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Reduced Fatalism and Increased Prevention Behavior After Two High-Profile Lung Cancer Events

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Abstract

The positive impact of media coverage of high-profile cancer events on cancer prevention behaviors is well-established. However, less work has focused on potential adverse psychological reactions to such events, such as fatalism. Conducting 3 studies, the authors explored how the lung cancer death of Peter Jennings and diagnosis of Dana Reeve in 2005 related to fatalism. Analysis of a national media sample in Study 1 found that media coverage of these events often focused on reiterating the typical profile of those diagnosed with lung cancer; 38% of the media mentioned at least 1 known risk factor for lung cancer, most often smoking. Data from a nationally representative survey in Study 2 found that respondents reported lower lung cancer fatalism, after, compared with before, the events (OR = 0.16, 95% CI [0.03, 0.93]). A sustained increase in call volume to the national tobacco Quitline after these events was found in Study 3. These results suggest that there is a temporal association between high-profile cancer events, the subsequent media coverage, psychological outcomes, and cancer prevention behaviors. These results suggest that high-profile cancer events could be leveraged as an opportunity for large-scale public health communication campaigns through the dissemination of cancer prevention messages and services.

A single high-profile event that draws the attention of the popular media can have many times the reach of a traditional public health intervention that might reach only a small proportion of the audience most likely to benefit from it (Glasgow, Vogt, & Boles, 1999). Media coverage might serve to increase the public's understanding of health topics such as

cancer prevention, which is cited as a priority from the Institute of Medicine (U.S. Department of Health and Human Services, 2006). Media coverage of cancer is the most common health topic covered in the news media, accounting for more than 10% of all health news coverage, which is one of the top news topics (Kaiser Family Foundation, 2008; Schwitzer, 2009). In proportion to its contribution to mortality, cancer receives relatively more media coverage than other diseases (Blanchard, Erblich, Montgomery, & Bovbjerg, 2002; Slater, Long, Bettinghaus, & Reineke, 2008). This coverage can influence cancer preventive behavior through changes in beliefs and attitudes. Media coverage of high-profile cancer events serves to reinforce messages about risk factors and prevention as well as increase cancer information seeking.

High-profile cancer events, such as the diagnosis or death of a well-known person, often bring intense media coverage of cancer prevention. This coverage often leads to changes in cancer prevention behaviors after the event. The most widely cited example was the rise in colonoscopies for 9 months after American television news anchor Katie Couric's 2000 colon cancer campaign, during which she had a colonoscopy on air (Cram et al., 2003). Similarly, a twentyfold increase was seen for mammographies in Australia after heavy media coverage of singer Kylie Minogue's breast cancer diagnosis in 2005 (Chapman, McLeod, Wakefield, & Holding, 2005; Kelaher et al., 2008).

In addition to affecting behavior, media coverage is related to information seeking, especially among those for whom the information is most relevant, such as those with a family history of cancer (Niederdeppe, Frosch, & Hornik, 2008; Rutten, Squiers, & Hesse, 2006). Information seeking has been hypothesized to mediate the path between exposure to risk information and the relevant health behavior. This occurs partly through correcting or reinforcing critical information about the outcome or prevention strategy and through increasing response efficacy (Griffin, Dunwoody, & Neuwirth, 1999). This information seeking might be particularly important when it speaks to specific risk factors and prevention behaviors that might prompt moving from a more contemplative stage toward action (DiClemente et al., 1991).

Although there are numerous documented positive effects of media attention to high-profile cancer events, less work has examined potential downsides (Cram et al., 2003). In the case of Kylie Minogue, increasing numbers of younger women requesting mammograms, a group for which the test is not recommended and evidence is limited about its benefit, could be considered a negative outcome (Kelaher et al., 2008). Exposure to cancer-related media coverage might serve to increase beliefs about the ubiquity of cancer and its causes (Peters, McCaul, Stefanek, & Nelson, 2006). One such belief is fatalism, which reflects the idea that individuals have no control over what happens to them and that they are powerless to influence their future. Distinct from generalized fatalism, outcome-specific fatalism has often been operationalized as the belief about one's efficacy to avoid that outcome. For example, cancer fatalism has been operationalized as the belief that everything causes cancer. Such beliefs have been reported by up to half of the U.S. population (Niederdeppe & Levy, 2007). Increased cancer fatalism has been linked to failures to engage in cancer risk-reducing behaviors (e.g., diet) and screening (Mayo, Ureda, & Parker, 2001; Niederdeppe & Levy, 2007; Powe, 1995).

These fatalistic beliefs might result from media coverage, through their tone and focus (Jensen et al., 2011; McClure, Allen, & Walkey, 2001; Niederdeppe, Fowler, Goldstein, & Pribble, 2010). Rather than discussing all aspects of the disease—including risk factors, prevention, treatment, and outcomes—a focus in simplified news stories mainly on the causes of cancer makes these causes more salient to the determinant of other important factors about cancer, namely prevention (Slater, Hayes, Reineke, Long, & Bettinghaus, 2008). Without the opposing prevention information and the efficacy of such actions, fatalistic beliefs might result. Compared with other cancer topics, relatively few news stories focus on the prevention of cancer (Slater et al., 2008). This lack of prevention information could lead to a decrease in fatalistic beliefs and to an increase in information seeking. However, cancer fatalism might be lowered in response to news coverage that includes information on known risk factors and preventive behaviors rather than possible risk factors alone. Thus, knowledge of specific risk factors and greater preventive behaviors are likely related to lower fatalism.

Overview of the Studies

This article examines two high-profile lung cancer events, their coverage in the media, and their temporal relation to changes in fatalistic beliefs and calls to the national tobacco Quitline. Understanding the determinants of fatalism might help target communications and interventions that increase cancer prevention behavior, without also increasing fatalism or other unintended consequences of communicating such risk information.

On April 5, 2005, Peter Jennings, anchor of ABC's *World News Tonight*, was diagnosed with lung cancer. Four months later, on August 7, 2005, he died from that cancer. Two days later, Dana Reeve, widow of actor Christopher Reeve, announced her lung cancer diagnosis. These events received considerable media attention and, given their close proximity, were examined together in the present studies. These two events differed: Jennings fit the profile of those typically diagnosed with lung cancer as a result of his cigarette smoking, his sex, and his age, whereas Reeve did not fit the typical profile; she was a female never-smoker who was younger than 45 years of age. Study 1 analyzed a nationally representative sample of newspaper coverage of these events, focusing on mentions of known lung cancer risk factors, which influence fatalism. Study 2 examined the temporal association between these events and changes in lung cancer fatalism in a nationally representative sample. Study 3 examined the temporal association between these events and calls to the national tobacco Quitline.

Study 1

Method

To examine the media coverage resulting from Jennings' death (August 7, 2005) and Reeve's diagnosis of lung cancer, a sample of newspaper articles surrounding these events was collected. A sampling strategy that has previously been found to be a reliable proxy for the national news environment, including newspaper and television, was used. Stryker (2008) found that using articles from three sources, the *Associated Press*, *The Washington Post*, and *The New York Times*, form a valid index of the national news environment, and

highly correlates with a more exhaustive sampling strategy. Using the LexisNexis database of news, articles published between April 5, 2005, and August 15, 2005, were gathered using the overinclusive search terms: (“Jennings” or “Reeve”) and (“Cancer” or “Lung”). The time frame for this sample was limited to coincide with end of data collection for Study 2. A total of 73 articles were retrieved.

Article Coding—Articles were read by two coders and excluded if they did not mention Jennings’ death or Reeve’s diagnosis ($n = 17$; see Figure 1). The final sample included 56 articles. Two coders independently determined whether the article mentioned Jennings’ diagnosis ($\kappa = .857$, 92.8% agreement), Jennings’ death ($\kappa = 1.0$, 100% agreement), or Reeve’s diagnosis ($\kappa = .892$, 94.6% agreement). Then, the presence¹ of lung cancer risk factors including smoking ($\kappa = .928$, 96.4% agreement) or other risk factors ($\kappa = .750$, 87.5% agreement) were coded for, as previous studies have found that a lack of media coverage of cancer prevention is related to cancer-specific fatalism (Niederdeppe et al., 2010). All factors were also coded for their prominence in the article ($\kappa = 1.0$, 100% agreement) and the section of newspaper in which the article appeared ($\kappa = 1.0$, 100% agreement) to determine the article’s focus and prominence (Cappella et al., 2008). Coding discrepancies were resolved through discussion.

Results

Of the 56 valid articles, more than half focused on Jennings’ death and/or Reeve’s diagnosis (Figure 1). Among those focusing on Jennings’ death, 65.5% ($n = 19$) mentioned lung cancer and 37.9% ($n = 11$) cited smoking as a risk factor for lung cancer; one article mentioned both smoking and genetics as an additional risk factor. Half these articles (51.7%, $n = 15$) were in the news sections and the majority of the remaining articles were in the entertainment section (41.4%, $n = 12$). Mentions of lung cancer and/or smoking were most often in the title of the article 34.4% ($n = 10$) or the first paragraph 27.5% ($n = 8$). These articles often quoted Jennings from his final broadcast announcing his diagnosis and that he was a smoker for 20 years and relapsed after 9/11. Articles that did not mention a risk factor were most often official obituaries or news of his memorial service.

Among the 23 articles focusing on Jennings’ diagnosis, 34.7% ($n = 8$) cited smoking as a risk factor. No other risk factors for lung cancer were mentioned. The majority of these articles (56.5%, $n = 13$) were in the entertainment section. Mentions of lung cancer and/or smoking were most often in the title of the article 21.8% ($n = 5$) or the first paragraph 39.1% ($n = 9$).

Among the 10 articles that mentioned Reeve’s diagnosis, only 4 focused solely on her diagnosis without mentioning Jennings. Of those, only one identified smoking as well as age as known risk factors for lung cancer. However, among all 10 articles mentioning Reeve’s diagnosis half, mentioned that she was atypical of the normal profile of someone diagnosed

¹We report only on coding for the presence/absence of mentions of these coding units because we were interested primarily in the prevalence of mentions of these topics. However, additional coding attempting to classify language around the causes of lung cancer along a continuum from probabilistic through deterministic (Cappella et al., 2008). This approach was not fruitful because the majority of mentions of smoking and lung cancer were not linked by statements that could be coded using this, or other systems to code for a more nuanced analysis of these statements.

with lung cancer in that she did not smoke or live with a smoker, was female, and was younger than 45 years of age.

Discussion

Media coverage surrounding Jennings' death/Reeve's diagnosis prominently displayed information on lung cancer risk factors. Presenting that information explained the circumstances of the illness, and gave information to the public about risk factors for lung cancer. These articles paired an emotionally charged and relevant exemplar in the form of a nationally known and respected figure with salient factors for lung cancer prevention, namely to tobacco abstinence.

The media coverage focused on two different types of cancer events, namely diagnosis and death, as well as one person who fit the profile of the typical person diagnosed with lung cancer and one who did not. It should be noted that people with lung cancer regardless of smoking status experience stigma of the most well-known cause of the disease, smoking (Chapple, Ziebland, & McPherson, 2004; Nicole, LoConte, Schiller, & Hyde, 2009; Steptoe et al., 2002). In both cases here, this known risk factor, smoking, was highlighted. This information could lead to greater cancer fatalism if it is interpreted as evidence that there are many known risks. It could also be interpreted to reinforce the idea that there is scientific consensus on a small number of risk factors, some of which can be modified to reduce an individual's risk, resulting in lowered lung cancer fatalism.

Study 2

Study 2 examined how Jennings' diagnosis (April 5, 2005), and Jennings' death (August 7, 2005) and Reeve's diagnosis (August 9, 2005) were temporally related to changes in fatalistic attitudes about lung cancer.

Method

Changes in lung cancer fatalism were examined in the Health Information National Trends Survey (HINTS). HINTS is a cross-sectional survey of adults using a complex probability sampling design to allow for nationally representative estimates of cancer attitudes, information seeking, and cancer prevention and control behaviors (National Cancer Institute, 2011; Nelson et al., 2004). HINTS data were collected between February 21 and August 15, 2005, using random digit dialing, and had a final overall response rate of 20.83% resulting in a final sample of 5,586 weighted to represent the population of noninstitutionalized U.S. adults at the time of the survey. A full explanation of the complex sampling, weighting and bias adjustments is described elsewhere (National Cancer Institute, 2005).

Respondents were randomly assigned to answer a question measuring fatalism specific to lung, colon, or skin cancer: "It seems like almost everything causes [lung/colon/skin] cancer. Would you say you agree or disagree?" with the following response options: agree/disagree.

To obtain the largest sample after Jennings' death and Reeve's diagnosis, the dates of the survey response and Jennings' death and media coverage of his death (August 7, 2005) were used to dichotomize those who responded before ($n = 5,229$) and after ($n = 163$; see Table 1).

Although this date includes a small number of respondents after announcement of Jennings' death but before announcement of Reeve's diagnosis ($n = 21$), it allows for the greatest postevent sample size.

Other theoretically important variables known or hypothesized to be related to fatalism were included in the analysis including: race/ethnicity, education, insurance coverage, and having a personal and/or family history of cancer (Dettenborn, DuHamel, Butts, Thompson, & Jandorf, 2004; Hall et al., 2008; Powe, 1995). To address those individuals who are most at risk for lung cancer for whom this media event might be most salient, smoking status was included. Respondents were classified as never (<100 cigarettes in lifetime), former (>100 cigarettes in lifetime, no current smoking), or current (>100 cigarettes in lifetime, currently smoking) smokers. Last, to control for media attention, we included measures of newspaper reading and television news viewing in the previous week,² the time period that overlaps with Jennings' death and Reeve's diagnosis.

Analysis—Data were analyzed using SAS-callable SUDAAN v.10.0.0 to account for the complex sampling strategy and to incorporate jackknife replicate weights to compute accurate standard errors (Shah, Barnwell, & Bieler, 1997). A weighted logistic regression model regressed the dichotomous lung cancer fatalism item on the previously discussed predictors: education, race/ethnicity, insurance coverage, cancer history, smoking status, media attention, and date of response. To isolate any effect to lung cancer fatalism, separate regressions were performed using the outcomes of skin and colon cancer fatalism using the same predictors. Because skin and colon cancer fatalism should not be affected by a high-profile lung cancer event, these analyses were used as controls for the lung cancer analysis.

Results

The odds of endorsing the lung cancer fatalism item was significantly smaller among those who responded to HINTS after Jennings' death/Reeve's diagnosis ($OR = 0.16$, 95% CI [0.03, 0.93]) compared with those who responded before (see Table 2). There was also an effect for education; compared with those with high school or less education, respondents who reported some college ($OR = 0.33$, 95% CI [0.16, 0.68]) or college or more ($OR = 0.17$, 95% CI [0.09, 0.33]) showed significantly reduced odds of endorsing the lung cancer fatalism item. The only effect for race/ethnicity was that Asians were much more likely to endorse the fatalism item compared with non-Hispanic Whites ($OR = 7.01$, 95% CI [1.42, 34.49]). Current smokers were more than twice as likely to endorse the lung cancer fatalism item as never smokers ($OR = 2.14$, 95% CI [1.21, 3.78]). There were no significant effects for insurance status, cancer history, or attention to media. Inclusion of interaction terms with smoking status or stratified analyses were not possible because of the small sample size of post-Jennings respondents.

To isolate the effect of Jennings' death specifically on lung cancer fatalism, endorsement of the colon and skin cancer fatalism items, which should not be affected by this event, were examined using the same predictors and analytic strategy. There was no effect for time of

²Because of the extreme bimodal distribution of the newspaper variable, it was dichotomized as 2 or fewer days per week versus 5 or more days per week.

response to HINTS for colon cancer fatalism (OR = 1.13, 95% CI [0.12, 10.26]) or skin cancer fatalism (OR = 0.33, 95% CI [0.01, 8.50]).

To examine whether a similar temporal association occurred with respect to the timing of Jennings's diagnosis, these analyses were repeated using the dichotomous variable of time of response to HINTS relative to Jennings' diagnosis of lung cancer, before or after April 5, 2005. That sample had a much larger proportion of respondents after his diagnosis compared with the previous analysis ($n = 498$ before diagnosis, $n = 4894$ after diagnosis). In addition, endorsement of the fatalism items were examined comparing all respondent before Jennings' diagnosis to HINTS respondents the week of, and 1, 2, and 3 weeks after his diagnosis. No significant effects for time of response relative to Jennings' diagnosis emerged in either analysis.

Discussion

Data from this nationally representative survey showed lower endorsement of lung cancer fatalism, that "it seems like almost everything causes lung cancer," after Jennings' death/Reeve's diagnosis. This effect was not observed for fatalism about other cancers or for the time after Jennings' diagnosis. The lack of effects on fatalism surrounding Jennings' diagnosis might be due to the relative amount and placement of news stories for that event versus his death, as was found in Study 1, or the salience of his death highlighting those risk factors.

That this effect was isolated to lung cancer fatalism, but not colon or skin cancer suggests that generalized cancer fatalism is not affected by this specific media event. The change in fatalism after this event can, perhaps, be attributed to the media coverage. Confirming past findings, respondents with higher levels of education reported lower levels of fatalism for all three cancers measured (Niederdeppe & Levy, 2007). This finding reiterates that education, and presumably increased health literacy, contributes to a more accurate understanding of disease risk factors, which is associated with lower fatalism.

Respondents who were at increased risk of lung cancer, smokers, reported higher levels of fatalism compared with never smokers. As fatalism in this survey was defined as lung cancer seemingly being caused by everything, this might be explained by those smokers engaging in defensive processing and recall of risk information to minimize the perceived potential risk of their smoking behavior (Freeman, Hennessy, & Marzullo, 2001; Kessels, Ruiter, & Jansma, 2010; Kunda, 1990; Weinstein, Marcus, & Moser, 2005). However, because of the small sample size of respondents after Jennings's death, testing whether current smokers' fatalistic beliefs changed as a result of Jennings' diagnosis and/or death was not possible.

Study 3

Study 2 found that fatalistic attitudes toward lung cancer were lower after high-profile lung cancer events. Paired with data from Study 1 showing that among the 37.9% of news articles mentioning causes of lung cancer, smoking was always identified as a risk, this suggests that lung cancer was salient given that this high-profile event and its main cause, tobacco use,

was reinforced. Study 3 examined calls to the national tobacco Quitline before and after Jennings' diagnosis, as well as Jennings' death and Reeve's diagnosis. These calls could be considered information seeking about tobacco cessation and/or the first step toward tobacco cessation among smokers, for whom media coverage of these events would be salient.

Method

Counts of the raw number of call attempts per day to 1-800-QUIT-NOW throughout 2005 were obtained from the National Cancer Institute's Cancer Information Service. Calls are routed through the Cancer Information Service to the appropriate state Quitline for tobacco cessation services. Call attempts were collected at the state level and aggregated to form an index of call attempts, per day, at the national level. Because of a known large-scale promotion of the Quitline in Ohio during 2005, unrelated to Jennings or Reeve, data from Ohio were excluded.

Analysis—The average number of calls per day to 1-800-QUIT-NOW was computed for each week preceding, during, and after Peter Jennings' diagnosis and Jennings' death and Reeve's diagnosis. For example, the week after Jennings' death was defined as August 7, 2005, to August 13, 2005. The average number of calls to the Quitline during the weeks immediately before and after Jennings' diagnosis (April 5, 2005) as well as Jennings' death and Reeve's diagnosis (August 7, 2005) were examined using independent samples *t* tests, to examine a temporal change in the volume of calls. These comparison periods do not include the Quit to Live campaign carried on many television networks which promoted the Quitline after tobacco-related news stories and at the end of broadcasts. A spike in call volume to the Quitline resulting from the Quit to Live promotion has previously been documented (Hurd, Augustson, Backinger, Deaton, & Bright, 2007).

Results

When examining the volume of calls to the Quitline around Jennings' death and Reeve's diagnosis (August 7, 2005), an increase in call volume was seen after Jennings' death (Figure 2). The week of Jennings' death there were slightly, but not significantly so, more calls per day ($M = 345.57$, $SD = 102.29$) than the previous week ($M = 332.72$, $SD = 186.17$), $t(12) = -.160$, $p = .875$, significantly more calls than 2 weeks earlier ($M = 131.29$, $SD = 52.84$), $t(12) = -4.92$, $p < .001$, and significantly more calls than 3 weeks earlier ($M = 137.86$, $SD = 50.64$), $t(12) = -4.82$, $p < .001$. Calls to the Quitline after Jennings' death remained at elevated levels for 2 additional weeks. Only the week starting August 28 do the calls per day drop below the levels observed immediately after his death ($M = 225.29$, $SD = 54.36$), $t(12) = 2.75$, $p = .18$.

When examining change in call volume after Jennings' diagnosis, the week starting April 5, 2005, there were slightly, but not significantly so, more calls per day ($M = 388.71$, $SD = 212.44$) than the previous week ($M = 295.71$, $SD = 205.01$), $t(12) = .421$, $p = .421$, significantly more calls than 2 weeks earlier, ($M = 97.29$, $SD = 36.36$), $t(12) = -3.58$, $p = .004$, and significantly more calls than 3 weeks earlier ($M = 92.43$, $SD = 35.55$, $t(12) = -3.64$, $p = .003$. This elevated levels of calls per day significantly declines from levels seen the

week of Jennings' diagnosis starting May 3, 2005, 1 month after his diagnosis, ($M = 160.29$, $SD = 80.21$), $t(12) = 2.67$, $p = .21$.

Discussion

Calls to the national tobacco Quitline showed an increase after both Jennings' diagnosis as well as Jennings' death/Reeve's diagnosis. The spike after Jennings' diagnosis returned to baseline levels within 1 month. After Jennings' death and Reeve's diagnosis the increased call volume was sustained for 3 weeks. When conceptualizing the steps of tobacco cessation, calling for information and resources about quitting can be thought of as initial behavioral attempts in the process of tobacco cessation, and consequently lung cancer risk reduction. That the increase in calls after Jennings' diagnosis, as well as after his death and Reeve's diagnosis, was sustained for almost 1 month suggests the potential salience of those events, as well as the amount of media attention they garnered, beyond any routine variation in call volume.

These results must be tempered with the limitations of this study. First, there was an unexplained increase in calls during the week before Jennings' diagnosis and death. However in the week immediately after his diagnosis and death, a spike in the average number of calls per day was observed over and above these already slightly elevated levels. A second limitation of this analysis is that we do not have data on the purpose of the call itself. Although we can presume that the call attempt had something to do with tobacco cessation (Quitline's objective) either gathering information or planning a quit attempt, this cannot be verified from our data. Similarly, it is not possible from the present analyses to examine whether those who called the Quitline were smokers and/or those with lower levels of lung cancer fatalism. Niederdeppe (2008) found that news coverage of high-profile events was linked to information seeking but primarily among high socioeconomic status individuals.

Nevertheless, the pattern of increased calls after these events suggests that a high-profile cancer event might result in some level of risk-relevant behavior. This is consistent with previous analyses of cancer prevention behavior after a high-profile cancer event, namely colonoscopies after Katie Couric's campaign in 2000 and mammographies after Kylie Minogue's 2005 breast cancer diagnosis.

General Discussion

Integrating the results from three national data sets revealed a temporal association between two high-profile cancer events, Peter Jennings' death and Dana Reeve's diagnosis of lung cancer, and an increase in behaviors relevant to risk reduction, less endorsement of fatalistic beliefs about the causes of lung cancer, and a national media environment that mentioned those causes. These results are consistent with past studies demonstrating that high-profile cancer events lead to changes in attitudes and behaviors (Chapman et al., 2005; Cram et al., 2003; Kelaher et al., 2008). Although previous studies have found that media coverage of cancer generally does not focus on prevention (Slater et al., 2008), in this case, the news of Jennings' death/Reeve's diagnosis paired with health messages about smoking as the major risk factor for lung cancer could be considered a prevention message. Thus, even though

high levels of general cancer fatalism have previously been documented (Niederdeppe & Levy, 2007); this event appears to be temporally related to lower cancer fatalism, specific to lung cancer. Although the reduced fatalism might be due to the prevention message inherent in these events, other unmeasured factors might also have been responsible for this change.

Limitations

Although data is from three national samples, a number of limitations should be addressed. In Study 1, the coding scheme focused only on the mention of lung cancer risk factors, which was most relevant to the analyses in the other two studies. However, the tone of the articles, or other factors could show interesting patterns, which should be explored in future analyses. Second, to sample the national media environment a small sample of publications was used. Although this approach has been validated to represent the national media environment (Stryker, 2008), it obscures regional differences in coverage, and does not account for media coverage in languages other than English, or newspapers directed toward a specific communities (Caburnay et al., 2008).

The main limitation of Study 2 was the relatively small sample size of HINTS respondents after Jennings' death ($n = 163$). Although the analysis was weighted for national representation, the low absolute number of respondents prevented stratifying the sample by smoking status or creating interaction terms with time to examine how lung cancer fatalism changed for smokers versus never smokers. Despite this lowered statistical power, this study did find statistical differences between the groups. Although some express concerns that the low response rate of HINTS could introduce bias, an analysis of HINTS has shown non-response bias not to be an issue in the data (Cantor, 2011). The main outcome variable—lung cancer fatalism—was operationalized using a single item, preventing us from measuring all facets of lung cancer fatalism. However, this limitation is somewhat tempered by showing that changes were only observed for lung cancer fatalism, but not skin or colon cancer fatalism. Last, we have no measures of the amount of media coverage, if any, respondents viewed about these events.

In the Quitline analysis in Study 3, only a general increase in calls to the Quitline could be documented. That is, we could not distinguish calls of people for a first smoking quit attempt from a new quit attempt from calls for information or on behalf of another person. Nonetheless, the rise in calls after Jennings' diagnosis as well as his death and Reeve's diagnosis without overt promotion of the Quitline, does suggest a temporal link. In addition we cannot explain the rise in calls the week before Jennings' death. However the additional increase in calls after his death, and the fact that they remained at elevated levels for 1 month after Jennings' death suggests that these calls are related to his death and the surrounding media coverage. As in Study 2, we do not have individual measures of the amount of media coverage of these events callers to the Quitline were exposed to.

Interpreting the combined effects of the three studies is limited by separate samples for each study. Therefore, although we can make general conclusions about how specific media attention might have affected an individual whose fatalistic attitudes are captured in the HINTS analysis and their behavior in the Quitline data, we must acknowledge that these samples are separate. Although this limits our conclusions about individual trajectories and

responses to this high-profile cancer event, it does not preclude us from making more general inferences about the pattern at the national level.

Future Directions and Implications

The results of these analyses suggest a number of future directions. Regional and other variations in the media sample could provide interesting differences which might suggest ways to tailor the communication about high-profile cancer events to optimize their public health impact. These regional media samples could be linked to HINTS or other datasets that include data to indicate the respondent's state, county, or the respondent's primary media market (Nielsen, 2009; Slater et al., 2009). Thus, the specific amount and content of media messages across communication channels could be examined and linked to fatalism or other outcomes. Similarly, linking the amount and type of regional coverage to regional variation in the number of calls to the Quitline could be examined to determine the dose-response relationship between media coverage, fatalistic beliefs and health behavior.

Although we saw limited differences by sociodemographic factors on changes in lung cancer fatalism in Study 2, we cannot conclude from the data how such media messages are interpreted in the context of cultural beliefs, acculturation, or other individual differences. Ethnic and cultural differences might be especially interesting to investigate because differences in cancer fatalism have been found on the basis of ethnic and cultural factors (e.g., Dettenborn et al., 2004).

Consistent with other studies on fatalism, those with higher education reported the lowest levels of lung cancer fatalism. These results might suggest that fatalism, operationalized as the belief that everything causes a specific cancer, should be examined taking into account individual difference factors including willingness and ability to process that information, as well as past knowledge.

These studies demonstrated that a high-profile cancer event can have a significant public health impact. In addition, coverage of these high-profile events did not increase fatalistic attitudes about lung cancer. Media coverage that included known risk factors was temporally associated with lower fatalism, and a possible first step toward tobacco cessation. At a time when the public's attention is temporarily focused on the topic, these events should be leveraged to ensure that accurate information is disseminated and materials and services to facilitate behavior change are publicized and otherwise made available.

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Figure 1.
Evaluation of articles for media analysis.

Figure 2.
Histogram of calls to 1-800-QUIT-NOW during 2005.

Table 1

Sample for HINTS analysis

	Before Jennings' death (N = 5,229)	After Jennings' death (N = 163)	<i>p</i> value
Age, <i>M</i> (<i>SD</i>)	52.13 (17.19)	51.88 (17.63)	.861
Education			.824
Less than high school	663 (12.7%)	22 (13.5%)	
High school graduate	1,402 (26.9%)	44 (27.0%)	
Some college	1,503 (28.9%)	41 (25.2%)	
Bachelor's degree	970 (18.6%)	35 (21.5%)	
Postbaccalaureate degree	669 (12.8%)	21 (12.9%)	
Has health insurance	4,593 (88.1%)	146 (89.6%)	.430
Cancer history			.902
None	1169 (22.7%)	36 (22.6%)	
Personal and/or family history	3364 (65.3%)	102 (64.2%)	
Personal and family history	620 (12.0%)	21 (13.2%)	
Race			.313
Hispanic	474 (9.2%)	21 (13.0%)	
Non-Hispanic White	3,976 (76.9%)	124 (76.5%)	
Non-Hispanic Black	429 (9.3%)	8 (5.0%)	
American Indian or Alaska Native	80 (1.5%)	1 (0.6%)	
Asian	101 (2.0%)	3 (1.9%)	
Native Hawaiian or other Pacific Islander	12 (0.2%)	0 (0%)	
Multiple Races	97 (1.9%)	5 (3.1%)	
Smoking Status			.386
Current	969 (18.6%)	25 (15.3%)	
Former	1,507 (28.9%)	54 (33.1%)	
Never	2,739 (52.5%)	84 (51.5%)	
Gender (male)	1,796 (34.3%)	56 (34.3%)	.998

Note. All data presented as n (%) except age. Percentages presented are unweighted. Tests of difference for education, race, insurance, cancer history, and smoking status used chi-square analysis.

Table 2

Multivariate logistic regression model predicting lung cancer fatalism

Variable/level	OR	Lower 95% CI	Upper 95% CI
Response relative to Jennings' death/Reeve's diagnosis			
Before	1.00	Ref.	Ref.
After	0.16	.03	.93
Education			
High school or less	1.00	Ref.	Ref.
High school	.59	.31	1.13
Some college	.33	.16	.68
College or more	.17	.09	.33
Age			
(Continuous measure)	1.02	1.01	1.04
Gender			
Male	1.00	Ref.	Ref.
Female	1.27	0.73	2.22
Race/ethnicity			
Non-Hispanic White	1.00	Ref.	Ref.
Hispanic	1.97	.87	4.47
Non-Hispanic Black	1.42	.60	3.34
American Indian/Alaska Native	1.44	.26	8.00
Asian	7.01	1.42	34.49
Multiple	2.74	.69	10.87
Insurance status			
No	.66	.31	1.43
Yes	1.00	Ref.	Ref.
Cancer history			
None	1.00	Ref.	Ref.
Personal or Family	.84	.45	1.55
Personal & Family	.98	.38	2.50
Smoking status			
Current	2.14	1.21	3.78
Former	1.10	.69	1.76
Never	1.00	Ref.	Ref.
Television news attention			
(Continuous measure)	1.02	.90	1.16
Newspaper attention			
0–2 days newspaper	1.00	Ref.	Ref.
5–7 days newspaper	.81	.47	1.40

Note. Weighted logistic regression predicting odds of responding “yes” to Lung Cancer Fatalism item. Ref. = Reference group used for categorical variables.