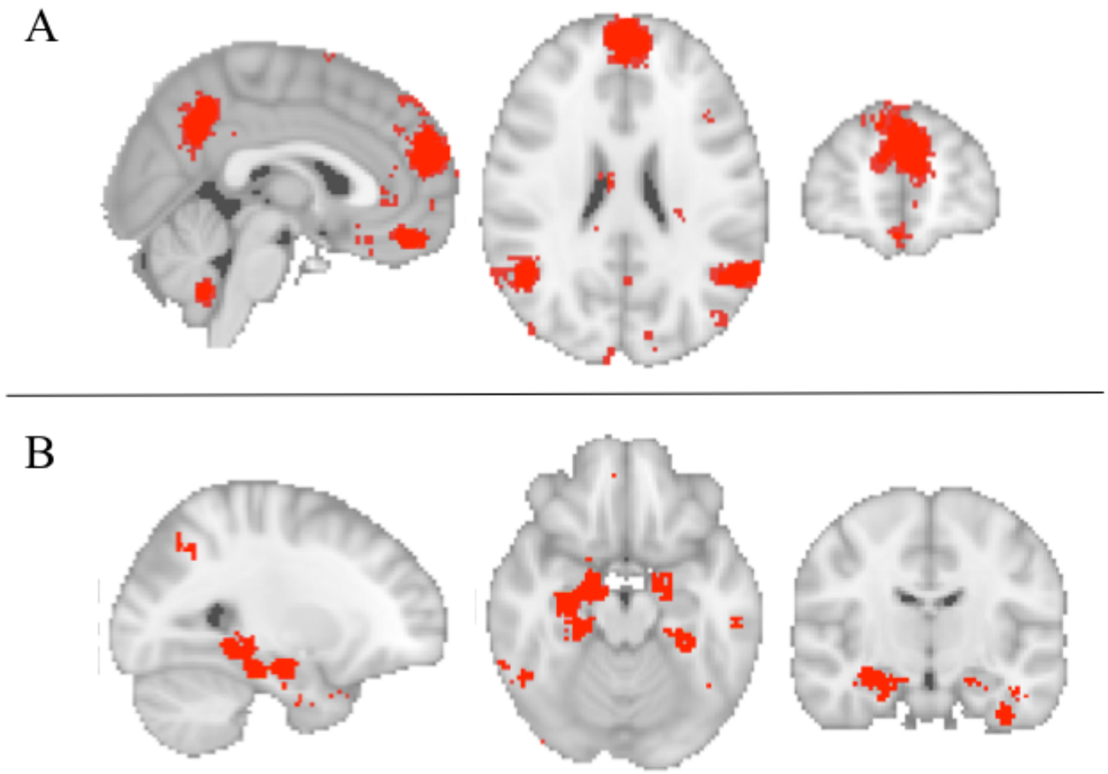



Figure S1. *Brain regions of interest.* Neural response was measured in A) social processing regions and B) memory encoding regions. These brain regions were identified using the Neurosynth database (http://neurosynth.org) using association test brain maps that correspond with the occurrence of the word “mentalizing” and the phrase “memory encoding,” respectively. The brain map for social processing regions represents 5,569 neural activation voxels across 124 studies; the brain map for memory encoding regions represents 4,313 neural activation voxels across 124 studies. Brain maps were downloaded from neurosynth.org on February 2, 2018.

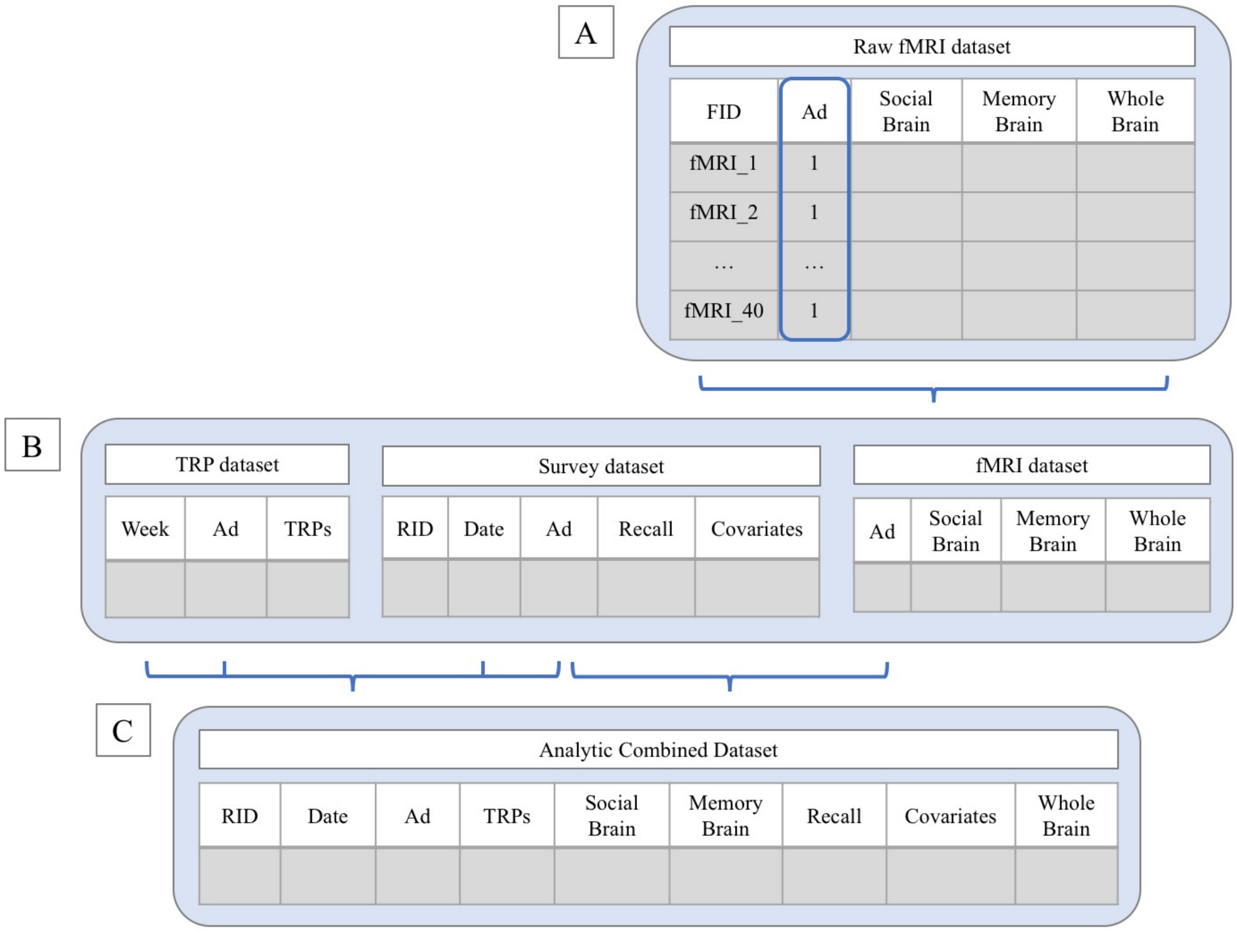



Figure S2. *Schematic of study datasets, data merging procedure, and analytic combined dataset.* (A) Prior to merging datasets, we aggregated neural response in each set of regions and the whole brain across the fMRI sample (FID = fMRI participant ID) for each ad. (B) With the Survey dataset in long form (RID = respondent ID), we merged the TRP and Survey datasets by date and ad number, such that Survey respondents were assigned aggregated TRPs, separately for each ad, on the basis of the week during which their survey interview occurred. We also merged the Survey and fMRI datasets by ad, such that Survey respondents were assigned mean neural response values in social processing regions, memory encoding regions, and the whole brain separately for each ad. (C) This procedure resulted in the Analytic Combined Dataset, which contained a separate row for each Survey respondent and cued recall item completed, their personalized exposure estimate based on the timing of TRPs, and aggregated neural parameters as measured during exposure to each ad in the fMRI sample.

We first assessed the main effect of ad-specific TRPs on cued recall (H1). We estimated a mixed-effect multilevel model, regressing past 30-day cued recall on past 8-week TRPs. To assess whether brain response in (1) social processing regions and (2) memory encoding regions during exposure to The Real Cost ads moderates the association between TRPs and cued recall (H2a and H2b), we estimated mixed-effect multilevel models, separately regressing past 30-day cued recall on the interaction between past 8-week TRPs and (1) mean neural response residuals in social processing regions, and (2) mean neural response residuals in memory encoding regions. Both models included main effects of TRPs and aggregate neural response derived from the fMRI sample for each ad, on cued recall in the national survey. Respondents and ads were treated as random effects, with random intercepts to account for non-independence of repeated measures within respondents and ads. To remove the influence of whole-brain neural response in the fMRI sample during ad exposure and reduce noise from individual-level variables in the Survey sample that may associate with cued recall, analyses controlled for whole-brain neural response and potential covariates listed in the Methods section.

Table S2

*Demographic distributions of the Survey study sample (n=5,110) and fMRI study sample (n=40)*

| | *Survey sample* | | *fMRI sample* | |
|---|---|---|---|---|
| | Frequency/Mean | Percentage/SD | Frequency/Mean | Percentage/SD |
| Age | 15.34 | 1.40 | 16.10 | 0.94 |
| 13-15 | 2,426 | 47.5 | 10 | 25.0 |
| 16-17 | 2,684 | 52.5 | 30 | 75.0 |
| Sex | | | | |
| Male | 2,670 | 52.3 | 19 | 47.5 |
| Female | 2,435 | 47.7 | 21 | 52.5 |
| Race | | | | |
| White (non-Hispanic) | 2,555 | 50.2 | 12 | 30.0 |
| Hispanic | 1,257 | 24.7 | 0 | 0.0 |
| Black or African American (non-Hispanic) | 674 | 13.2 | 13 | 32.5 |
| Other or more than one race | 603 | 11.8 | 15 | 37.5 |
| Sensation seeking | 2.42 | 0.52 | 2.93 | 0.47 |
| Parent educational attainment | | | | |
| Less than or equal to a high school degree | 1,092 | 24.6 | 17 | 42.5 |
| Some college | 688 | 15.5 | 7 | 17.5 |

| | | | | |
|---|---|---|---|---|
| College degree | 1,457 | 32.9 | 7 | 17.5 |
| Completed graduate school | 1,194 | 26.9 | 9 | 22.5 |
| Parental disapproval of smoking | 2.90 | 0.35 | -- | -- |
| Don't/wouldn't mind (1) | 77 | 1.5 | -- | -- |
| Would/disapprove a little (2) | 365 | 7.2 | -- | -- |
| Would/disapprove a lot (3) | 4,653 | 91.3 | -- | -- |
| Household cigarette use | | | | |
| No/Lives alone | 3,809 | 75.4 | 27 | 67.5 |
| Yes | 1,243 | 24.6 | 13 | 32.5 |
| Average weekly hours TV watching | 23.95 | 21.36 | -- | -- |

*Note. SD* = standard deviation. In the parental disapproval of smoking subcategories, categories are scored as follows: 1 = Don't/wouldn't mind, 2 = Would/disapprove a little, and 3 = Would/disapprove a lot. Dashes indicate variables that were not measured in the fMRI study sample.

Due to missing values in the Survey dataset, the frequency of several variables in the left column does not sum to 5,110.

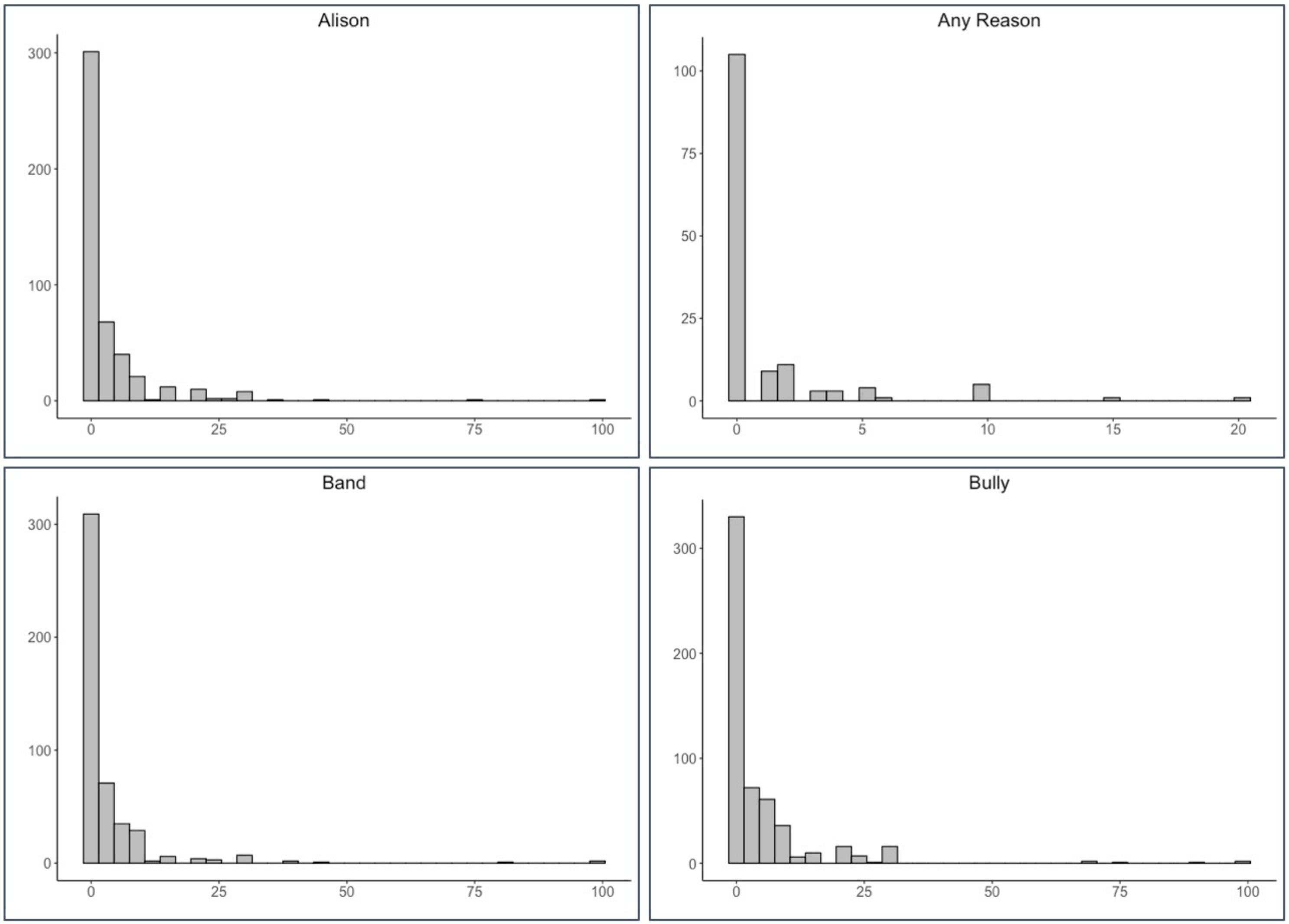
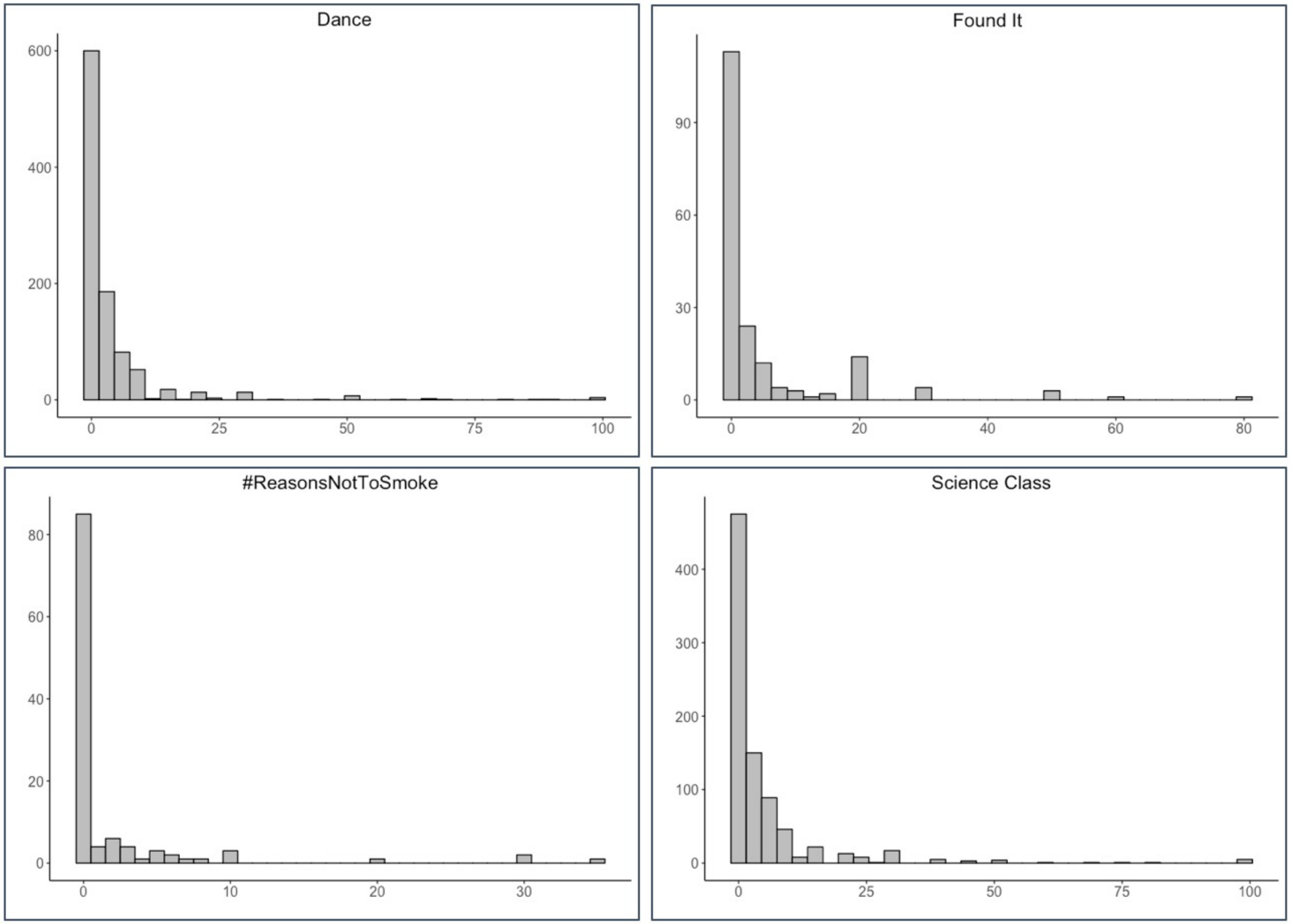



Figure S3. *Histograms of cued ad recall in the Survey dataset for each of 12 ads from The Real Cost campaign*

For each histogram, the x-axis is cued ad recall and the y-axis is the frequency of Survey respondents who reported that level of recall.

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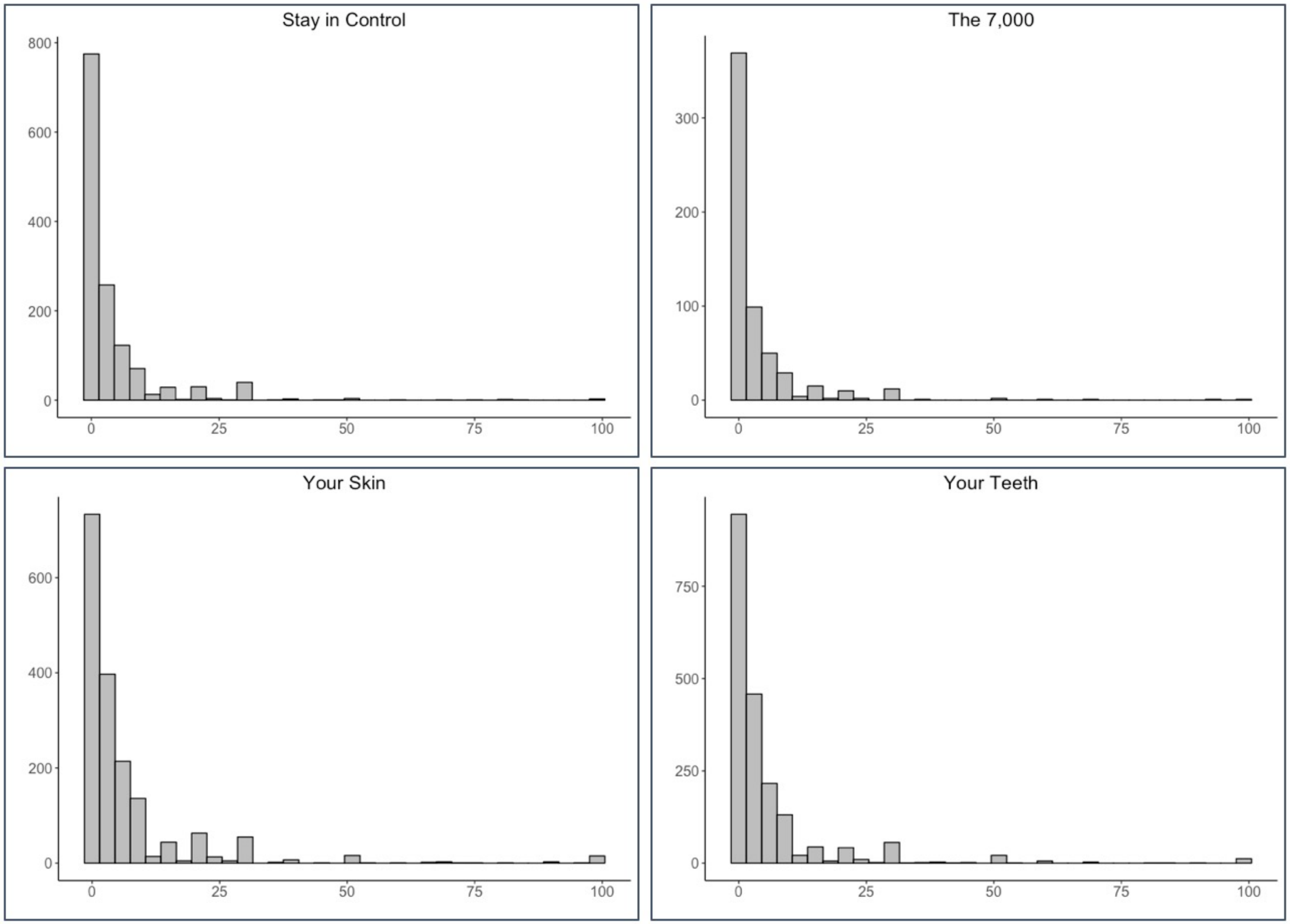


Figure S3. *Histograms of cued ad recall in the Survey dataset for each of 12 ads from The Real Cost campaign*

For each histogram, the x-axis is cued ad recall and the y-axis is the frequency of Survey respondents who reported that level of recall.

**Testing the Fit of Regression Models With FMRI-derived Regressors**

To test the fit of regression models with and without fMRI-derived regressors, we used the *anova* function in R to separately compare the main effect regression model (H1) with (1) the social processing moderation model (H2a), and (2) the memory encoding moderation model (H2b). As indicated in Table S3, results from chi-square tests indicated that models with fMRI-derived regressors are significantly better fit to the data, compared with the main effect model which excludes fMRI-derived regressors (Test 1: $\chi^2 = 21.23$, $p < .001$; Test 2: $\chi^2 = 23.22$, $p < .001$). Other fit indices (e.g., Akaike information criterion, Bayesian information criterion) provide additional evidence that the models with fMRI-derived regressors are better fit to the data, compared with the main effect regression model (see Table S3).

**Sensitivity Analyses and Robustness Checks**

In the subsequent section, we provide results from a series of sensitivity analyses and robustness checks. We first conducted sensitivity analyses to examine whether regression results differed if we used raw (un-residualized) neural activation values from the fMRI sample in lieu of residualized neural values as the moderating variable. The results from models that used residualized versus un-residualized neural activation values were substantively similar, however the predictor variables were more significantly associated with the dependent variable (cued recall) in the residualized regression models relative to the un-residualized models (see Table S4). Next, we examined whether results from regression models controlling for whole-brain neural response (excluding response in hypothesized regions) differed from parallel models that omitted this whole-brain variable. Results from the latter of these models did not differ substantively from those provided in Table 1 (see Table S5), demonstrating the robustness of results.

To assess whether TRP aggregations over longer and shorter periods differentially influence moderation results, we first aggregated weekly totals of ad-specific TRPs to 4- and 12-week measures (parallel to the procedure employed in the main methods). We then estimated a series of regression models to examine the moderating effects of neural response in (1) social processing and (2) memory encoding regions on the associations between (1) past 4-week TRPs and (2) past 12-week TRPs on cued recall (4 models in total; see Tables S6 & S7). Results from 12-week models are substantively similar to results from 8-week models, presented in the main manuscript (Table 1). These results demonstrate significant, positive effects for the interaction between past 12-week TRPs and neural response in social processing regions ($\beta$ = 0.037, $p$ < .001, 95% CI [0.019, 0.055]) and memory encoding regions ($\beta$ = 0.042, $p$ < .001, 95% CI [0.020, 0.064]) on cued recall. We interpret these results as evidence that moderation effects are robust to TRP aggregations over longer periods of time.

Results from 4-week TRP models also suggest that our models are generally robust to aggregation choices. While findings show a significant, positive effect for the interaction between past 4-week TRPs and neural response in social processing regions on cued recall ($\beta$ = 0.024, $p$ < .05, 95% CI [0.006, 0.042]), the interaction between past 4-week TRPs and neural response in memory encoding regions on cued recall, though positive, is only marginally significant ($\beta$ = 0.015, $p$ - .086, 95% CI [-0.003, 0.033]). Though all aggregated TRP variables (4-week, 8-week, and 12-week) had skewed distributions, past 4-week TRPs also contained a disproportionately large number of cases with zero values, which may have influenced these results. Additionally, self-reported of past 30-day cued recall may reflect recalled exposure over a longer period of time, a distinct possibility given that past 8- and 12-week TRPs were significant predictors of cued recall, and given prior evidence showing increasing ad effects with longer exposure (Richardson, Langley, et al., 2014; White, Durkin, Coomber, & Wakefield, 2013).

Given that TV watching is a likely predictor of exposure and is strongly correlated with cued recall in all regression models, we estimated regression models with a 3-way interaction between TRPs, ad-elicited brain response, and self-reported TV-watching behavior on cued recall, with separate models testing brain response in social processing and memory encoding regions. Results from both models demonstrated non-significant 3-way interactions, indicating that the interaction between TRPs and brain response does not vary significantly with Survey respondents' TV-watching behavior (see Table S8). Additionally, as the Survey and fMRI samples differed significantly in sensation seeking, we conducted sensitivity analyses with a matched subsample from the Survey dataset. Results from regression models demonstrated that results are robust to differences in sensation seeking between the two datasets (see Table S9).

Lastly, in the Survey sample, 13.3% of respondents had missing data for the parental education variable (*paredu*). To test whether these missing values influenced results, we employed Manski-Horowitz logical bounds (Horowitz & Manski, 2006) as follows. We created two additional *paredu* variables, one in which all missing *paredu* values were recoded to the lowest value of that variable: less than or equal to a high school degree (*paredu_low*), and one in which all missing *paredu* values were recoded to the highest value of that variable: completed graduate school (*paredu_high*). We then separately estimated social processing and memory encoding moderation models with (1) *paredu_low* and (2) *paredu_high* in lieu of the original *paredu* variable. Results demonstrated that the missingness of these items did not affect study results (see Tables S10 & S11). Given this finding, we omitted rows with missing data from analyses.

Table S3

*Results from tests comparing the fit of regression models with and without fMRI-derived regressors.*

| | | AIC | BIC | LL | deviance | $\chi^2$ | df | p |
|---|---|---|---|---|---|---|---|---|
| Test 1 | Main effect model | 20436 | 20569 | -10199 | 20398 | --- | -- | -- |
| | Social processing moderation model | 20421 | 20574 | -10188 | 20377 | 21.23*** | 3 | .000 |
| Test 2 | Main effect model | 20436 | 20569 | -10199 | 20398 | --- | -- | -- |
| | Memory encoding moderation model | 20419 | 20572 | -10188 | 20375 | 23.22*** | 3 | .000 |

*Note.* Boldface indicates statistical significance (*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$).

AIC = Akaike information criterion. BIC = Bayesian information criterion. LL = log-likelihood.

Table S4

*Results from mixed-effect multilevel regression models testing the moderating effect of mean raw (un-residualized) neural response in social processing and memory encoding regions on the association between past 8-week TRPs and past 30-day cued recall, controlling for whole-brain neural response and potential covariates*

| | Social processing brain regions | | | | Memory encoding brain regions | | | |
|---|---|---|---|---|---|---|---|---|
| | β | SE | t | p | β | SE | t | p |
| Past 8-week TRPs | **.033*** | **.013** | **2.47** | **.013** | **.027*** | **.013** | **2.13** | **.034** |
| Mean raw neural response in regions | -.053 | .046 | -1.16 | .278 | -.007 | .090 | -0.08 | .936 |
| Past 8-week TRPs*mean raw neural response in regions | **.039***** | **.011** | **3.46** | **.000** | **.043**** | **.013** | **3.24** | **.001** |
| Whole-brain neural response | .008 | .041 | 0.20 | .843 | -.026 | .085 | -0.30 | .768 |
| Age | .028 | .015 | 1.81 | .071 | .028 | .015 | 1.80 | .071 |
| Sex | **-.035*** | **.015** | **-2.43** | **.015** | **-.035*** | **.015** | **-2.43** | **.015** |
| Race (White=*Ref.*) | | | | | | | | |
| Hispanic | **.033*** | **.016** | **1.99** | **.046** | **.033*** | **.016** | **1.99** | **.047** |
| Black/African American | **.074***** | **.015** | **4.79** | **.000** | **.074***** | **.015** | **4.78** | **.000** |
| Other/multiple races | .020 | .015 | 1.31 | .189 | .020 | .015 | 1.32 | .186 |
| Sensation seeking | **.059***** | **.015** | **3.93** | **.000** | **.059***** | **.015** | **3.93** | **.000** |
| Parent disapproval | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (Would/disapprove a lot=*Ref.)* | | | | | | | | |
| Don't/wouldn't mind | -.012 | .015 | -0.80 | .424 | -.012 | .015 | -0.81 | .416 |
| Would/disapprove a little | **-.033*** | **.014** | **-2.30** | **.021** | **-.033*** | **.014** | **-2.29** | **.022** |
| Household cigarette use | **.046**** | **.015** | **3.02** | **.003** | **.045**** | **.015** | **3.01** | **.003** |
| Parental education (HS=*Ref.*) | | | | | | | | |
| Some college | -.030 | .017 | -1.71 | .087 | -.030 | .017 | -1.73 | .084 |
| College degree | -.036 | .019 | -1.88 | .061 | -.036 | .019 | -1.88 | .060 |
| Graduate degree | **-.039*** | **.019** | **-2.02** | **.043** | **-.039*** | **.019** | **-2.05** | **.041** |
| TV watching | **.098***** | **.015** | **6.73** | **.000** | **.098***** | **.015** | **6.74** | **.000** |
| Interview week | -.015 | .018 | -0.83 | .406 | -.017 | .018 | -0.98 | .330 |

*Note.* Boldface indicates statistical significance (*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$).

β = standardized coefficient. SE = standard error. *Ref.* = reference category. HS = high school degree or some high school.

Table S5

*Results from mixed-effect multilevel regression models testing the moderating effect of mean neural response in social processing and memory encoding regions on the association between past 8-week TRPs and past 30-day cued recall, controlling for potential covariates and excluding whole-brain neural response*

| | Social processing brain regions | | | | Memory encoding brain regions | | | |
|---|---|---|---|---|---|---|---|---|
| | β | SE | t | p | β | SE | t | p |
| Past 8-week TRPs | **.038**** | **.013** | **2.86** | **.004** | **.033*** | **.013** | **2.55** | **.011** |
| Mean neural response in regions | -.014 | .036 | -0.40 | .701 | -.010 | .034 | -0.30 | .771 |
| Past 8-week TRPs*mean neural response in regions | **.041***** | **.009** | **4.40** | **.000** | **.049***** | **.011** | **4.49** | **.000** |
| Age | .028 | .015 | 1.80 | .072 | .027 | .015 | 1.78 | .076 |
| Sex | **-.035*** | **.015** | **-2.43** | **.015** | **-.035*** | **.015** | **-2.44** | **.015** |
| Race (White=*Ref.*) | | | | | | | | |
| Hispanic | **.033*** | **.016** | **1.99** | **.046** | **.032*** | **.016** | **1.98** | **.048** |
| Black/African American | **.074***** | **.015** | **4.80** | **.000** | **.074***** | **.015** | **4.77** | **.000** |
| Other/multiple races | .020 | .015 | 1.31 | .191 | .020 | .015 | 1.30 | .192 |
| Sensation seeking | **.058***** | **.015** | **3.91** | **.000** | **.059***** | **.015** | **3.93** | **.000** |
| Parent disapproval | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (Would/disapprove a lot=*Ref.)* | | | | | | | | |
| Don't/wouldn't mind | -.012 | .015 | -0.79 | .429 | -.012 | .015 | -0.81 | .420 |
| Would/disapprove a little | **-.033*** | **.014** | **-2.31** | **.021** | **-.033*** | **.014** | **-2.32** | **.021** |
| Household cigarette use | **.046**** | **.015** | **3.04** | **.002** | **.046**** | **.015** | **3.03** | **.002** |
| Parental education (HS=*Ref.*) | | | | | | | | |
| Some college | -.030 | .017 | -1.70 | .090 | -.030 | .017 | -1.70 | .089 |
| College degree | -.035 | .019 | -1.86 | .063 | -.036 | .019 | -1.87 | .062 |
| Graduate degree | **-.038*** | **.019** | **-2.01** | **.045** | **-.039*** | **.019** | **-2.04** | **.041** |
| TV watching | **.098***** | **.015** | **6.76** | **.000** | **.099***** | **.015** | **6.78** | **.000** |
| Interview week | -.004 | .018 | -0.24 | .809 | -.006 | .018 | -0.32 | .746 |

*Note.* Boldface indicates statistical significance (*$p$ < 0.05, **$p$ < 0.01, ***$p$ < 0.001).

β = standardized coefficient. SE = standard error. *Ref.* = reference category. HS = high school degree or some high school.

Table S6

*Results from mixed-effect multilevel regression models testing the moderating effect of mean neural response in social processing and memory encoding regions on the association between past 4-week TRPs and past 30-day cued recall, controlling for whole-brain neural response and potential covariates*

| | Social processing brain regions | | | | Memory encoding brain regions | | | |
|---|---|---|---|---|---|---|---|---|
| | β | SE | t | p | β | SE | t | p |
| Past 4-week TRPs | .000 | .011 | 0.04 | .966 | -.003 | .011 | -0.27 | .787 |
| Mean raw neural response in regions | .001 | .042 | 0.03 | .974 | .042 | .046 | 0.93 | .382 |
| Past 4-week TRPs*mean raw neural response in regions | **.024*** | **.009** | **2.57** | **.010** | .015 | .009 | 1.72 | .086 |
| Whole-brain neural response | -.036 | .035 | -1.04 | .325 | -.060 | .039 | -1.56 | .155 |
| Age | .027 | .015 | 1.79 | .074 | .028 | .015 | 1.80 | .073 |
| Sex | **-.035*** | **.015** | **-2.41** | **.016** | **-.035*** | **.015** | **-2.41** | **.016** |
| Race (White=*Ref.*) | | | | | | | | |
| Hispanic | **.033*** | **.016** | **2.02** | **.044** | **.033*** | **.016** | **2.00** | **.045** |
| Black/African American | **.074****** | **.015** | **4.78** | **.000** | **.074****** | **.015** | **4.77** | **.000** |
| Other/multiple races | .020 | .015 | 1.31 | .191 | .020 | .015 | 1.31 | .190 |
| Sensation seeking | **.059****** | **.015** | **3.95** | **.000** | **.059****** | **.015** | **3.96** | **.000** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parent disapproval | | | | | | | | |
| (Would/disapprove a lot=*Ref.*) | | | | | | | | |
| Don't/wouldn't mind | -.013 | .015 | -0.84 | .401 | -.012 | .015 | -0.83 | .408 |
| Would/disapprove a little | **-.034*** | **.014** | **-2.32** | **.020** | **-.034*** | **.014** | **-2.32** | **.020** |
| Household cigarette use | **.045**** | **.015** | **3.00** | **.003** | **.045**** | **.015** | **2.99** | **.003** |
| Parental education (HS=*Ref.*) | | | | | | | | |
| Some college | -.031 | .017 | -1.75 | .080 | -.030 | .017 | -1.75 | .081 |
| College degree | -.036 | .019 | -1.89 | .059 | -.036 | .019 | -1.89 | .059 |
| Graduate degree | **-.039*** | **.019** | **-2.05** | **.040** | **-.039*** | **.019** | **-2.07** | **.039** |
| TV watching | **.099***** | **.015** | **6.80** | **.000** | **.098***** | **.015** | **6.78** | **.000** |
| Interview week | -.028 | .017 | -1.67 | .094 | -.027 | .017 | -1.62 | .106 |

*Note.* Boldface indicates statistical significance (*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$).

β = standardized coefficient. SE = standard error. *Ref.* = reference category. HS = high school degree or some high school.

Neural response residuals were estimated with models that controlled for fMRI participants' past 8-week TRPs, prior ad recall, and days since each ad was first aired. We tested whether controlling for past 4- or 12-week TRPs in these residual models influenced study results. As results did not differ substantively, we report results using residuals from models that controlled for fMRI participants' past 8-week TRPs.

Table S7

*Results from mixed-effect multilevel regression models testing the moderating effect of mean neural response in social processing and memory encoding regions on the association between past 12-week TRPs and past 30-day cued recall, controlling for whole-brain neural response and potential covariates*

| | Social processing brain regions | | | | Memory encoding brain regions | | | |
|---|---|---|---|---|---|---|---|---|
| | β | SE | t | p | β | SE | t | p |
| Past 12-week TRPs | **.037**** | **.013** | **2.80** | **.005** | **.035**** | **.013** | **2.64** | **.008** |
| Mean neural response in regions | .008 | .040 | 0.21 | .841 | .039 | .042 | 0.93 | .380 |
| Past 12-week TRPs*mean neural response in regions | **.037***** | **.009** | **4.04** | **.000** | **.042***** | **.011** | **3.70** | **.000** |
| Whole-brain neural response | -.037 | .033 | -1.13 | .287 | -.059 | .036 | -1.65 | .133 |
| Age | .028 | .015 | 1.83 | .067 | .028 | .015 | 1.82 | .069 |
| Sex | **-.036*** | **.015** | **-2.44** | **.015** | **-.035*** | **.015** | **-2.43** | **.015** |
| Race (White=*Ref.*) | | | | | | | | |
| Hispanic | **.032*** | **.016** | **1.98** | **.047** | **.032*** | **.016** | **1.97** | **.049** |
| Black/African American | **.075***** | **.015** | **4.82** | **.000** | **.074***** | **.015** | **4.79** | **.000** |
| Other/multiple races | .020 | .015 | 1.30 | .193 | .020 | .015 | 1.31 | .189 |
| Sensation seeking | **.058***** | **.015** | **3.89** | **.000** | **.058***** | **.015** | **3.90** | **.000** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parent disapproval | | | | | | | | |
| (Would/disapprove a lot=*Ref.)* | | | | | | | | |
| Don't/wouldn't mind | -.011 | .015 | -0.76 | .447 | -.011 | .015 | -0.77 | .443 |
| Would/disapprove a little | **-.033*** | **.014** | **-2.30** | **.022** | **-.033*** | **.014** | **-2.31** | **.021** |
| Household cigarette use | **.046**** | **.015** | **3.02** | **.003** | **.046**** | **.015** | **3.02** | **.003** |
| Parental education (HS=*Ref.*) | | | | | | | | |
| Some college | -.030 | .017 | -1.71 | .087 | -.030 | .017 | -1.72 | .085 |
| College degree | -.036 | .019 | -1.88 | .061 | -.036 | .019 | -1.89 | .059 |
| Graduate degree | **-.039*** | **.019** | **-2.02** | **.043** | **-.039*** | **.019** | **-2.05** | **.040** |
| TV watching | **.099***** | **.015** | **6.78** | **.000** | **.099***** | **.015** | **6.78** | **.000** |
| Interview week | -.003 | .018 | -0.17 | .862 | -.001 | .018 | -0.08 | .934 |

*Note.* Boldface indicates statistical significance (**p* < 0.05, ***p* < 0.01, ****p* < 0.001).

β = standardized coefficient. SE = standard error. *Ref.* = reference category. HS = high school degree or some high school.

Neural response residuals were estimated with models that controlled for fMRI participants' past 8-week TRPs, prior ad recall, and days since each ad was first aired. We tested whether controlling for past 4- or 12-week TRPs in these residual models influenced study results. As results did not differ substantively, we report results using residuals from models that controlled for fMRI participants' past 8-week TRPs.

Table S8

*Results from mixed-effect multilevel regression models testing a 3-way interaction between past 8-week TRPs, mean neural response in social processing or memory encoding regions, and self-reported TV-watching behavior on past 30-day cued recall, controlling for whole-brain neural response (excluding regions of interest) and potential covariates*

| | Social processing brain regions | | | | Memory encoding brain regions | | | |
|---|---|---|---|---|---|---|---|---|
| | β | SE | t | p | β | SE | t | p |
| Past 8-week TRPs | **.038**** | **.013** | **2.88** | **.004** | **.033*** | **.013** | **2.57** | **.010** |
| Mean neural response in regions | .007 | .040 | 0.19 | .857 | .038 | .042 | 0.90 | .392 |
| TV watching | **.099***** | **.015** | **6.72** | **.000** | **.102***** | **.015** | **6.91** | **.000** |
| Past 8-week TRPs*mean neural response in regions | **.041***** | **.009** | **4.43** | **.000** | **.050***** | **.011** | **4.50** | **.000** |
| Past 8-week TRPs*TV watching | .008 | .011 | 0.67 | .505 | .010 | .011 | 0.89 | .375 |
| Mean neural response in regions* TV watching | .004 | .009 | 0.46 | .643 | .009 | .009 | 1.01 | .310 |
| Past 8-week TRPs*mean neural response in regions*TV watching | .002 | .010 | 0.18 | .854 | .012 | .010 | 1.19 | .233 |
| Whole-brain neural response | -.039 | .033 | -1.17 | .268 | -.061 | .036 | -1.70 | .125 |
| Age | .028 | .015 | 1.80 | .072 | .027 | .015 | 1.79 | .074 |
| Sex | **-.035*** | **.015** | **-2.43** | **.015** | **-.035*** | **.015** | **-2.43** | **.015** |
| Race (White=*Ref.*) | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Hispanic | **.033*** | **.016** | **1.99** | **.047** | **.032*** | **.016** | **1.96** | **.050** |
| Black/African American | **.074***** | **.015** | **4.79** | **.000** | **.073***** | **.015** | **4.73** | **.000** |
| Other/multiple races | .020 | .015 | 1.30 | .193 | .019 | .015 | 1.28 | .199 |
| Sensation seeking | **.058***** | **.015** | **3.90** | **.000** | **.059***** | **.015** | **3.93** | **.000** |
| Parent disapproval | | | | | | | | |
| (Would/disapprove a lot=*Ref.)* | | | | | | | | |
| Don't/wouldn't mind | -.012 | .015 | -0.78 | .435 | -.012 | .015 | -0.79 | .430 |
| Would/disapprove a little | **-.033*** | **.014** | **-2.30** | **.021** | **-.034*** | **.014** | **-2.32** | **.020** |
| Household cigarette use | **.046**** | **.015** | **3.04** | **.002** | **.046**** | **.015** | **3.03** | **.003** |
| Parental education (HS=*Ref.*) | | | | | | | | |
| Some college | -.030 | .017 | -1.70 | .090 | -.030 | .017 | -1.70 | .090 |
| College degree | -.035 | .019 | -1.85 | .064 | -.036 | .019 | -1.87 | .062 |
| Graduate degree | **-.038*** | **.019** | **-2.00** | **.045** | **-.039*** | **.019** | **-2.03** | **.042** |
| Interview week | -.003 | .018 | -0.16 | .870 | -.004 | .018 | -0.20 | .843 |

*Note.* Boldface indicates statistical significance (**p* < 0.05, ***p* < 0.01, ****p* < 0.001).

β = standardized coefficient. SE = standard error. *Ref.* = reference category. HS = high school degree or some high school.

Table S9

*Results from mixed-effect multilevel regression models testing the moderating effect of mean neural response in social processing and memory encoding regions on the association between past 8-week TRPs and past 30-day cued recall in a high-sensation seeking subset of the Survey dataset, controlling for whole-brain neural response and potential covariates*

| | Social processing brain regions | | | | Memory encoding brain regions | | | |
|---|---|---|---|---|---|---|---|---|
| | β | SE | t | p | β | SE | t | p |
| Past 8-week TRPs | **.041*** | **.017** | **2.38** | **.018** | **.034*** | **.017** | **2.05** | **.041** |
| Mean neural response in regions | .015 | .043 | 0.36 | .727 | .047 | .045 | 1.05 | .324 |
| Past 8-week TRPs*mean neural response in regions | **.040***** | **.012** | **3.37** | **.000** | **.043**** | **.014** | **3.10** | **.002** |
| Whole-brain neural response | -.041 | .036 | -1.14 | .281 | -.064 | .039 | -1.65 | .130 |
| Age | .025 | .020 | 1.22 | .224 | .025 | .020 | 1.20 | .229 |
| Sex | -.031 | .020 | -1.59 | .112 | -.031 | .020 | -1.61 | .108 |
| Race (White=*Ref.*) | | | | | | | | |
| Hispanic | .007 | .022 | 0.31 | .756 | .007 | .022 | 0.30 | .762 |
| Black/African American | **.070***** | **.021** | **3.39** | **.000** | **.070***** | **.021** | **3.38** | **.000** |
| Other/multiple races | .012 | .020 | 0.58 | .566 | .012 | .020 | 0.58 | .562 |
| Sensation seeking | .036 | .019 | 1.89 | .059 | .037 | .019 | 1.91 | .056 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parent disapproval | | | | | | | | |
| (Would/disapprove a lot=*Ref.*) | | | | | | | | |
| Don't/wouldn't mind | -.013 | .020 | -0.66 | .509 | -.013 | .020 | -0.67 | .501 |
| Would/disapprove a little | -.037 | .019 | -1.93 | .053 | -.037 | .019 | -1.94 | .053 |
| Household cigarette use | **.062**** | **.020** | **3.09** | **.002** | **.062**** | **.020** | **3.09** | **.002** |
| Parental education (HS=*Ref.*) | | | | | | | | |
| Some college | -.044 | .023 | -1.93 | .053 | -.045 | .023 | -1.95 | .051 |
| College degree | **-.057*** | **.025** | **-2.28** | **.023** | **-.058*** | **.025** | **-2.32** | **.021** |
| Graduate degree | **-.064**** | **.025** | **-2.59** | **.010** | **-.065**** | **.025** | **-2.64** | **.008** |
| TV watching | **.091***** | **.019** | **4.73** | **.000** | **.091***** | **.019** | **4.74** | **.000** |
| Interview week | -.003 | .024 | -0.14 | .891 | -.004 | .024 | -0.18 | .857 |

*Note.* Boldface indicates statistical significance (*$p$ < 0.05, **$p$ < 0.01, ***$p$ < 0.001).

β = standardized coefficient. SE = standard error. *Ref.* = reference category. HS = high school degree or some high school.

Table S10

*Results from mixed-effect multilevel regression models testing the moderating effect of mean neural response in social processing and memory encoding regions on the association between past 8-week TRPs and past 30-day cued recall, controlling for whole-brain neural response and potential covariates, with lower Manski-Horowitz logical bounds in place of missing parental education data*

| | Social processing brain regions | | | | Memory encoding brain regions | | | |
|---|---|---|---|---|---|---|---|---|
| | β | SE | t | p | β | SE | t | p |
| Past 8-week TRPs | **.043*** ** | **.012** | **3.52** | **.000** | **.039** ** | **.012** | **3.25** | **.001** |
| Mean neural response in regions | .008 | .039 | 0.21 | .836 | .031 | .042 | 0.73 | .488 |
| Past 8-week TRPs*mean neural response in regions | **.042*** ** | **.009** | **4.92** | **.000** | **.052*** ** | **.010** | **5.14** | **.000** |
| Whole-brain neural response | -.039 | .032 | -1.21 | .257 | -.056 | .036 | -1.58 | .148 |
| Age | .027 | .014 | 1.94 | .053 | .026 | .014 | 1.89 | .058 |
| Sex | **-.030* ** | **.013** | **-2.22** | **.027** | **-.030* ** | **.013** | **-2.23** | **.026** |
| Race (White=*Ref.*) | | | | | | | | |
| Hispanic | **.038** ** | **.015** | **2.60** | **.009** | **.038* ** | **.015** | **2.57** | **.010** |
| Black/African American | **.069*** ** | **.014** | **4.86** | **.000** | **.068*** ** | **.014** | **4.84** | **.000** |
| Other/multiple races | .017 | .014 | 1.25 | .213 | .017 | .014 | 1.24 | .215 |
| Sensation seeking | **.057*** ** | **.014** | **4.14** | **.000** | **.057*** ** | **.014** | **4.17** | **.000** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parent disapproval | | | | | | | | |
| (Would/disapprove a lot=*Ref.*) | | | | | | | | |
| Don't/wouldn't mind | -.014 | .014 | -1.01 | .313 | -.014 | .014 | -1.04 | .299 |
| Would/disapprove a little | **-.028*** | **.013** | **-2.05** | **.040** | **-.028*** | **.013** | **-2.06** | **.040** |
| Household cigarette use | **.049***** | **.014** | **3.61** | **.000** | **.049***** | **.014** | **3.60** | **.000** |
| Parental education (HS=*Ref.*) | | | | | | | | |
| Some college | -.011 | .015 | -0.72 | .469 | -.011 | .015 | -0.72 | .469 |
| College degree | -.012 | .016 | -0.73 | .464 | -.012 | .016 | -0.74 | .460 |
| Graduate degree | -.015 | .016 | -0.96 | .339 | -.016 | .016 | -1.00 | .318 |
| TV watching | **.095***** | **.013** | **7.16** | **.000** | **.095***** | **.013** | **7.19** | **.000** |
| Interview week | .000 | .016 | 0.01 | .991 | -.000 | .016 | 0.00 | .998 |

*Note.* Boldface indicates statistical significance (*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$).

β = standardized coefficient. SE = standard error. *Ref.* = reference category. HS = high school degree or some high school.

To test whether missing parental education attainment values influenced our main regression results, we employed Manski-Horowitz logical bounds (Horowitz & Manski, 2006), replacing the missing values for parental education attainment with the lowest value of that variable (less than or equal to a high school degree).

Table S11

*Results from mixed-effect multilevel regression models testing the moderating effect of mean neural response in social processing and memory encoding regions on the association between past 8-week TRPs and past 30-day cued recall, controlling for whole-brain neural response and potential covariates, with higher Manski-Horowitz logical bounds in place of missing parental education data*

| | Social processing brain regions | | | | Memory encoding brain regions | | | |
|---|---|---|---|---|---|---|---|---|
| | β | SE | t | p | β | SE | t | p |
| Past 8-week TRPs | **.043*** ** | **.012** | **3.51** | **.000** | **.038** ** | **.012** | **3.25** | **.001** |
| Mean neural response in regions | .009 | .039 | 0.22 | .832 | .031 | .042 | 0.73 | .486 |
| Past 8-week TRPs*mean neural response in regions | **.042*** ** | **.009** | **4.90** | **.000** | **.052*** ** | **.010** | **5.13** | **.000** |
| Whole-brain neural response | -.039 | .032 | -1.21 | .254 | -.056 | .036 | -1.59 | .146 |
| Age | .021 | .014 | 1.55 | .122 | .021 | .014 | 1.50 | .134 |
| Sex | **-.029* ** | **.013** | **-2.16** | **.031** | **-.029* ** | **.013** | **-2.17** | **.030** |
| Race (White=*Ref.*) | | | | | | | | |
| Hispanic | **.032* ** | **.015** | **2.22** | **.027** | **.032* ** | **.015** | **2.20** | **.028** |
| Black/African American | **.068*** ** | **.014** | **4.80** | **.000** | **.068*** ** | **.014** | **4.78** | **.000** |
| Other/multiple races | .017 | .014 | 1.20 | .230 | .017 | .014 | 1.20 | .232 |
| Sensation seeking | **.056*** ** | **.014** | **4.08** | **.000** | **.056*** ** | **.014** | **4.11** | **.000** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parent disapproval | | | | | | | | |
| (Would/disapprove a lot=*Ref.*) | | | | | | | | |
| Don't/wouldn't mind | -.014 | .014 | -0.99 | .320 | -.014 | .014 | -1.03 | .305 |
| Would/disapprove a little | **-.028*** | **.013** | **-2.05** | **.040** | **-.028*** | **.013** | **-2.06** | **.040** |
| Household cigarette use | **.047***** | **.014** | **3.48** | **.000** | **.047***** | **.014** | **3.47** | **.000** |
| Parental education (HS=*Ref.*) | | | | | | | | |
| Some college | -.028 | .016 | -1.73 | .085 | -.028 | .016 | -1.73 | .084 |
| College degree | -.035 | .018 | -1.96 | .050 | **-.035*** | **.018** | **-1.97** | **.049** |
| Graduate degree | **-.050**** | **.018** | **-2.71** | **.007** | **-.050**** | **.018** | **-2.74** | **.006** |
| TV watching | **.094***** | **.013** | **7.12** | **.000** | **.094***** | **.013** | **7.14** | **.000** |
| Interview week | -.000 | .016 | -0.02 | .988 | -.000 | .016 | -0.03 | .977 |

*Note.* Boldface indicates statistical significance (*$p$ < 0.05, **$p$ < 0.01, ***$p$ < 0.001).

β = standardized coefficient. SE = standard error. *Ref.* = reference category. HS = high school degree or some high school.

To test whether missing parental education attainment values influenced our main regression results, we employed Manski-Horowitz logical bounds (Horowitz & Manski, 2006), replacing the missing values for parental education attainment with the highest value of that variable (completed graduate school).

**Relevant Publications**

Below is a list of publications featuring analyses conducted with data from the current study:

Kranzler, E. C., Schmälzle, R., O'Donnell, M. B., Pei, R., & Falk, E. B. (2019). Adolescent neural responses to antismoking messages, perceived effectiveness, and sharing intention. Media Psychology, 22:2, 323-349. https://doi.org/10.1080/15213269.2018.1476158

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