stress and driving: the relationship between life crisis experiences and a sudden deterioration in driving record

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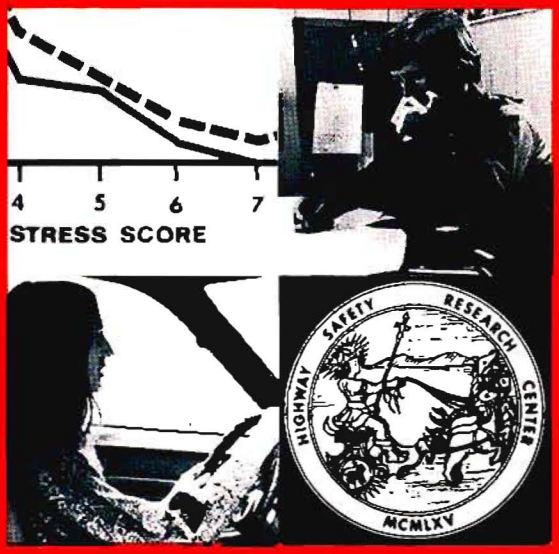

HIGHWAY SAFETY
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University of North Carolina, Chapel Hill, N.C.

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STRESS AND DRIVING:

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ATTENTION

The enclosed report is a reprint of the original technical report which has recently gone out of print. Its content does not differ in any way from the original report. The format differs slightly due to time restrictions in the reprinting process.

We hope that this report will fulfill your interests. We appreciate your continued concern in highway safety.

Stress and Driving: The Relationship between Life Crisis Experiences and a Sudden Deterioration in Driving Record

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ABSTRACT

This study was an exploratory investigation of whether drivers who have shown a rapid deterioration in driving record differ from control subjects in the frequency with which they have experienced certain kinds of potential life stresses.

The "Crisis" group was made up of drivers whose records showed three consecutive years with no accidents or violations followed by a fourth year with at least three violations or three accidents. These drivers were compared with a control sample.

The composition of the Crisis group differed from the total licensed population, with more young drivers, more males, and more nonwhites in the Crisis population.

Data were collected through telephone interviews. Biases introduced by the telephone interview procedure appeared to operate in a similar fashion for both Crisis and Control groups, so that the interviewed samples of each were comparable on the basis of age, race, and sex.

Comparing interviewed subjects, it was found that a greater proportion of Crisis subjects reported an increase in the amount of driving done in the past year, while Control subjects were more likely to report a decrease. Control subjects were more likely to be married. No differences were found in educational level, height, weight, or socioeconomic status. Crisis subjects were more likely to have experienced personal health problems,

but no differences were found for family health problems, job problems, moving, sudden loss of income, increasing concern about bills, marital stress, getting married, having a baby, or experiencing undue criticism. The Crisis group reported significantly more arguments, breakup of relationships (of all kinds), engagements, separations, and planned divorces, while the Control group was more likely to report planning or taking a trip or vacation.

Stress events were analyzed as to whether they directly preceded accidents or violations, with only one significant finding, namely, Control subjects were more likely to report moving or planning a move just prior to a violation. Because so many comparisons were made, this one finding cannot be given much emphasis. When the 16 stressors asked about were summed to yield a total stress score for each subject, it was found that the Crisis and Control groups differed significantly. A larger proportion of the Crisis group report no stresses, and a larger proportion of the Control group reported one stress. Beyond one stress the groups were comparable, so that the results are not readily interpreted.

There were three questions concerning feelings of depression, changes in drinking habits, and whether the person ever felt "that there is just no point in living." These items were not considered stressors *per se* but rather as possible responses to stress. It was found that Crisis subjects were more likely to report that they felt like there is no point in living. When these three questions were tallied to obtain a response to stress score,

the Crisis group showed more of the responses to stress than the Control group. Since the Crisis group was not found actually to experience more stressors than the Control group, it may be that responses to stress are more important in determining group membership than the number of stressors experienced.

The life stresses distinguishing the Crisis and Control groups appear to be difficulty in interpersonal relationships, a decline in personal health, and/or feeling that there is no purpose in living. Should it be more firmly established that persons experiencing such stressors are overrepresented in traffic violations and accidents, there remains the task of developing effective countermeasures. It may be possible to elicit the participation of counselors, physicians, or legal personnel, including law enforcement officials, lawyers, and judges, to take measures aimed at reducing the risk.

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INTRODUCTION

Greenwood and Woods put forth a theory, in 1919, that has persisted in the field of accident research. This theory, derived from a study of industrial accidents in Great Britain during World War I, held that there are certain persons who have a higher than average probability of contributing to or being involved in accidents. Those who have worked in the field of traffic safety, such as law enforcement personnel, driver improvement representatives, and hearing officers, are personally acquainted with many drivers who appear to be habitual violators and to have more than their share of traffic accidents. Such observations have led to the notion that if we remove these few unsafe drivers from the highways, then we will eliminate the major portion of our accident problem. Every state has some kind of program designed to identify these high accident risk drivers and improve their performance or remove them from the driving population. Yet the highway accident problem is essentially unchanged despite efforts to identify and restrict the problem driver. What has gone wrong?

As early as 1939 Forbes reported that if we removed all accident repeaters from the highway, we would bring about very little improvement in the subsequent accident picture. This phenomenon has been demonstrated

a number of times since, most recently in North Carolina (Campbell 1971). Campbell examined consecutive time periods and found, for the most part, that the same drivers did not continue to contribute to the accident picture (although a small minority were accident repeaters). Most accidents involve drivers who have no record of past accidents rather than a small number of high risk drivers or accident repeaters. There is little or no evidence to support the use of accident records as a basis for "getting the bad drivers off the roads" so that the rest of us can drive in safety.

Does this mean that most accidents are chance events, and, that except for controlling the high risk drivers, causing a small portion of accidents, there is little we can do to improve the accident picture by regulating the driver? McGuire (1970) has developed a typology of accident proneness in which he attempts to resolve the apparent conflict between the data that argue for the existence of accident prone individuals and the data reported by Forbes, Campbell, and others. McGuire suggests that there are two major kinds of accident proneness, long term and short term. Long term accident prone persons include, among others, those with serious drinking problems, those with certain kinds of mental or personality disorders, and those with certain medical problems. These persons, because of their problems, remain high risk over an extended period of time, some for life. For the most part, these are the persons who have been recognized as presenting driving problems, and special laws and

regulations have been developed for dealing with them. However, the person who is a high accident risk for a short period of time is perhaps more characteristic of the drivers in accidents. Indeed, all of us at one time or another may be high risks for brief periods. The kinds of stresses that many of us experience at one time or another may elevate our risk so that we are more likely to show up in the accident statistics, yet this risk may not remain elevated. Short term risk may include reaction to crisis, such as divorce, financial problems, health problems, or job changes.

Several studies investigating drivers in fatal crashes have reported findings of crisis in the lives of the drivers preceding the fatal crash. Selzer, Rogers, and Kern (1960) found that, compared to a control sample, drivers in fatal crashes showed evidence of greater social stress, including interpersonal crisis or vocational-financial difficulties. Another study by Brown and Bohnert (1968) found that drivers in fatal crashes had experienced more interpersonal conflict, more job and financial problems, and more personal losses. A third study of fatal crashes by Tabachnick (1966) found evidence of personal stress in drivers who died in single vehicle crashes. Tabachnick related his findings to similar findings for suicides. McMurray (1970) documents the elevated accident risk of persons undergoing divorce proceedings. There has been little other work done to evaluate the hypothesis of short term elevated accident risk in response to crisis situations.

There is a major study relating stress to increased risk of poor mental health. In the Midtown Manhatten Study, Langer and Michael (1963) report that the number of stresses a person has experienced is directly related to his mental health. Furthermore, current stresses were more strongly related to mental health than childhood stresses. Problems such as worry about work, marital difficulties, poor physical health, and economic concerns, were among current concerns. The more stress a person accumulated, the greater was his mental health risk. Whether a similar relationship exists between stress and traffic accident risk has not been established.

If an association can be established between certain fairly common stresses experienced by much of the population at one time or another and elevated accident risk, it may be possible to develop intervention programs to provide support for the duration of the elevated risk. Adams (1972) has suggested such a possibility whereby utilization could be made of existing personnel who are likely to be contacted in a time of crisis such as, "physicians and admitting secretaries of hospitals, policemen, personnel officers, ministers, priests and rabbis, psychologists, or ambulance drivers" (page 343). One might add firemen, undertakers, or even bartenders and cosmetologists. However, before intervention programs could be established, it is necessary to determine what association, if any, exists between traffic accident risk and certain crisis events.

The current study was conceived of as an exploratory study of drivers who had demonstrated a rapid deterioration in their driving performance as indicated by their driving record. Persons were selected who showed a "clean" driving record for three consecutive years (no violations or accidents) followed by a fourth year in which at least three violations or three accidents occurred. We were interested in determining what might have accounted for the sudden change in the driver record. If it could be established that there were certain common experiences contributing to the change, and further established that a reasonable proportion of persons undergoing such experiences showed elevated risk, then there would be a basis for attempts to provide help to people undergoing these experiences before they lead to a deterioration in their driving performance.

METHOD

The selection of drivers for the Crisis[1] group was made by checking the North Carolina driver's license file for drivers who showed a "clean" driving record for three consecutive years (no violations or accidents) followed by a fourth year in which at least three unrelated violations or three accidents occurred. This fourth year coincided with the one immediately preceding the study. To investigate what had happened to these drivers a number of approaches were considered. The first sample that was pulled was checked to eliminate any record that showed a revocation or suspension of driver license prior to the "clean" three-year period, since a "clean" record could result from a person not driving for an extended period of time. After such cases were eliminated a further check was made to determine whether the driver had had contact with a hearing officer in the Department of Motor Vehicles. It was found that very few had had such contact. This was partly because hearing officer interviews are based on the point system which considers

[1]The subjects selected on the basis of their driving record were labeled "Crisis" subjects for ease of identification. This label does not infer that it was assumed that these subjects are (as hypothesized) undergoing unusual stresses and crisis in their lives.

violations only. Therefore, a person who showed a sudden increase in accidents that involved no violations would not come to the attention of the Department of Motor Vehicles. In those cases in which a hearing officer had been seen, a copy of the hearing officer's report was obtained. However, it was found that these reports varied in their thoroughness and provided no systematic information that could be used as the basis for determining what had caused the sudden change in driving performance. Consequently, it was necessary to contact the driver directly to get the needed information.

The use of a mailed questionnaire was considered. Although our experience with mailed questionnaires had been excellent, in this instance we had reason to believe that many of the drivers would be unlikely to respond. Also, we wanted fairly detailed information that might not have been easily obtained from a written questionnaire. A more personal approach was considered necessary. Ideally, these drivers would have been interviewed in person, but considerations of time, personnel, and money ruled out such a possibility. Therefore, it was decided that a telephone interview would be the most appropriate procedure.

After the driving records were obtained, the data were transferred to a cover sheet for coding purposes. Because telephone directory listings were frequently out of date, directory assistance was contacted in an effort to obtain telephone listings for all subjects. Telephone calls were placed to those for whom listings were obtained.

The Crisis subjects were interviewed in July and August of 1971 by one male and three female interviewers. Calls were placed on weekday nights and Saturdays with Sundays being excluded. The interviewer used the following introduction:

> May I speak to_____.
> My name is_____.
>
> I'm with the Highway Safety Research Center at the University of North Carolina. We are talking to a large number of people throughout the state to learn more about traffic violations and accidents. May I take a few minutes of your time to ask you some questions about your traffic violations/accidents (whichever was appropriate)?

The questionnaire provided the structure for the interview (See Appendix A). Upon completion of the interview the subject was thanked for his cooperation and later sent a follow-up letter expressing appreciation for his cooperation and assuring the legitimacy of the interview (See Appendix A). This follow-up letter was considered especially important in the case of the Crisis subjects. If these drivers were indeed experiencing undue stress, it was considered important that they have something in writing explaining the interview and providing a phone number and name to contact should any question arise. SSubjects who could not be reached during the evenings or on Saturdays were called at various times during weekdays. If a subject could not be reached in ten attempts, no further effort was made to contact him.

In the fall of 1971 a control sample of drivers was pulled from the North Carolina driver's license file. Several considerations were

taken into account concerning the control sample. On the one hand, the Crisis group might have been easier to contact since it was known that they had been driving in the state within the previous year. Such was not the case with the Control sample. On the whole it would be expected that the Control sample would have been in contact with the Department of Motor Vehicles on an average of two years prior to the study, since in North Carolina a license must be renewed every four years. Consequently, for the Control sample there would have been a longer period of time in which changes in name and/or address could have occurred. On the other hand, if the Crisis group were indeed experiencing major problems, they could be more difficult to contact than a Control sample not under such stress. Because it was not possible to predict the relative ease of contacting a Control sample, and because it was desirable to have at least as many completed Control interviews as Crisis interviews, it was decided to select a Control group larger than the Crisis group. This provided an added advantage, since accidents and violations are relatively infrequent events and a larger sample would provide greater stability of such low frequency data. Such a consideration did not apply to the Crisis group, since it was selected by virture of having a large number of accidents or violations.

The plan was to pull a two-for-one Control, matched to the Crisis sample on the basis of age, race, and sex. Because of coding errors the Control sample was not an exact match on these variables. Furthermore,

no effort was made to contact drivers who had North Carolina licenses but out-of-state addresses. Drivers who did not have a valid North Carolina license but were on the driver license file for other reasons were also eliminated.

The interview procedures outlined above were again followed for the Control subjects. It should be noted that interviewers knew which group the subject belonged to before the interview. The subjects were interviewed between late September and mid-November with the majority of the interviews conducted in October. The interviewers for the control group were two males. The interviewer used the following introduction:

> May I speak to_____.
> My name is_____.
>
> I'm with the Highway Safety Research Center at the University of North Carolina. We're talking with people all over the state to try to learn more about traffic accidents and violations. Your name was chosen at random. We're particularly interested in how different events in people's lives may affect their driving. May I take a few minutes and ask you some questions? Everything you tell me will be held confidential, of course.

The interview was modified where appropriate for the Control subjects (See Appendix A). When there were no violations or accidents in the preceding year, as was the case for most Controls, the subject was asked if he had experienced any of the potential stresses or changes at any time during the preceding year, rather than experiencing them in relation to violations or accidents occurring in the preceding year. It should be noted that all Crisis subjects and Control subjects with

accidents and/or violations were asked about the occurrence of stressors in relation to their accidents and/or violations, while Control subjects with clean records for the previous year were asked whether they had experienced the various kinds of stresses during the prior year. This distinction should be kept in mind when examining the comparisons between the two groups.

Each Control subject was also sent a follow-up letter thanking him for his cooperation and assuring him of the legitimacy and confidentiality of the study (See Appendix A.)

The data were then coded and keypunched. Interviews were coded as Invalid if all data were not recorded or if the person indicated that he had not driven in North Carolina for the last four years and therefore may have had violations or accidents out of state during his "clean" years.

The analyses were based on both individuals and events (accidents or violations). Analyses based on individuals compared information on the Crisis individuals with information on the Control individuals. For analyses based on events, it was necessary to eliminate multiple events for any one person, since it was known that on the whole the Crisis subjects had many more events than the Control subjects. If multiple events were not eliminated, a relatively small number of individuals in the Crisis group could disproportionately affect the outcome of the comparisons. Therefore, for each person with any violations, one viola-

tion was selected using a random number generator. Persons without violations were not included in these analyses. *Comparisons were made between the Crisis violations and the Control violations on the basis of the circumstances surrounding them. The same procedures were used for comparing accident events for the two groups.*

RESULTS AND DISCUSSION

Crisis Group by Age, Race, and Sex

The composition of the Crisis group by age, race, and sex is presented in Table 1. Although white males under age 30 predominate, a nonsignificant X^2 indicates that the race-sex categories are comparably distributed across the age groups.

Crisis Group Versus Total Driving Population

All licensed drivers in North Carolina over 19 years of age were potentially eligible to be included in the Crisis sample. At 20 years of age a person could have been licensed and driving in North Carolina for four years, and thus have three "clean" years of driving followed by a fourth year with three or more accidents or three or more violations. A listing was obtained of all licensed North Carolina drivers as of January 1, 1972. Drivers from age 20 to 100 years were grouped by age, race, and sex for comparison with the Crisis sample. This comparison is presented in Table 1.

The composition of the Crisis group by age, race, and sex is presented in Table 2. There is a marked difference between the Crisis group and Total Driving Population for age, race, and sex composition. There were no subjects in the Crisis group age 20 or 21; therefore, this age group

TABLE 1. Comparison of crisis group with total licensed population (age 20 and above) by age, race and sex. N (% Group Total)

	Age	Population	White males	Non-white males	White females	Non-white females	Total
	20-21	Total	67169 (2.6)	20850 (0.8)	61115 (2.4)	13506 (0.5)	162640 (6.4)
		Crisis	0	0	0	0	0 0
	22-24	Total	114963 (4.5)	29450 (1.2)	103735 (4.1)	20608 (0.8)	268756 (10.6)
		Crisis	57 (14.1)	41 (10.2)	10 (2.5)	6 (1.5)	114 (28.3)
	25-30	Total	183998 (7.2)	38316 (1.5)	170013 (6.7)	28852 (1.3)	421179 (16.5)
		Crisis	58 (14.4)	34 (8.4)	11 (2.7)	7 (1.7)	110 (27.3)
	31-40	Total	238863 (9.4)	43353 (1.7)	223717 (8.8)	35005 (1.4)	540938 (21.2)
		Crisis	46 (13.9)	26 (6.4)	9 (2.2)	3 (0.7)	94 (23.3)
	41-50	Total	231102 (9.1)	38635 (1.5)	201964 (7.9)	28454 (1.1)	500155 (19.6)
		Crisis	31 (7.7)	11 (2.7)	3 (0.7)	1 (0.3)	46 (11.4)
	50+	Total	339621 (13.3)	54923 (2.2)	235965 (9.3)	23116 (0.9)	653625 (25.7)
		Crisis	21 (5.2)	15 (3.7)	3 (0.7)	0 0	39 (9.7)
TOTALS		Total	1175716 (46.2)	225527 (8.8)	996509 (39.1)	149541 (5.9)	2547293 (100.0)
		Crisis	223 (55.3)	127 (31.5)	36 (8.9)	17 (4.2)	403 (100.0)

TABLE 2. Crisis population by age, race, and sex

N(% Grand Total)

Age	White males	Non-white males	White females	Non-white females	Totals
22-24	57 (14.1)	41 (10.2)	10 (2.5)	6 (1.5)	114 (28.3)
25-30	58 (14.4)	34 (8.4)	11 (2.7)	7 (1.7)	110 (27.3)
31-40	56 (13.9)	26 (6.4)	9 (2.2)	3 (0.7)	94 (23.3)
41-50	31 (7.7)	11 (2.7)	3 (0.7)	1 (0.3)	46 (11.4)
51+	21 (5.2)	15 (3.7)	3 (0.7)	0 (0.0)	39 (9.7)
Totals	223 (55.3)	127 (31.5)	36 (8.9)	17 (4.2)	403 (100.0)

was not used in comparing the two groups by age. The age comparison showed a significant difference (X^2 = 188.54, 4 df, p <.001) with younger (age 22 through 30) drivers overrepresented and older (age 41 and above) drivers underrepresented in the Crisis group as compared to the Total Driving Population. Males are overrepresented in the Crisis group (X^2 = 165.05, 1 df, p < .001) as are nonwhites (X^2 = 141.60, 1 df, p < .001) when compared to the Total Driving Population.

It has been reported that young males have high violation rates (Harrington, 1971). However, nonwhite males have nearly a four-fold increase in their proportion in the Crisis group over that in the Total Driving Population, accounting, for the most part, for the male overrepresentation. It is also interesting to note that white females have a four-fold underrepresentation in the Crisis group. A partial explanation of the sex differences found may be that males and females differ in the amount of driving that they do.

Waller and Koch (1971) have reported that on the whole licensed males in North Carolina drive about twice the distance that licensed females drove and therefore have twice the opportunity for accidents and violations. Since males constitute 55 percent of the licensed drivers and drove roughly twice as far as females, and to the extent that accidents and violations are a function of mileage alone, it would be expected that males would acquire about 71 percent of the accidents and violations, with females acquiring the other 29 percent. By the same

token, males would be almost two and a half times more likely than females to reach any particular accident or violation criterion in any given time period. About 87 percent of the Crisis group is male. This is a larger proportion than the 71 percent that could be accounted for on the basis of mileage exposure alone.

Several possibilities may account for this difference. As mentioned above, the overrepresentation of males in the Crisis group is caused primarily by the overrepresentation of nonwhite males. Indeed, nonwhites of both sexes are overrepresented in the Crisis group, although females much less so than males. While it is not clear why so many nonwhite males are in the Crisis group, it could be related to the question of stress experience. It has been reported that stress is related to social class (Langer and Michael, 1963; Berkman, 1971), and on the whole nonwhites are at a lower socioeconomic level than whites. Thus it may be that, on the whole, nonwhites experience more stress than whites. It may also be that any stress experience is more likely to be expressed in the driving of nonwhites, since it has been hypothesized that, on the whole, members of the lower class are less likely to have developed the internal controls which are more characteristic of the middle class (Lanner and Michael, 1963;Hollingshead and Redlich, 1958). Therefore, it may be that the nonwhite male is, first, more likely to experience stress and, second, more likely to respond to such stress with impulsive or aggressive behavior in his driving.

A second hypothesis for the overrepresentation of the nonwhite

male in the Crisis group is that violations are discretionary in the sense that for a violation to appear on a driving record an officer must have made an arrest and the arrest must have been upheld by the court. A recent study by Zylman (1972) indicates that this is not the case in Michigan when it comes to arrests for driving under the influence, but whether the same holds true for other offenses and in other parts of the country cannot be determined at this time. If officers are more likely to arrest nonwhite males for a given offense and the courts are more likely to convict them, then such differences in the behavior toward the nonwhite male could account for differences in his driving record. Such an argument would be less likely to hold for accidents, but since most of the Crisis group was selected on the basis of violations, such biases could influence the race-sex composition of the group.

A third possible explanation for the age, race, and sex differences between the Crisis group and the Total Licensed Population is that different subgroups in the driving population may differ not only in amount of exposure but also in quality of exposure. If the driving engaged in by younger drivers and/or male drivers and/or nonwhite drivers is at higher accident risk (e.g., night driving in older vehicles in congested areas under complex social circumstances), then the quality of the exposure may account for differences in driver records. Whatever the reasons, it is clear that the age-race-sex composition of the Crisis group differs significantly from that of the total licensed population that was eligible

for selection.

Crisis Versus Control Group by Results of Efforts to Contact

The results of efforts to contact the members of the Crisis and Control groups are presented in Table 3. There was a two-fold increase in the proportion of interviewed subjects in the Control group as compared to the Crisis group (16.9 percent versus 34.9 percent). The differences are significant ($X^2 = 37.59$, 3 df, $p < .01$), indicating the drivers selected on the basis of a rapidly deteriorating driving record are more difficult to contact for telephone interviews than the drivers in the Control group. It is recognized that this difference introduces a bias the effect of which cannot be completely determined.

Less than six percent of the Crisis subjects and less than five percent of the Control subjects who were contacted refused to respond to the interview. This was considered a high level of cooperation for both groups.

Crisis Versus Control Group by Reasons for Noncontact

Table 4 gives a breakdown of the various reasons why people in the two groups were not contacted. The largest category for both groups is "No Listing." Telephone numbers are usually listed under the name of the male head-of-the-household. This makes it difficult to obtain listings for females and young males still living with their parents. The address listed on the driving record could be up to four years old, thus making it difficult to find listings for those

TABLE 3. Comparison of crisis group and control group by results of efforts to contact. N(% Row Total)

	Contacted			Not Contacted	
Group	Interviewed	Refused interview	Invalid interview	Unable to contact	Total
Crisis	68 (16.9)	6 (1.5)	31 (7.7)	298 (73.9)	403
Control	210 (34.9)	11 (1.8)	26 (4.3)	354 (58.9)	601

$X^2 = 37.59$, 3df, $p < .01$

TABLE 4. Comparison of crisis group and control group by reasons for noncontact. N(% Rows)

Group	Unable to interview	Not reached in ten trys	No listing	Incorrect listings	Unpublished listings	Telephone not in service	Total
Crisis	8 (2.7)	11 (3.7)	194 (65.1)	47 (15.8)	23 (7.7)	15 (5.0)	298
Control	39 (11.0)	13 (3.7)	226 (63.8)	52 (14.7)	17 (4.8)	7 (2.0)	354
Total	47 (7.2)	24 (3.7)	420 (64.4)	99 (15.2)	40 (6.1)	22 (3.4)	652 (100.0)

$X^2 = 15.37$, 5df, $p < .01$

who had moved in the last four years without reporting a change of address to the Department of Motor Vehicles. Similar reasoning could account for the second largest category "Incorrect Listing," or wrong numbers. The "Unable to Interview" category includes those cases in which the correct number was reached but the subject was on vacation, in the military, deceased, or otherwise not available. If the subject was not reached in ten attempts no further attempts were made, and he was placed in the "Not Reached in Ten Tries" category. The final two categories are "Unpublished Listings" and "Telephone Out of Service," both of which are disproportionately large for the Crisis group. These differences plus the greater proportion of Control subjects who were "Unable to be Interviewed" account for a statistically significant difference between the Crisis and Control groups ($X^2 = 15.37$, 5 df, $p < .01$). The Crisis group is less likely to be temporarily unavailabe for interviews but more likely to have unpublished numbers or out-of-order telephones. Thus, it seems the Crisis subjects may be more reluctant to be contacted by telephone or to have their equipment repaired, while the Control group may be somewhat more transient and therefore less likely to be available.

Interviewed Versus Not Interviewed Subjects by Age, Race, and Sex

The Interviewed subjects were compared with the Not Interviewed subjects in each of the two groups. Table 5 compares the age, race and sex composition of Interviewed and Not Interviewed subjects in the

TABLE 5. Crisis group: comparison of interviewed subjects and non-interviewed subjects by age, race and sex. N (% Group Total)

Age	Interviews	White males	Non-white males	White females	Non-white females	Totals
22-24	Valid interviews	7 (10.3)	2 (2.9)	2 (2.9)	1 (1.5)	12 (17.6)
	* Non-interviewed	50 (14.9)	39 (11.6)	8 (2.4)	5 (1.5)	102 (30.4)
25-30	Valid interviews	13 (19.1)	3 (4.4)	0	0	16 (23.5)
	Non-interviewed	45 (13.4)	31 (9.2)	11 (3.3)	7 (2.1)	94 (28.1)
31-40	Valid interviews	10 (14.7)	4 (5.9)	2 (2.9)	0	16 (23.5)
	Non-interviewed	46 (13.7)	22 (6.6)	7 (2.1)	3 (0.9)	78 (23.3)
41-50	Valid interviews	9 (13.2)	1 (1.5)	2 (2.9)	0	12 (17.6)
	Non-interviewed	22 (6.6)	10 (3.0)	1 (0.3)	1 (0.3)	34 (10.1)
51+	Valid interviews	9 (13.2)	3 (4.4)	0	0	12 (17.6)
	Non-interviewed	22 (3.6)	12 (3.6)	3 (0.9)	0	27 (8.1)
Totals	Valid interviews	48 (70.6)	13 (19.1)	6 (8.8)	1 (1.5)	68
	Non-interviewed	175 (52.2)	114 (34.0)	30 (9.0)	16 (4.8)	335

*Includes invalid interviews and refused interviews

Crisis group. There is a significant difference (X^2 = 7.40, 1 df, $p < .01$) in the racial composition of the two groups with proportionally fewer nonwhites in the interviewed group. There is also a significant difference (X^2 = 11.85, 4 df, $p < .02$) in the ages of the two groups, with younger people (age 22-24) underrepresented in the Interviewed group and older people (age 41+) overrepresented. As mentioned above, a young person still living at home would be likely to have a telephone listed under the name of the head of the household. Nonwhites may be less likely to have telephones than whites so that more nonwhites would have no listing at all. There is no significant difference in the sex distribution of the two groups, with both predominantly males. The differences between the Interviewed and Not Interviewed Crisis subjects are not unexpected and seem to be directly related to either the probability of having a telephone or of having a telephone listed in one's own name.

In comparing Interviewed and Not Interviewed Control subjects, similar differences are found in Table 6. The distribution of the sexes in the two groups does not differ significantly, but the racial composition differs significantly (X^2 = 36.47, 1 df, $p < .001$) with proportionally more nonwhites in the Not Interviewed group. Age distribution is also significantly different for the two groups (X^2 = 90.42, 4 df, $p < .001$). Subjects under 30 years of age are underrepresented and subjects over 30 years of age are overrepresented. This finding tends to support the

TABLE 6. Control group: comparison of interviewed subjects and non-interviewed subjects. by age, race and sex. N (% Group Total)

Age	Interviews	White males	Non-white males	White females	Non-white females	Totals
22-24	Valid interviews	7 (3.3)	2 (1.0)	8 (3.8)	0	17 (8.1)
	Not interviewed	30 (7.7)	16 (4.1)	29 (7.4)	7 (1.8)	82 (21.0)
25-30	Valid interviews	30 (14.3)	7 (3.3)	7 (3.3)	2 (1.0)	46 (21.9)
	Not interviewed	70 (17.9)	40 (10.2)	17 (4.3)	6 (1.5)	133 (34.0)
31-40	Valid interviews	48 (22.9)	12 (5.7)	8 (3.8)	2 (1.0)	70 (33.3)
	Not interviewed	46 (11.8)	37 (9.5)	8 (2.0)	4 (1.0)	95 (24.3)
41-50	Valid interviews	36 (17.1)	8 (3.8)	3 (1.4)	0	47 (22.4)
	Not interviewed	22 (5.6)	14 (3.6)	3 (0.8)	0	39
51+	Valid interviews	20 (9.5)	8 (3.8)	2 (1.0)	0	30 (14.3)
	Not interviewed	15 (3.8)	23 (5.9)	4 (1.0)	0	42
Totals		141 (67.1)	37 (17.6)	28 (13.3)	4 (1.9)	210 (34.9)
		183 (46.8)	130 (33.2)	61 (15.6)	17 (4.3)	391 (65.1)

above hypothesis that being interviewed is directly related to having a telephone and/or having a listing under one's name.

Crisis Versus Control Group

A comparison of the total Crisis group with the total Control group showed significant differences in age distribution (X^2= 20.68, 4 df, $p < .01$) and sex (X^2 = 4.71, 1 df, $p < .05$, see Table 7). The Crisis group included a greater proportion of persons age 22 through 24 and a higher proportion of males. The racial composition was not significantly different. However, when comparisons were based on only interviewed subjects there were no significant differences between the groups for age, race, or sex (Table 8). It appears that the telephone interview procedure rendered comparable populations from the original subject pools.

Driving history.

The first question on the interview asked whether or not the subject had lived and driven in North Carolina during the preceding four years. If he had not, the interview was classified as invalid, since the period with no violations or accidents on the North Carolina driving record could have been the result of not driving in the state and it was not feasible to check out-of-state records.

Driving record.

Subjects with valid interviews in the two groups were compared on the basis of driving record. Because the Crisis subjects were selected by virtue of having poor driving records for the previous year, their

TABLE 7. Comparison of total crisis group and total control group by age, race and sex. N(% Group Total)

Age	Subjects	White males	Non-white males	White females	Non-white females	Total
22-24	Crisis	57 (14.1)	41 (10.2)	10 (2.5)	6 (1.5)	114 (38.3)
	Control	91 (11.3)	72 (9.0)	40 (5.0)	12 (1.5)	215 (26.8)
25-30	Crisis	58 (14.4)	34 (8.4)	11 (2.7)	7 (1.7)	110 (27.3)
	Control	114 (14.2)	76 (9.5)	29 (3.6)	11 (1.4)	230 (28.6)
31-40	Crisis	56 (13.9)	26 (6.4)	9 (2.2)	3 (0.7)	94 (23.3)
	Control	106 (13.2)	60 (7.5)	18 (2.2)	6 (0.01)	190 (23.7)
41-50	Crisis	31 (7.7)	11 (2.7)	3 (0.7)	1 (0.3)	46 (11.4)
	Control	62 (7.7)	22 (2.7)	6 (0.01)	0	90 (11.2)
51+	Crisis	21 (5.2)	15 (3.7)	3 (0.7)	0	39 (9.7)
	Control	40 (5.0)	32 (4.0)	6 (0.01)	0	78 (9.7)
Totals	Crisis	223 (55.3)	127 (31.5)	36 (8.9)	17 (4.2)	403
	Control	413 (51.4)	262 (32.6)	99 (12.3)	29 (3.6)	803

TABLE 8. Interviewed subjects: comparison of crisis group and control group by age, race and sex. N(% Group Total)

Age	Subjects	White Male	Non-white Male	White female	Non-white female	Totals
22-24	Crisis	7 (10.29)	2 (2.94)	2 (2.94)	1 (1.47)	12
	Control	7 (3.33)	2 (0.95)	8 (3.81)	0	17
25-30	Crisis	13 (19.12)	3 (4.41)	0	0	16
	Control	30 (14.29)	7 (3.33)	7 (3.33)	2 (0.95)	46
31-40	Crisis	10 (14.71)	4 (5.88)	2 (2.94)	0	16
	Control	48 (22.86)	12 (5.71)	8 (3.81)	2 (0.95)	70
41-50	Crisis	9 (13.24)	1 (1.47)	2 (2.94)	0	12
	Control	36 (17.14)	8 (3.81)	3 (1.43)	0	47
51+	Crisis	9 (13.24)	3 (4.41)	0	0	12
	Control	20 (9.52)	8 (3.81)	2 (0.95)	0	30
Totals	Crisis	48 (70.59)	13 (19.12)	6 (8.82)	1 (1.47)	68
	Control	141 (67.14)	37 (17.62)	28 (13.33)	4 (1.90)	210

violation record was considerably worse than that of the Control group (Table 9, $X^2 = 229.23$, 4 df, $p < .001$). Over 94 percent of the Control subjects had no reported accidents during the preceding year, while 47 percent of the Crisis subjects had at least one accident during this time, a significant difference ($X^2 = 75.97$, 4 df, $p < .001$, Table 10). The violation and accident experience of the Control group might be that expected of a group of drivers with this age, race, and sex composition. However, it is recognized that in any given year one can select an extreme group of records and compare them with a random group and detect highly significant differences.

Changes in amount of driving.

Subjects were asked whether during the preceding year they had driven more than, less than, or about the same as usual. The Crisis and Control groups differed significantly in their responses ($X^2 = 10.58$, 2 df, $p < .01$, Table 11), with a higher proportion of the Crisis subjects reporting an increase in their driving and a higher proportion of the Control subjects reporting a decrease in their driving. Because no estimate was obtained of actual amount of driving done, it is not possible to determine whether part of the driving record differences can be attributed to higher absolute mileage being accumulated by the Crisis group. The differences in accident and violation experience are so great that it does not appear likely that reported differences in driving exposure could entirely account for them. The proportion reporting no change in

TABLE 9. Interviewed subjects: comparison of crisis group and control group by number of violations. N (% Row Total)

Group	(0)	(1)	(2)	(3)	(4)
Crisis	6 (8.8)	3 (4.4)	2 (2.9)	53 (77.9)	4 (5.9)
Control	193 (91.9)	16 (7.6)	1 (0.5)	0	0

$X^2 = 229.23$, 4 df, $p < .001$

TABLE 10. Interviewed subjects: comparison of crisis group and control group by number of accidents. N (% Row Total)

Group	(0)	(1)	(2)	(3)	(4)
Crisis	36 (52.9)	13 (19.1)	6 (8.8)	10 (14.7)	3 (4.4)
Control	198 (94.3)	11 (5.2)	0	1 (0.5)	0

$X^2 = 75.97$, 4 df, $p < .001$

TABLE 11. Interviewed subjects: comparison of crisis group and control group by changes in amount of driving. N (% Row Total)

	Compared to previous years the subjects drove		
Group	More	Less	About the same
Crisis	31 (45.6)	2 (2.9)	35 (51.5)
Control	60 (28.6)	30 (14.3)	120 (57.1)

$X^2 = 10.58$, 2 df, $p < .01$

amount of driving was fairly equal for the two groups.

Driving in connection with work.

Table 12 shows the responses to a question concerning driving done in relation to work. The two groups differ significantly (X^2 = 23.87, 8 df, $p < .01$). The most marked difference is that there are over four times the proportion of truck drivers in the Crisis group compared to the Control group. On the other hand, the Control group has three times the proportion of commuters (over 50 miles a day) as the Crisis group. Thus there are two groups of drivers that could be considered high mileage, but one is overrepresented in the Crisis group while the other is overrepresented in the Control group. It is also interesting to note that the Crisis group has six times the proportion of students found in the Control group. No firm conclusions about work-related driving and group membership could be drawn.

Marital status.

The two groups differ significantly on marital status (X^2 = 17.34, 4 df, $p < .01$, Table 13). About 91 percent of the Control subjects were married, compared to 75 percent of the Crisis subjects. The Crisis group includes a greater proportion of people who are separated, widowed, or never married, but none who are divorced. Thus, it appears that being married is associated with a lower probability of experiencing a rapid deterioration in driving record as shown in the Crisis group.

TABLE 12. Interviewed subjects: comparison of crisis group and control group by driving in connection with work. N(% Row Total)

	Type of driving								
Group	Incorrect reply	Doesn't drive on job	Salesman	Truck driver	Local Delivery	Commutes over 50 miles	Other	Not employed	Student
Crisis	0	31 (45.6)	3 (4.4)	9 (13.2)	17 (25.0)	1 (1.5)	3 (4.4)	0	4 (5.9)
Control	4 (1.9)	82 (39.0)	7 (3.3)	6 (2.9)	82 (39.0)	10 (4.8)	13 (6.2)	4 (1.9)	2 (1.0)

$X^2 = 23.87$, 8df, $p < .01$

TABLE 13. Interviewed subjects: comparison of crisis group and control group by marital status. N (% Row Total)

	Marital status				
Group	Married	Separated	Divorced	Widowed	Never Married
Crisis	51 (75.0)	5 (7.4)	0	2 (2.9)	10 (14.7)
Control	192 (91.4)	4 (1.9)	3 (1.4)	3 (1.4)	8 (3.8)

$X^2 = 17.34$, 4 df, $p < .01$

Education.

A group of questions concerned with level of education, height, and weight, and suggestions concerning the State's role in reducing highway fatalities were placed at the close of the interview to serve as buffers after the subject had been discussing possibly stressful topics. There were no significant differences between the two groups on educational level (Appendix B, Table 1B), although it is of interest to note the large proportion of the Crisis group that has had postgraduate training.

Height and weight.

The height and weight of each subject was requested because data from California had suggested that these factors might be related to driver record (Coppin, McBride, and Peck, 1967). Because the California data showed different relationships for males and females, the results were analyzed separately for the two sexes.

There were no significant differences in the distribution of height or deviation from mean weight by sex for the two groups. Once this had been established the question was whether or not either height or weight was related to the driving record. The Crisis group showed no differences in the distribution of violations or accidents by height or deviation from mean weight for both sexes.

Similarly, the Control group showed no significant differences in the distribution of violations or accidents by height or weight

for either sex. (Because female Control subjects had no accidents, no analysis could be performed.)

State's role in highway safety.

The interview was closed by asking the subject what he felt the State could do to reduce the number of fatalities on the road. There were significant differences in the number of ideas expressed by the two groups, with the Crisis group more likely to give longer and more varied answers ($X^2 = 12.24$, 3 df, $p < .01$, Table 14). Perhaps their more frequent experiences with accidents and violations made the Crisis subjects more aware of possible improvements than the Control subjects with few or no accidents or violations.

On the whole the biographical data did not distinguish between the Crisis and Control groups. Most of the significant differences had little practical use or did not readily yield to interpretation. The major differences other than driving record (which established the criterion for membership in the Crisis sample) were marital status, with a smaller proportion of Crisis subjects married; and response to the final question, with Crisis subjects providing more ideas about the State's role in improving highway safety.

Socioeconomic status.

Each subject was assigned a rank of one to five according to his occupation and education. This was based on Hollingshead (1967). The Crisis and Control groups were found not to differ on this measure of

TABLE 14. Interviewed subjects: comparison of crisis group and control group by number of ideas for reducing fatalities. N (% Row Total)

	Number of ideas			
Group	No reply	One	Two	Three
Crisis	10 (14.7)	36 (52.9)	20 (29.4)	2 (2.9)
Control	28 (13.3)	146 (69.5)	36 (17.1)	0

$X^2 = 12.24$, 3 df, $p < .01$

socioeconomic status, Appendix B, Table 2B.

Presence of potential stressors.

The major portion of the interview concerned the relationship between the presence of potentially stressful events and the accident and violation experience of each individual for the preceding year. All interviewed subjects in the Crisis group and any Control subjects with any violations or accidents were questioned about the presence of potential stressors in relation to the violations or accidents experienced. Control subjects with "clean" records were asked whether the stressors were experienced at any time during the preceding year. Because of this difference in the way the questions were posed, the Control subjects with "clean" records were asked whether any of the stressors existed at any time during the twelve-month period preceding the interview while all Crisis subjects and Control subjects with accidents and/or violations were asked about stressors only in relationship to their accidents and violations. Thus, there may be a bias toward reducing the probability of detecting a stressor for Crisis subjects if it were not in direct relation to an accident or violation but still occurred within the preceding year. On the other hand, because Crisis subjects were questioned in relation to specific events, there may have been a greater likelihood that they would report stress experiences in order to rationalize the occurrence of their violations or accidents. Furthermore, interviewers were aware of whether persons belonged to the Crisis or Control group. To what

extent these biases operated and to what extent they tended to cancel each other out cannot be determined.

Changes in personal health, family health or job.

Crisis subjects reported more changes or problems in personal health during the preceding year (X^2 = 10.74, 1 df, $p < .01$, Table 15). However, there were no significant differences between the two groups in reported changes in the health of family or close friends (Table 16). Thus it appears that while family health problems may be of some concern, only personal health problems are associated with a rapidly deteriorating driving record. Poor physical health has been shown to be strongly related to poor mental health (Langer and Michael, 1963), and certain forms of poor mental health have been related to poor driving records. Thus it is not too surprising to find this relationship between poor personal health and the poor driving record that characterizes the Crisis sample.

Job problems or changes showed no significant difference between the two groups (Table 17). Of the three kinds of stressors that were investigated in great detail, namely, personal health, family health, and job changes or problems, only personal health problems distinguished between the two groups, with 33.8 percent of the Crisis group reporting personal health difficulties in the past year compared to only 14.8 percent of the Control group.

Other life changes.

A large section of the questionnaire concerned a number of potential

TABLE 15. Interviewed subjects: comparison of crisis group and control group by personal health problems. N (% Row Total)

	Had personal health problems	
Group	No	Yes
Crisis	45 (66.2)	23 (33.8)
Control	179 (85.2)	31 (14.8)

$X^2 = 10.74$, 1 df, $p < .01$

TABLE 16. Interviewed subjects: comparison of crisis group and control group by family health problems. N (% Row Total)

Group	Family health problems	
	No	Yes
Crisis	45 (66.2)	23 (33.8)
Control	151 (71.9)	59 (28.1)

TABLE 17. Interviewed subjects: comparison of crisis group and control group by job problems. N (% Row Total)

Group	Job Problems	
	No	Yes
Crisis	53 (77.9)	15 (22.1)
Control	160 (76.2)	50 (23.8)

stressors that were, on the whole, considered less serious than the three above, which were covered in detail in the interview. It should be noted that some life changes were investigated that might be considered positive because a change in itself might be stressful even if the change were for the better. Also, since anticipation of a change might induce stress, each subject was asked if he were planning or expecting certain events as well as if the event had occurred.

a. Moving and trips. The two groups showed no differences in whether or not they reported planning to move or having recently moved (Appendix B, Table 3B). However, almost twice the proportion of Control subjects had planned or taken a trip in the past year ($X^2 = 14.68$, 1 df, $p < .001$, Table 18).

b. Financial problems. The results of two questions concerning financial problems, namely sudden loss of income and increasing concern about bills, showed no significant differences between the two groups. This suggests that these particular problems may not tend to be reflected in the driving record. (Appendix B, Tables 4B and 5B).

c. Arguments or disagreements. There is a five-fold increase in the proportion of the Crisis subjects reporting arguments or disagreements with other people ($X^2 = 11.20$, 1 df, $p < .001$, Table 19). Crisis subjects seem less likely to get along smoothly with others than do Control subjects, or at least they are more likely to report such difficulties.

d. Breakup of relationship. Table 20 compares the two groups

TABLE 18. Interviewed subjects: comparison of crisis group and control group by whether subject had taken a trip. N(% Row Total)

	Taken/planned a trip	
Group	No	Yes
Crisis	46 (67.6)	22 (32.4)
Control	84 (40.0)	126 (60.0)

$X^2 = 14.68$, 1df, $p < .001$

TABLE 19. Interviewed subjects: comparison of crisis group and control group by arguments or disagreements. N(% Row Total)

	Had had arguments or disagreements	
Group	No	Yes
Crisis	58 (85.3)	10 (14.7)
Control	204 (97.1)	6 (2.9)

$X^2 = 11.20$, 1df, $p < .001$

TABLE 20. Interviewed subjects: comparison of crisis group and control group by breakup of a relationship. N(% Row Total)

	Had had a breakup	
Group	No	Yes
Crisis	60 (88.2)	8 (11.8)
Control	201 (95.7)	9 (4.3)

$X^2 = 3.79$, 1df, $p = .05$

on whether there has been a breakup of a relationship in the preceding year. Crisis subjects show over twice the proportion of such breakups found in the Control group ($X^2 = 3.79$, 1 df, $p = .05$). This finding, gives another indication that subjects in the Crisis group may have difficulty in maintaining interpersonal relationships.

e. Marital stress. For the comparison of the two groups on marital stress, all subjects who had never been married were eliminated. All other subjects were included, since persons who were divorced, separated, or widowed at the time of interview could potentially have experienced marital stress at some time during the previous year if they were married at that time. The two groups did not differ significantly (Appendix B, Table 6B). For both groups reports of marital stress were quite low, with 5.2 percent of the Crisis group and 2.5 percent of the Control group reporting it. The subjects generally seemed candid in all their responses, so that these results are considered a fairly accurate reflection of the way the subjects perceived the situation.

f. Engagement or marriage. No one in the Control group had been engaged in the past year but 7.4 percent of the Crisis group had been engaged ($p < .001$, Fisher's Exact Test, Table 21). This difference may be partially explained by the greater proportion of unmarried persons in the Crisis group, 14.7 percent versus 3.8 percent in the Control group. Married subjects were not eliminated from this comparison, since a person could have been engaged and married within the past year. Proportionally

TABLE 21. Interviewed subjects: comparison of crisis group and control group by engagement. N (% Row Total)

Group	Had been engaged	
	No	Yes
Crisis	63 (92.6)	5 (7.4)
Control	210 (100)	0

$p < .001$, Fisher's Exact Test

fewer Control subjects were either planning a marriage or had been married during the preceding year (Appendix B, Table 7B), not a significant difference.

g. Separation and divorce. The Crisis group had significantly more persons who were separated ($p < .05$, Fisher's Exact Test, Table 22). Never married subjects were eliminated from this comparison. There were also significantly more people planning divorces among the Crisis subjects ($p < .05$, Fisher's Exact Test, Table 23). Since none of the Crisis group reported they were divorced, those who answered this question affirmatively had to be expecting a divorce rather than have been divorced. These differences are particularly interesting in view of the nonsignificant (and low) reports of marital stress for the two groups.

h. Expecting or had a baby. Expecting or having a baby showed no significant difference between the two groups (Appendix B, Table 8B). Never married males were eliminated from this comparison.

i. Criticism. Whether or not the person reported that he had experienced undue criticism during the past year showed no significant differences (Appendix B, Table 9B).

Of the questions categorized as Other Life Changes, those that showed significant differences between the two groups are arguments, breakup of relationships, engagements to be married, separations, and impending divorces. All of these reflect problems or changes in interpersonal relationships. Whether interpersonal problems lead to poor

TABLE 22. Interviewed subjects: comparison of crisis group and control group by separation. N (% Row Total)

Group	Had been separated	
	No	Yes
Crisis	53 (91.4)	5 (8.6)
Control	199 (98.5)	3 (1.5)

$p < .05$, Fisher's Exact Test

TABLE 23. Interviewed subjects: comparison of crisis group and control group by divorce. N (% Row Total)

Group	Had planned a divorce	
	No	Yes
Crisis	55 (94.8)	3 (5.2)
Control	201 (99.5)	1 (.5)

$p < .05$, Fisher's Exact Test

driving records or whether certain kinds of personality difficulties lead to both interpersonal problems and driving problems cannot be ascertained by the present study. It is possible, for an example, that an impulsive, aggressive person might have difficulty with interpersonal relations *and* with driving, but the poor interpersonal relations *per se* would not be causing the poor driving record. Future research might well investigate this area to determine if the difficulties with interpersonal relationships are a causative factor in rapidly deteriorating driving records or if personality difficulties cause both problems.

Responses to stress.

There were three questions that concerned the behavior of the subject himself rather than the stressors that he had experienced. These behaviors might be considered as how a person responds to his environment with whatever stressors that might include. The first question asked whether the subject had felt particularly discouraged or depressed in the past year (Appendix B, Table 10B). There were no significant differences between the two groups. The next question concerned changes in the persons' drinking habits (Appendix B, Table 11B), and again there were no significant differences. The third question asked how often the subject had felt there was no point in living (Table 24). Crisis subjects were more likely to answer this question in the affirmative ($X^2 = 11.50$, 3 df, $p < .01$).

The responses to these three questions were broken down by age,

TABLE 24. Interviewed subjects: comparison of crisis group and control group by feelings of "no point in living". N (% Row Total)

	Frequency of feeling			
Group	Often	Sometimes	Occasionally	Never
Crisis	3 (4.4)	5 (7.4)	18 (26.5)	42 (61.8)
Control	3 (1.4)	7 (3.3)	29 (13.8)	171 (81.4)

$X^2 = 11.50$, 3 df, $p < .01$

race, and sex to see if there might be any associations.

White subjects in the Control group were more likely than nonwhites to report that they felt discouraged or depressed ($X^2 = 4.10$, 4 df, $p < .05$, Table 25). Racial differences were not significant for Crisis subjects (Appendix B, Table 12B). In both groups proportionally more women than men reported that they had been depressed but the difference was significant only for the Control group ($X^2 = 7.09$, 1 df, $p < .01$, Table 26; $X^2 = 2.22$, 1 df, NS, Table 27). Age showed a significant difference on this question ($X^2 = 7.11.48$, 4 df, $p = .02$, Table 28) for the Crisis group, with reports of depression decreasing with increased age. An opposite trend is seen in the Control group, although it is not significant. Figure 1 compares by age distribution the reports of depression for the two groups, which differ significantly ($X^2 = 17.27$, 4 df, $p < .01$). The high proportion of young people reporting depression in the Crisis sample is of interest. Thus, we see for the Control group that reports of depression were associated with being white and being female while younger subjects in the Crisis group are more likely to report depression or discouragement than in the Control group.

Reported changes in drinking habits showed no significant differences by age, race, or sex for either group.

There were no differences between the two groups in the proportion that had attempted suicide. Only one person, in the Crisis group, reported an attempt. The question in the interview concerning methods of

TABLE 25. Interviewed control subjects: feelings of discouragment or depression by race. N (% Row Total)

Group	Had felt discouraged or depressed	
	No	Yes
White	136 (80.5)	33 (19.5)
Non-white	39 (95.1)	2 (4.9)

$X^2 = 4.10$, 1 df, $p < .05$

TABLE 26. Interviewed control subjects: feelings of depression by sex. N (% Row Total)

Group	Had felt discouraged or depressed	
	No	Yes
Male	154 (86.5)	24 (13.5)
Female	21 (65.6)	11 (34.4)

$X^2 = 7.09$, 1 df, $p < .01$

TABLE 27. Interviewed crisis subjects: feelings of discouragement or depression by sex. N (% Row Total)

Group	Had felt discouraged or depressed	
	No	Yes
Male	154 (77.0)	24 (23.0)
Female	21 (42.9)	11 (57.1)

$X^2 = 2.22$, 1 df, N.S.

TABLE 28. Interviewed crisis subjects: feelings of discouragement or depression by age. N (% Row Total)

	Had felt discouraged or depressed				
	Age				
	22-24	25-30	31-40	41-50	Over 50
No	5 (41.7)	10 (62.5)	14 (87.5)	11 (91.7)	10 (83.3)
Yes	7 (58.3)	6 (37.5)	2 (12.5)	1 (8.3)	2 (16.7)

$X^2 = 11.48$, 4 df, $p = .02$

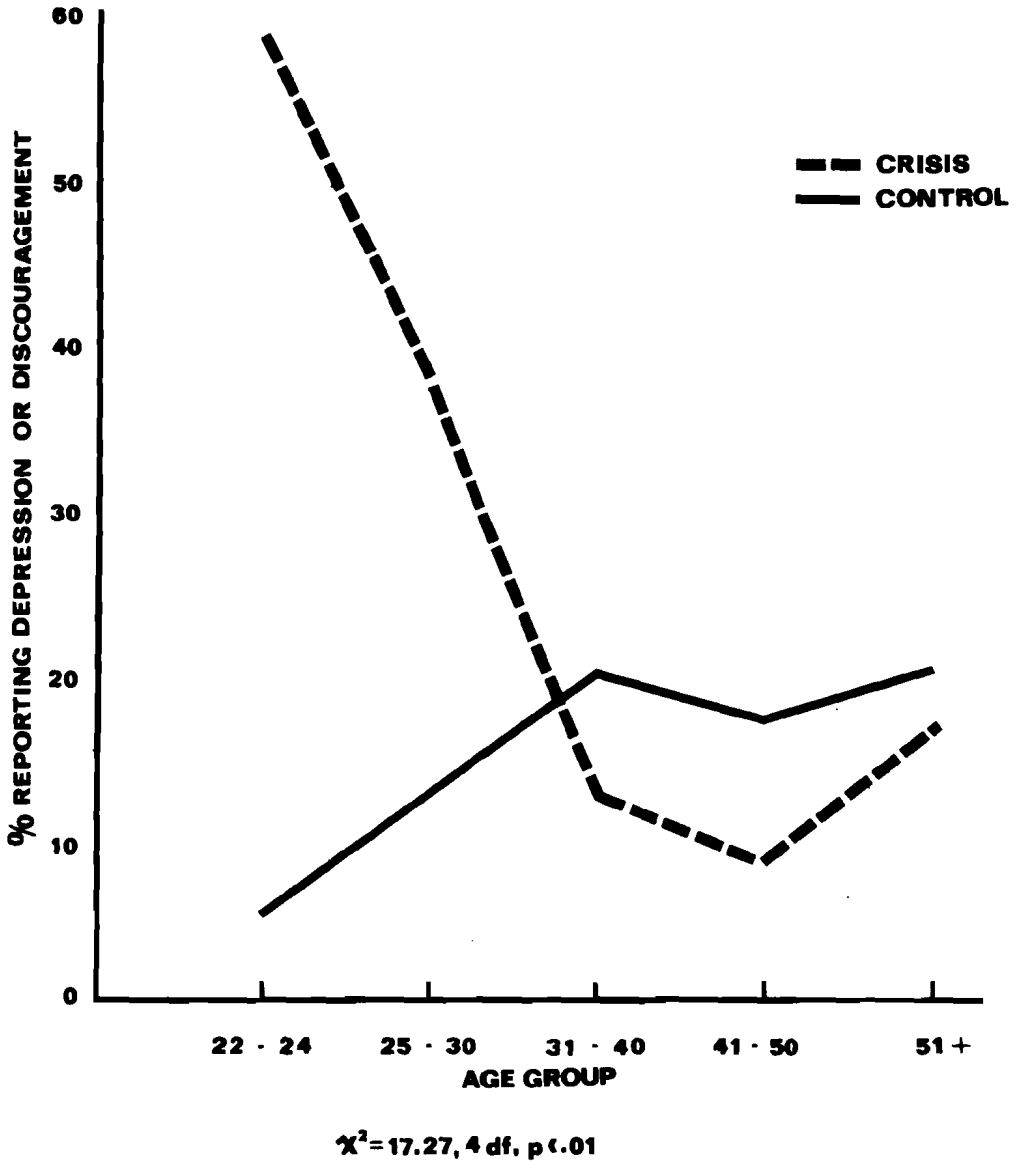

Figure 1. Interviewed Subjects: comparison of crisis and control group reports of depression by age.

suicide was not analyzed because a procedural difference between the Crisis and Control interviews introduced a bias.

Crisis Versus Control Group by Total Stressors

Total stressors.

The relationship between total number of stressors and accidents or violations was examined to determine whether a greater number of stress experiences was associated with poorer driving record. Possible stress areas included personal health problems, family health problems, job problems, a planned or recent move, a planned or executed trip, sudden loss of income, increased concern about bills, arguments, breakup of relationship, growing marital stress, a planned or recent engagement, a planned or recent marriage, separation, divorce, pregnancy or birth, and being the subject of criticism. A positive response about the presence of any one of these stressors was given a score of one, and the total scores for the subjects in each group were compared (Table 29). The maximum number of stressors possible was 16, and the maximum number reported by any one subject was eight. While the differences between the groups are significant ($X^2 = 18.46$, 8 df, $p < .02$), the results are not easily interpreted. Figure 2 presents the data graphically, and it can be seen that the largest differences in the two groups are for zero or one stressor. A larger proportion of the Control group reported only one stressor. Nearly 40 percent of the Crisis group and almost 49 percent of the Control group reported either one or no stresses. For a total of two or more stressors the two

TABLE 29. Interviewed subjects: comparison of crisis group and control group by total stress score. N (% Row Total)

	Total stress score								
Group	0	1	2	3	4	5	6	7	8
Crisis	16 (23.5)	11 (16.2)	14 (00.6)	12 (17.6)	6 (8.8)	4 (5.9)	2 (2.9)	1 (1.5)	2 (2.9)
Control	29 (13.8)	73 (34.8)	53 (25.2)	30 (14.3)	11 (5.2)	10 (4.8)	3 (1.4)	1 (0.5)	0

$X^2 = 18.46$, 8 df, $p < .02$

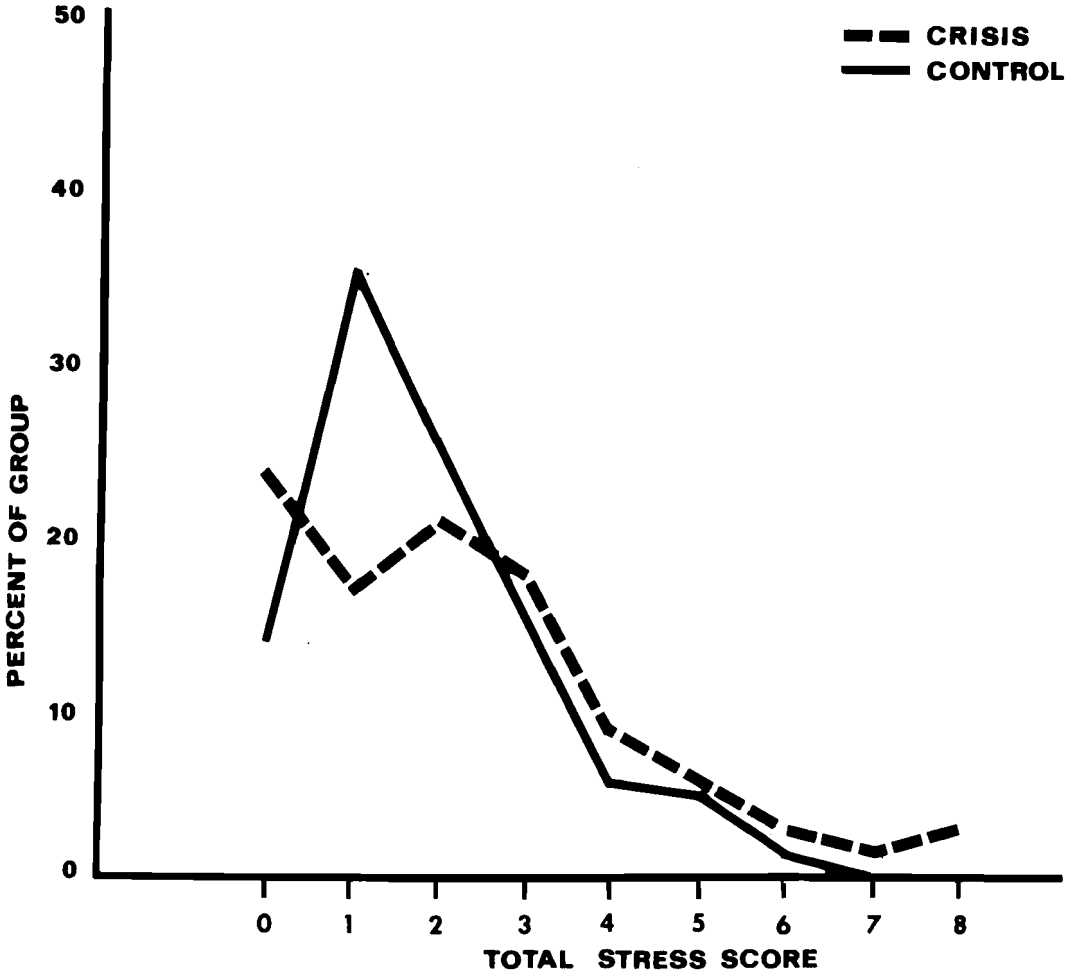

Figure 2. Interviewed Subjects: comparison of crisis group and control group by total stress score.

curves are remarkably similar. Thus it appears that the Crisis group subjects are not, on the whole, experiencing a proportionally larger number of stressors than the Control group. Such a comparison, of course, does not take into consideration differences in the way people experience stress situations.

Total response to stress score.

The items that were previously referred to as responses to stress, namely, feelings of depression, changes in drinking habits, and feeling that there is no point in living, were tallied for each subject to arrive at a Response to Stress score and the two groups were compared on this score. A maximum score was three, and some Crisis subjects reported all three, while no Control subject reported more than two. The groups differ significantly, with the Crisis subjects showing a higher frequency of the behaviors investigated than the Control subjects ($X^2 = 16.85$, 3 df, $p < .001$, Table 30). The Control subjects were more likely to report no such responses at all (about 70 percent), while over 54 percent of the Crisis subjects reported at least one of the responses, Figure 3. Since the Crisis group does not appear to differ meaningfully in numbers of stressors experienced, this difference in responses to stress may be a major distinguishing feature of the Crisis population. Feelings and frustrations arising from stressors may be expressed more overtly by people in the Crisis group. This is then reflected in their deviant driving record. The Control group, representative of the licensed population of this age, race and sex composition seems

TABLE 30. Interviewed subjects: comparison of crisis group and control group by response to stress score. N (% Row Total)

	Response to Stress			
Group	0	1	2	3
Crisis	31 (45.6)	24 (35.3)	11 (16.2)	2 (2.9)
Control	145 (69.0)	42 (20.0)	23 (11.0)	0

$X^2 = 16.85$, 3 df, $p < .001$

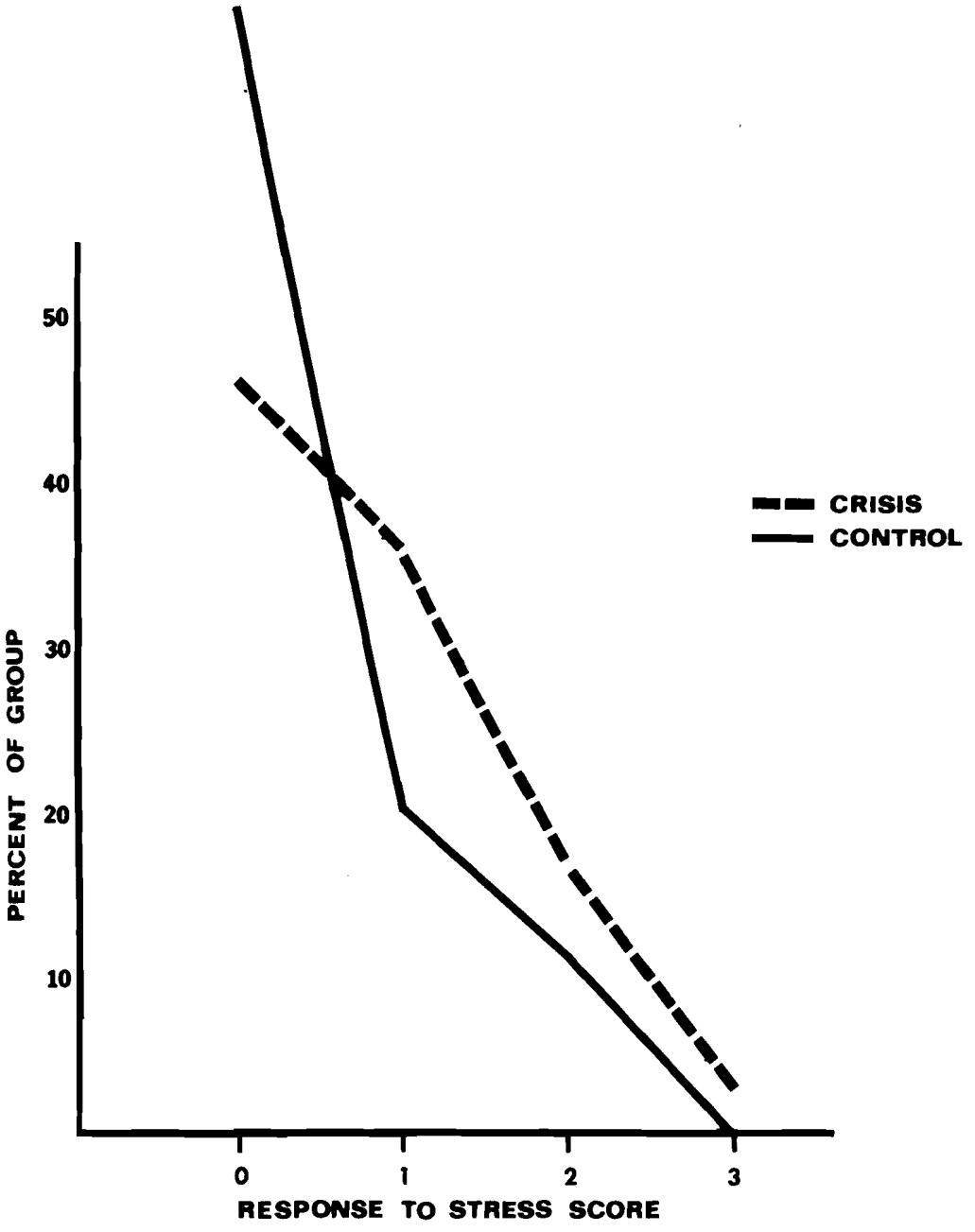

Figure 3. Interviewed Subjects: comparison of crisis group by response to stress score.

to be able to handle stressful situations. The Crisis group, on the other hand, reporting no more total stressors, may respond to stress in such a way as to create even more problems for themselves (in this case, accidents and violations). Future research should focus on the ways in which people respond or cope with their problems to determine whether it is stress *per se* or the way a person deals with stress that makes a difference.

Total stress and driving record.

The Total Stress score was compared to the number of violations and the number of accidents for each group. No significant differences were found for either the Crisis or Control groups.

Response to stress and driving record.

The Response to Stress score showed no significant differences when compared to number of violations and number of accidents for each group. The small range of scores may have precluded any trends.

Circumstances Surrounding Accident or Violation Events

Results reported thus far are based on information about individual subjects. The following analyses are based on events, that is, violations and accidents experienced by the Crisis and Control subjects. These comparisons were run to determine whether circumstances surrounding the events experienced by Crisis subjects differed in any way from circumstances surrounding the events experienced by Control subjects. Because Crisis

subjects were selected by virtue of having a large number of events, it was necessary to include only one event per eligible person; otherwise a few Crisis subjects could conceivably have had a disproportionate influence on the outcome of the comparisons. Therefore, no person could contribute more than one accident and one violation to the analyses, regardless of how many events he had experienced.

To select which accident or violation would be used for a subject who had multiple events, the following procedure was used. The events were numbered chronologically and a random number generator then selected a number from one to three inclusive. The violation corresponding to the randomly selected number was then included for the analysis.[2]

Stressors preceding violation.

The various kinds of stresses that were analyzed earlier for individuals were analyzed here to determine whether they were experienced preceding a violation. There were no significant differences between the Crisis and Control groups in the proportion of violations that were preceded by personal health problems, family health problems, or job problems.

There was a significant difference between the groups in the proportion that had moved or were planning to move preceding a violation

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[2]In the analyses of event data, an at-fault accident was included as an accident event rather than a violation event.

($p < .01$, Fisher's Exact Test, Table 31), with nearly a nine-fold increase in the proportion of Control subjects who reported moving prior to the violation. There were no significant differences between the two groups for any of the other potential stress experiences, including planning or taking a trip, experiencing loss of income, increasing concern about bills, arguments, breakup of a relationship, marital stress, engagement, marriage, separation, divorce, expecting a baby, and experiencing criticism.

Comparisons were made on the basis of two of the three responses to stress preceding violations, namely, feeling depressed or discouraged and changes in drinking habits. There were no differences between the two groups on these factors. The third factor, feeling there was no point in living, had not been asked specifically in relation to accidents or violations, so that it is not appropriate to analyze it in this context.

Thus, of all the potential stressors covered in the interview, only one, namely moving or planning a move, discriminated between the Control and the Crisis groups when it was asked whether the stressor had preceded a violation. Failure to find significant differences between the two groups may be, in part, attributed to the low frequency of violation

TABLE 31. Interviewed subjects: comparison of crisis group and control group by moving prior to violation. N (% Row Total)

	Had planned move	
Group	No	Yes
Crisis	55 (96.5)	9 (3.5)
Control	2 (69.2)	4 (30.8)

$p < .01$, Fisher's Exact Test

events in the Control group. Of 148 violations[3] in the Crisis group, only 57 were included in the analyses, while for the Control group 12 out of a total of 13 were included. This difference underscores the differences between the two groups in the proportion of persons who had multiple violations. Finding one significant difference among so many comparisons cannot be given undue emphasis, but should only be used as an indicator of a potential discriminator.

Circumstances preceding violation.

Crisis and Control violations were compared, first, for whether or not the day on which they had occurred had been unusual up to the time of the violation. Almost 39 percent of the Control subjects and almost 29 percent of the Crisis subjects reported that it was an unusual day, but this difference is not statistically significant (Appendix B, Table 13B). The reported mood of the persons prior to the violation also did not differ significantly for the two groups (Appendix B, Table 14B).

Consequences of violation.

The next factors investigated concerned problems or changes that followed the violation. There were no significant differences between the two groups in the proportion that experienced financial problems, job problems, or family or marital problems following the violation. Post-violation changes in driving habits also showed no significant differences, although nearly twice the proportion in the Control group

[3]Violations in conjunction with accidents were considered at-fault accidents and dealt with as accident data.

reported changes in driving compared to the Crisis group. The Crisis group reported nearly a two-fold increase over the Control group in the proportion of subjects experiencing emotional problems following a violation, but this difference was not significant. There were no significant differences in reports of other problems following the violation.

Stressors preceding accident.

Similar analyses were performed for the two groups on the basis of stressors preceding accidents. There were no significant differences found for any of the stressors, for total stress, or for responses to stress preceeding accidents.

Circumstances preceding accident.

The following comparisons concern factors preceding the accident itself. As before, each subject was allowed to contribute information on no more than one accident, regardless of how many he may have experienced. This procedure yielded information on 32 out of 69 accidents in the Crisis group and 12 out of 14 accidents in the Control group. It can readily be seen that approximately 50 percent of the total accidents in the Crisis group are experienced by accident repeaters.

The kind of day prior to the accident did not differ significantly for the two groups (Appendix B, Table 15B). The categories of mood listed in the questionnaire had too small frequencies to provide meaningful analysis so they were collapsed into three categories for comparison (Appendix B, Table 16B). This comparison showed a non-significant difference

between the two groups in the Subject's mood prior to the accident.

Similarly, two other question categories had to be collasped from those listed in the questionnaire to provide sufficient frequencies for analysis. These items are kind of accident, analyzed as severity of accident (Table 32) and number of vehicles in accident (Table 33) and cause of accident (Table 34). None of these three tables showed a significant difference (Fisher's Exact Test) between the two groups. Both groups reported the majority of accidents to be minor, multiple car, and not caused by the subject making an error in driving. Thus, both groups report similar types of accidents.

Thus, among factors related to the accident itself, only the cause of the accident differs significantly between the two groups. Because of the large number of analyses carried out, a single significant finding cannot be given great emphasis.

Consequences of accident.

Six questions were specifically aimed at determining whether or not an accident was followed by certain consequences. These consequences included financial problems, job problems, family or marital problems, emotional problems, changes in driving habits, or any other problems. Again there were no significant differences between the two groups. It should be borne in mind that the low frequency of accidents, particularly in the Control group, makes it unlikely that differences would be detected.

TABLE 32. Interviewed subjects: comparison of crisis group and control group by severity of accident. N(% Row Total)

	Severity of Accident	
Group	Major	Minor
Crisis	8 (26.7)	22 (73.3)
Control	2 (18.2)	9 (81.8)

TABLE 33. Interviewed subjects: comparison of crisis group and control group by number of vehicles in accident. N (% Row Total)

	Number of vehicles	
Group	Single car	Multiple car
Crisis	7 (23.3)	23 (76.7)
Control	1 (9.1)	10 (90.9)

TABLE 34. Interviewed subjects: comparison of crisis group and control group by cause of accident. N (% Row Total)

Group	Cause of Accident	
	Subject's error	Other driver/miscellaneous
Crisis	10 (38.5)	16 (61.5)
Control	1 (10.0)	9 (90.0)

It may be noted that a number of these potential stress experiences showed significant differences between the Crisis and Control groups when the analysis was based on individuals and whether they had experienced the stressors in the preceding year. Those factors that were significant for the comparisons when based on individuals, but are not significant when comparisons are based on events, include personal health problems, taking a trip, arguments, a breakup of a relationship, engagement, separation, and planning a divorce.

SUMMARY

This study was designed as an exploratory investigation of whether drivers who have shown a rapid deterioration in driving record differ from a control group in the frequency with which they have experienced certain kinds of potential stressors.

Drivers were selected whose records showed three consecutive years with no accidents or violations followed by a fourth year in which there were at least three accidents or three violations. This fourth year coincided with the one immediately preceding the study. This group of drivers was arbitrarily labelled the Crisis group. A control sample of drivers was pulled with no attempt made to select on the basis of driving record.

Data were collected through telephone interviews. Efforts were made to obtain telephone numbers for all subjects. A questionnaire was developed to structure the interview. All subjects interviewed were sent a post-interview letter thanking them for their participation.

The Crisis group differed significantly from the total licensed population in North Carolina, showing a greater proportion of young males.

When interviewed subjects were compared for the Crisis and Control groups, there were no significant differences on the basis of age, race,

or sex, although a difference existed for the total groups. It was felt that the bias of the telephone interview procedure was responsible for eliminating the significant differences between the two interviewed samples.

There were differences between the Crisis and the Control groups in the reasons why some subjects could not be contacted by telephone. Crisis subjects were more likely to have telephones out of service or unpublished numbers, suggesting that they may be more reluctant to be contacted by telephone. Control subjects were more likely to be temporarily unavailable for the interview, e.g., away on vacation or in the service. The major reason for noncontact for both groups was the failure to obtain a correct listing. In both groups the young and the nonwhite were more likely to fall into the Not Interviewed category. These two groups would be less likely to have telephones listed under their own names if they have a telephone at all.

When interviewed subjects were compared, it was found that a greater proportion of the Crisis subjects reported an increase in the amount of driving done in the past year, while Control subjects were more likely to report a decrease. However, the majority of both groups reported that their mileage had remained about the same. Because no exposure information was obtained, nothing can be concluded about absolute mileage for each group.

No conclusions could be drawn about driving in connection with work.

Married people made up about 91 percent of the Control group compared

with 75 percent of the Crisis group, a significant difference.

Educational level, height, weight, and socio-economic class did not differ significantly for the two groups, nor were height and weight associated with driving record as had been suggested by previous research.

The interview included a question about what the State could do to reduce highway deaths. The Crisis people responded with more lengthy answers containing more different ideas than did the people in the Control group.

The interview concentrated on 16 stressors which the literature indicated might have an influence on subsequent behavior. Three of these stressors were investigated in depth, namely, personal health problems, family health problems (including death), and job problems. Of these, only personal health problems distinguished between the two groups; Crisis subjects were more likely to report problems in their personal health. This seems to be symptomatic of group membership rather than being associated with either accidents or violation. When analyses were run to determine if these three stressors directly preceded either accidents or violations, no significant differences were found between the Control and Crisis groups.

There were thirteen other potential stressors categorized as Other Life Changes that were considered to be less severe than the above three. Moving, sudden loss of income, increasing concern about bills, marital

stress, marriage, having a baby, and undue criticism all showed no significant difference between the individuals in the two groups. On the other hand, the Crisis group reported significantly more arguments, breakup of relationships (of all kinds), engagements, separations, and planned divorces while the Control group was notable only for taking significantly more trips.

The stressors were analyzed as to whether they directly preceded accidents or violations. The only stressor item that showed a significant difference was moving or planning a move, with Control subjects more likely to report it in the case of violations. Because so many comparisons were made, it is difficult to place much weight on this single significant finding.

Three additional questions were asked concerning feelings of depression, changes in drinking habits, and whether or not the subject ever felt "that there is just no point in living." These three items were not considered as stressors *per se* but rather as possible responses to stress. Only responses to the third question were found to be significantly different, with Crisis subjects more likely to report that they felt like there was no point in living.

Presence of the 16 stressors listed above were summed to yield a Total Stress score for each subject. This score was compared for the two groups with the differences proving significant. Nearly equal proportions of each group report between two and eight (the maximum

reported) stresses. The significant difference results from the much larger proportion of Control subjects reporting one stress and the larger proportion of Crisis subjects reporting no stresses (nearly one-fourth). Such results are not readily interpreted.

Affirmative responses to the response to stress questions were also tallied for comparison. The Crisis group was significantly different from the Control group, showing more of the responses to stress. Thus it appears that responses to stress may be more important in determining group membership than the number of stresses experienced.

Neither the Total Stress score nor the Response to Stress score was associated with accidents or violations.

When analyses were based on circumstances surrounding the event (accident or violation) itself, it was found that there were no differences between the groups in whether or not the day was unusual prior to a violation or accident. The mood the subject was in did not differ between the two groups prior to a violation or accident. Preceding the violation, only taking a trip differentiated between the two groups for violations. No stressor or response to stress preceding an accident differentiated between the two groups.

The subjects in both groups reported that most accidents were minor, multiple car, and not caused by the subject's own error. Thus, it seems that both groups have similar types of accidents.

There seems to be little or no relationship to stressors directly

preceding an accident or a violation. However, certain stressors are symptomatic of the Crisis population. A possibly more important distinction seems to be the response to stressors experienced. Crisis subjects seem to be less able to successfully cope with their problems.

CONCLUSIONS

The results of this study must be interpreted with caution. Only 16.9 percent of the pool of Crisis subjects and 34.9 percent of the pool of Control subjects were actually reached and successfully interviewed. Therefore, a number of uncontrolled variables may have introduced biases, the effect of which cannot be determined.

However, on the basis of the subjects interviewed, it was found that those drivers characterized by a rapid deterioration in their driving records showed significant differences in reported life stresses when compared with a control group not selected on the basis of driving record. The distinguishing life stresses appear to be difficulties in interpersonal relations, a decline in personal health, and/or thoughts that there is no purpose in living.

Should it be more firmly established that persons experiencing the kinds of stresses found to be significant in this study are overrepresented in traffic violations and accidents, then it would be worthwhile to investigate how society could intervene to prevent such problems from resulting in elevated accident or violation experience. In the normal course of events there is a high probability that many of these problems would bring people into contact with official representatives of society, such as counselors,

physicians, or legal personnel, including law enforcement officials, lawyers, and judges. If these professionals in turn recognized the danger of elevated violation or accident risk, they could take measures aimed at reducing the risk.

The multiple offenders and accident repeaters in the Crisis group as a whole had quite a bit to say about highway safety and ways to improve it. While, admittedly, many of their ideas were naive or trivial, nonetheless their first hand experience with accidents and violations could prove a potentially valuable source of ideas and information for those charged with improving highway safety.

The data in this study suggest that how a person responds to the stresses he experiences may be more important than the sheer amount of stress experienced. Future research is needed to explore this possibility. Further exploration is also needed to determine whether the interpersonal difficulties detected in the Crisis group are causally related to driving deterioration or whether the driving problems and the poor interpersonal relations are both the result of a third factor, such as personality problems. The relationship between poor physical health and poor driving record also needs to be investigated to determine whether the health problems are causing the driving difficulties in a direct fashion or whether the driving problems are the result of a third factor such as the preoccupation and concern that may accompany health problems.

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APPENDIX A

STRESS & CRISIS EVALUATION QUESTIONNAIRE--CRISIS

University of North Carolina
Highway Safety Research Center

1. First, could you tell me if you have been living and driving in North Carolina during the last 4 years?

   1. NO
   2. YES

1a. IF NO: How many violations/accidents have you had in the last four years?

   1. violations
   2. accidents

2. Would you say that during the last year you've driven more, less, or about the same as in previous years?

   1. more
   2. less
   3. about the same

3. Do you drive as a part of you job?

   1. No
   2. Salesman
   3. Truck driver
   4. Local delivery or drive locally
   5. Commute 50 or more miles each day to work
   6. Other, specify _____
   7. Not employed
   8. Student

4. What is your occupation? (or husband's occupation)_____

   Describe what you do. _____

   _____

5. Are you . . .

   1. Married
   2. Separated
   3. Divorced
   4. Widowed
   5. Never married
   6. Other, specify _____

6. I see by the records here you've driven for a time without any traffic violations or accidents. Are there any reasons you can think of why you've gotten/been in _____ within the last year. _____

   _____

   _____

7. How would you say the violations/accidents affected you?

Did any cause . . .	Which one? violations	accidents
1. any financial problems	1 2 3 4 5 6	1 2 3 4 5 6
2. any job problems	1 2 3 4 5 6	1 2 3 4 5 6
3. any family or marital problems	1 2 3 4 5 6	1 2 3 4 5 6
4. any emotional upset	1 2 3 4 5 6	1 2 3 4 5 6
5. change in driving habits	1 2 3 4 5 6	1 2 3 4 5 6

   6. any other effects or problems _____

   AS I MENTIONED earlier we are particularly interested in any changes or problems that you experienced during the time before receiving/being in any traffic violations/accidents.

8. Were there any changes or problems with your health during the time before any of your traffic violations/accidents?

1. NO
2. YES

8a. What kind of changes or problems?
1. accident
2. hospitalized
3. sick
4. fatigued or tired
5. angry or upset
6. nervous breakdown
7. other _____

8b. Would you say this was
1. mild
2. moderate
3. severe

8c. Before which violation? 1 2 3 4 5 6

accident? 1 2 3 4 5 6

8d. When, before?
1. less than 2 hours
2. 3 hours to 6 hours
3. 7 hours to "Day before"
4. 2 days to 1 week
5. 2 weeks to 2 months
6. 3 months to 6 months
7. more than 6 months
8. other _____

GO TO 9 unless indicated angry or upset or nervous breakdown.

8e. Do you remember why you felt angry or upset? _____

_____

8f. How upset or angry were you?

Would you say you were . . .
1. extremely upset or angry
2. very upset or angry
3. somewhat
4. not very upset or angry
5. not at all

9. How about other members of your family or people close to you? Had there been any health changes or problems? Did anyone close to you pass away?

1. NO
2. YES, Death
3. YES, Health

9a. Who was this?
1. Spouse
2. Child
3. Parent
4. Brother/Sister
5. Grandparent or other relative
6. Girl/boyfriend
7. Close friend
8. Other, specify _____

IF DEATH, SKIP TO 9d.

9b. What kind of changes/problems?
1. accident
2. hospitalized
3. sick
4. fatigued or tired
5. angry or upset
6. nervous breakdown
7. other _____

9c. Would you say this was . . .
1. mild
2. moderate
3. severe

9d. Before which violation? 1 2 3 4 5 6

accident? 1 2 3 4 5 6

9e. When, before? _____

1. less than 2 hours
2. 3 hours to 6 hours
3. 7 hours to "Day before"
4. 2 days to 1 week
5. 2 weeks to 2 months
6. 3 months to 6 months
7. more than 6 months
8. other _____

10. What about your job? Were there any changes or problems, or were you expecting any changes or new responsibilities?

1. NO (GO TO 11)
2. Changes
3. Problems
4. Expecting changes
5. New responsibilities
6. Expecting new responsibilities
7. Not employed
8. Student
9. Other _____

10a. Had you been . . .

1. Laid off
2. Changed jobs
3. Been promoted
4. Disabled
5. Retired
6. Given more responsibility
7. Retired
8. Job uncertainty
9. Other _____

10b. Would you say this affected you . . .

1. mildly
2. moderately
3. severely

10c. Before which violation? 1 2 3 4 5 6

accident? 1 2 3 4 5 6

10d. When, before? _____

1. less than 2 hours
2. 3 hours to 6 hours
3. 7 hours to "Day before"
4. 2 days to 1 week
5. 2 weeks to 2 months
6. 3 months tc 6 months
7. more than 6 months
8. other _____

I'm going to read a list of changes and problems that often affect people. If any of these were true before any of your violations/accidents please tell me.

		BEFORE WHICH?		
		viol.	acc.	When?
11.	planning or recently moved	_____	_____	_____
12.	planning or taking a trip or vacation	_____	_____	_____
13.	sudden loss of income	_____	_____	_____
14.	increasing concern about bills	_____	_____	_____
15.	arguments or disagreements with others (who _____)	_____	_____	_____
16.	Breakup of a relationship (who)	_____	_____	_____
17.	Growing marital stress	_____	_____	_____
18.	Recent engagement or planning engagement (which)	_____	_____	_____
19.	Recently married or planning marriage (which)	_____	_____	_____

20. Separation from wife (husband) _____ _____ _____

21. Getting a divorce _____ _____ _____

22. Expecting a new child or recently had a new baby (which) _____ _____ _____

23. Been criticized by others (who?) _____ _____ _____

24. Felt discouraged or depressed _____ _____ _____

25. Change in amount of drinking _____ _____ _____

26. The way things are today most people at one time or another feel that life is just hopeless. How often would you say you have the feeling that there is just no point in living?

Would you say:

1. Often
2. Sometimes
3. Once in a while
4. Never (GO TO 27)

27. If you have ever thought of ending your life, was it a sudden impulse or did you think about it over an extended period of time?

1. Impulsive
2. Extended period
3. Don't know
4. Never really thought about it

28. Have there ever been attempts at suicide?

1. NO
2. YES

When _____
How _____
Why _____

29. If a person was to consider ending their life there are many ways to do it. What do you think would be the best way?

1. Gun
2. Gas
3. Knife
4. Sleeping pills
5. Jump from building
6. Car
7. Walk into traffic
8. Other, specify _____
9. Doesn't apply

30. Can you tell me how far you were able to go in school. (Highest grade completed)

1. 1-6
2. 7-8
3. Some high school
4. High school graduate or equivalent
5. Some college or vocational school
6. College grad
7. Post graduate or professional school
8. No information

31. What is your height and weight?

Ht._____

Wt._____

32. And, for the last question. What do you think the state might do to help drivers reduce the number of fatalities on the road?

A. Now, the 1st 2nd 3rd 4th 5th 6th 1. violation 2. accident 3. violation & accident was on _____for_____. Was there anything unusual (out of the ordinary) that happened that day or the day before, or were you planning anything at that time?

1. NO, usual day
2. YES, unusual day

Probes: a) Do you recall that day?
b) Can you tell me anything about that day?

A. TIME: before/after_____

1. less than 2 hours before
2. 3 hours to 6 hours before
3. 7 hours to "day before"
4. 2 days to 1 week
5. 2 weeks to 2 months
6. 3 months to 6 months
7. more than 6 months
8. planning within next week
9. planning beyond next week

B. IF ACCIDENT: what kind?

1. single car, minor
2. single car, major
3. with other car, minor
4. with other car, major
5. with other car, other driver's fault, minor
6. with other car, other driver's fault, major
7. other, _____

C. IF ACCIDENT: What do you think caused it?

1. misjudgment or distraction
2. carelessness
3. driving too fast for conditions
4. angry or upset
5. alcohol or drugs
6. tired
7. car defect
8. other driver's fault
9. other _____

D. Can you tell me what kind of a mood were you in before the violation/ accident?

1. angry or upset
2. depressed or discouraged
3. worried
4. tired
5. distracted
6. hurried
7. happy
8. no particular mood
9. other _____

E. Can you think of anything that might have helped you avoid the accident/violation?

THE UNIVERSITY OF NORTH CAROLINA
HIGHWAY SAFETY RESEARCH CENTER
CHAPEL HILL 27514

Mr. John Doe
1010 Main Street
Smalltown, North Carolina

Dear Mr. Doe:

As you undoubtedly are aware, the problems of safety on our highways are of greater concern with every passing year. North Carolina is one of the first states to set up an independent research facility specifically devoted to studying these problems. Of course, much of our research depends upon the cooperation of the citizens of North Carolina. You were recently contacted by a member of our research staff as a part of a current study of traffic accidents and violations. We appreciate your cooperation in answering our questions and helping us learn more about traffic accidents and violations.

All of the detailed information received from people like you, who were contacted in this study, is handled with strictest confidence and is in no way available to any outside agency or interest.

The final report of this research will not contain any names or other identifying information about the people who cooperated in the study, but will only present the kinds of general information that we have found about accidents and violations.

If you have any questions about the study, please feel free to contact Dr. Patricia Waller at the Highway Safety Research Center and she will be happy to talk with you. Again, thank you very much for your cooperation.

Sincerely,

STRESS & CRISIS EVALUATION QUESTIONNAIRE-CONTROL

University of North Carolina
Highway Safety Research Center

1. First, could you tell me if you have been living and driving in North Carolina during the last 4 years?

   1. NO
   2. YES

1a. IF NO: How many violations/accidents have you had in the last four years?

   1. violations
   2. accidents

2. Would you say that during the last year you've driven more, less, or about the same as in previous years?

   1. more
   2. less
   3. about the same

3. Do you driver as a part of your job?

   1. No
   2. Salesman
   3. Truck driver
   4. Local delivery or drive locally
   5. Commute 50 or more miles each day to work
   6. Other, specify_____
   7. Not employed
   8. Student

4. What is your occupation? (or husband's occupation)_____

Describe what you do._____

_____

5. Are you . . .

1. Married
2. Separated
3. Divorced
4. Widowed
5. Never married
6. Other, specify

*6. *I see by the records here you've had_____violations_____ accidents this past year. Are ther any reasons you can think of why (this) these occurred?*_____

_____

_____

_____

*7. *How would you say the violation(s) /accident(s) affected You?*

Did any cause . . .	*violations*	*Which one? accidents*
1. any financial problems	1 2 3 4 5 6	1 2 3 4 5 6
2. any job problems	1 2 3 4 5 6	1 2 3 4 5 6
3. any family or marital problems	1 2 3 4 5 6	1 2 3 4 5 6
4. any emotional upset	1 2 3 4 5 6	1 2 3 4 5 6
5. change in driving habits	1 2 3 4 5 6	1 2 3 4 5 6
*6. any other effects or problems*_____		

AS I MENTIONED earlier we are particularly interested in any changes or problems that you experienced during the (past year) *time before receiving/being in any traffic violations/accidents.*

8. Were there any changes or problems with your health during the (last 12 months) *time before any of your traffic violations/accidents?*

1. NO (GO TO 9)
2. YES

8a. What kind of changes or problems?
1. accident
2. hospitalized
3. sick
4. fatigued or tired
5. angry or upset
6. nervous breakdown
7. other_____

8b. Would you say this was
1. mild
2. moderate
3. severe

*8c. *Before which violation?* 1 2 3 4 5 6

accident? 1 2 3 4 5 6

*8d. *When, before?*
1. less than 2 hours
2. 3 hours to 6 hours
3. 7 hours to "Day before"
4. 2 days to 1 week
5. 2 weeks to 2 months
6. 3 months to 6 months
7. more than 6 months
*8. other*_____

GO TO 9 unless indicated angry or upset or nervous breakdown

8e. Do you remember why you felt angry or upset?_____

_____

8f. How upset or angry were you?

Would you say you were . . .
1. extremely upset or angry
2. very upset or angry
3. somewhat
4. not very upset or angry
5. not at all

9. How about other members of your family or people close to you? Had there been any health changes or problems? (in the last year?) Did anyone close to you pass away?

1. NO
2. YES, Death
3. YES, Health

9a. Who was this?
1. Spouse
2. Child
3. Parent
4. Brother/Sister
5. Grandparent or other relative
6. Girl/boyfriend
7. Close friend
8. Other, specify_____

IF DEATH, SKIP TO 9d.

9b. What kind of changes/problems?
1. accident
2. hospitalized
3. sick
4. fatigued or tired
5. angry or upset
6. nervous breakdown
7. other_____

9c. Would you say this was . . .
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2. moderate
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*9d. *Before which violation?* 1 2 3 4 5 6

accident? 1 2 3 4 5 6

*9e. *When, before?*_____

1. *less than 2 hours*
2. *3 hours to 6 hours*
3. *7 hours to "Day before"*
4. *2 days to 1 week*
5. *2 weeks to 2 months*
6. *3 months to 6 months*
7. *more than 6 months*
8. *other*_____

10. What about your job? Were there any changes or problems, or were you expecting any changes or new responsibilities?

1. NO (GO TO 11)
2. Changes
3. Problems
4. Expecting changes
5. New responsibilities
6. Expecting new responsibilities
7. Not employed
8. Student
9. Other_____

10a. Had you been . . .

1. Laid off
2. Changed jobs
3. Been promoted
4. Disabled
5. Retired
6. Given more responsibility
7. Retired
8. Job uncertainty
9. Other _____

10b. Would you say this affected you . . .

1. mildly
2. moderately
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*10c. *Before which violation?* 1 2 3 4 5 6

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1. *less than 2 hours*
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3. *7 hours to "Day before"*
4. *2 days to 1 week*
5. *2 weeks to 2 months*
6. *3 months to 6 months*
7. *more than 6 months*
8. *other* _____

I'm going to read a list of changes and problems that often affect people. If any of these were true (during the past year)*(before any of your violations/accidents) please tell me.*

		BEFORE WHICH?		
		viol.	*acc.*	When?
11.	planning or recently moved	_____	_____	_____
12.	planning or taking a trip or vacation	_____	_____	_____
13.	sudden loss of income	_____	_____	_____
14.	increasing concern about bills	_____	_____	_____
15.	arguments or disagreements with others (who_____)	_____	_____	_____
16.	Breakup of a relationship (who)	_____	_____	_____
17.	Growing marital stress	_____	_____	_____
18.	Recent engagement or planning engagement	_____	_____	_____
19.	Recently married or planning marriage (which)	_____	_____	_____
20.	Separation from wife (husband)	_____	_____	_____

21. Getting a divorce _____ _____ _____

22. Expecting a new child or recently had a new baby (which) _____ _____ _____

23. Been criticized by others (who)? _____ _____ _____

24. Felt discouraged or depressed _____ _____ _____

25. Change in amount of drinking _____ _____ _____

26. The way things are today most people at one time or another feel that life is just hopeless. How often would you say you have the feeling that there is just no point in living?

Would you say:

1. often
2. sometimes
3. once in a while
4. never (GO to 27)

27. If you have ever thought of ending your life, was it a sudden impulse or did you think about it over an extended period of time?

1. impulsive
2. extended period
3. don't know
4. never really thought about it

28. Have there ever been attempts at suicide?

1. NO
2. YES

When_____
How_____
Why_____

29. If a person was to consider ending their life there are many ways to do it. What do you think would be the best way?

1. Gun
2. Gas
3. Knife
4. Sleeping pills
5. Jump from building

6. Car
7. Walk into traffic
8. Other, specify_____
9. Doesn't apply

30. Can you tell me how far you were able to go in school. (Highest grade completed)

1. 1-6
2. 7-8
3. Some high school
4. High school graduate or equivalent
5. Some college or vocational school
6. College grad
7. Post graduate or professional school
8. No information

31. What is your height and weight?

Ht._____

Wt._____

32. And, for the last question. What do you think the state might do to help drivers reduce the number of fatalities on the road?

A. Now, the 1st 2nd 3rd 4th 5th 6th 1. violation 2. accident 3. violation & accident was on_____ for_____. Was there anything unusual (out of the ordinary) that happened that day or the day before, or were you planning anything at that time?

1. NO, usual day
2. YES, unusual day

Probes: a) Do you recall that day?
b) Can you tell me anything about that day?

A. TIME: before/after_____

1. less than 2 hours before
2. 3 hours to 6 hours before
3. 7 hours to "day before"
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5. 2 weeks to 2 months
6. 3 months to 6 months
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8. planning within next week
9. planning beyond next week

B. IF ACCIDENT: what kind?

1. Single car, minor
2. single car, major
3. with other car, minor
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5. with other car, other driver's fault, minor
6. with other car, other driver's fault, major
7. other,_____

C. IF ACCIDENT: What do you think caused it?

1. misjudgement or distraction
2. carelessness
3. driving too fast for conditions
4. angry or upset
5. alcohol or drugs
6. tired
7. car defect
8. other driver's fault
9. other_____

D. Can you tell me what kind of a mood were you in before the violation/ accident?

1. angry or upset
2. depressed or discouraged
3. worried
4. tired
5. distracted
6. hurried
7. happy
8. no particular mood
9. other_____

E. Can you think of anything that might have helped you avoid the accident/violation?

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Sincerely,

APPENDIX B

TABLE 1B. Interviewed Subjects: Comparison of Crisis group and Control group by level of education. N (% Row Total)

	Level of education						
Group	Completed grades 1-6	7-8	Some high school	High school graduate	Some college	College graduate	Post graduate
Crisis	6 (8.8)	7 (10.3)	9 (13.2)	19 (27.9)	12 (17.6)	6 (8.8)	9 (13.2)
Control	19 (9.0)	23 (11.0)	38 (18.1)	66 (31.4)	42 (20.0)	12 (5.7)	10 (4.8)

TABLE 2B. Interviewed Subjects: Comparison of Crisis group and Control group by socioeconomic status. N (% Row Total)

	Socioeconomic status					
	High - - - - - - - - - - - - - - - - → Low Unknown					
Group	1	2	3	4	5	
Crisis	1 (1.5)	4 (5.9)	18 (26.5)	24 (35.3)	21 (30.9)	0 (0.0)
Control	7 (3.3)	14 (6.7)	43 (20.5)	83 (39.5)	61 (29.0)	2 (1.0)

TABLE 3B. Interviewed Subjects: Comparison of Crisis group and Control group by planned or completed move. N (% Row Total)

	Had planned or completed a move	
Group	No	Yes
Crisis	59 (86.8)	9 (13.2)
Control	181 (86.2)	29 (13.8)

TABLE 4B. Interviewed Subjects: Comparison of Crisis group and Control group by sudden loss of income. N (% Row Total)

	Had had a sudden loss of income	
Group	No	Yes
Crisis	64 (94.1)	4 (5.9)
Control	188 (89.5)	22 (10.5)

TABLE 5B. Interviewed Subjects: Comparison of Crisis group and Control group by increasing concern about bills. N (% Row Total)

	Had had increasing concern about bills	
Group	No	Yes
Crisis	57 (83.8)	11 (16.2)
Control	188 (89.5)	22 (10.5)

TABLE 6B. Interviewed Subjects: Comparison of Crisis group and Control group by marital stress.* N (% Row Total)

	Had reported marital stress	
Group	No	Yes
Crisis	55 (94.8)	3 (5.2)
Control	197 (96.1)	5 (3.9)

*table excludes subjects that had never been married

TABLE 7B. Interviewed Subjects: Comparison of Crisis group and Control group by marriage (within the last year). N (% Row Total)

	Had been or planned marriage	
Group	No	Yes
Crisis	65 (95.6)	3 (4.4)
Control	208 (99.0)	2 (1.0)

TABLE 8B. Interviewed Subjects: Comparison of Crisis group and Control group by expecting or had a baby.* N (% Row Total)

	Had expected or had a baby	
Group	No	Yes
Crisis	55 (93.2)	4 (6.8)
Control	189 (92.2)	16 (7.8)

*This table excludes males who have never been married.

TABLE 9B. Interviewed subjects: comparison of crisis group and control group by criticism. N (% Row Total)

	Had been criticised	
Group	No	Yes
Crisis	62 (91.2)	6 (8.8)
Control	201 (95.7)	9 (4.3)

TABLE 10B. Interviewed subjects: comparison crisis group and control group by discouragement or depression. N (% Row Total)

Group	Had been discouraged or depressed	
	No	Yes
Crisis	50 (73.5)	18 (26.5)
Control	175 (83.3)	35 (16.7)

TABLE 11B. Interviewed subjects: comparison of crisis group and control group by changes in drinking habits. N (% Row Total)

	Had had changes in drinking habits	
Group	No	Yes
Crisis	60 (88.2)	8 (11.8)
Control	196 (93.3)	14 (6.7)

TABLE 12B. Interviewed crisis subjects: feelings of discouragement or depression by race. N (% Row Total)

Race	Had been discouraged or depressed	
	No	Yes
White	40 (74.1)	14 (25.9)
Non-white	10 (71.4)	4 (28.6)

TABLE 13B. Intrviewed subjects: comparison of crisis group and control group by kind of day prior to violation. N (% Row Total)

	Kind of day	
Group	Usual	Unusual
Crisis	40 (71.4)	16 (28.6)
Control	8 (61.5)	5 (38.5)

TABLE 14B. Interviewed subjects: comparison of crisis group and control group by mood prior to violation. N (% Row Total)

	Subject's mood		
Group	Negative	Positive	Neutral
Crisis	27 (48.2)	6 (10.7)	23 (41.1)
Control	5 (41.7)	3 (25.0)	4 (33.3)

TABLE 15B. Interviewed subjects: comparison of crisis group and control group by kind of day prior to accident. N (% Row Total)

	Kind of day	
Group	Usual	Unusual
Crisis	24 (80.0)	6 (20.0)
Control	10 (90.9)	1 (9.1)

TABLE 16B. Interviewed subjects: comparison of crisis group and control group by mood prior to accident. N (% Row Total)

	Subject's mood		
Group	Negative	Positive	Neutral
Crisis	6 (18.2)	6 (18.2)	21 (63.6)
Control	1 (8.3)	5 (41.7)	6 (50.0)