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Publisher: Routledge

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Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



The Journal of Social Psychology

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/vsoc20>

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Available online: 02 Apr 2010

To cite this article: Ted H. Shore, Armen Tashchian & Janet S. Adams (2000): Development and Validation of a Scale Measuring Attitudes Toward Smoking, *The Journal of Social Psychology*, 140:5, 615-623

To link to this article: <http://dx.doi.org/10.1080/00224540009600501>

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Development and Validation of a Scale Measuring Attitudes Toward Smoking

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ABSTRACT. The authors developed the Smoking Attitudes Scale (SAS) and administered it to 2 samples of U.S. students who were smokers or nonsmokers. Exploratory and confirmatory factor analysis with LISREL (K. G. Jöreskog & D. Sörbom, 1989) methodology revealed that the SAS consists of 4 factors. The overall instrument possesses good internal consistency and adequate construct validity as well.

Key words: attitudes toward smoking, scale development and validation

IN RECENT YEARS, smoking has become a social issue of increasing prominence. As researchers have continued to document the health consequences of smoking, legislators have implemented numerous regulations and laws restricting smoking at work and in public places throughout the United States (Losey, 1991). These actions have prompted national debate about the rights of smokers and nonsmokers. Central to this issue are deeply held attitudes and beliefs about smoking. Understanding attitudes toward smoking behavior is important on both an individual and a societal level.

Numerous approaches aimed at helping the individual smoker reduce or eliminate smoking have been developed. Ultimately, these programs require

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behavior change by the smoker. Past research has clearly demonstrated a link between behavior and attitudes, with attitudes often viewed as an antecedent of behavior. Some theorists argue that to change a behavior such as smoking, an understanding of the underlying attitudes toward that behavior is necessary. The theories of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) and planned behavior (Ajzen, 1991) posit that behavior is a function of a person's intentions, which, in turn, are determined by personal attitudes and social norms.

On a societal level, attitudes toward smoking influence public policy. Over time, a dramatic shift in society's attitudes toward smoking has resulted in many changes in public policies. An understanding of societal attitudes toward smoking would enable public and corporate policy makers to better gauge the public's reaction to proposed legislation and regulation of public smoking. Given the influence of attitudes on behavior and the need to understand societal attitudes toward smoking, we developed a psychometrically sound instrument for measuring attitudes toward smoking.

Researchers have attempted to measure attitudes toward smoking because of their direct influence on behavior (Bagozzi, Baumgartner, & Yi, 1989). However, there is considerable variability in how smoking attitudes have been operationalized. Pederson and Lefcoe (1985) developed a questionnaire to study smoking during late adolescence in the United States; they reported that smokers were uninformed about the health effects of smoking and held positive attitudes toward smoking. Chen (1988) modified Pederson and Lefcoe's questionnaire and found that favorable attitudes toward smoking were an important determinant of the desire to smoke among adolescents in the Republic of China. The modified instrument comprised 17 Likert-type items anchored with a 4-point scale. Crowe, Torabi, and Nakornkhet (1994) used Chen's questionnaire to study smoking attitudes in 7th- and 8th-grade students in the United States and China; they reported that their instrument has adequate internal consistency. They found that Chinese students had more positive attitudes toward smoking than did U.S. students and that smokers held more positive attitudes toward smoking than did nonsmokers.

De Vries, Backbier, Kok, and Dijkstra (1995) measured smoking attitudes in a sample of secondary school students in the Netherlands. Their measure assessed smoking attitudes with 28 Likert-type items that measured beliefs and evaluations rather than attitudes per se. Because no data regarding the reliability, validity, or both of their scale were reported, it is not possible to assess their scale development. They reported that smoking attitudes (and self-efficacy) added significantly to the prediction of smoking behavior beyond other variables such as social pressure.

Green and Gerken (1989) studied public opinions toward smoking policies in California in 1984 and 1987 by using a telephone survey. Smokers were significantly more opposed than nonsmokers to public smoking restrictions and tobacco sales tax increases. Dixon, Lowery, Levy, and Ferraro (1991) extended

the work of Green and Gerken by means of a telephone survey of Illinois and North Carolina residents. The results were consistent with Green and Gerken's findings that self-interests were related to attitudes toward smoking restrictions and tobacco sales taxes.

Researchers' past attempts to measure attitudes toward smoking have several limitations. First, they treated smoking attitudes as a global unidimensional construct. However, the literature suggests distinct facets of smoking attitudes, including health concerns, restrictions on public smoking, interpersonal relationships, and marketing of cigarettes. It is possible that individuals have distinct views toward these different smoking-related issues. Therefore, in the present study, we constructed a smoking attitudes scale with subscales to measure the different components of smoking attitudes. A second limitation of prior measures is that, with the exception of phone surveys (Dixon et al., 1991; Green & Gerken, 1989), they were designed to measure smoking attitudes in adolescents (Chen, 1988; Crowe et al., 1994; De Vries et al., 1995; Pederson & Lefcoe, 1985). However, because adolescents and adults may have discrepant views on some smoking issues, there is a need for a measure that is applicable to a wide age range. Therefore, we designed the Smoking Attitudes Scale (SAS) for use with both adolescent and adult populations. Finally, prior researchers (De Vries et al.) did not report complete information on how attitude measures were developed or on their psychometric properties. In the present study, we reported on the process used to develop and validate the SAS.

Method

Development of Items for the SAS

In the initial phase of the present research, we reviewed literature in the areas of applied social psychology and public policy to identify topical areas dealing with smoking attitudes. We developed the SAS to measure attitudes toward smoking on a wide variety of smoking-related issues (e.g., smoking in restaurants, the sale of cigarettes, legal restrictions, smokers' rights, and non-smokers' rights). Several items were written on each topic to increase scale reliability. The preliminary scale consisted of 32 items anchored by a Likert-type format (1 = *strongly disagree*, 7 = *strongly agree*), with about half of the items designed for reverse scoring so that high responses indicate negative attitudes toward smoking.

Samples

We selected two samples. The first sample consisted of 284 undergraduate business and psychology students (74 smokers, 210 nonsmokers; mean age = 21.4 years, $SD = 2.1$) at a medium-sized state university in the U.S. Northeast.

Questionnaires were distributed during scheduled classes following a brief verbal introduction to the study. Respondents completed the SAS as part of a study assessing attitudes toward hypothetical company smoking policies.

The second sample consisted of 274 graduate students (34 smokers, 240 nonsmokers; mean age = 34.6 years, $SD = 7.8$) enrolled in a Master of Business Administration program at a medium-sized state university in the U.S. Southeast. More than 90% of these students held full-time jobs. Respondents completed the 32-item SAS as part of a larger survey that included measures of organizational commitment, job satisfaction, personal values, description of and satisfaction with their company's smoking policy, and demographic information (employment status, smoking status, age, race, marital status, and smoking status of family and significant others).

Results

Exploratory Factor Analysis

To assess the structure of the SAS scale, we factor-analyzed all 32 items by means of principal components analysis with varimax rotation. The initial factor solution for the undergraduate sample resulted in four factors with eigenvalues greater than 1. The four-factor solution accounted for 54% of the variance. In selecting items for the final scale, we examined the pattern of loadings, looking for items with high loadings on the intended factor and low loadings on the other factors. We used a minimum factor loading of .30 (Nunnally, 1978) as a guideline for considering an item to be part of a factor. Moreover, in order to purify the list, we eliminated items with loadings of .40 or greater on more than one of the factors. We factor-analyzed the reduced list a second time. This resulted in the same four factors with eigenvalues greater than one. These factors accounted for 61% of the variance. The process resulted in the elimination of 15 items from the preliminary questionnaire because of weak factor loadings or high cross loadings on more than one factor. The final 17-item SAS, along with the factor loadings is shown in Table 1.

As can be seen in Table 1, there were minimal double-loadings complications for items. Factor 1 reflected relationships with smokers and included 5 items (e.g., "I would not date a person who smokes"). Factor 2 reflected views toward smoking restrictions and laws and comprised 6 items (e.g., "Restricting smoking in public places is unfair to smokers"). Factor 3 reflected concerns about secondhand smoke and comprised 3 items (e.g., "Secondhand smoke is a legitimate health risk"). Factor 4 reflected attitudes concerning the sale and marketing of cigarettes and comprised 3 items (e.g., "All forms of cigarette advertising should be illegal").

We tested the final set of items derived from factor analysis for their reliability by submitting them to item analysis using item-total correlations. We analyzed

the items for each subscale separately. The internal consistencies were .88, .80, .70, and .69 for Factors 1 through 4, respectively, and .90 for the overall SAS.

Confirmatory Factor Analysis

To verify the factor structure of the SAS obtained from the exploratory analysis, we conducted a confirmatory factor analysis of the covariance matrix obtained

TABLE 1
Factor Loadings for the Four Dimensions of the Smoking Attitudes Scale

Item	Loading			
	Factor 1	Factor 2	Factor 3	Factor 4
I would not date a person who smokes.	.850			
I would marry a person who smokes.	.798			
I would object to living with a smoker.	.771			
I prefer not to spend a lot of time with people who smoke.	.729			
I would be willing to form a close friendship with a smoker.	.683			
There is no good reason to ban smoking on airplane flights.		.756		
Restricting smoking in public places is unfair to smokers.		.664		
Laws restricting smoking in the work place are unfair to smokers.		.603		
People should have the right to smoke where and when they want.		.585		
Smoking should not be restricted by law in any way.		.571		
Nonsmokers should learn to be more tolerant of smokers.		.447	.328	
People have a basic right to breathe smoke-free air.			.804	
Secondhand smoke is a legitimate health risk.			.751	
Employers should be required to provide a smoke-free work environment for their employees.			.563	
All forms of cigarette advertising should be illegal.				.807
Cigarette companies should be permitted to advertise their products in any way they wish.				.751
The sale of cigarettes should be outlawed altogether.	.346			.588

from the graduate student sample. We obtained maximum likelihood solutions by using LISREL 7 (Jöreskog & Sörbom, 1989) to verify the relationship between observable variables and latent constructs. This process determined a smaller set of underlying latent factors from the 17 items of the SAS. The χ^2 statistic was non-significant for the final model, indicating an adequate fit of the confirmatory model to the data, $\chi^2(109, N = 274) = 122.07, p = .188$. Furthermore, the plot of the normalized residuals approximated a straight line, indicating that there were no specification errors or departures from normality in the data. The confirmatory factor model accounted for about 77% of the variation for the four dimensions of the SAS, indicating reliable dimensions. The internal consistencies of Factors 1 through 4 were .91, .83, .72, and .72, respectively, and .93 for the overall SAS. The correlations among the four factors showed that the tobacco sales factor had the lowest correlation with the other factors, $r_s = .44-.46$. The highest correlation was between the smoking restrictions and passive smoking factors, $r = .87$.

Construct Validity

Finally, we examined the construct validity of the SAS by determining whether smokers and nonsmokers displayed different attitudes with respect to the four factors. For all four factors, the nonsmokers and smokers had significantly different scores because of different item responses. The nonsmokers' attitudes were significantly more antismoking than the smokers' attitudes on all items except 1 ("Cigarette companies should be permitted to advertise their products in any way they wish"), where the difference was in the expected direction but did not reach significance. Specifically, the nonsmokers, compared with the smokers, held more negative attitudes toward various types of relationships with smokers, favored more laws and restrictions on smoking, had more concerns about the health risks of secondhand smoke, and favored more stringent restrictions on the marketing of cigarettes. Thus, the underlying factors of the SAS were found to be significantly related to smoking status, providing empirical support for the constructs measured by the SAS.

Discussion

In the present study, we reported on the development of an instrument intended to measure a broad range of attitudes toward smoking. We developed the preliminary questionnaire by reviewing literature on smoking attitudes and administered it to two samples of students. A factor analysis yielded four distinct factors, which reflect attitudes toward (a) interpersonal relationships with smokers, (b) laws and societal restrictions of smoking in public places, (c) health concerns, and (d) the marketing and sale of cigarettes. On the basis of factor analysis, we revised the preliminary questionnaire to produce a final instrument comprising 17 items. The SAS was found to have high internal consistency.

Support for the construct validity of the SAS was shown in two ways. First, as expected, smokers and nonsmokers responded quite differently to the SAS. To a much greater degree than smokers, nonsmokers favored restrictions on smoking in public places and on the marketing and sale of cigarettes. The nonsmokers also had significantly more concerns about the risks of secondhand smoke and were more opposed than the smokers to relationships with smokers. Second, our findings were consistent with those from prior studies showing contrasting attitudes of smokers and nonsmokers. Several researchers (e.g., Dixon et al., 1991; Green & Gerken, 1989) have reported that self-interests were related to smoking attitudes such that smokers were more opposed than nonsmokers to public smoking restrictions and tobacco sales tax increases. Other researchers have found that smokers were less inclined than nonsmokers to believe in the health hazards associated with smoking (Chapman, Wang, & Smith, 1993; Loken, 1982; Shervington, 1994). This consistent pattern of differential responses across the SAS items for smokers versus nonsmokers, coupled with the similarity of our findings to those of prior studies, supports the SAS as a valid measure of smoking attitudes.

It is interesting to note the variability in the degree to which smokers and nonsmokers differed in their views on the four factors that constituted the SAS. The greatest differences were in the area of interpersonal relationships. Nonsmokers held much more negative attitudes toward types of relationships (e.g., dating, marital, and social) with smokers than did smokers. One possible reason for this is that nonsmokers may believe that relationships with smokers reflect poorly on their social image, because society's attitudes toward smoking have become much more negative in recent years. For most smokers, this concern is likely to be minimal. Furthermore, nonsmokers may wish to minimize associations with smokers because of the potential health consequences of secondhand smoke.

The attitudes of smokers and nonsmokers differed sharply in the area of legal restrictions on smoking in public places. Nonsmokers more strongly favored restrictions on smoking (e.g., in the work place, airplanes, and public places) than did smokers. It is not particularly surprising that smokers would have strong negative reactions to restrictions imposed on their behavior, especially because smoking is a legal (i.e., "free") behavior (Brehm, 1966). On the other hand, nonsmokers have become quite vocal in asserting their beliefs in their right to a smoke-free environment. Apparently, smokers and nonsmokers have deeply held convictions about these conflicting rights.

Smokers and nonsmokers also differed in their concerns about secondhand smoke. Smokers did not consider secondhand smoke a legitimate health risk or feel that employers should be required to provide a smoke-free work environment for their employees. By contrast, nonsmokers were more concerned about the effects of secondhand smoke and felt they had a right to a smoke-free work place. These results are not surprising in light of the mounting evidence of the health effects of secondhand smoke reported in the news media recently. Furthermore, this finding is consistent with those of prior research showing that

smokers have been less convinced than nonsmokers of the negative consequences of smoking (Chapman et al., 1993; Loken, 1982; Shervington, 1994).

The least significant differences in attitudes of smokers and nonsmokers concerned the sale and marketing of cigarettes. Smokers and nonsmokers were generally opposed to the advertising of cigarettes and favored outlawing the sale of cigarettes; however, nonsmokers had stronger attitudes toward these issues. These findings are somewhat inconsistent with earlier findings that self-interests influenced one's attitudes. For example, it has been reported that smokers are more likely than nonsmokers to oppose increases in tobacco sales taxes (Dixon et al., 1991; Green & Gerken, 1989). Perhaps these conflicting findings occurred because earlier studies were based on surveys of the general population, whereas the present findings were based on a sample of MBA students who may have been less tolerant toward smoking despite their self-interests.

The SAS potentially has a wide range of applications. Numerous programs aimed at helping people reduce smoking have been developed, but they often have a high failure rate. Because the link between attitudes and behavior has been well established (Ajzen & Fishbein, 1980; Festinger, 1957), people must understand their attitudes toward their behavior to reduce their smoking. The SAS may help provide smokers with insights about their own smoking attitudes, which, in turn, may facilitate smoking cessation. Health practitioners could use the SAS to predict the likelihood of success in smoking cessation programs. The SAS might also be used to identify young people who are likely to become smokers and toward whom appropriate interventions could be directed. The SAS could enable business organizations to develop policies consistent with employee attitudes toward smoking. Finally, the SAS could enable social scientists to monitor social trends in attitudes toward smoking.

One very significant limitation of the present study is that the SAS was developed with samples of largely White U.S. students. Further research is needed to determine if the present results are generalizable to other age, ethnic, and cultural groups. Another limitation is the absence of external criteria to evaluate the SAS. It would be valuable to determine whether the SAS can predict criteria such as reactions to corporate and public smoking policies and success in smoking cessation programs.

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Received April 2, 1998

Accepted December 4, 1998