

What Kinds of People Do Not Use Seat Belts?

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Abstract: In the course of a Community Mental Health Epidemiology study conducted in Washington County, Maryland between December, 1971 and July, 1974, interviews were conducted with randomly selected adults in a weekly systematic sampling of households. In a subsequent re-interview of 1009 respondents who had family cars with seat belts, nearly 47 per cent said they did not use them. Non-use of seat belts was significantly higher among females and among persons with less than high school education or low income. Non-use of seat belts was also higher

among those who felt that their station in life as measured by the Cantril ladder was unsatisfactory, who felt powerless to change at least some aspects of their lives, and who were infrequent church attenders. Significant associations were also found with infrequency of two other preventive health behaviors, dental checkups and Pap tests. Among young adults the tendency seemed to be for marriage to increase the non-use of seat belts among females but to decrease non-use among males. (*Am. J. Public Health* 67:1043-1050 1977)

Motor vehicle crashes are one of the few indisputably modern plagues. Deaths from this cause in the United States rose steadily until 1931, reached a peak of 30 per 100,000 in 1937, fell sharply during World War II, and then increased gradually during the early sixties to a plateau of 26 to 28 per 100,000.^{1, 2} By 1975, the rate had dropped to below 22 per 100,000³; probably lower speeds, improved vehicles, improved highways, and improved emergency medical systems were the principal factors contributing to the reduction. Crude rates, however, fail to indicate the full impact of motor vehicle accidents on U.S. mortality. Over half of all motor vehicle fatalities in 1975 occurred among persons 15-34 years old, and motor vehicle accidents were by far the leading cause of death in that age group, accounting for 25 per cent of the total.³ The relative importance of motor vehicle accidents is emphasized by the fact that the other four leading causes of death among young adults in 1900 (tuberculosis, influenza and pneumonia, typhoid fever, and heart disease) have all dropped sharply since that time.^{1, 6}

In 1974, nearly 80 per cent of motor vehicle fatalities involved the occupants of a moving vehicle.⁴ Most of these deaths could have been prevented by the use of simple devices that were widely available at that time—seat belts.⁵ But in spite of their simplicity and demonstrated ef-

fectiveness, seat belts are used by less than one-third of the people who own them.^{5, 7, 8}

How to increase the use of seat belts is a major challenge to preventive medicine. Buzzers and lights as reminders have not been successful⁸; interlocks that keep the engine from starting until belts have been fastened sparked a popular revolt and a Congressional ban on federal requirement of such devices. Automatic "passive" belts that protect occupants without requiring any action on their part are presently available in only one make of car. Techniques for individual motivation, the remaining possibility, require knowledge of the characteristics of users and non-users for their optimal application.

Much work on factors influencing the use of seat belts has already been done.⁹⁻¹² Many persons report seat belt usage to be related to situational factors, such as driving conditions or ease of attachment, but at least one study found individual characteristics to be more important determinants.⁹ In an extensive review of the Scandinavian and English-language literature,¹⁰ Phaner and Hane noted that in most studies older people tended to use seat belts more than younger persons and there was little difference in usage by sex. There were, however, a considerable number of reports that disagreed with the majority conclusions regarding the influence of age and sex. Married persons used seat belts more than the unmarried. Virtually all studies agreed that socio-economic status was positively associated with seat belt usage, education being the socio-economic indicator most often investigated.

Some recent U.S. studies based on observed use of seat belts^{13, 14} found that males are slightly more likely than females to use seat belts, and that drivers on long trips were

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more likely to be using belts than those on short trips. In general, the studies that compare observed with self-reported use of seat belts^{8, 15} find reasonably good agreement, on the order of 70 to 80 per cent, for those who say they nearly always use seat belts and much greater agreement (90 to 100 per cent) for those who say they rarely or never use seat belts. The 70 to 80 per cent agreement between reported and observed use is more impressive when compared to the 73 per cent agreement between two different observers of the same drivers when a validation of observers' reports was attempted.⁹

Psycho-social characteristics have not been studied as thoroughly as demographic factors. Phaner and Hane¹⁰ noted a single study that found persons who were either unusually aggressive or unduly shy and retiring to be unlikely to use seat belts. Factor analysis in another study suggested that a tendency to worry was weakly associated with seat belts usage.¹¹ There are also reports that persons who take actions designed to minimize risks, such as having periodic physical examinations, not smoking, or being immunized, are more likely to use seat belts.^{10, 12, 16, 17}

Most of these studies have been based on relatively small numbers or have looked at only a few individual characteristics. In an attempt to overcome some of these failings, the present paper reports interview results from more than a thousand adult subjects, for whom a considerable number of demographic, psycho-social, and behavioral characteristics were known.

Materials and Methods

Washington County, in western Maryland, was one of two sites for an on-going study of community mood carried out between December 1971 and July 1974 on behalf of the Center for Epidemiologic Studies (CES), National Institute of Mental Health. Samples of dwelling units were selected weekly at first and later at monthly intervals from an updated listing of all dwelling units in the county. Sampling was done without replacement by systematically selecting every *n*th unit after a random start. The procedure was designed to yield weekly samples of 30 or monthly samples of 90 occupied dwellings. An individual to be interviewed was randomly chosen from persons 18 years of age or older in the selected residence. The response rate was 78 per cent, with non-response associated most strongly with lowest education levels.¹⁸

Although the questionnaire was designed primarily to measure depressed mood, a considerable number of demographic, socio-economic and behavioral items were also included. Among the psycho-social items were the CES-depression scale,^{19, 20} Cantril ladder,²¹ Gurin's measure of overall happiness,²² a scale of aggressive behavior, and the Marlowe-Crowne scale of social desirability.²³ An amended version of the questionnaire, adopted in the spring of 1973, was designated Q2 to distinguish it from the first version, Q1. It dropped the Marlowe-Crowne scale, and asked for information on smoking, drinking, alienation,²⁴ belonginglessness, normlessness, and powerlessness. The Cantril ladder,

aggression, alienation, belonginglessness, normlessness and powerlessness scales used are shown in Appendix A. It should be noted that the sampling design insured that respondents to Q1 and to Q2 were equally representative of the county population.

Between August 1973 and September 1974, 1530 respondents to questionnaires Q1 or Q2 were asked to complete a follow-up questionnaire (Q3), and 1209 or 79 per cent did so. This questionnaire, Q3, asked for information on seat belt use as well as on other preventive behavior such as various screening examinations and immunizations for children in the household. The analysis was limited to persons who had a family car with seat belts, and the outcome was classified as non-use of seat belts for this presentation, although the other two outcomes were also examined. To isolate the effects of individual items on failure to use seat belts, insofar as this is possible, adjustments were done by a binary variable multiple regression method²⁵ as modified by Drs. Helen Abbey and James A. Tonascia of the Department of Biostatistics, Johns Hopkins School of Hygiene and Public Health. Possible interactions were sought by examining non-usage of seat belts by all possible combinations of two independent variables.

Results

Among the 1209 respondents to the follow-up questionnaire Q3, 136 or 11.2 per cent had no family car (Table 1). And of the 1073 individuals with cars in the family, over 95 per cent had cars with seat belts. Only 26 per cent of the 1024 respondents with cars so equipped said they almost always used the belts; 47 per cent said they never did.

Only 13 respondents with seat belts in their cars were blacks, of whom two almost always used the belts while 11 used them only sometimes or not at all. Two others were Orientals, both of whom almost always used seat belts. Because of the very small number of nonwhites in this population, the remainder of the analysis will be restricted to the 1009 whites whose family cars were equipped with seat belts.

Data will be presented in terms of the respondents who stated they did not use seat belts, partly because these comprise the target population for efforts at primary prevention of mortality from auto accidents and partly because previous studies^{9, 15} have shown greater agreement between reported and actual use for those who say they don't use seat belts than for those who say they do. Non-use of seat belts will be related to commonly used demographic and socio-economic variables, and to several behavioral or psychological variables.

Figure 1 illustrates the percentages of persons in each category who said they do not use seat belts with the *N* for each category also given. The dotted lines connect the crude rates, which represent the situation as it exists in the population. The solid lines connect the adjusted rates, the rate for each variable having been adjusted for the effects of all the other variables by binary variable multiple regression. The vertical lines designate plus and minus one standard error

TABLE 1—Availability of Seat Belts and Their Usage among the Total Study Population

	Respondents to Q3		Per cent of persons having a car with belts
	No.	%	
Response*	1209	100.0	100.0
No family car	136	11.2	—
No seat belts in car	49	4.0	—
No, don't use belts	480	39.8	46.9
Sometimes use belts	280	23.2	27.3
Almost always use belts	264	21.8	25.8

* Question asked: "Do you use seat belts when you ride in the family car?"

from the adjusted rate. The adjusted rates indicate the relative importance of each factor when the confounding effects of other (possibly correlated) factors are removed. Adjustment did not shift any category into or out of statistically significant levels, so the following discussion of the adjusted rates will apply in general to the crude rates as well. The p values are based on adjusted rates.

A significantly higher proportion of females (50.8 per cent) than males (41.4 per cent) said they did not use seat

belts. Education was also markedly associated with seat belt usage, those with more than high school education having a much lower percentage of non-use. Age and marital status showed less than significant differences, though non-use seemed to be greater among the younger and the separated or divorced. When the "income not stated" was omitted, there was a significant negative association between household income level and non-use of seat belts as shown by the Cochran X² test for trend. For this characteristic, adjustment for the effects of other variables reduced the significance level from <.001 for the crude data to <.05 for the adjusted rates.

Several psychological and behavioral characteristics were also related to seat belt use. Infrequency of church attendance and a low position on the Cantril ladder were strongly associated with non-use of seat belts; as might be expected, individuals with high aggression scores seemed to have a greater tendency toward non-use, though the trend was not statistically significant. As a result of the multiple adjustment procedure, high levels of depressed mood, as measured by the CES-D scale, appeared to be associated with a lower percentage of non-users of seat belts, an association that is, however, only suggestive (.05 < p < .1).

All two-way interactions were investigated, but only

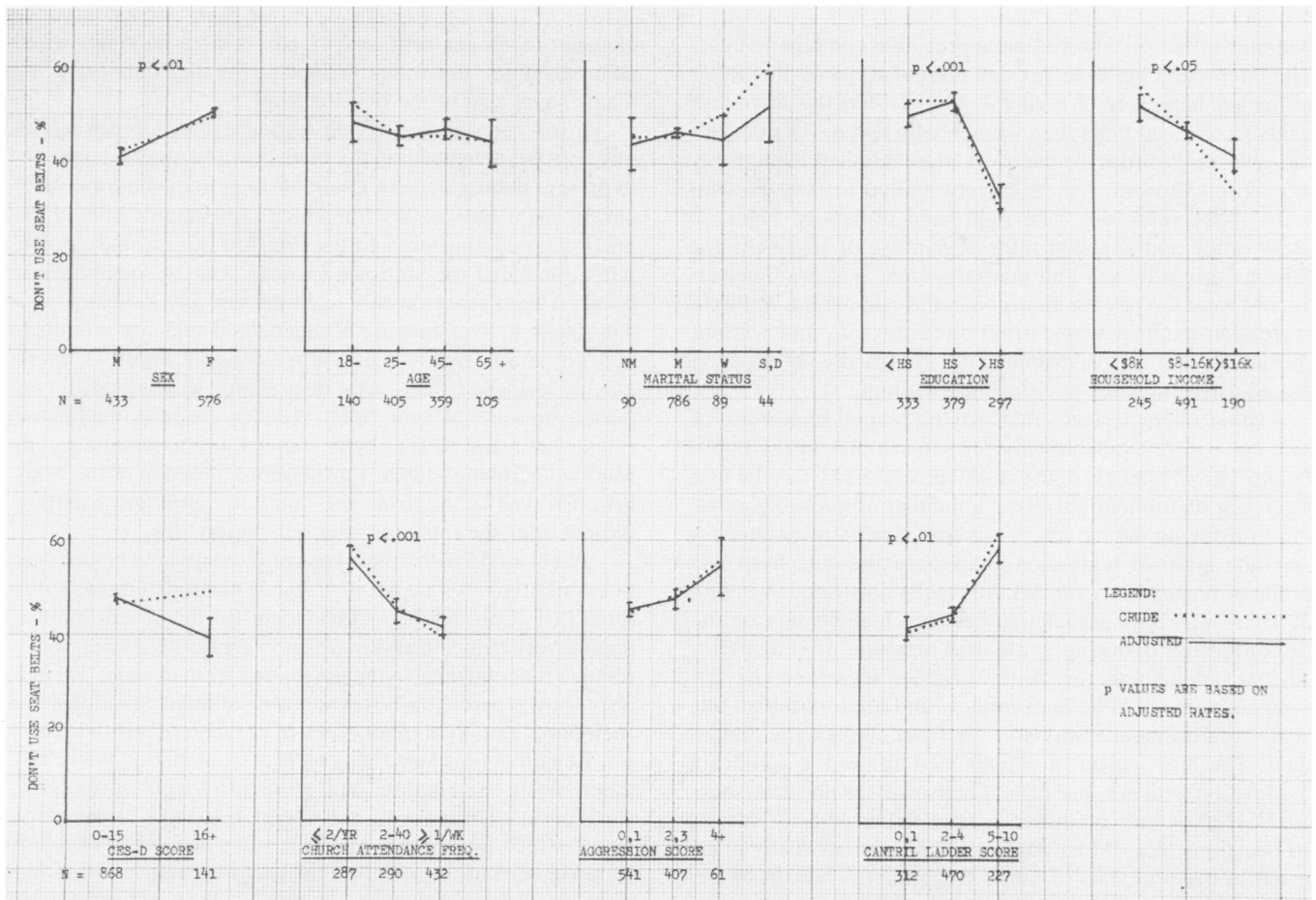


FIGURE 1.—Percentage of Respondents Who Say They Do Not Use Seat Belts. Crude and Adjusted Rates by Respondent Characteristics. N = 1009

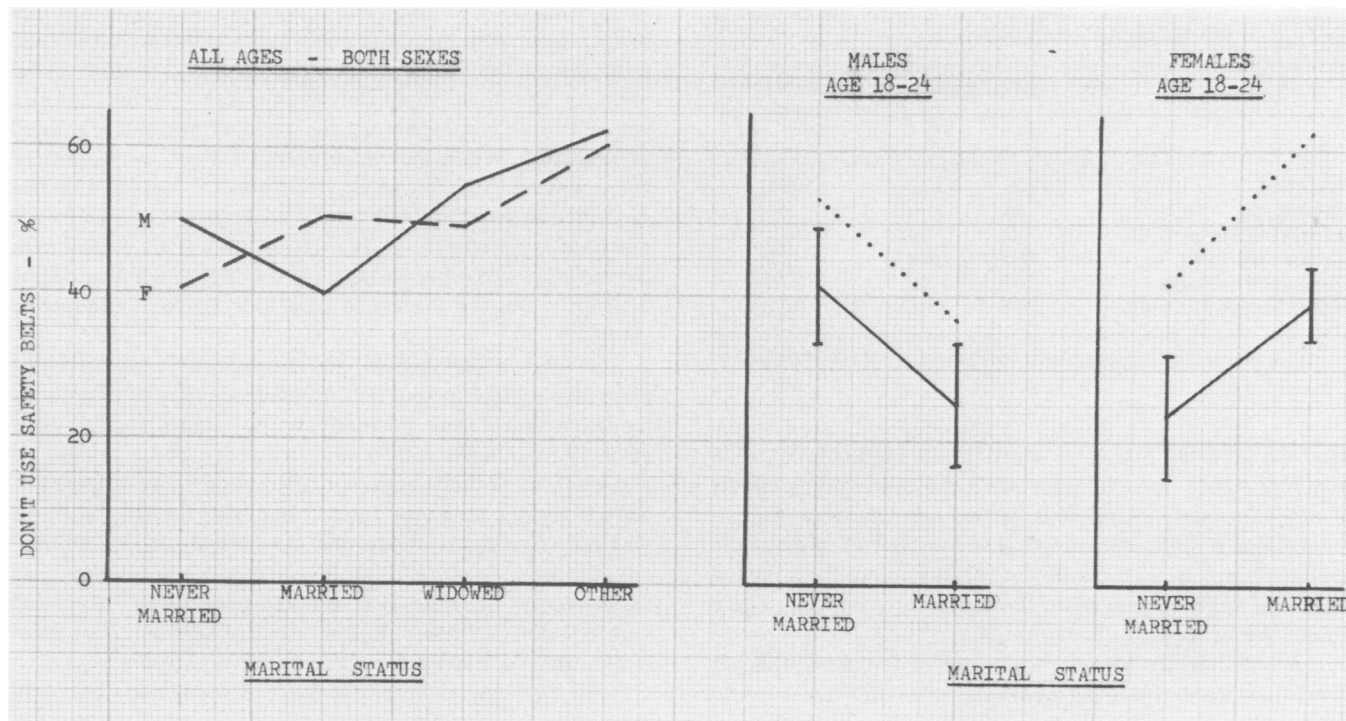


FIGURE 2—Percentage of Respondents Who Say They Do Not Use Seat Belts. Interactions—Sex and Marital Status

one pair of factors showed an appreciable combined effect. The interaction between sex and marital status is illustrated in the left-hand side of Figure 2. Married females were less likely to use seat belts than women who had never married; the reverse was true for males. A more detailed look at this interaction showed it to be largely limited to persons who were 18–24 years old. The right-hand frames of Figure 2 show crude and adjusted rates of non-use of seat belts for this age group by sex and marital status. Widowed and divorced were too few for inclusion in the calculation. Multiple regression analysis was carried out both with and without this interaction factor; dropping it had virtually no effect on the adjusted rates for the remaining factors.

Other characteristics that may be related to non-use of seat belts were available only for sub-samples of the population. The 459 people in the study for whom Q2 was the first interview instrument answered a number of questions relating to drinking habits and to several aspects of anomie. A separate multiple regression analysis of the data from this group of respondents yielded the results illustrated in Figure 3. There was little association between high scorers on the uncontrolled drinking scale and non-use of seat belts. Though adjustment for other variables increased the difference in use of belts between low and high scores on this scale, the difference was still far from statistically significant. The only aspect of anomie that showed a significant association with non-use of seat belts was the powerlessness scale. High scorers on this scale are persons who answer yes to questions like "Most public officials are not really interested in the problems of the average man." Nearly 68 per cent of high scorers were non-users of seat belts as compared to 43 per cent of low scorers. These percentages

changed to 58 per cent and 45 per cent respectively after adjustment for the other variables, but the difference remains significant at the $p < .05$ level.

It has been suggested that responses in surveys such as this may be influenced by the tendency of some respondents to present themselves in a favorable light to the interviewer²⁶ and if so, a bias exists for which adjustments should be made. Q1, administered to the first 550 of our study population, included the Marlowe-Crowne scale of social desirability. A high score on this scale presumably indicates persons likely to overstate use of seat belts if such use is considered to be a desirable trait. As is shown in Figure 3, there was no evidence that social desirability was related to reported non-use of seat belts. Neither crude nor adjusted rates of non-use of seat belts showed any association with Marlowe-Crowne scores. Furthermore, deletion of the Marlowe-Crowne scores from the multiple regression equation did not alter the rates for other characteristics.

Association with other types of preventive behavior was not consistent. As shown in Table 2, cigarette smokers differed little from non-smokers except for increased non-use among very heavy smokers (over 35 cigarettes a day), a difference that could easily have resulted from chance. Table 2 also shows percentages of non-use among individuals by their participation in other types of preventive health behavior. Length of time since last physical examination, since last tuberculosis examination, and since last electrocardiogram were not associated with non-use of seat belts. Time since last Pap test, for women, and time since last dental checkup were significantly associated, the groups recently exhibiting these preventive behaviors having a lower percentage of non-users of seat belts.

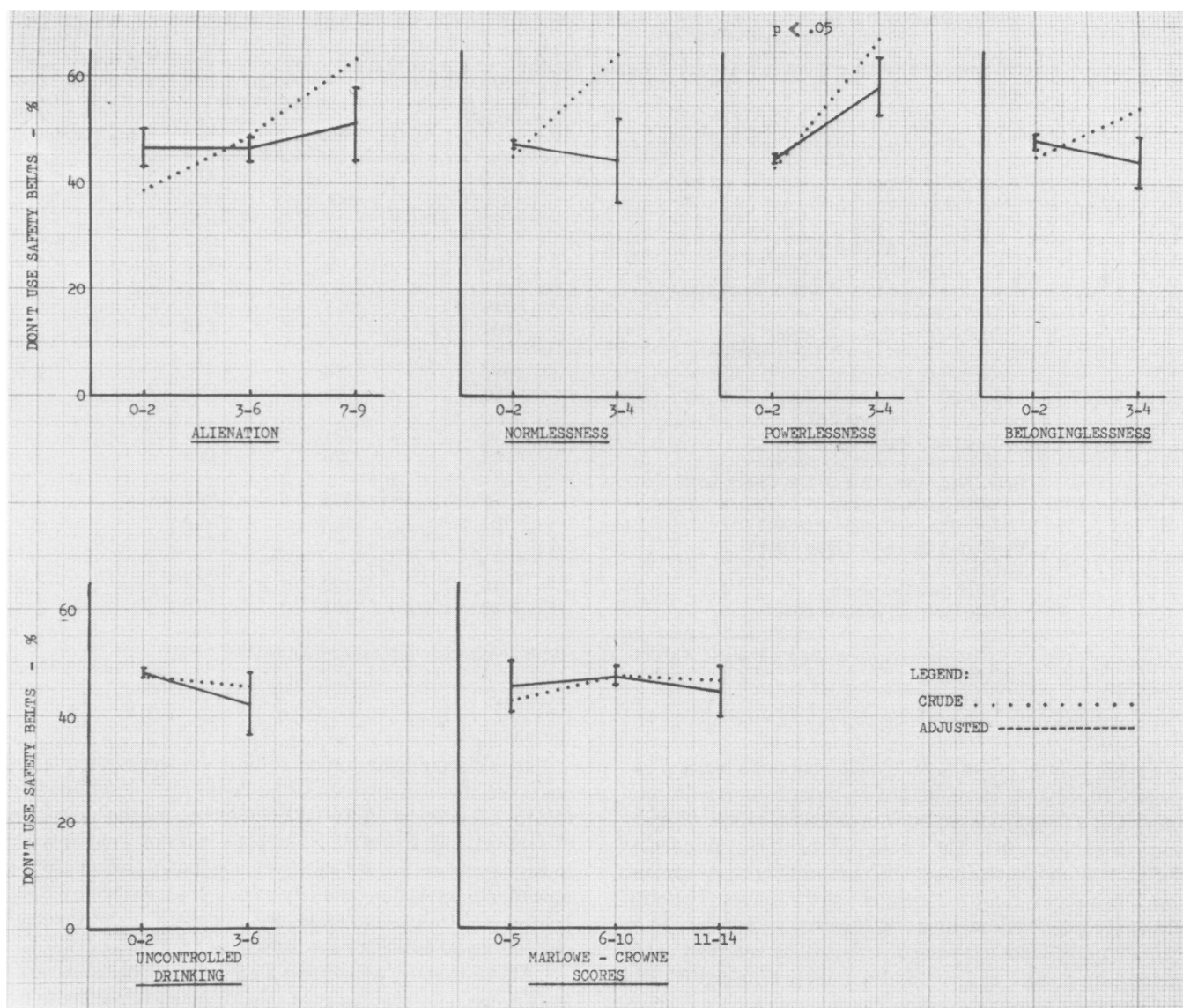


FIGURE 3—Percentage of Respondents Who Say They Do Not Use Seat Belts. Crude and Adjusted Rates by Scores on Psychosocial Variables. N = 459 for all Except Marlowe-Crowne, Where N = 550.

The association with suicide attempts and with frequency of suicide thoughts was also investigated. As shown in Table 3, those who had actually attempted suicide some time in the past, and those who thought about committing suicide, appeared to be *less* likely to be non-users of seat belts than the vast majority of people. However, the numbers in these categories are too small to be more than slightly suggestive, the reason for including them being that they show no indication that non-usage of seat belts is a manifestation of suicidal thoughts or behavior.

Discussion

This study, in addition to confirming the findings of a number of other researchers as to the association of sex, age, and education with use or non-use of seat belts, adds some other significant relationships. Non-users of seat belts are

more commonly found among people with lower incomes, among those who consider themselves low on the Cantril ladder of life, who are infrequent church attenders, and who feel themselves to be lacking in power to influence their lives. There is also a suggestive association between high aggression scores and non-use of seat belts, which is consistent with the findings of others that individuals with more demerit points for traffic violations have more accidents,²⁷ and that drivers involved in accidents are less likely to be wearing seat belts than drivers not involved in accidents.²⁸

The association between non-use of seat belts and infrequency of Pap tests agrees with findings here in Washington County a decade earlier.¹⁶ This relationship and a similar one with infrequent dental checkups is in the same direction indicated by Morgan¹² for other types of preventive health behavior such as getting polio inoculations or having family medical and hospitalization insurance.

TABLE 2—Percentage of Respondents Who Say They Do Not Use Seat Belts, by Other Aspects of Preventive Health Behavior

	Number in category ^(a)	Do not wear seat belts	
		N	%
Cigarette Smoking:			
Not now or never	324	149	46.0
1-14 cigarettes/day	37	17	45.9
15-34 cigarettes/day	83	41	49.4
35 + cigarettes/day	15	9	60.0
How Long Since Last Physical Examination:			
Within past two years	749	358	47.8
More than two years or never	236	101	42.8
How Long Since Last TB Examination:			
Within past two years	537	250	46.6
More than two years or never	400	188	47.0
How Long Since Last EKG:			
Within past two years	288	144	50.0
More than two years or never	703	320	45.5
How Long Since Last Dental Check-up:**			
Within past two years	760	332	43.7
More than two years or never	197	107	54.3
How Long Since Last Pap Test:*			
(females only)			
Within past two years	378	179	47.4
More than two years or never	182	103	56.6

(a) Cigarette smoking data are available only for Q2 respondents. "Not stated" responses are not included in any tabulations.

* p < .05

** p < .01

There is little question that socio-economic factors, especially education, show the greatest association with seat belt usage, a finding consistent with all other studies we have found in the literature. The strong association of frequency of church attendance with seat belt usage adds a new dimension which seems to be independent of the others. The only other psycho-behavioral items that seemed clearly related to seat belt usage were the powerlessness scale and the Cantril ladder. The picture of a person least likely to use seat belts thus emerges as someone who has no schooling past high school, who feels that his or her station in life is unsatisfactory, and who also feels powerless to change at least some aspects of it. The fact that non-users tend to be infrequent church attenders suggests that they could also be lacking in social support from outside groups. Such persons present serious challenges to health educators.

In common with most research in this field, demographic, socio-economic, and behavioral variables were able to predict relatively little about the non-use of safety belts. Multiple regression analyses resulted in over-all correlation coefficients of approximately 0.4, which means that the study factors together accounted for only 16 per cent of the variation in seat belt usage in the population studies. It is obvious, as Phaner and Hane suggested,¹⁰ that other variables must have a stronger effect than do the factors studied to date. Some such variables might be prior accidents involving either the respondent or someone close to him, inconvenience or discomfort associated with specific seat belt designs, or perhaps personality traits not yet investigated in this connection.

It is discouraging to find so little evidence pointing toward specific characteristics that could provide productive foci for educational efforts aimed at increasing the utilization of seat belts. The complete ineffectiveness of what appears to have been an exceptionally well conducted and controlled nine month television publicity campaign described by Robertson, et al²⁹ does not make one optimistic about the success of the advertising approach.

Mandatory use of seat belts, now widespread in Australia, Europe, and even parts of Canada, seems unlikely to be enacted in the United States or, if enacted, to be any more

TABLE 3—Percentage of Respondents Who Say They Do Not Use Seat Belts, by Suicide Thoughts and Behavior

	(a) Number of respondents	Do not use seat belts	
		N	%
Have You Ever Tried to Commit Suicide?			
No	445	212	47.6
Yes	13	4	30.7
How Often Did You Think About Suicide in the Past Month?			
Never	950	446	46.9
Rarely	38	18	47.4
Occasionally, fairly often, or very often	20	8	40.0

(a) Attempted suicide data are available only for Q2 respondents.

popular or widely enforced than was Prohibition in the 1920's. A law giving insurance companies freedom from financial liability for injuries suffered by non-users of seat belts is a superficially appealing approach, but its beneficial effect is by no means assured. The isolated cases where courts have reduced the size of payments when the injured person was not wearing available seat belts obviously have not influenced a majority of the public to use seat belts. This leaves mandatory passive restraint systems such as air bags, seat belts that automatically deploy when the door is shut, or other approaches requiring no conscious action by occupants of the vehicle, as virtually the only feasible alternative for reducing the death toll from automobile accidents to any substantial degree.

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APPENDIX A

Q2 Anomie series questions:

Now I'd like your opinion on a number of different things. I'm going to read you several statements. Some people agree with these statements; some disagree with them. As I read each one, will you tell me whether you more or less agree with it, or more or less disagree with it? 0 = Disagree 1 = Agree

Scale & Score

- | | |
|--|-----|
| 1. If I were sick, I'm not sure I could get a doctor to see me quickly. | P + |
| 2. Nowadays a person has to live pretty much for today and let tomorrow take care of itself. | A + |
| 3. The trouble with the world today is that most people really don't believe in anything. | N + |
| 4. If I were looking for a good job around here, I could probably find one pretty quickly. | P - |

5. In spite of what some people say, the lot (situation, condition) of the average man is getting worse, not better.
6. Most public officials (people in public office) are not really interested in the problems of the average man.
7. These days a person doesn't really know whom he can count on.
8. The morals people live by have changed a lot in recent years, but there are still some unchangeable rules.
9. Most people really don't care what happens to the next fellow.
10. Next to health, money is the most important thing in life.
11. Everything changes so quickly these days that I often have trouble deciding which are the right rules to follow.
12. I hardly ever feel awkward and out of place.
13. You sometimes can't help wondering whether anything is worthwhile.
14. I think the police around here respond very quickly to most citizens' requests.
15. There just aren't any definite rules to live by any more.
16. It's hardly fair to bring a child into the world with the way things look for the future.
17. I find that people are just naturally friendly and helpful.
18. To make money there are no right and wrong ways any more, only easy and hard ways.

A = Alienation B = Belongingness
 N = Normlessness P = Powerlessness

A +, P +

A +, B +

N -

A +, B +

A +

N +

B -

A +

P -

N +

A +

B -

A +

Q2 Aggression scale:

During the past week how often did you:	Not at all (0)	Once (1 time) (1)	Several times (2-3 times) (2)	Often (3+ times) (3)
Get angry?	0	1	2	3
Get into an argument with a friend?	0	1	2	3
Get into a fight?	0	1	2	3

Cantril Ladder:

Here is a picture of a ladder. The top of the ladder (10) represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. Where on the ladder do you feel you personally stand at the present time?

10
9
8
7
6
5
4
3
2
1
0

Note: Score is 10 minus number indicated by respondent.

Health Habits

Health lives in rebus. It is a name for processes as digestion, circulation, sleep, etc., that go on happily, tho . . . we are more inclined to . . . say the man digests and sleeps so well because he is so healthy. . . .

Health in actu means, among other things, good sleeping and digesting. But a healthy man need not always be sleeping, or always digesting. . . . All such qualities sink to the status of "habits" between their times of exercise.

William James: Pragmatism: A New Name for Some Old Ways of Thinking. New York: Longmans, Green and Co., 1907.