Do different styles of antismoking ads influence the types of smokers who call quitlines?

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Abstract
This study examined the relationship between television antismoking advertisements and the proportion of smokers who call a smokers’ quitline who are ready to quit or have high confidence in quitting. The primary data of interest came from completed intake interviews of smokers. Using a generalized linear model, we modeled the proportion of Quitline callers who are ready to quit and/or have high confidence in quitting. The primary explanatory variable was monthly target audience rating points (TARPs) for antismoking advertisements, a measure of broadcast media exposure, obtained from the state’s media buyer. The proportions of callers ready to quit and with high confidence in quitting were negatively associated with total TARPs. This result, over all ad types, was driven by why to quit—graphic ads. These results suggest that why to quit—graphic ads influence smokers who are less ready to quit or have lower confidence they can quit, likely new quitters, to call the Quitline.

Introduction
The task force on Community Preventive Services found that quitlines are effective in promoting cessation among callers [1]. Numerous studies have found that broadcast media increases calls to quitlines [2–9]. Other analyses have provided further insight into the relationship between media and call volume, examining how ad type influences quitline call volume. In one study, graphic ads or ads that combine strong negative emotions with graphic images were associated with increased call volume to quitlines, whereas ads containing only strong negative emotional appeals were associated with decreased call volume [10]. A study examining the cost-effectiveness of advertisements found that messages about the dangers of secondhand smoke (SHS) were less effective as measured by cost per quitline call than ads featuring testimonials by smokers or family members, ads detailing reasons to quit smoking and ads offering guidance on how to quit [7]. Another study analyzed the impact of ads on quitline call volume in Australia and found that compared to lower emotion and non-narrative ads, highly emotional narrative ads had the greatest impact on increased call volume among lower socioeconomic status groups and also were effective in driving calls from high socioeconomic groups [11]. Currently, little is known about how different types of ads, specifically differences in content and stylistic characteristics, influence the types of smokers who call quitlines. A few studies have examined reactions to smoking cessation ads by stage of change or readiness to quit. In one study, pre-contemplators (less ready to quit) were found to be more responsive to ads depicting the negative health consequences of smoking (why to quit—graphic ads), whereas contemplators and those in the preparation stage were more responsive to ads that focused on the benefits of smoking [12]. Another study found differences in response to different ad types by level of readiness to quit [13]. Smokers less ready to quit were more responsive to graphic ads...
coupled with information on how to quit (high-efficacy ads), whereas smokers ready to quit were more responsive to how to quit type ads (high efficacy). For a thorough review of the relationship between mass media campaigns and smoking cessation, see Durkin et al. [14].

The needs of smokers who call quitlines depend to some extent on their readiness to quit. Quitlines assess a caller’s readiness to quit so they can tailor services to the caller. Given the importance of advertising campaigns in promoting calls to quitlines, it is important to identify whether and how different types of ads induce different types of smokers to call quitlines. For instance, some ad types may increase calls from smokers as a whole, whereas other types may specifically increase calls from smokers ready to quit or smokers with high confidence in quitting.

To assess these possible relationships, we examined changes in the proportion of smokers who call the New York State Smokers’ Quitline (Quitline) who are either assessed as ready to quit or have high confidence in quitting, as a function of broadcast levels of antismoking advertising by different dimensions (e.g. ad type and ad characteristics).

Methods

Data
Quitline data for the current analysis came from completed intake interviews of smokers who spoke to a Quitline specialist. In operation since 2000, the Quitline offers eligible callers free telephone counseling, motivational messages and tips, nicotine replacement therapy, self-help materials and an informational Web site (Quitsite). Both the Quitline and Quitsite are available 24 hours per day, 7 days per week. Quitline callers may be smokers calling on their own behalf, the friend or relative of a smoker, a health care provider or others. Smokers can choose to speak to a Quitline specialist, listen to prerecorded messages and/or request information to be sent to their home. Smokers who choose to speak to a Quitline specialist are assessed on a number of dimensions. Information collected includes caller demographics, Quitline services received, smoking history and the specialist’s assessment of the smoker’s readiness to quit. We examined data on smokers who completed an intake interview between January 2006 and May 2009. Smokers who registered through the Quitsite were excluded from the analysis because measures of their characteristics and smoking behavior were not collected.

Monthly data on target audience rating points (TARPs) were obtained for each of the 10 media markets in New York State from the state’s media buyer. TARPs provide a measure of broadcast media exposure to quitline advertising and are defined as the product of the percentage of the audience reached for a given advertisement’s airing and the frequency of airings. For instance, if 20% of the population was exposed to a commercial five times, total TARPs for the advertisement would equal 100. The advertisements were purchased by either the New York State Department of Health or the New York City Department of Health and Mental Hygiene.

Measures
The main outcomes considered were characteristics of callers to the Quitline. Specifically, we examined whether a smoker who calls the Quitline (i) is ready to quit and (ii) reports high confidence in quitting. We created a dichotomized indicator for readiness to quit based on responses to two questions: (i) Have you ever tried to quit before? and (ii) Do you plan to stop smoking in the next 2 weeks? Callers were coded as ‘ready to quit’ if they reported having ever attempted to quit smoking and their intention to quit in the next 2 weeks. High confidence in quitting is a dichotomized measure based on a caller’s response to the following question: On a scale of 1 to 10, with 1 being not at all confident and 10 being extremely confident, how confident are you that you will not be smoking a year from now? Callers reporting their confidence as 8 or higher were coded as having ‘high’ (1) confidence in quitting, whereas callers reporting anything from 0 to 7 were coded as having ‘low’ (0) confidence in quitting. Of specific interest is the proportion of Quitline callers
with these attributes. These proportional measures were created at the monthly level by summing the dichotomized values of the outcomes and dividing this sum by the number of callers completing an intake interview in that given month.

Our measure of readiness to quit is based on the readiness to quit construct defined in the stages of change model of cessation [15]. The stages of change model have been proposed to explain the smoking cessation process. According to this model, behavior change occurs in a sequence of five steps: pre-contemplation, contemplation, preparation, action and maintenance. Those in the action and maintenance stages have by definition quit already, so current smokers can only fall into the first three stages. Those in the preparation stage plan to quit in the next 30 days and have tried to quit within the past year. Pre-contemplators are those who do not intend to quit within the next 6 months, and contemplators are those who plan to quit in the next 6 months but not the next 30 days. Thus, our measure of readiness is meant to distinguish between those who are preparing to quit and those who have not yet reached this stage of readiness. Unfortunately, in our data, we do not have these exact items, so we use the following items to measure readiness to quit: ever attempted to quit and plans to quit in the next 2 weeks. Although these variables are related (in our data, we estimated a tetrachoric correlation between the two of 0.64), they appear to measure different aspects of the cessation process. In our data, we found that our measures of readiness to quit and confidence in quitting were predictive of future quit success (results available from authors upon request). In addition, readiness to quit was associated with 24-hour point prevalence, whereas high confidence in quitting was most strongly related to 7-day point prevalence. These results further demonstrate the differences in these outcomes.

Copies of all 57 advertisements aired between January 2006 and May 2009 were obtained from the New York Tobacco Control Program. Advertisements were then characterized by the purpose of the ad. Some advertisements promote cessation, some focus on the health effects of SHS and others cover the tobacco industry’s manipulative marketing practices. These form the primary categories of advertisement type used in our analyses: cessation, SHS and anti-industry.

Ads were coded for content following methodology detailed by Niederdeppe et al. [16] and Davis et al. [17]. Four broad message themes have typically been used in cessation-focused media campaigns [16]: why to quit, how to quit, SHS and anti-industry. Messages about the health effects of smoking using graphic images were coded as cessation ‘why to quit—graphic images’. Ads utilizing personal testimonials to evoke strong negative emotions were coded as ‘why to quit—testimonial’ ads. Practical messages offering advice about the quitting process were coded as ‘how to quit’. Other cessation-focused ads highlighting the dangers of smoking during pregnancy or questioning the social acceptability of smoking were grouped as ‘other cessation’ ads. Ads centered on the health effects of SHS were categorized as ‘SHS’, whereas ads describing the tobacco industry’s deceptive marketing practices were categorized as ‘anti-industry’ ads.

In a previous study using these coded data, inter-coder agreement was found to be reliable [17]. For instance, a personal testimonial from someone who has directly or indirectly suffered as a result of smoking (e.g. loss of normal bodily functioning or loss of a loved one) would indicate the presence of strong negative emotions. Intense or graphic imagery could include the depiction of diseased organs juxtaposed with information about the health consequences of smoking. Based on this information, advertisements were categorized into six groups: (i) why to quit—graphic (e.g. Australia’s ‘Every Cigarette Does You Damage’ campaign; http://apps.nccd.cdc.gov/MCRC/Apps/ExploreCampaignDetails.aspx?CampaignID=66&Mode=EC. Accessed: 2 July 2012), (ii) why to quit—testimonial (e.g. the ‘Rick Stoddard’ series; http://apps.nccd.cdc.gov/MCRC/Apps/ExploreCampaignDetails.aspx?CampaignID=27&Mode=EC. Accessed: 2 July 2012), (iii) how to quit (e.g. American Legacy’s ‘EX—Re-learn Life Without Cigarettes’ campaign; http://apps.nccd.cdc.gov/MCRC/Apps/ExploreCampaignDetails.aspx?CampaignID=136.
Accessed: 2 July 2012), (iv) other cessation (e.g. teen prevention, social acceptability, pregnancy and smoking related ads), (v) anti-industry (e.g. Massachusetts Department of Health’s ‘Vacuum Cleaner’; http://apps.nccd.cdc.gov/MCRC/Apps/SearchDetails.aspx?CatalogID=68&IFS=9516. Accessed 2 July 2012) and (vi) SHS (e.g. Massachusetts Department of Health’s ‘Careful George’; http://apps.nccd.cdc.gov/MCRC/Apps/SearchDetails.aspx?CatalogID=812&IFS=20250. Accessed: 2 July 2012).

The model
Using a generalized linear model, we modeled the changes in the proportion of Quitline callers with the caller characteristics defined in the ‘Measures’ section. The results of this model represent the change in the mix of individuals with either of the characteristics of interest completing intake interviews and not absolute increases or decreases in these types of callers. The main outcomes are the proportion of callers ‘ready to quit’ and the proportion of callers with ‘high’ confidence in quitting. Each model used a different measure of monthly TARPs as the primary independent variable: (i) TARPs overall and (ii) TARPs by type of ad (why to quit—graphic, why to quit—testimonial, how to quit, other cessation, anti-industry and SHS). All models include fixed effects for calendar month and media market to control for any seasonal trends or regional differences.

Descriptive statistics
Figure 1 illustrates the generally upward trend in total call volume over time. Total quarterly call volume has fluctuated from a low of 30,000 in Q2 2007 to a high of 95,802 in Q2 2008. The number of adult New York smokers completing intake interviews over the entire study period was 193,449 smokers, peaking in Q1 2009 at 21,060. In a typical quarter, 26% of total calls resulted in completed intake interviews. This percentage ranged from a low of 16% in Q2 2009 to a high of 32% in Q3 2006.

Figure 2 illustrates the changing composition of total TARPs over time. Generally, cessation advertisements make up the largest portion of total TARPs and in multiple instances account for the entirety of TARPs in a given quarter. On average, why to quit—testimonial ads made up the largest portion of TARPs (37.5%), followed by why to quit—graphic ads (21.3%) and SHS ads (17.1%). In the aggregate, why to quit—graphic ads made up the most TARPs (2826.8), followed by SHS ads (2800.7) and why to quit—testimonial (2662.7).

Average call volume by exposure
All types of advertisements with the exception of ‘other’ cessation ads were associated with increased call volume during the months in which they were aired in comparison to months when advertisements were off air (Table I). On average, 2.2 times more intake interviews were completed in months when television advertisements were running than when they were not. More specifically, at least twice as many intake interviews were completed in months when why to quit—graphic (2.1 times more intake interviews complete compared to months when ads were not airing) or why to quit—testimonial ads (2.6 times more intake interviews) aired. The mean number of intake interviews completed increased in months when how to quit (1.9 times more intake interviews), anti-industry (1.3 times more intake interviews) and SHS (1.2 times more intake interviews) ads aired. Only ads categorized as ‘other’ cessation were associated with a decrease in mean call volume, with a ratio of calls while on air to off air of 0.9.

Caller characteristics
The proportion of callers completing an intake interview who are assessed as ready to quit has generally fluctuated between 75% and 85% over time, averaging 80.6% in any given month (Fig. 3) and 153,149/193,449 or 79% across the entire study period. On average, 63.5% of callers expressed high confidence in quitting, gradually decreasing from a high of 70.3% in January 2006. Across the entire study period, 121,925/193,449 or 63% had
Antismoking ads and the types of smokers who call quitlines

**Fig. 1.** Trends in quarterly call volume and adult New York smokers completing intake interview.

**Fig. 2.** Statewide TARPs by advertisement type.
high confidence in quitting. The percentage of callers across the study period who were both ready to quit and had high confidence in quitting was 100 902/193 449 or 52%. The correlation (tetra-choric) between readiness to quit and confidence in quitting was 0.2.

Results of the generalized linear model

There is a negative and significant ($P < 0.05$) relationship between total exposure as measured by TARPs and the proportion of smokers calling the Quitline who are assessed as ready to quit (Table II). Advertisement content was found to be significantly associated with the proportion of ready

### Table I. Average call volume by media exposure

<table>
<thead>
<tr>
<th>Advertisements aired</th>
<th>Mean calls per media market, per month</th>
<th>Ratio of on air to off air calls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cessation ads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Why to quit—graphic</td>
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<td>Why to quit—testimonial</td>
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<tr>
<td>Other ads</td>
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<td></td>
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<tr>
<td>Anti-industry</td>
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<td>464</td>
</tr>
<tr>
<td>Secondhand smoke</td>
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<td>448</td>
</tr>
<tr>
<td>All ad types</td>
<td>561</td>
<td>255</td>
</tr>
</tbody>
</table>

**Fig. 3.** Trends in proportion of callers completing intake interview assessed as "Ready to Quit" and proportion of callers with "high" confidence in quitting.
to quit callers. In particular, why to quit—graphic advertisements were negatively associated with the proportion of ready to quit callers ($P < 0.001$). Why to quit—testimonial, how to quit, other cessation, anti-industry and SHS ads were not significantly associated with the proportion of ready to quit Quitline callers.

Total exposure is negatively associated with the proportion of smokers having high confidence in quitting ($P < 0.01$). This relationship is also observed with why to quit—graphic ads ($P < 0.001$). When assessing the impact of advertisement content on the proportion of high-confidence callers, only anti-industry ads are significantly associated with a decrease in the proportion of high-confidence callers ($P < 0.05$). Why to quit—testimonial, how to quit, other cessation and SHS ads are not significantly associated with the proportion of high-confidence Quitline callers.

### Conclusion and discussion

The results of this study suggest that ad content influences the types of smokers who call the Quitline, which is consistent with emerging research [10–14]. Overall, antismoking advertising decreases the proportion of smokers calling the Quitline who are ready to quit as well as the proportion with high confidence in quitting. This result was driven by why to quit—graphic advertisements that decreased the proportions of both types of callers.

The results of this study suggest that when why to quit—graphic ads are on the air, the proportion of smokers calling who are ready to quit or have high confidence in quitting is lower. This suggests that at times when no ads are running, a higher proportion of callers are ready to quit or have high confidence in quitting. This makes sense because these smokers are more interested or motivated to quit and thus require less prompting to take action to attempt to quit. Why to quit—graphic ads seem to prompt smokers to call who are less ready to quit or have lower confidence that they will quit, suggesting that ads influence smokers to take action and start the process of quitting.

These results are not without limitations. In particular, we cannot be sure whether the differences in the outcomes expressed as proportions are due to a difference in the numerator (call volume for a particular type of smoker), denominator (total call volume) or both. Our descriptive results suggest that call volume is increased when ads are on the air and this is especially true for both why to quit—graphic and why to quit—testimonial ads. Another limitation stems from the fact that we do not have a measure of ad quality. Ad quality may differ across ads and ad types, which could explain some of our observed differences by ad type. For example, we were unable to document whether a voice-over of the New York State Smokers’ Quitline telephone number was used in each of the advertisements. However, our understanding is that it was not used systematically for any particular type of advertisement. We also do not have information on the time of day ads were aired or whether other local activities to promote the Quitline took place during the study period. An additional limitation is that the rating of advertisements was done by research assistants rather than a sample of smokers, which could lead to misclassifications of the advertisements in terms of their emotional strength. Related
to this latter limitation, our coding involves the raters’ assessment of the ad content in terms of emotional content and graphic imagery. We do not measure an emotional reaction to the ads. The ads we are classifying as emotional predominantly involve emotions of negative affect (e.g. sadness) conveyed through personal testimonial-type ads that focus on the personal loss associated with smoking. The ads we classify as graphic also likely induce an emotional response from smokers, but these ads would likely result in emotions like fear. Finally, we note that smokers who call the Quitline are potentially different from smokers in general. We compared smokers who called the Quitline and spoke to a Quitline specialist to current smokers from the New York Adult Tobacco Survey and found that the most substantial difference was that Quitline callers smoked significantly more cigarettes per day than current smokers in the Adult Tobacco Survey (20.8 versus 12.6).

These results are consistent with emerging research suggesting that different ad types have different effects on different types of smokers. These results also suggest that quitlines should expect an increased proportion of smokers less ready to quit or with less confidence in quitting when antismoking campaigns featuring why to quit—graphic ads are on the air.

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**Conflict of interest statement**

None declared.

**References**


