

# Do smokers support smoke-free laws to help themselves quit smoking? Findings from a longitudinal study

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# Do smokers support smoke-free laws to help themselves quit smoking? Findings from a longitudinal study

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## ABSTRACT

**Background** A growing number of smokers support smoke-free laws. The theory of self-control provides one possible explanation for why smokers support laws that would restrict their own behaviour: the laws could serve as a self-control device for smokers who are trying to quit.

**Objective** To test the hypothesis that support for smoke-free laws predicts smoking cessation.

**Methods** We used longitudinal data (1999–2000) from a US national sample of adult smokers (n=6415) from the Current Population Survey, Tobacco Use Supplements. At baseline, smokers were asked whether they made a quit attempt in the past year. They were also asked whether they thought smoking should not be allowed in hospitals, indoor sporting events, indoor shopping malls, indoor work areas, restaurants, or bars and cocktail lounges. At 1-year follow-up, smokers were asked whether they had quit smoking.

**Findings** Smokers who supported smoke-free laws were more likely to have made a recent quit attempt. At 1-year follow-up, those who supported smoke-free laws in 4–6 venues were more likely to have quit smoking (14.8%) than smokers who supported smoke-free laws in 1–3 venues (10.6%) or smokers who supported smoke-free laws in none of the venues (8.0%). These differences were statistically significant in multivariate analyses controlling for demographics.

**Conclusions** Support for smoke-free laws among smokers correlates with past quit attempts and predicts future quitting. These findings are consistent with the hypothesis that some smokers support smoke-free laws because the laws could help them quit smoking.

## INTRODUCTION

Smoke-free laws are implemented to protect non-smokers from the harms of second-hand smoke.<sup>1</sup> Therefore, it is not surprising that most non-smokers are proponents of implementing smoke-free laws in a variety of public places.<sup>2–5</sup> In contrast, smokers are generally less supportive of implementing smoke-free laws,<sup>2–5</sup> which is also not surprising as smoke-free laws put restrictions on places where they are allowed to smoke. However, several studies have shown that a growing number of smokers support smoke-free laws.<sup>2 3 6 7</sup> Given that these laws restrict smoking behaviour, it would seem irrational for smokers to be in favour of them. We hypothesise that these smokers support smoke-free laws not only for the protection of non-smokers, but also because these laws might help them to quit smoking.

The seemingly irrational attitudes of smokers who support laws that limit the number of places where they can smoke can be explained using the economic *theory of self-control*.<sup>8</sup> This theory states that counter-intuitive, self-limiting attitudes such as these are actually rational when the cost of the restriction is lower than the benefits of having an external limit that acts as a self-control device. This concept of self-control can be better understood when the self is seen as comprised of two conflicting subselves, which Thaler and Shefrin<sup>8</sup> call the *planner* and the *doer*. The planner is concerned with lifetime utility, whereas the doer is concerned only with the present. The planner can put *incentives* or *rules* into place to restrict the doer. This theory leads to a wide range of predictions for human behaviour. For example, a smoker (the planner) may support tobacco control policies because the policies impose an external limit (a rule) on his or her future behaviour, which may help to control himself or herself (the doer) from relapsing after making a quit attempt.

Behavioural economists have suggested that cigarette taxation is a potential self-control device that can help smokers quit smoking.<sup>9</sup> For example, Gruber and Mullainathan<sup>10</sup> argued that more insight into the mechanisms of self-control is provided by examining whether tobacco tax increases make smokers happier, if their need for self-control were satisfied. They indeed found evidence that increased tobacco taxes made smokers happier and assumed that the reason behind that finding is that tobacco taxes help smokers quit smoking.<sup>10</sup>

Although tobacco taxation may be used by some smokers as a self-control device, smoke-free laws may be a more direct self-control device because of the legal restriction on smokers' behaviour. These restrictions help reduce their own smoking as well as that of others smoking around them, which can be a trigger for relapse. Studies have investigated if smokers' intention to quit smoking is related to their support for smoke-free laws,<sup>11 12</sup> and several have indeed found a positive correlation.<sup>7 13–15</sup> Two cross-sectional studies have found that support for smoke-free laws also correlates with quitting behaviour.<sup>11 16</sup> However, it is not clear if the attitudes toward smoke-free laws changed after the smokers quit or if these changes preceded quitting. A longitudinal study design would allow researchers to examine if smokers' current support for smoke-free laws predicts their future quitting behaviour.

The present study uses data from a large longitudinal national sample from the Current Population



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Survey, Tobacco Use Supplements (TUS-CPS), which is representative of the adult smoking population in the USA. We test the hypothesis that support for smoke-free laws at baseline predicts smoking cessation 1 year later at the follow-up survey.

The present study used the 1999–2000 longitudinal dataset from TUS-CPS. It is one of only two longitudinal datasets available from TUS-CPS and it is the one with a larger sample size. Moreover, this survey was conducted in the years soon after the 1998 Master Settlement Agreement was implemented across the USA.<sup>17</sup> It was a period of much discussion of smoke-free policies in the news media. Many states started to consider laws to restrict smoking in public places, after witnessing the success in other states such as California.<sup>3 4 18</sup>

## METHODS

### Sample

The TUS-CPS is a large national household survey conducted among US citizens aged 15 years and older and is administered by the Census Bureau for the National Cancer Institute. The CPS includes a multi-stage probability sample from over 50 000 households per month. The TUS is conducted periodically as part of the CPS with eight panel rotations in three waves, each covering all 50 US states and Washington DC.

In the current study, we used longitudinal data from the TUS-CPS in 1999 with a 1-year follow-up in 2000. Data were collected in January and May 1999 and in January and May 2000. Due to the rotating panel design of the CPS, a subset of those interviewed in 1999 was interviewed again in 2000. Therefore, TUS-CPS data can be used for longitudinal analyses, although only a few studies have used the data in this way.<sup>19 20</sup> Additional details about the methodology of the 1999 and 2000 TUS-CPS can be found in technical reports on the TUS-CPS website of the National Cancer Institute.<sup>21 22</sup>

For the analyses in this paper, we excluded proxies (those who responded to the survey on behalf of others), respondents aged 15–17 years, and non-smokers in 1999. A sample of 6415 smokers who were interviewed in 1999 and were followed up 2 years later were used for the analyses in this paper.

### Measures

*Support for smoke-free laws* was measured for six venues: hospitals, indoor sporting events, indoor shopping malls, indoor work areas, restaurants, and bars and cocktail lounges. Respondents were asked whether they thought that smoking should be allowed in all areas, allowed in some areas, or not at all. Responses were dichotomised as 1 = 'should not be allowed at all' and 0 = 'should be allowed in all areas' or 'should be allowed in some areas'. We first examined the predictive value of smokers' attitude for each venue separately in a univariate analysis. After finding that the baseline attitude in each venue predicted quitting at the follow-up survey, we decided to use a composite score. A sum score of all six venues was used as a measure of overall support for smoke-free laws, ranging from 0–6. This sum score was used to group all respondents into three groups: those who supported smoke-free laws in 0 venues, those who supported the laws in 1–3 venues, and those who supported the laws in 4–6 venues.

*Quit attempt rate* was calculated as the percentage of smokers who made any attempt that lasted at least 24 h in the 12 months before the survey. Quit attempts were assessed in the 1999 survey, although only among daily smokers, and not at all in the 2000 survey. The *quit rate* was defined as the percentage of smokers who had stopped smoking at the time of the 2000 survey.

*Demographic variables* that were included as covariates in this study were: education, age, gender, and ethnicity. Education was categorised as (1) less than high school (no diploma), (2) high school (diploma or equivalent), (3) some college or associate degree, and (4) bachelor's degree and higher. Age was categorised into four groups: (1) 18–24 years, (2) 25–44 years, (3) 45–64 years, and (4) 65 years and older. Ethnicity was categorised as (1) non-Hispanic white, (2) Hispanic, (3) black, (4) Asian, and (5) Native Americans. The term 'ethnicity' was used in a general sense to stand for both race and ethnicity.

### Analyses

For the baseline sample, the variances were estimated using census-derived weights to adjust for the probability of selection and non-response. Multivariate logistic regression was used to test the association between support for smoke-free laws and the quit attempt rate in 1999. We also used multivariate logistic regression to test whether support for smoke-free laws in 1999 was associated with quit rates in 2000 after controlling for the demographic variables. The full sample and replicate weights for this 1999–2000 sample were created based on the same methods as used for the 2002–2003 longitudinal sample.<sup>23</sup> All computations and variance estimations were performed with SUDAAN V.11.0.<sup>24</sup>

## RESULTS

### Support for smoke-free laws

Table 1 shows that a little over one fifth of smokers did not support smoke-free laws in any of the six venues (21.8%). A larger group supported smoke-free laws in 1–3 venues (44.2%) or in 4–6 venues (34.0%). Smokers who were most supportive of smoke-free laws (those who supported the laws in 4–6 venues) were more likely to be those with higher education. Women were more likely than men to support the laws. Also, Hispanics were more likely to support the smoke-free laws than non-Hispanic whites. Asians were also more likely to support the laws than whites.

### Association with quit attempt rate at baseline

Figure 1 shows the rate of quit attempts made in the 12 months preceding the 1999 baseline survey (only daily smokers were asked this question). Daily smokers who supported smoke-free laws in 1–3 venues were more likely to have attempted to quit smoking in the last 12 months than those who did not support any of these laws ( $p < 0.001$ ). Those who supported the laws in 4–6 venues were more likely to have tried to quit than those who supported such laws in 1–3 venues ( $p < 0.001$ ). These differences were also statistically significant in a multivariate analysis, controlling for the effects of education, age group, gender, ethnicity, and number of cigarettes per day (all  $p < 0.001$ ).

### Association with quit rate at follow-up

Figure 2 shows the quit rate in 2000 by support for smoke-free laws in 1999. Smokers who supported the laws in 1–3 venues at baseline were more likely to have stopped smoking than those who did not support any laws ( $p < 0.05$ ), and smokers who supported the laws in 4–6 venues were more likely to quit than those who supported the laws only in 1–3 venues ( $p < 0.01$ ).

The results of a multivariate analysis, controlling for the effects of education, age group, gender, ethnicity, and number of cigarette per day, are shown in table 2. The difference between 1–3 venues and zero venues was marginally significant, but those who supported the laws in 4–6 venues were

**Table 1** Percentage of smokers who reported supporting smoke-free laws in 0 venues, 1–3 venues, or 4–6 venues at the baseline survey (the year 1999)

	N	% support smoke-free laws in 0 venues	% support smoke-free laws in 1–3 venues	% support smoke-free laws in 4–6 venues
<b>Overall</b>	6415	21.8 (20.7–23.0)	44.2 (42.6–45.8)	34.0 (32.4–35.7)
Education				
Less than high school	1124	26.9 (24.1–29.9)	41.5 (38.5–44.5)	31.6 (28.4–35.0)
High school	2649	22.2 (20.5–24.0)	45.9 (43.6–48.1)	31.9 (29.8–34.2)
Some college	1743	19.8 (17.8–21.9)	44.7 (41.8–47.7)	35.5 (32.8–38.3)
Bachelor degree and higher	899	17.9 (15.1–21.2)	41.9 (38.3–45.6)	40.2 (36.5–44.0)
Age group (years)				
18–24	323	14.5 (11.0–18.8)	48.1 (41.6–54.7)	37.4 (30.4–45.0)
25–44	2968	19.6 (18.0–21.3)	44.9 (42.6–47.2)	35.5 (33.1–38.0)
45–64	2408	24.3 (22.4–26.4)	43.3 (40.9–45.6)	32.4 (30.1–34.8)
≥65	654	25.3 (21.0–30.2)	42.4 (37.9–47.0)	32.3 (28.7–36.2)
Gender				
Male	2826	22.6 (20.9–24.5)	45.1 (43.0–47.3)	32.3 (30.2–34.4)
Female	3589	21.0 (19.7–22.4)	43.3 (41.3–45.2)	35.7 (33.9–37.6)
Ethnicity				
White	5417	22.7 (21.4–24.1)	45.7 (43.9–47.4)	31.7 (30.0–33.4)
Hispanic	269	12.5 (8.9–17.4)	33.3 (26.8–40.5)	54.2 (47.3–60.9)
Black	543	23.2 (19.1–28.0)	38.4 (34.2–42.7)	38.4 (33.5–43.5)
Asian	83	7.5 (3.7–14.9)	43.1 (30.4–56.9)	49.3 (36.6–62.2)
Native American	103	14.2 (7.3–25.8)	49.8 (34.3–65.3)	36.1 (22.9–51.9)
CPD				
≥15	3782	26.7 (25.2–28.3)	48.1 (46.3–49.9)	25.2 (23.5–27.0)
<15	2606	14.3 (12.9–15.8)	38.6 (36.3–40.9)	47.1 (44.9–49.3)

CPD, cigarettes per day.

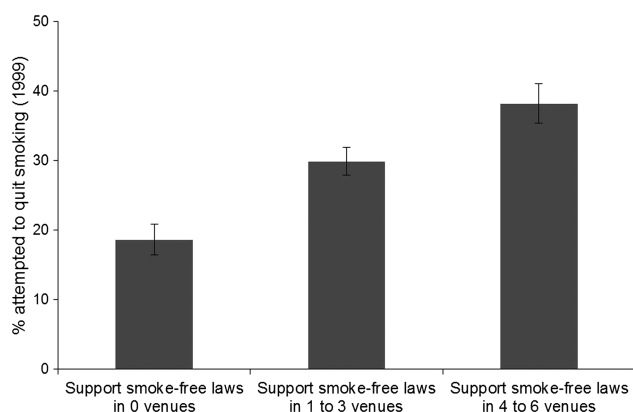
significantly more likely to have stopped smoking than those who did not support any such laws ( $p < 0.01$ ).

## DISCUSSION

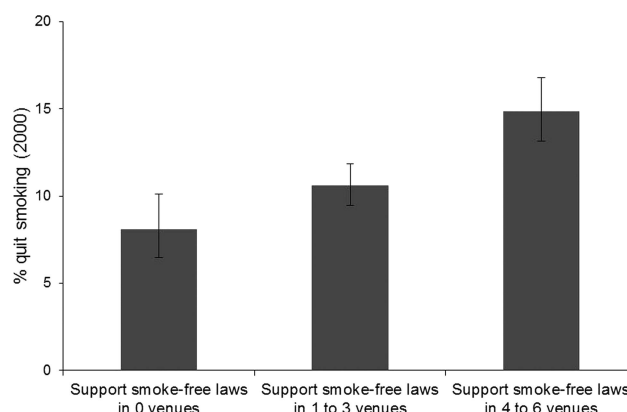
The results from this longitudinal national survey support the hypothesis that smokers' attitudes towards smoke-free laws predict their future quitting. These results are consistent with the behavioural economics conception of self-control.<sup>8–25</sup> Even though these laws restrict where smokers can smoke, smokers may support them because they can serve as a self-control device, helping smokers to quit in the future. In a certain sense, these smokers are making a commitment to future quitting by supporting these laws.<sup>25</sup> Thus, what appears to be irrational at

present (ie, smokers supporting laws that increase the costs of their own behaviour) can be explained by what could benefit them in the future.

These results also support earlier research which examined associations between smokers' support for smoke-free laws with their intentions to quit<sup>11–12–26</sup> and recent quit attempts.<sup>11–16</sup> These results add to the literature by demonstrating that smokers' support for these laws is not only related to previous quit attempts, but also to future quitting. The longitudinal study design used here provides stronger support for this self-control hypothesis. Because the data come from a representative sample of the US adult smoking population they also add to the generalisability of the observed phenomenon.



**Figure 1** Percentage of daily smokers who attempted to quit smoking in 1999 by support for smoke-free laws in 0 venues, 1–3 venues, or 4–6 venues in 1999 (n=5176).



**Figure 2** Percentage of smokers who quit smoking in 2000 by support for smoke-free laws in 0 venues, 1–3 venues, or 4–6 venues in 1999 (n=6415).

**Table 2** Baseline predictors of having stopped smoking at follow-up survey a year later (multivariate analysis)

	Quit in 2000 (%) (N=6326)	OR (95% CI)
Support for smoke-free laws		
0 venues	8.0	1
1–3 venues	10.6	1.27 (0.97 to 1.68)
4–6 venues	14.8	1.64 (1.22 to 2.20)
Education		
Less than high school	9.9	1
High school	10.1	1.07 (0.81 to 1.42)
Some college	13.1	1.35 (1.02 to 1.78)
Bachelor degree and higher	14.2	1.35 (1.00 to 1.81)
Age group (years)		
18–24	8.5	1
25–44	11.1	1.54 (0.93 to 2.56)
45–64	11.0	1.67 (1.02 to 2.73)
≥65	16.9	2.75 (1.56 to 4.86)
Gender		
Male	12.0	1
Female	11.0	0.80 (0.66 to 0.96)
Ethnicity		
White	11.7	1
Hispanic	13.3	0.90 (0.59 to 1.37)
Black	8.8	0.60 (0.42 to 0.85)
Asian	7.7	0.45 (0.16 to 1.30)
Native American	17.5	1.44 (0.69 to 3.01)
CPD		
<15	16.3	1
≥15	8.2	0.46 (0.38 to 0.56)

CPD, cigarettes per day.

It should be noted, however, that the present study did not directly measure smokers' need for self-control, and it did not ask smokers whether they supported smoke-free laws to help themselves quit smoking. Strictly speaking, therefore, the results provide support for the self-control hypothesis rather than a direct test. However, it should also be noted that the self-control hypothesis does not require that smokers always be conscious of the connection between laws and their potential function as self-control devices. The value of this economic conception of self-control<sup>8 23</sup> depends on its success in predicting behavioural patterns at the population level, not on whether individual survey respondents report self-control as a reason for supporting restrictions. Moreover, it is unlikely that all smokers support laws for reasons of self-control, even if some clearly see benefits to future quit attempts. Some smokers may support these laws out of their concern for the negative health effects to non-smokers, and others may be concerned about the negative social effects on children who may be less likely to initiate smoking if they see fewer smokers around.<sup>27 28</sup>

A recent population study from Catalonia made a first attempt to directly measure people's need for self-control in non-smokers as well as in smokers.<sup>26</sup> The authors argue that their data indicate that non-smokers support the smoke-free laws not only to protect themselves from exposure to second-hand smoke, but also to protect themselves from either initiating smoking or from relapsing if they are former smokers.<sup>26</sup> Future research should determine whether these findings for non-smokers can be replicated.

The results from the present study have practical implications for current discussions on tobacco control policies. The primary

argument for implementing smoke-free laws is that it protects non-smokers from the harms of second-hand smoke. The possibility that some smokers support smoke-free laws to help themselves quit smoking provides useful information for discussion on the implementation of smoke-free laws. It can be used as a secondary argument for implementing smoke-free laws, as has been suggested by other researchers who study the beneficial effects of increasing the financial or social costs of smoking.<sup>10 12 26</sup> Of course, there are also direct ways of helping smokers who want to quit smoking in addition to providing them with possible self-control mechanisms. Tobacco control programmes can, for example, help smokers directly by providing them with smoking cessation assistance at low or no cost.<sup>29</sup> If policies for smoke-free laws are implemented together with direct assistance programmes, it will make it easier for smokers to support new laws restricting smoking, which will ultimately increase their chances of quitting successfully.

### What this paper adds

- ▶ Support for smoke-free laws among smokers correlates with past quit attempts and predicts future quitting.
- ▶ It seems that some smokers support smoke-free laws to help themselves quit smoking.

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**Contributor** GEN drafted the manuscript. Y-LZ conducted the statistical analysis with assistance from AG who guided the development of replicate weights for this longitudinal portion of TUS-CPS surveys. S-HZ conceived the study and is the guarantor of the paper. All authors contributed to the data interpretation and to the writing of the manuscript. All authors revised the manuscript for intellectual content.

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**Competing interests** None.

**Ethics approval** This study has been approved by the ethics committee of the institutional review board, University of California, San Diego, Human Research Protection Program.

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**Data sharing statement** The data of the TUS-CPS study are available for download here: <http://riskfactor.cancer.gov/studies/tus-cps/info.html>.

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