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Relation between newspaper coverage of tobacco issues and smoking attitudes and behaviour among American teens

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ABSTRACT

Objective: Geographic variation in youth smoking prevalence suggests that community-level factors influence risk of tobacco use. We examine the extent to which newspaper coverage of tobacco issues is related to youth smoking attitudes and behaviours.

Design: We conducted a content analysis of 8390 newspaper articles on tobacco issues from 386 daily newspapers circulating at 5% or more in 2001–3 Monitoring the Future (MTF) survey communities. This resulted in the creation of community level measures of news volume, content and valence. Associations between news and youth outcomes were assessed using logistic regression analyses adjusting for individual, geographic and tobacco policy factors linked to youth smoking and attitudes.

Subjects: 98 747 youth participating in the nationally representative school-based MTF annual surveys between 2001 and 2003.

Main outcome measures: Perceived harm of smoking, perceived peer smoking, disapproval of smoking, smoking within the past 30 days, daily cigarette consumption.

Results: In the five months preceding survey administration, newspapers in MTF communities published an average of 11.9 tobacco related articles (range 0–55.7). Each 10-article increase in newspaper volume over the five-month period was associated with increased odds of perceiving great harm from smoking (OR = 1.04, $p < 0.01$) and disapproving of smoking (OR = 1.04, $p < 0.05$) and decreased odds of perceiving most or all friends smoke (0.94, $p < 0.01$) and smoking in the past 30 days (OR = 0.93, $p < 0.001$). No consistent association was found between the content or valence of coverage and youth smoking outcomes.

Conclusions: Gaining and keeping tobacco on the media agenda is an important tool for tackling youth smoking. As volume appears to be the driving factor, media advocacy may be best targeted towards generating events and highlighting issues likely to increase and sustain news attention.

There is a growing body of research demonstrating the influence of community-level factors on smoking initiation and maintenance.^{1–4} The need for research that considers the influence of various geographic and social environmental factors at the collective level is underscored by data showing that past month smoking prevalence among youth across US states ranges from 7.3% to 32.7%.⁵ While state differences in prevalence can be partly accounted for by individual characteristics, cultural and tobacco policy factors also influence youth

smoking. In particular, the media are an important component of the social and environmental context, shown to have potential to shape smoking attitudes and behaviours.^{6,7} Although media influences such as anti-tobacco advertising and depiction of smoking in movies have received significant attention for their role in affecting smoking behaviour,^{7–11} the relation between news media coverage about tobacco issues and smoking attitudes and behaviour has not been adequately explored.⁶ There is, however, a research literature establishing a link between news media and other youth problem behaviours.^{12–13}

News media often serve as a framework within which issues of concern are presented to the public,¹⁴ guiding interpretation of events of which one does not have personal experience and emerging issues upon which one has yet to formulate an opinion.¹⁵ To this end, the news media hold considerable influence over which events and ideas become public issues and which do not. Furthermore, by identifying “problems” for their audience, the media also shape possible solutions.^{16–18}

Various tobacco control efforts have attracted significant news media attention,^{19–22} with research showing that Americans closely follow health-related news stories, and tobacco stories in particular.²³ The tobacco industry has long understood the importance of news media coverage of tobacco issues, with Philip Morris developing an “InfoFlow” measure to “understand what the public is reading, hearing and seeing in the news related to tobacco and to determine the impact this has on the general public’s overall view of the tobacco industry.”²⁴ Newspaper coverage has been shown to be particularly influential, often setting the agenda for other news media.^{25–27}

The news media and youth

Previous research has demonstrated a relation between the volume of newspaper coverage of tobacco issues and adult smoking behaviours.^{28–31} The volume of print media has also been found to be strongly and positively associated with policy changes, such as the passage of municipal smoking bylaws.³² We know, however, of only two studies to explicitly link newspaper coverage to youth outcomes. Pierce and Gilpin³⁰ conducted a historical analysis of the relation between the volume of coverage of tobacco issues in popular magazines and tobacco use initiation and cessation patterns, and found an association between coverage of

tobacco and cessation, but not with initiation among youth or young adults. In more recent work, Niederdeppe *et al*³³ attributed a portion of the effect of the Florida Tobacco Control Program to newspaper coverage of the state campaign. There remains, therefore, considerable scope for examination of the nature of the possible relation between news and youth smoking outcomes.

News consumption levels differ by age and media channel. According to findings from the Monitoring The Future (MTF) survey regarding any type of newspaper readership, just over one-third of 8th graders read newspapers weekly or more in 2001, compared with 46% of 10th graders and 52% of 12th graders.³⁴ The idea that newspaper coverage is potentially meaningfully linked to behaviour among youth is often seen as unlikely,³⁵ but the MTF readership levels suggest that news may have some direct influence on attitudes and behaviours. However, the theoretical model driving our analysis³⁶ prioritises indirect effects on youth outcomes of news media through the pathway influencing community sentiment and tobacco control actions. News coverage is potentially influential to the extent that it plays a role in setting a community's agenda for discussions about tobacco among parents, friends and peers and in school and other local activities.^{37–40} These contextual factors may influence community-level tobacco control actions, as well as the tobacco-related attitudes and behaviours of the general population—both of which are important factors in determining youth smoking intentions and behaviours.³⁷ We examine the relation between newspaper coverage and youth smoking behaviour by relating indices of community-level newspaper coverage on tobacco issues to youth smoking attitudes and behaviours while controlling for existing state-level tobacco policies and individual characteristics known to be related to smoking.

METHODS

Sample selection and data collection

Individual student data

Data on individual student characteristics, smoking-related attitudes and self-reported tobacco use for the years 2001–3 were obtained from the MTF study.⁴¹ Data were collected from February to June from separate and non-overlapping school samples of 8th, 10th and 12th grade classes, drawn to be representative of all students in the specified grade for the 48 contiguous states.⁴² All surveys were self-completed and group administered within school settings. Response rates averaged 87% across the three grades, with a final total possible sample size of 136 527 (36% 8th graders; 33% 10th graders and 31% 12th graders). For our purposes, all students within each MTF school are considered to constitute a single community.

Newspaper data

We utilise newspapers as a proxy for community-wide news coverage of tobacco issues (including television, radio and internet news), given research suggesting that newspapers shape overall news coverage.⁴⁰ A detailed account of the data collection and textual analytical procedures that underpin the newspaper data is provided elsewhere.³⁶ A national news clipping service was contracted to identify newspaper articles according to predefined tobacco search terms. The Audit Bureau of Circulation⁴³ provides zip code-specific circulation rates for each newspaper, and our data are taken from daily newspapers with a circulation rate of 5% or higher within the zip codes of participating MTF schools. The school zip code therefore serves

as a geographic proxy for a single community. Two thousand sampled students (1.5% of the total) resided in communities with no newspapers circulating at 5% or higher, and were thus removed from analyses. In order to reduce the volume of data to a practical level, from all eligible newspapers, a random sample of one-third of the days in each month was selected⁴⁴ and all clipped articles from the selected dates were subjected to textual analysis. Articles were coded by a team of five trained coders. Inter-rater reliability kappa scores were calculated for each variable and achieved a mean kappa value of 0.79 (range 0.71–0.84), indicating substantial agreement.⁴⁵

Each article was coded for various measures of content and valence.³⁶ (We use “article” as a collective term for hard news, letters, editorials and columns.) The content of each article was coded from the perspective of tobacco control efforts. Examples of positive events for tobacco control include studies reporting on the health hazards of smoking, the successful outcome of legal cases against the tobacco industry or news of progress towards the passage of tobacco control policies. Negative events included reports of tobacco control setbacks such as the defeat of tobacco control policies, the loss of legal cases to the tobacco industry and studies finding contradictory health outcomes of tobacco use. A category of mixed/neutral events included those where the implications for tobacco control were unclear, such as new harm reduction products and those that were seen to have little direct relevance for tobacco control, such as general discussions of the practices of tobacco farming.

In addition, all commentary articles were also coded for valence related to tobacco issues. (We use “commentary article” as a collective term for the subset of articles that are *not* hard news—namely, letters to the editor, editorials and columns.)

Our valence code was intended to indicate the nature of any explicit opinion being proffered by the writer, and thus was not applicable to hard news. In positive commentary articles, writers espoused views supporting tobacco control, whereas in negative commentary articles, writers were hostile. Again, a category of mixed/neutral was included for commentary coding.

Finally, we sought also to measure each article's substantive focus, and therefore coded each article for one of 13 mutually exclusive themes.³⁶ For the purpose of this analysis, we recoded these themes into a single dichotomous variable indicating articles that thematically focused on secondhand smoke (SHS) issues and those that did not. SHS was the only theme with a reasonable distribution across both event and commentary coding, and a large enough number of articles, to produce meaningful analysis.

State tobacco control policy data

Data on the average real price/pack of cigarettes by state and year were calculated using data from *The Tax Burden on Tobacco*⁴⁶ and the US Bureau of Labor Statistics' Consumer Price Index. In addition, a smoke-free air (SFA) index measuring state SFA law strictness was included. The SFA index included scores for the strength of protection from SHS for the following: schools (public and private), recreational facilities, cultural facilities, shopping malls, private work sites, public transit, restaurants and healthcare facilities. Points were subtracted for state SFA pre-emption laws (pre-emption laws being those whereby state law precludes or overrides local laws, disallowing local governments from enacting stricter policies than those at the state level).⁹ Further, we controlled for state-level youth smoking prevalence levels from the period before the majority of states began mass media anti-smoking campaigns. To this

end, state-level smoking prevalence data for youth aged 15–18 for 1995–6⁴⁷ was also added as a covariate in all models.

Measures and analysis

Dependent variables

Previous research has established that perceived harm of smoking,⁴¹ perceived peer smoking prevalence⁴⁸ and perceived disapproval of smoking^{12, 49} are related to youth smoking uptake. Separate models were analysed for each of the following student self-reported dependent variables:

- ▶ Perceived harm of smoking: 1 = believe people risk “great harm” to themselves by smoking ≥ 1 pack of cigarettes/day.
- ▶ Perceived peer smoking prevalence: 1 = believe most/all friends smoke cigarettes.
- ▶ Perceived disapproval of smoking: Do you disapprove of others* smoking > 1 packs of cigarettes/day? Responses categories included: 1 = don’t disapprove, 2 = disapprove, 3 = strongly disapprove.
- ▶ Current smoking: 1 = any cigarette smoking in the past 30 days.
- ▶ Consumption among current smokers, measured by a 6-point scale: < 1 cigarette/day (0.5), 1–5 cigarettes/day (3.0), about $\frac{1}{2}$ pack/day (10), about 1 pack/day (20), about $1\frac{1}{2}$ pack/day (30), and 2+ packs/day (40). The natural log of this scale was used in all models.

*8th/10th graders asked about their views on “people” smoking, while 12th graders are asked about their views on “people (who are 18 or older)” smoking.

Independent variables of newspaper coverage

Independent variables were designed as community-specific counts of articles per month (accounting for weighted average newspaper penetration rates) and included (1) total volume of tobacco-related newspaper articles per community; (2) the number of newspaper articles for each tobacco control event per community (positive, negative, and mixed/neutral); (3) the number of newspaper articles for each type of commentary per community (positive, negative, and mixed/neutral); and (4) the number of newspaper articles with the theme of SHS per community. The newspaper exposure variables were generated from newspaper coverage in each community over the five-month period leading up to the date of MTF survey administration. Details on the process of developing these variables are presented below.

Data from *The International Yearbook*^{50–52} were used to calculate the number of days per month of publication for each newspaper (“daily” newspapers can be published 5, 6 or 7 days per week):

$$(\text{Total No of days newspaper published per week}) \times (4 \text{ weeks}) = \text{total days newspaper published per month}$$

These publication data were then applied to the monthly-specific newspaper variables, and the resulting value indicates the newspaper-specific number of articles per month for each newspaper variable:

$$(\text{No of articles per variable} / \text{Total days newspaper published per month}) = \text{Newspaper-specific No of articles per month}$$

These values were then assigned to students within a single MTF school (community) by zip codes (the final range of newspapers per community was 1 to 6). Per-community newspaper weighted average penetration rates were calculated as follows:

$$(((\text{No of weekdays published}) \times (\text{weekday penetration rate})) + \text{Sunday penetration rate, if any}) / \text{Total number of days published per week per specified community}$$

Thus, weighted average penetration rates differ from raw zip code circulation rates, because they are adjusted for the number of days published and weighted by the differing zip code circulation rates that are observed on weekdays and Sundays. Newspaper-specific monthly counts of articles were then multiplied by the appropriate average per-community newspaper weighted average penetration rates and summed together to form a per community count of articles per month, to enable merging with individual MTF student data.

Each youth was assigned a five-month sum of each newspaper variable based on MTF survey administration date. Youth who completed the survey in the first half of a month were assigned values up to the month preceding it, whereas youth who completed the survey on or after the 15th of the month were assigned all the values for that month. Previous analyses examining exposure to news coverage suggest that while the optimum agenda-setting effect on relevant population attitudes occurs after 18 months of coverage, even four months of previous exposure produced nearly comparable effects.⁵³ We explored various aggregation methods and found a straight sum (simply summing the 5 months of exposure) to be the most robust. A five-month aggregation also permitted the greatest number of months of newspaper data available in this dataset to be matched to all of the MTF survey dates. As 2001–3 MTF surveys were completed during the months of February through early June, relevant coded articles were for the months of September through May. The resulting sample included 8390 tobacco-focused newspaper articles from 386 daily US newspapers.

As noted previously, we coded only articles from a random one-third of the days in each month. To weight the sample back to a best estimate of news articles over the period, all five-month per community newspaper variables were multiplied by three, yielding a best estimate of 25 170 articles over the five-month period.

A weighted total of 134 416 students were able to be matched to collected newspaper article data (98.5% of the original MTF sample). Examination of the distributions of the newspaper codes used showed strong third standard deviation outlier values for 8918 (6.6%) of available cases that were removed from analyses. (Results for volume analyses were not sensitive to the exclusion of outlier values; models simultaneously including event, commentary and theme showed no clear pattern of sensitivity.)

Mixed/neutral commentary proved exceedingly skewed, and was dichotomised into any/none. The weighted number available for analyses was 125 498 students (91.9% of the initial MTF sample for 2001–3).

Control variables

All models included the following control variables known to predict individual youth smoking behaviour: grade level, gender; race/ethnicity (using “white” as the referent category); real earned income adjusted for the 1982–4 consumer price index; average parental education; a dichotomous variable indicating if the student lived with both parents; grade point average; evenings out per week for fun/recreation; and truancy. Further, state cigarette price (real average price/pack of cigarettes (generics excluded) for the first six months of each year), state Smoke-Free Air Index value, and smoking prevalence for 1995–6

Table 1 Descriptive statistics

	%/Mean	SE	Range
Dependent variables			
Perceive great harm in smoking 1+ packs/day (weighted* n = 91 597)	69.73		
Perceived peer smoking prevalence (most/all friends smoke) (weighted n = 57 948)	14.62		
Perceived disapproval of smoking 1+ packs/day (weighted n = 85 583)	2.35	0.010	1–3
Don't disapprove	17.37		
Disapprove	30.61		
Strongly disapprove	52.02		
Current smoking (past 30 days; n = 97 284)	18.32		
Consumption among current smokers (weighted n = 17 827)	5.48	0.023	0.50–40.00
Independent variables: news coverage (weighted n = 98 747)†			
Total volume (No of all articles)	11.89	0.399	0.0–55.7
Event slant (No of all articles)			
Positive event slant	7.19	0.241	0.0–37.6
Negative event slant	2.45	0.105	0.0–14.4
Mixed/neutral event slant	0.67	0.030	0.0–4.11
Secondhand smoke theme (No of all articles)	2.72	0.108	0.0–20.0
Commentary (No of editorials, columns, letters and cartoons)			
Positive commentary	1.28	0.060	0.0–8.0
Negative commentary	0.36	0.024	0.0–3.0
Mixed/neutral commentary (any)	30.96		
Control variables (weighted n = 98 747)			
Male	47.19		
Grade			
8th	34.54		
10th	33.93		
12th	31.53		
Race/ethnicity			
African American	12.63		
Hispanic	11.41		
Other	9.91		
White	66.00		
Average parental education‡	39.42	0.233	10–60
Presence of both parents in household	74.64		
Grade point average§	6.24	0.026	1–9
Out 3+ nights per week for fun/recreation	43.51		
Past 4-week truancy	18.99		
Earned income quartiles (in median \$/week, adjusted for '82–'84 CPI)¶	1–15		
State smoking and tobacco control environment			
Smoking prevalence for 15–18 year olds (1995–6)	12.70	0.112	6.16–20.19
Smoke-free air index	13.67	0.511	–22.50– 51.00
Cigarette price (\$)	2.11	0.013	1.65–3.21
Region			
Northeast	18.73		
Midwest	27.93		
South	34.72		
West	18.63		
Year			
2001	32.15		
2002	32.09		
2003	35.76		

*Reported numbers have been weighted to account for the probability of MTF survey participation.

†All news coverage variables are expressed as five-month sums of total monthly tobacco-related articles per code, adjusted for newspaper penetration rates per zip code, and rescaled by 0.10 to facilitate estimate interpretation.

‡Parental education was a scaled value ranging from 10 to 60 and was a combined average of the mother's and father's highest levels of education, where 10 = grade school or less, 20 = some high school, 30 = high school completion, 40 = some college, 50 = college completion, and 60 = graduate school.

§Grade point average was a 9-item scale where a mean of 6 indicates a B (1 = D or below, 2 = C–, 3 = C, 4 = C+, 5 = C–, 6 = B, 7 = B+, 8 = A–, and 9 = A).

¶Earned income used in analyses as a 4-point scale of 0 = \$0; 1 = \$1–\$15; 2 = \$16–\$39; 3 = \$40+.

for 15–18-year-olds were included to control for the state youth smoking and tobacco control policy environments. Finally, region and year dummies were also included to account for geographic and social trends. After removing cases with missing data on any included control measures (missing data were only found for student sociodemographics), a total of 98 747 weighted cases (79% of available cases) were included in final analysis models.

Models and analysis

Analyses were conducted using SVYLOGIT, SVYREG and GOLOGIT2 procedures in Stata v.9.2. All analyses accounted for both the clustered nature of the data (students within communities (schools), with each community having single measures of newspaper coverage) as well as sampling weights accounting for the probability of survey participation. Analyses modelled relations between community-level newspaper coverage on tobacco issues and youth smoking attitudes and behaviours, and focused specifically on examining if (a) overall volume of tobacco-related newspaper coverage, or (b) the content of coverage (positive, negative or neutral/mixed event; or SHS theme) and/or valence of commentary was related to key youth outcomes. Models focusing on overall volume were run separately. Models focusing on content and valence included all of the following continuous five-month sum newspaper coverage variables simultaneously: positive event, negative event, mixed/neutral event, SHS theme, positive commentary, negative commentary. Models including content and valence also included the dichotomous any/none mixed/neutral commentary variable.

RESULTS

Sample characteristics

The volume of newspaper coverage of tobacco issues varied considerably between communities (table 1). On average, the total volume of newspaper coverage over the five months leading up to MTF survey administration was 11.9 articles (range 0–55.7 articles) per community. Coverage generally focused on positive events from a tobacco control perspective: mean coverage of positive events was over twice that for negative or mixed/neutral events (7.2 articles versus 2.4 and 0.7, respectively), and coverage on SHS averaged 2.7 articles per community. In commentary articles, coverage was more often positive (averaging 1.3 articles), rather than negative (0.4 articles) and only 31% of students resided in communities with any mixed/neutral commentary. There was considerable

variation between communities in the nature of tobacco events being covered, as well as the nature of commentary on such events (table 1).

Almost 70% of all students stated that they saw smoking one or more packs of cigarettes per day as very harmful (table 1). Fifteen per cent of students reported that they believed most or all of their close friends smoked cigarettes. Just over half of students (52%) strongly disapproved of smoking one or more packs of cigarettes per day; however, 14% reported no disapproval of such behaviour. Overall, 18% of students reported smoking within the past 30 days. Of those who did report current smoking, the average number of cigarettes smoked was 5.5 per day.

Newspaper coverage and youth smoking-related outcomes

Table 2 demonstrates that, that for each additional 10 newspaper articles per community, there was a 4% higher odds of youth perceiving great harm in smoking one or more packs of cigarettes per day (OR 1.04; $p<0.01$). Greater total volume was also associated with lower odds of perceived peer smoking prevalence (OR 0.94; $p<0.05$) and increased odds of reporting disapproval versus no disapproval of smoking at least a pack a day (OR 1.04; $p<0.05$). Finally, higher total volume was associated with lower odds of current smoking. For each additional 10 newspaper articles per community, the likelihood of having smoked in the past 30 days was 7% lower (OR 0.93; $p<0.001$). No relations were observed between total volume of coverage and smoking consumption level among current smokers.

Table 3 indicates that few significant associations and no consistent patterns of results were identified between valence or SHS content of newspaper coverage and youth smoking outcomes.

DISCUSSION

Despite the wide variation in the volume, SHS content and valence of tobacco-related newspaper coverage across communities, we found a tendency for newspapers to highlight positive stories rather than setbacks. Similarly, although the level of commentary varied between communities, the nature of the commentary tended to be supportive of a tobacco control position.

Our analysis revealed that a greater volume of news coverage was related to greater perceived smoking harm, more disapproval of smoking, lower perceived peer smoking prevalence, and lower likelihood of having smoked in the past 30 days.

Table 2 Relations between volume of newspaper coverage of tobacco-related issues and youth smoking-related attitudes and behaviours

Model outcome	Odds ratio	p Value	(95% CI)
Perceived harm	1.04	**	(1.01 to 1.07)
Perceived peer smoking prevalence	0.94	*	(0.90 to 0.99)
Perceived disapproval			
Moving from "don't disapprove" to "disapprove"	1.04	*	(1.00 to 1.08)
Moving from "disapprove" to "strongly disapprove"	1.01		(0.98 to 1.04)
Current smoking	0.93	***	(0.89 to 0.97)
	Coeff	p Value	SE
Consumption among current smokers	–0.02		0.019

All models controlled for gender, grade, race/ethnicity, average parental education, presence of both parents in the household, GPA, nights out, truancy, earned income, state youth smoking prevalence, state smoke-free air index value, state cigarette price, region, and year. Volume of news coverage expressed as five-month sums of total monthly tobacco-related articles, adjusted for newspaper penetration rates per zip code, and rescaled by 0.10 to facilitate estimate interpretation. * $p<0.05$; ** $p<0.01$; *** $p<0.001$.

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Table 3 Relations between event, commentary and theme of newspaper coverage of tobacco-related issues and youth smoking-related attitudes and behaviours

Model outcome	Event†								
	Positive			Negative			Mixed/neutral		
	OR	p Value	(95% CI)	OR	p Value	(95% CI)	OR	p Value	(95% CI)
Perceived harm	1.09	*	(1.01 to 1.17)	1.01		(0.88 to 1.17)	0.99		(0.87 to 1.12)
Perceived peer smoking prevalence	0.93		(0.81 to 1.06)	0.99		(0.75 to 1.29)	0.91		(0.70 to 1.19)
Perceived disapproval									
Moving from “don’t disapprove” to “disapprove”	1.05		(0.96 to 1.15)	0.99		(0.82 to 1.19)	1.04		(0.91 to 1.19)
Moving from “disapprove” to “strongly disapprove”	1.00		(0.93 to 1.07)	0.99		(0.86 to 1.13)	1.00		(0.90 to 1.12)
Current smoking	0.94		(0.85 to 1.04)	0.89		(0.73 to 1.08)	0.95		(0.82 to 1.11)
	Coeff	p Value	SE	Coeff	p Value	SE	Coeff	p Value	SE
Consumption among current smokers	-0.03		0.04	-0.16	+	0.08	0.01		0.07
Commentary†									
Model outcome	Positive			Negative			Mixed/neutral (any)		
	OR	p Value	(95% CI)	OR	p Value	(95% CI)	OR	p Value	(95% CI)
	OR	p Value	(95% CI)	OR	p Value	(95% CI)	OR	p Value	(95% CI)
Perceived harm	1.03		(0.84 to 1.28)	0.76		(0.52 to 1.12)	1.00		(0.94 to 1.06)
Perceived peer smoking prevalence	1.22		(0.81 to 1.84)	1.85		(0.83 to 4.12)	1.12	*	(1.01 to 1.25)
Perceived disapproval									
Moving from “don’t disapprove” to “disapprove”	1.00		(0.76 to 1.30)	0.83		(0.52 to 1.33)	1.00		(0.93 to 1.08)
Moving from “disapprove” to “strongly disapprove”	1.07		(0.88 to 1.31)	0.90		(0.63 to 1.27)	0.99		(0.93 to 1.06)
Current smoking	1.22		(0.91 to 1.65)	0.93		(0.54 to 1.61)	1.06		(0.98 to 1.16)
	Coeff	p Value	SE	Coeff	p Value	SE	Coeff	p Value	SE
Consumption among current smokers	0.15		0.115	0.48	+	0.25	0.03		0.03
Theme†									
Model outcome	OR	p Value	(95% CI)						
	OR	p Value	(95% CI)						
Secondhand smoke									
Perceived harm	0.99		(0.87 to 1.13)						
Perceived peer smoking prevalence	0.80	+	(0.62 to 1.04)						
Perceived disapproval									
Moving from “don’t disapprove” to “disapprove”	1.05		(0.88 to 1.25)						
Moving from “disapprove” to “strongly disapprove”	1.06		(0.93 to 1.21)						
Current smoking	0.87		(0.72 to 1.04)						
	Coeff	p Value	SE						
Consumption among current smokers	-0.03		0.09						

All models controlled for gender, grade, race/ethnicity, average parental education, presence of both parents in the household, GPA, nights out, truancy, earned income, state youth smoking prevalence, state smoke-free air index value, state cigarette price, region, and year. News coverage expressed as five-month sums of total monthly tobacco-related articles, adjusted for newspaper penetration rates per zip code, and rescaled by 0.10 to facilitate estimate interpretation. +p<0.10; *p<0.05.

†Event, commentary and theme variables included simultaneously, and all (excluding the dichotomous any/none mixed/neutral commentary) were continuous five-month sums of newspaper articles per community. “Positive” refers to events or commentary supportive of tobacco control efforts; “negative” refers to events or commentary that would be viewed as setbacks from a tobacco-control perspective. “Mixed/neutral” events and commentary are those where the implications for tobacco control efforts are unclear.

However, valence of news coverage and SHS content were unrelated to youth smoking outcomes.

One interpretation of these findings is that the influence of the news media essentially flow from an agenda-setting function. Influencing youth smoking behaviour relies on one’s ability to establish and maintain the familiarity and salience of tobacco issues by high levels of repetition of mention. Alternatively, the effect on attitudes and behaviours of differences in content and valence of news stories may be too small to detect at the population level despite being observable in forced exposure experimental studies.^{54–56}

The findings pertaining to increased volume of news suggest that getting newspaper coverage for all kinds of tobacco issues and topics is a worthwhile objective for tobacco control programmes. From an agenda setting perspective,³⁹ a greater volume of coverage leads to communities discussing an issue and engaging with what is involved—even if this means that controversy is stirred up.³⁷ Discussion gets tobacco on the public agenda, which in turn promotes policy change that is protective for youth. Communities with more discussion of tobacco education programmes, tobacco control policies, and smoking

cessation services and resources are the same communities that will engage with the creation of social structures to prevent youth smoking and promote cessation. In this scenario, greater newspaper coverage leads to community activity, which is then associated with positive outcomes in terms of attitudes and behaviours.

Alternatively, it may be that tobacco issues and events are generating more newspaper coverage precisely because such policy or structural changes would be in some way controversial or engaging, and where there is less general support for tobacco control measures. In this model, a heightened level of activity is assessed by newsmakers as being newsworthy. In this case, the association of heightened volume with positive outcomes needs to be understood as resulting either from the extent to which the ideas posed are seen to signify considerable change, or as resulting from active community debate over the issue. This is, in turn, potentially beneficial in terms of the creation of services and structures that protect young people from tobacco use.

In either case, the result is an increase in overall news coverage about tobacco issues. Our study demonstrates that an active news environment for tobacco issues, alongside other

What this paper adds

Although there is growing evidence that media is important in shaping youth smoking beliefs and behaviours, few studies have linked news coverage about tobacco issues to youth smoking. This study found that a greater number of newspaper articles on tobacco issues per community was associated with an increased odds of perceiving great harm from smoking and increased disapproval of smoking, and lower odds of perceiving most or all friends smoke and smoking in the past 30 days among American teens. The valence and content of the coverage was unrelated to smoking outcomes. Our data lend support to the value of media advocacy efforts and suggest that efforts to increase and sustain the overall volume of news coverage on tobacco issues is one important strategy for reducing youth smoking.

progressive tobacco control efforts, contributes to positive tobacco outcomes for youth.

Limitations

This analysis is subject to certain limitations. The data are cross-sectional, limiting our ability to make causal inferences as to the relation between news media and smoking outcomes. Newspaper coverage is also imperfect as a measure of youth exposure to news media. As outlined in the methods section, however, there is a strong rationale for using daily newspapers as a proxy for the wider news media environment. Moreover, we emphasised an indirect, rather than direct, pathway of influence on youth attitudes and behaviour. Therefore, we argue that in both these respects, print news serves as both a practical and appropriate proxy for the overall news environment.

We matched newspaper data to youth survey data by zip code of the school where the MTF survey was administered. Although not all students will live in their school zip code, the impact of taking one zip code as a proxy for community is likely to be limited since we would not expect a great difference between the extent and influence of given newspapers in neighbouring zip codes. Again, our model of influence prioritises indirect effects, which includes the community in which young people are educated, as well as that in which they live.

Our results may also be a function of the particular time period (2001–3) during which we collected our data, when coverage of tobacco issues was predominantly positive for tobacco control and tobacco use was becoming less socially acceptable. Had this analysis been conducted five years earlier or later, our results may have been different. This is of course an issue with all studies, and a reason why replication and additional study of the relation between news coverage and tobacco use is important.

Finally, our outcome data are based on the responses of individual youth within a community. Our newspaper measures, however, were created at a community level, reflecting the average exposure to each given newspaper based on zip code-specific newspaper penetration rates. Thus, each youth who is surveyed in the same school at the same time is assumed to be exposed to equivalent newspaper coverage on tobacco. This most probably would have the effect of reducing the strength of any relation found from what it might be in reality. Moreover, we were only able to utilise state-level tobacco policy controls, rather than county-specific policies.

Despite these limitations, this study is the first to our knowledge to quantitatively relate newspaper coverage to youth smoking attitudes and behaviours in a national sample of American students. The Monitoring the Future Survey is one of the most robust, representative sources of data regarding youth behaviour, and the newspaper data collection procedures were carefully designed to merge with the survey data.

CONCLUSION

As researchers increasingly adopt ecological approaches to understanding youth smoking behaviours, the news environment deserves greater attention as an important community-level factor. Understanding how the news media assist or undermine youth focused tobacco control efforts remains an important research endeavour. The lack of systematic results linking newspaper content with key youth outcomes suggests that seeking simply to increase the overall volume of coverage is likely to yield considerable “bang for the buck” and would be an appropriate goal for tobacco control media advocacy efforts.

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