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DETECTING THE HIGH RISK DRIVER: THE DEVELOPMENT OF A RISK QUESTIONNAIRE

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16. Abstract <p>This report describes the development of a driver risk questionnaire that is intended to be used for the identification of accident-prone drivers from problem drivers in general and from alcoholic drivers in particular. A self-administered questionnaire which assesses drivers' demographic and personality characteristics, life events, general psychological stress, traffic exposure, and drinking was used in two phases of investigation; 532 drivers and 1059 drivers respectively participated in the two phases. The results, based on analysis of the retrospective data of the accidents which were reported by the drivers, showed promising moderate correlations between these accidents and our constructed risk score. However, the most important validating correlation between the risk score and the prospective accidents which appeared on driving records was low and statistically not significant. Since it was shown that recorded accidents are substantially less than those reported by the drivers, other validating criteria should be used in future research.</p> <div data-bbox="831 1541 1300 1749" style="border: 1px solid black; padding: 5px; text-align: center;">Highway Safety Research Institute</div>			
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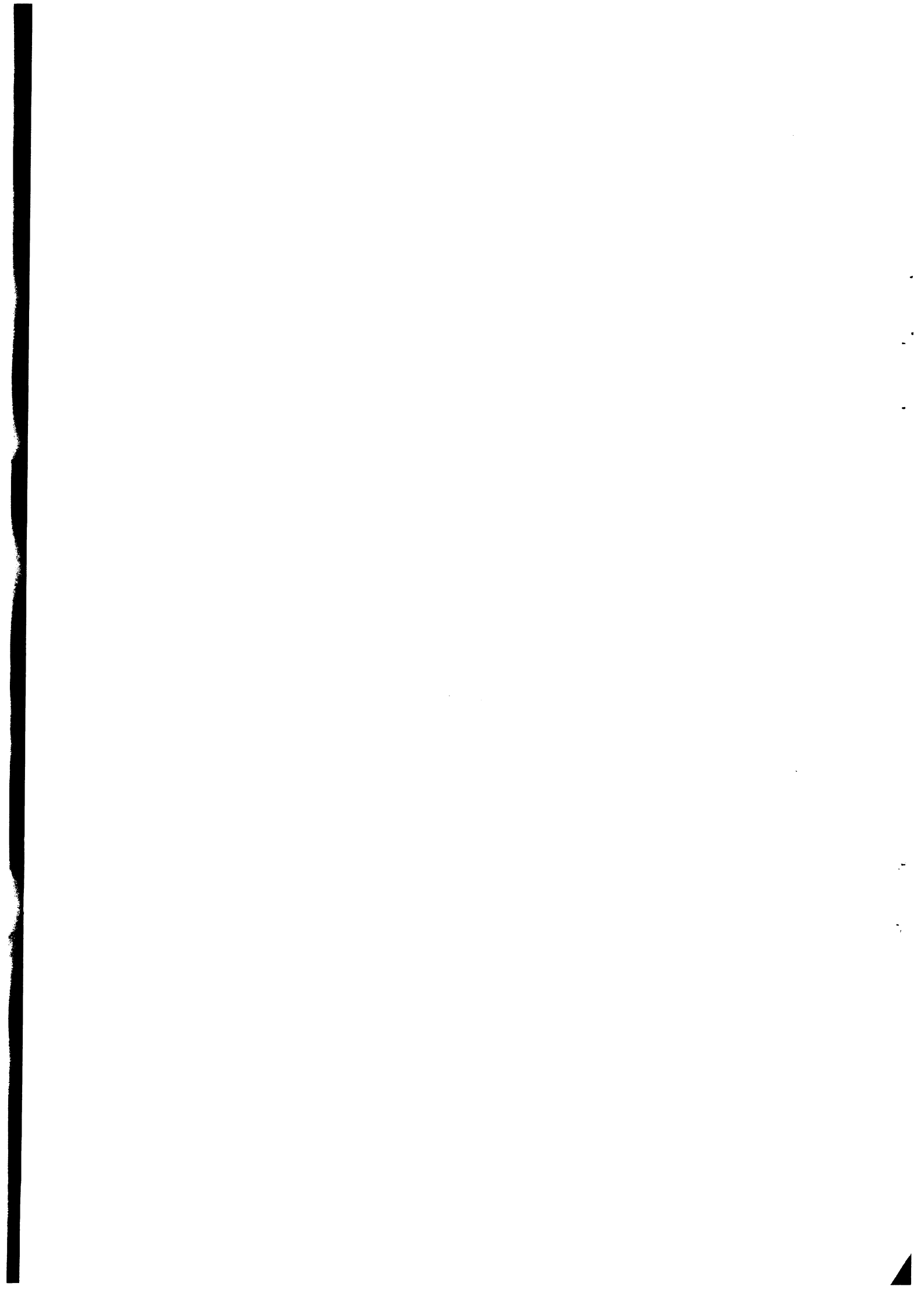
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DETECTING THE HIGH RISK DRIVER:
THE DEVELOPMENT OF A "RISK" QUESTIONNAIRE

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INTRODUCTION

Considerable traffic safety research has been devoted to the identification of the risk-prone driver, the driver thought most likely to be involved in serious accidents, incurring property damage, injury and loss of life. Past research has attempted to identify the risk-prone driver on the basis of his attitudes, motivation and personality (1,2) as well as on the basis of general biographical data, (e.g., marital status, age) and previous driving record (3,4). While such research demonstrated the possibility of identifying and predicting the risk-prone driver, it left much to be desired in terms of the accuracy of these predictions as well as the applicability of these tests for general and practical use. Consequently, the major purpose of the proposed project will be the construction and validation of a practical and truly useable questionnaire to detect the high risk driver.

The relationship between alcohol and serious traffic accidents is now well documented as is the major contribution of alcoholics to this type of accident. The Michigan Alcoholism Screening Test (MAST) was devised to provide a rapid and practical means for court and traffic agency personnel to find individuals who are alcoholic (5,6). Although the MAST is proving successful in detecting alcoholism, in its present form it does not distinguish between high and low accident risk alcoholic drivers (7). This is a vital consideration since our own work and that of other investigators indicates that many alcoholics have traffic records indistinguishable from non-alcoholic drivers. Furthermore, alcoholics appear to have high accident and low accident phases in their alcoholic lives.

As a result of the current and projected National Highway Traffic Safety Administration's programs now underway to promote and stimulate programs to reduce drunk driving throughout the country, there is going to be an expansion of and change in the patterns of sanctions imposed on persons apprehended for driving while intoxicated. This will probably include a more rehabilitation-oriented approach which will put an increasing burden on the judgement of motor vehicle department and court examiners as to how much leeway to allow certain alcoholic drivers in the extent of driving they may or may not do, the type of restrictions to place upon their driving privileges, what point in time they may be permitted to drive again and so on. These examiners will obviously need adequate tools to make judgements regarding the risk any given alcoholic or non-alcoholic driver represents. It follows that it is imperative a questionnaire instrument be formulated and tested which will assist in determining relative accident risk for problem drivers as well as for alcoholic drivers.

Theoretical Rationale

Since most traffic accidents are initiated by driver action or inaction (8) it is not surprising that many studies have focused on the various physiological, psychological and social factors affecting drivers and pedestrians responsible for traffic accidents. A new approach to accident precursors will be suggested

that may lead to a better assessment of individual accident risk and ultimately to more rational traffic safety programs. A brief review of earlier approaches is in order because they are contributory to the main theme of this paper.

Many investigators have attempted to identify the characteristics of "accident-prone" drivers (3,8,9,10). These physical or psychological characteristics were viewed as stable phenomena present in certain drivers. It soon became apparent that physical and physiological characteristics (except those related to disease processes) were not a discriminatory factor and research efforts shifted to psychological and social variables (8,9). Typically, the latter studies used personality inventories, projective techniques, or contact with medical or social agencies to assess personality traits, attitudes or social behavior. These variables were then correlated with accidents or compared across high and low accident groups. Several studies demonstrated that many psychological or social factors such as aggressiveness, depression, or social maladjustment were significantly related to traffic accidents (3,8,9,10). Nevertheless, the correlations were usually not high enough to justify the practical use of the various inventories in accident prevention programs.

Much of the earlier research was guided by a concept of high accident liability as a relatively permanent characteristic of problem drivers, a view that must be seriously questioned because of data showing low correlations of accidents, for the same drivers across different time periods (9, 3).

Given the relatively low correlations between personality variables and accidents and accident rate variations for the same drivers during different time periods, one turns to the possibility of transient factors. The work of Holmes and Rahe et al (11-14) linking the onset of illness to measurable life changes provided us with a useful framework to determine if life changes (divorce, job change, financial difficulty, etc.) and the degree of subsequent adjustment they require are meaningfully related to the accident process. Their research indicated that the greater the number of life changes, and the greater the degree of adjustment initiated by the life changes, the higher the risk of illness and the greater the likelihood of major rather than minor illness. (A similar study relating recent life changes to clinical depression is particularly provocative because it provides a potential link between earlier studies that related emotional and personality factors to accidents and our current project (15). If most clinical depressions are indeed triggered by life changes, then depression itself, which in many studies is found to be correlated with accidents, may be regarded as a secondary or intermediary factor between life changes and the accident. Perhaps other personality factors heretofore implicated in traffic accidents will also prove to be a function of life changes.)

If phenomena as abstruse and etiologically diversified as human illness are indeed related to life changes, then these changes could well modify critical emotional and mental functions which very directly influence behavior, including driving behavior. A few earlier papers support the concept that stress and life events are related to traffic accidents. In one study by Selzer of 96 drivers at fault in fatal accidents and a matched control group, an assessment was made of interpersonal and vocational-financial stresses impinging upon both groups (16,17). While 52 percent of the fatal accident group experienced such stresses, only 18 percent of the controls reported similar experiences. (In

general, the social stresses documented in the fatal accident study were equivalent to the "life changes" used in our project: marital strife or separation, job loss or change, serious indebtedness, etc.) Direct documentation for a link between life changes and accidents was provided by research demonstrating that the accident rate of persons undergoing divorce doubled during the six months before and after the divorce date (18).

No concept of driver-caused accidents would be complete without considering the disproportionate number of accidents, particularly serious and fatal accidents, caused by alcoholic drivers (17, 19). That excessive use of alcohol is itself a response to stress is often ignored. Moreover, dependence on alcohol invariably perpetuates and aggravates the condition of stress. In effect, alcoholism can be regarded as a response to stress which soon develops into a superstress as a consequence of resultant life changes. No doubt excessive consumption of alcohol has an inimical effect on driving. However, it is possible that the most disastrous effects emerge in the presence of both recent life stresses and excessive alcohol consumption. This interaction may make the alcoholic driver exceptionally dangerous at certain times.

Specific Objective of the Project

The purpose of this project is to develop and validate an instrument to identify the risk-prone driver and the alcoholic risk-prone driver. This instrument should separate the risk-prone driver from the general driver population as well as from the population of alcoholic drivers.

The measure will be based on the driver's responses to a short self-administered questionnaire. The questionnaire must be easily administered and scored in order to insure it will be used in prevention programs.

METHOD

Material and Procedures

A self-administered questionnaire was designed, pretested and used for this study. The questionnaire focused on the type and number of life changes and the resultant social and psychological stress experienced by the drivers during the previous twelve months. To assess life changes, we used a modified version of Holmes and Rahe's Life Events Checklist (11) for the previous twelve months. Their scoring method to measure the social and psychological readjustment required by these life events was also used. However, we also utilized a new scoring system based on the subjects personal estimate of the adjustment required of him by each life event.

Also included were a variety of questions to measure physical stress responses and subjective stress emanating from many life contexts including marital and family life, working conditions, financial state, and health concerns. In general, these questions focused on the frequency and intensity of serious disturbances in each life context. These disturbances either reflected conflict with significant others or serious worry, pressure or aggravation related to the context being explored (marriage, job, health, etc.). Questions typical of this aspect of the questionnaire were, "How often do you have problems with

your wife that make you seriously irritated or aggravated?" followed by "How serious and disturbing do you find it?" Each question was followed by a scale with a complete range of responses. Based on previous research findings demonstrating the relationships of certain types of psychopathology to road accidents (16,17,20), the questionnaire included several questions and scales pertaining to aggression, paranoid thinking, depression and suicidal proclivity. The assessment of aggression was based on a selected pool of ten items from the Buss aggression scale (21) and questions regarding physical aggression. Paranoid thinking was based on five questions reflecting ideas of reference, excessive suspiciousness and paranoid thoughts. The assessment of depression was based on a twelve-item version of the Zung scale (22). Suicidal proclivity was evaluated by questions regarding frequency and seriousness of suicidal thoughts or acts.

Questions about drinking included quantity and frequency as well as the use of the Michigan Alcoholism Screening Test (MAST) to determine the effect of drinking upon the driver's life (6).

The questionnaire elicited the subject's driving history during the preceding twelve months (including recent accidents, annual mileage, night driving) as well as a demographic profile (age, education, employment, income).

Samples

In phase I, a total of 532 male drivers above the age of 20 filled out our self-administered questionnaire in four locations in Washtenaw County, Michigan. Data from 102 drivers routinely renewing their driver licenses were collected at the state licensing office with a refusal rate of 50%. Data was collected from 172 drivers who were sent to the Ann Arbor Driver Safety School by the traffic courts following their conviction for moving traffic violations. We also obtained data from two groups of alcoholics: 147 drivers undergoing inpatient treatment for alcoholism at the Brighton Hospital and 111 alcoholic drivers receiving outpatient treatment at the Washtenaw County Council on Alcoholism. In the latter three groups, taking the questionnaire was mandatory.

In phase II, a total of 1059 male drivers above the age of 20 responded to our self-administered questionnaire in nine locations in six Southeastern Michigan counties. These drivers represented three samples. The first sample consisted of 294 general population drivers (50% of those approached) who came to routinely renew their driving license. The second sample consisted of 480 problem drivers attending county safety schools. These drivers were convicted of serious moving traffic violations representing the high risk driving population in our study. Finally, the third sample consisted of 285 alcoholic drivers receiving inpatient or outpatient treatment for alcoholism in hospitals and outpatient rehabilitation programs.

A summary of the above samples in phases I and II along with the percent of drivers that were involved in at least one traffic accident in the previous twelve months is presented in Table 1.

RESULTS

Phase I

Data analysis disclosed essential similarity in the demographic characteristics of the first two groups (license office and safety school groups) and similarity of the two groups of alcoholic drivers (Brighton Hospital and Washtenaw Council on Alcoholism). The data from the first two groups (henceforth referred to as group G: 274 Ss) was then combined as were the data of the latter two alcoholic groups (henceforth referred to as group A: 258 Ss). All statistical analyses were then performed separately on the G and A groups. The assessment of the demographic, personality, life change and subjective stress variables enumerated above was performed mostly with indices, each of which was constructed by combining data from several questions relating to the same general context (i.e. aggression, job, wife, etc.). Table 2 contains a description of the Phase I variables including those based on combination indices. Product moment correlations between these variables and accident occurrence during the prior year were then computed and appear in Table 2.

Examination of the demographic variables in Table 2 discloses that only income was significantly correlated (negatively) with accidents and in Group G only. Among the personality variables, aggression alone was significantly correlated with accidents in both groups. In contrast to these relatively meager relationships between accidents and the demographic and personality variables, Table 2 illustrates that there were several significant correlations between accidents and life change-subjective stress variables. These relationships appear stronger for the alcoholic drivers (group A).

Among the various drinking practices and alcoholism questions used, only the average number of drinks per driver per sitting correlated positively with accidents! (The greater the number of drinks per sitting, the greater the likelihood of an accident.) Strangely enough, this held true for both Group G and Group A (alcoholic group) although there was a marked difference in alcohol intake between them. (The average number of drinks per sitting was 2.3 for group G and 10 for group A.)

In order to better compare the predictive power of the demographic, personality, and life change-subjective stress classes of variables, multiple correlations were computed. In each case, a product moment multiple correlation was computed between accidents and an additive combination of all of the variables in Table 2 comprising each of the above three classes of major variables and are shown in Table 3. Using this method the greater importance of the life change-subjective stress variables in accident causation becomes even more apparent. As seen in Table 3, all the multiple correlations between accidents and demographic or personality variables are very small and none is statistically significant. In contrast, the multiple correlations between accidents and life change-stress variables are higher and statistically significant at the .01 level in both G and A samples. Furthermore, the multiple correlations between accidents and life change-stress variables remains relatively the same after we controlled for all the demographic and personality variables (partial correlations

of .20 and .24 for group G and A respectively, both significant at the .01 level). In contrast, when the partial multiple correlations between accidents and demographic and personality variables were controlled for life change-stress variables, there was a drop from .21 to .14 in group G and from .19 to .08 in group A!

In order to determine the best combination of predictors of traffic accidents all data was subjected to a stepwise regression analysis. This analysis included all variables in Table 2 plus others including annual mileage and the percent of driving done at night. The results of this analysis appear at the bottom of Table 3. The best combination of predictors of accidents for group G included income (negatively correlated), aggression, disturbance with parents and/or in-laws, disturbance and pressure in school, concern with broad social and ecological issues (negatively correlated), and number of drinks per sitting. The best combination of predictors for group A (alcoholics) included the same variables with the exception of school related disturbance and pressure. Replacing this variable are job disturbance and pressure and financial trouble. The difference in predictors between the two groups is partly due to group G consisting of younger drivers (mean 30 years) with many students, while group A consisted of older drivers (mean 44 years). In both sets of best predictors, several of the variables involved life changes or subjective stress while only one was demographic (income) and only one was a personality variable (aggression). The multiple correlations based on the above best predictors are 0.31 for group G and 0.43 for group A, statistically significant at $p < .002$ and $p < .001$ levels, respectively.

On the basis of the above set of predictors each driver was assigned a predicted accident-risk score. The score range was set to include three risk levels: low, medium, and high. The distribution of accident-free and accident-involved drivers in the three risk levels is presented in Tables 4 and 5 for Groups G and A respectively.

As can readily be seen, there is a substantial and significant relationship between predicted risk score and accident involvement. In both groups G and A, the number of accident-involved drivers in the high risk category is roughly twice their number in the low risk category. Similarly, the number of accident free drivers in the low risk category is roughly twice their number in the high risk category.

Tables 6 and 7 for Groups G and A respectively, demonstrate that the relationship between risk-score and accidents holds equally well when drivers with one accident are compared to drivers with two or more accidents and is very strong when the accident-free drivers are compared to multiple accident drivers (Gammas .58 and .71 for Group G and A respectively).

Phase II

On the basis of extensive item analysis of the data obtained in Phase I and our experience with the interviewing process the questionnaire was modified considerably. We expanded those parts of the questionnaire that proved effective in predicting accidents and at the same time reduced the size of the questionnaire so that it was possible to administer it in thirty to forty minutes.

(The final version of the questionnaire used in Phase II is presented in Appendix A.)

Specifically, the questionnaire was redesigned and additional items were included to measure driver's exposure, (i.e., time spent on the road during the day and night) physical stress responses, anxiety, and cautiousness.

The phase II data analyses were patterned on the analyses done in phase I. Similarly, the data from the License Office and safety school groups were combined (henceforth, Group G: 774 SS) as were the data from the various inpatient and outpatient alcoholism groups (henceforth, Group A: 285 SS).

The significant product moment correlations that were found in Groups G and A between our independent variables and accident occurrence during the prior year are presented in Table 8. In general, the correlations are of similar magnitude to those found in phase I. In particular, the life events and other variables involving stress are significantly correlated with accidents in both Groups.

In order to determine the best combination of predictors of traffic accidents all these variables were again subjected to a stepwise regression analysis. The results of this analysis appear at the bottom of Table 8. The best combination of predictors for Group G included income (negatively correlated), exposure, physical stress responses, disturbance with parents and/or in-laws, and total subjective readjustment to undesirable life events ($R = .26$; $p < .001$). The combination of best predictors for Group A include age, frequency of drinking, night driving, aggression, disturbance with parents and/or in-laws, and total readjustment to undesirable life events ($R = .32$; $p < .001$).

Again, predicted accident-risk scores were derived from the regression based on the set of best predictors. The distributions of accident-free and accident-involved drivers in each risk level category were tabulated and are presented in Tables 9 and 10 for Group G and A respectively. These distributions disclose significant moderate relationships between predicted risk scores and accident involvement. The results which appear in Tables 11 and 12 demonstrate again that the above relationship holds equally well when drivers with one accident are compared to drivers with two or more accidents and is stronger when accident-free drivers are compared to drivers with two or more accidents (Gammas .49 and .63 for Groups G and A respectively).

Prospective analysis of the data obtained in phase I

The driving records of drivers who responded to our questionnaire in phase I were obtained from the Secretary of State. We were able to obtain 234 records from Group G (85% of the total) and 181 records from Group A (70% of the total). Information regarding convictions for moving traffic violations and accidents for the 12 months following the completion of the questionnaire was coded.

Two types of information were coded. The first type included the total number of points due to convictions for moving violations and accidents for the 12 months following the completion of the questionnaire. The second type included only the number of accidents that appeared on the record for the above period. These two variables were correlated with our accident-risk score which was constructed from the combination of best predictors (described in Table 3). The correlation between the accident-risk score and violation-

points was .21 ($P < .01$) for Group G and .05 for Group A. Most importantly, the correlation between accident-risk score and number of accidents was .08 for Group G and .03 for Group A. These negligible correlations cast serious doubt on the validity of the accident risk-score and its usefulness in predicting future accidents.

It seems possible that the lack of predictive validity for our accident-risk score stems from the fact that the score was based on retrospective rather than prospective evidence. We therefore attempted to construct a new accident risk-score by finding a new combination of variables that predicts the accidents and violation-points which appeared in the driving records. Using a stepwise regression analysis, the best combination of predictors of the accidents which appeared on the driving records was determined. For Group G, these predictors included age, disturbances with parents and/or in-laws, and total undesirable events. For Group A, the predictors included the score on the Michigan Alcoholism Screening Test (MAST), number of drinks per sitting, physical stress symptoms and undesirable life events. The multiple correlation between these variables and the number of accidents on record was .26 for Group G and .28 for Group A, both statistically significant at the .01 level. Although these correlations are statistically significant, they are even smaller than those obtained by using the retrospective data of (self reported) accidents as the dependent measure and certainly cannot serve as a basis for prediction for practical purposes.

It seems to us that the reason for these rather low correlations lies with the rather incomplete, and therefore unreliable, information on accidents in driving records. In order to investigate this hypothesis the mean number of self reported accidents in the questionnaire was compared with the mean number of accidents which appeared on driving records for a 12 month period.

For Group G the mean number of self reported accidents per driver was .47 and the mean number of accidents on records was .18. For Group A the first mean was .26 and the latter mean was .12. Thus, it is clear that less than half the accidents that drivers are involved in are recorded in state driving records!

It is equally obvious then that more research will be needed in order to further develop, improve and demonstrate the validity of our accident-risk-score. Furthermore, if any improvement is to be expected in future research, it is essential to use a vastly improved dependent measure of accidents rather than to rely on either drivers self report or driving records. An improvement in the recording of accidents may also have to include information about the severity of the accident and the driver at fault.

CONCLUSIONS, DISCUSSION, AND IMPLICATIONS FOR FUTURE RESEARCH

The results of the two phases of investigation consistently demonstrate a significant relationship between predicted accident-risk scores based primarily on stress variables and accident occurrence. This relationship proved much stronger when we focused on the predictions of multiple accident drivers. About 80 percent of these drivers can be predicted by the risk score.

In general, our results for Group G demonstrate that whereas 50 percent of the high risk-score drivers had one or more accidents during the one year period under investigation, only 23 percent of the low risk-score drivers had an accident in that period. Similarly, for Group A, 38 percent of the high scorers had one or more accidents compared to only 15 percent of the low scorers. Thus it is clear that those with low risk scores are indeed low risk drivers. Although drivers with high risk scores are certainly higher risk drivers in having better than a 40 percent chance of an accident, they would perhaps require further analytic scrutiny for additional predictive indicators of susceptibility to accidents.

The results of the prospective analysis of accidents which appeared on the drivers record for the 12 month period following the completion of the questionnaire demonstrated no correlation between our accident-risk score and the accidents in either Group. Using a new combination of best predictors only weak correlations could be obtained. Thus, the predictive validity of our risk score hasn't been demonstrated. Consequently, it would be premature and unjustified, at the moment, to use our questionnaire and its accident-risk score for practical use in prevention programs. We therefore reached the conclusion that more intensive research will be needed in order to find out whether our approach and its resultant accident-risk score does indeed lack any validity or that its validity could only be demonstrated with a more reliable and refined measure of accidents as our analysis seems to indicate.

REFERENCES

1. McGuire, F.L. The safe driver inventory: a test for use in the selection of the safe automobile driver. United States Armed Forces Medical Journal: Vol. 6, pp. 1249-1264, 1956.
2. Haner, C.F. Use of psychological inventories for youthful male drivers. Traffic Safety Research Review: 7, pp. 5-9, March 1963.
3. Schuster, D.H. and Guilford, J.P. The psychometric prediction of problem driving. Human Factors: 6, pp. 393-421, August 1964.
4. Schuster, D.H. Prediction of follow-up driving accidents and violations. Traffic Safety Research Review: Vol. 12, 1, pp. 17-21, 1968.
5. Selzer, M.L. and Lowenstein, J. The Michigan Alcoholism Screening Test (MAST) Proceedings of the Fifth International Conference on Alcohol and Traffic Safety. Germany, pp. 1-7, February 1969.
6. Selzer, M.L. The Michigan Alcoholism Screening Test (MAST): the quest for a new diagnostic instrument. American Journal of Psychiatry: 127: 1653-1658, 1971.
7. Selzer, M.L. and Chapman, M. Differential risk among alcoholic drivers. Proceedings of the 14th Annual Conference of the American Association for Automotive Medicine. pp. 207-213, 1971.
8. McFarland, R.A. and Moore, R.C. Human factors in highway safety: a review and evaluation. New England Journal of Medicine, 256: 792-798, 837-845, 890-897, 1957.
9. Cresswell, W.L. and Froggatt, P. The causation of bus driver accidents: an epidemiological study. Oxford University Press, Amen House, London, 1963.
10. McGuire, F.L. Psychological comparison of automobile drivers: accident and violation-free versus accident-violation incurring drivers. U.S. Armed Forces Medical Journal, 7: 1741-1748, 1956.
11. Holmes, T.H. and Rahe, R.H. The social readjustment rating scale. Journal of Psychosomatic Research, 11: 213-218, 1967.
12. Rahe, R.H., Meyer, M., Smith, M., Kjaer, G., and Holmes, T.H. Social stress and illness onset. Journal of Psychosomatic Research, 8: 35-44, 1964.

13. Rahe, R.H., McKean, J.D., and Arthur, R.J. A longitudinal study of life-change and illness patterns. Journal of Psychosomatic Research. 10: 355-366, 1966.
14. Rahe, R.H. Life crisis and health change. In Philip, R.A. and Winterborn, J.S. (Ed) , Psychotropic Drug Response: Advances in Prediction, Springfield, Illinois, Charles C. Thomas, 1969.
15. Paykel, E.S., et al. Life events and depression. Arch Gen Psychiatry, 21: 753-760, 1969.
16. Selzer, M.L., Rogers, J.E., Kern, S. Fatal accidents: the role of psychopathology, social stress, and acute disturbance. American Journal of Psychiatry, 124: 1028-1036, 1968.
17. Selzer, M.L. Alcoholism, mental illness, and stress in 96 drivers causing fatal accidents. Behavioral Science, 14: 1-10, 1969.
18. McMurray, L. Emotional stress and driving performance: the effect of divorce. Behavioral Research in Highway Safety, 1: 100-114, 1970.
19. Waller, J.A., and Turkell, H.W. Alcoholism and traffic deaths. New England Journal of Medicine. 275: 532-536, 1966.
20. Selzer, M.L., Payne, C.E., Westervelt, F.H., and Quinn, J. Automobile accidents as an expression of psychopathology in an alcoholic population. Quart J Stud Alcohol, 28: 505-516, 1967.
21. Buss, A.H. The Psychology of Aggression, New York: Wiley, 1961.
22. Zung, W. A self rating depression scale. Arch Gen Psychiat, 12: 63-70, 1965.
23. McNemar, Q. Psychological statistics. New York: Wiley, 3rd ed. 184, 1962.

TABLE I

Number of male drivers in several samples in Phases I and II and percent of drivers who were involved in at least one accident in the previous 12 months.

SAMPLE	Phase I		Phase II	
	N	Per cent W/ACC	N	Per cent W/ACC
	License Office Renewal	102	16%	294
Safety School	172	47%	480	45%
Group G: Subtotal of License Office & Safety School	274	35%	774	34%
Group A: Alcoholics	258	21%	285	27%
TOTAL	532	29%	1059	32%

TABLE 2

Product moment correlations between occurrence of traffic accidents during the prior twelve months and demographic, personality, and life change subjective stress variables for 532 alcoholic and non-alcoholic drivers.

<u>VARIABLES</u>	Non- alcoholics (Group G) N = 274	Alcoholics (Group A) N = 258
A. <u>Demographic</u>		
1. Age	0.00	-0.08
2. Education	-0.06	-0.04
3. Employment	0.00	0.00
4. Income	-0.12**	-0.06
B. <u>Personality</u>		
5. Aggression	0.14**	0.12**
6. Paranoia	0.08	0.05
7. Depression	0.11	0.05
8. Suicide	0.06	0.08
C. <u>Life events and subjective stress</u>		
9. Total subjective readjustment to life events	0.08	0.11*
10. Physical stress responses: smoking, insomnia, headaches, and/or ulcers	0.17**	0.10*
11. Serious disturbance with <u>wife</u>	0.05	0.12**
12. Serious disturbance with <u>parents and/or in-laws</u>	0.14**	0.24**
13. Serious disturbance or pressure on the <u>job</u>	0.03	0.13**
14. Serious disturbance or pressure in <u>school</u>	0.14**	#
15. Seriously disturbed about <u>financial situation</u>	0.01	0.15**
D. <u>Others</u>		
16. Alcohol use: average number of drinks per sitting	0.13**	0.13**
17. Distressed by broad social-ecological issues	-0.09	-0.10*
18. Michigan Alcoholism Screening Test(MAST)	0.02	0.01

Only 6 SS were at school

** p < .05 (significant)

* p < .10

TABLE 3

Multiple product moment correlations between occurrence of traffic accidents and demographic, personality, and life change-subjective stress variables for 532 alcoholic and non-alcoholic drivers.

<u>PREDICTORS</u>	Non-alcoholics (Group G) N = 274	Alcoholics (Group A) N = 258
All Demographic variables	.14 (.09)#	.12 (.05)#
All Personality variables	.18 (.15)	.17 (.13)
All Personality and Demographic variables	.21 (.14)	.19 (.09)
All Life Change and Subjective Stress variables	.25* (.20)	.26* (.21)
Selected best combination of predictors ##		
For group G using variables as numbered in Table 1: 4, 5, 10, 12, 14, 16, 17	.31** (.28)	
For group A using variables as numbered in Table 1: 4, 5, 10, 12, 13, 15, 16, 17		.43** (.40)

Correlations in parentheses are corrected for attenuation for number of cases and number of independent variables (23).

Set of best predictors was determined by a stepwise regression procedure.

* $p < .01$

** $p < .002$

TABLE 4

Frequency and percentage of accident-free and accident-involved drivers in Low, Medium and High accident-risk levels

Phase I : Group G

	Risk-level :	Low	Med.	High
	TOTAL	99	93	82
	COL %			
Acc. Free	177	76	60	41
	64.6	76.8	64.5	50.0
Acc. Involved	97	23	33	41
	35.4	23.2	35.5	50.0

$X^2: p < .006 ; \text{ GAMMA} = .3748$

Frequency and percentage of drivers with no accident, one accident, two accidents, etc., in Low, Medium and High accident-risk levels

	Risk-level :	Low	Med.	High
	TOTAL	99	93	82
	COL %			
No. of Accidents				
None	177	76	60	41
	64.6	76.8	64.5	50.0
One	69	19	25	25
	25.2	19.2	26.9	30.5
Two	24	4	8	12
	8.8	4.0	8.6	14.6
Three	3	0	0	3
	1.1			3.7
Four	1	0	0	1
	.4			1.2

$X^2: p < .005 ; \text{ GAMMA} = .3760$

TABLE 5

Frequency and percentage of accident-free and accident-involved drivers in Low, Medium and High accident-risk levels

Phase I : Group A

	Risk-level:	Low	Med.	High
	TOTAL	90	99	69
	COL %			
Acc. Free	203	77	82	44
	78.7	85.6	82.8	63.8
Acc. Involved	55	13	17	25
	21.3	14.4	17.2	36.2

$$X^2: p < .002 ; \text{ GAMMA} = .3778$$

Frequency and percentage of drivers with no accident, one accident, two accidents, etc., in Low, Medium and High accident-risk levels

	Risk-level:	Low	Med.	High
	TOTAL	90	99	69
	COL %			
No. of Accidents				
None	203	77	82	44
	78.7	85.6	82.8	63.8
One	47	12	16	19
	18.2	13.3	16.2	27.5
Two	6	1	1	4
	2.3	1.1	1.0	5.8
Three	2	0	0	2
	.8			2.9

$$X^2: p < .006 ; \text{ GAMMA} = .3829$$

TABLE 6

Frequency and percentage of drivers with one accident and with two or more accidents in Low, Medium and High accident-risk levels

Phase I : Group G

Risk-level:		Low	Med.	High
TOTAL		23	33	41
COL %				
No. of Accidents				
One	69 71.1	19 82.6	25 75.8	25 61.0
Two or More	28 28.9	4 17.4	8 24.2	16 39.0

$\chi^2: p < .14 ; \text{ GAMMA} = .3631$

Frequency and percentage of drivers with no accident and with two or more accidents in Low, Medium and High accident-risk levels

Risk-level:		Low	Med.	High
TOTAL		80	68	57
COL %				
No. of Accidents				
None	177 86.3	76 95.0	60 88.2	41 71.9
Two or More	28 13.7	4 5.0	8 11.8	16 28.1

$\chi^2: p < .001 ; \text{ GAMMA} = .5836$

TABLE 7

Frequency and percentage of drivers with one accident and with two or more accidents in Low, Medium and High accident-risk levels

Phase I : Group A

Risk-level:		Low	Med.	High
TOTAL		13	17	25
COL %				
No. of Accidents				
One	47 85.5	12 92.3	16 94.1	19 76.0
Two or More	8 14.5	1 7.7	1 5.9	6 24.0

$X^2 : p < .18 ; \text{GAMMA} = .5385$

Frequency and percentage of drivers with no accident and with two or more accidents in Low, Medium and High accident-risk levels

Risk-level:		Low	Med.	High
TOTAL		78	83	50
COL %				
No. of Accidents				
None	203 96.2	77 98.7	82 98.8	44 88.0
Two or More	8 3.8	1 1.3	1 1.2	6 12.0

$X^2 : p < .002 ; \text{GAMMA} = .7169$

TABLE 8

Product moment correlations between occurrence of traffic accidents during the prior 12 months and demographic, personality, and life events and stress variables for two samples of drivers in Phase II.

<u>VARIABLES</u>	Group G N = 774	Group A N = 285
A. <u>Demographic</u>		
1. Age	-.08**	-.17***
2. Income	-.07**	.00
3. Education	-.08**	.12**
B. <u>Personality</u>		
4. Aggression	.05	.17***
5. Paranoia	.06	.11*
6. Suicidal Tendencies	.10***	.09*
C. <u>Life events and stress</u>		
7. Total readjustments and pressure due to undesirable life events	.13***	.25***
8. Physical stress responses: smoking, insomnia, headaches, ulcers, etc.	.16***	.12**
9. Self reported stress and tension	.01	.15**
10. Disturbance with parents and/or in-laws	.10***	.14**
D. <u>Others: Drinking and Exposure</u>		
11. Total exposure: Driving day and night	.18***	.03
12. Night driving	.14***	.11*
13. Frequency of drinking	.04	.16***
Selected best combination of predictors		
For Group G, variables No.: 2, 7, 8, 10, 11	.26***	
For Group A, variables No.: 1, 4, 7, 10, 12, 13		.32***

* p < .10
** p < .05
*** p < .01

TABLE 9

Frequency and percentage of accident-free and accident-involved drivers in Low, Medium and High accident-risk levels

Phase II : Group G

	Risk-level:	Low	Med.	High
	TOTAL	288	243	243
	COL %			
Acc. Free	511	222	153	136
	66.0	77.1	63.0	56.0
Acc. Involved	263	66	90	107
	34.0	22.9	37.0	44.0

$\chi^2 : p < .001 ; \text{GAMMA} = .3149$

Frequency and percentage of drivers with no accident, one accident, two accidents, etc., in Low, Medium and High accident-risk levels

	Risk-level:	Low	Med.	High
	TOTAL	288	243	243
	COL %			
No. of Accidents				
None	507	219	153	135
	65.5	76.0	63.0	55.6
One	215	60	75	80
	27.8	20.8	30.9	32.9
Two	39	7	13	19
	5.0	2.4	5.3	7.8
Three	12	2	2	8
	1.6	.7	.8	3.3
Four	1	0	0	1
	.1			.4

$\chi^2 : p < .01 ; \text{GAMMA} = .3020$

TABLE 10

Frequency and percentage of accident-free and accident-involved drivers in Low, Medium and High accident-risk levels

Phase II : Group A

Risk-level:		Low	Med.	High
TOTAL		99	112	74
COL %				
Acc. Free	206 72.3	83 83.8	80 71.4	43 58.1
Acc. Involved	79 27.7	16 16.2	32 28.6	31 41.9

$X^2: p < .001 ; \text{GAMMA} = .3949$

Frequency and percentage of drivers with no accident, one accident, two accidents, etc., in Low, Medium and High accident-risk levels

Risk-level:		Low	Med.	High
TOTAL		99	112	74
COL %				
No. of Accidents				
None	207 72.6	83 83.8	80 71.4	44 59.5
One	55 19.3	13 13.1	26 23.2	16 21.6
Two	21 7.4	3 3.0	6 5.4	12 16.2
Three	2 .7	0	0	2 2.7

$X^2: p < .001 ; \text{GAMMA} = .3876$

TABLE 11

Frequency and percentage of drivers with one accident and with two or more accidents in Low, Medium and High accident-risk levels

Phase II : Group G

Risk-level:		Low	Med.	High
TOTAL		69	90	108
COL %				
No. of Accidents				
One	215 80.5	60 87.0	75 83.3	80 74.1
Two or More	52 19.5	9 13.0	15 16.7	28 25.9

$X^2 : p < .07 ; \text{GAMMA} = .2866$

Frequency and percentage of drivers with no accident and with two or more accidents in Low, Medium and High accident-risk levels

Risk-level:		Low	Med.	High
TOTAL		228	168	163
COL %				
No. of Accidents				
None	507 90.7	219 96.1	153 91.1	135 82.8
Two or More	52 9.3	9 3.9	15 8.9	28 17.2

$X^2 : p < .001 ; \text{GAMMA} = .4959$

TABLE 12

Frequency and percentage of drivers with one accident and with two or more accidents in Low, Medium and High accident-risk levels

Phase II : Group A

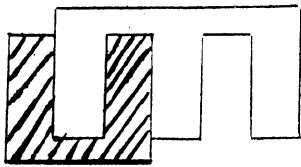
		Risk-level:	Low	Med.	High
		TOTAL	16	32	30
		COL %			
No. of Accidents					
One	55 70.5		13 81.3	26 81.3	16 53.3
Two or More	23 29.5		3 18.8	6 18.8	14 46.7

X^2 : $p < .03$; GAMMA = .4752

Frequency and percentage of drivers with no accident and with two or more accidents in Low, Medium and High accident-risk levels

		Risk-level:	Low	Med.	High
		TOTAL	86	86	58
		COL %			
No. of Accidents					
None	207 90.0		83 96.5	80 93.0	44 75.9
Two or More	23 10.0		3 3.5	6 7.0	14 24.1

X^2 : $p < .001$; GAMMA = .6276



THE UNIVERSITY OF MICHIGAN

APPENDIX

HIGHWAY SAFETY RESEARCH INSTITUTE

Institute of Science and Technology

Huron Parkway and Baxter Road

Ann Arbor, Michigan 48105

Location _____

Interview Number _____

Date of Interview _____
(Mo.) (Day) (Year)

Interviewer _____

Dear Respondent:

This interview is part of a long-range research project on driving conducted by the University of Michigan. It is intended to help develop programs that will prevent serious traffic accidents and injuries. We hope to gain a better understanding of what influences driving behavior by asking you about your driving, personal history, and other related areas.

The information gathered in this questionnaire will be used for research purposes only. Your answers will be treated in strictest confidence and will be seen only by our research staff.

Please answer the questions as frankly and accurately as you can. Be sure to read each question carefully before answering it.

If you have any questions now or while working on the questionnaire, please feel free to ask the interviewer for assistance.

We greatly appreciate your help in this research.

Yours sincerely,

Dr. Melvin L. Selzer
Principle Investigator
University of Michigan
Medical School

Dr. Amiram Vinokur
Associate Research Psychologist
Highway Safety Research Institute

1. Sex: 1. Male
 2. Female

2. When is your birthday? Month Day Year

3. My marital status: 1. Single
 2. Married
 3. Divorced
 4. Separated
 5. Widowed

4. Are you a student attending high school, college or university?

 1. No
 2. Yes. If yes, 3. Full time 4. Part time

5. Are you 1. Unemployed, but seeking a job?
 2. Partially employed (less than 20 hrs/week)
 3. Fully employed (at least 20 hrs/week)
 4. Unemployed, not seeking a job, such as

 5. Student
 6. Housewife
 7. Retired
 8. Handicapped
 9. Other? Explain: _____

6. How many years of school did you complete?

Circle Number: 1 2 3 4 5 6 7 8 9 10
 11 12 13 14 15 16 17 18 19 20 21+

7. At the present time, about what is your yearly income before taxes--include anything you earn yourself plus what your wife earns. Include fellowships and summer employment. CHECK ONE.

 1. Under 3,000 Under \$250/month
 2. \$ 3,000 up to \$ 6,000 \$ 250 - \$ 500/month
 3. \$ 6,000 up to \$ 9,000 \$ 500 - \$ 750/month
 4. \$ 9,000 up to \$12,000 \$ 750 - \$1,000/month
 5. \$12,000 up to \$15,000 \$1,000 - \$1,250/month
 6. \$15,000 up to \$18,000 \$1,250 - \$1,500/month
 7. \$18,000 up to \$21,000 \$1,500 - \$1,750/month
 8. \$21,000 or more \$1,750 or more/month

8. How many miles did you drive in the past 12 months?

- 1. up to 5,000 miles
- 2. 5,000 to 10,000
- 3. 10,000 to 15,000
- 4. 15,000 to 20,000
- 5. 20,000 to 25,000
- 6. 25,000 to 30,000
- 7. 30,000 to 35,000
- 8. 35,000 and more

9. How much of your driving was at night? Between--

- 1. 0- 20%
- 2. 21- 40%
- 3. 41- 60%
- 4. 61- 80%
- 5. 81-100%

10. On an average day (24 hours), how much time do you spend driving?

- 1. up to 1/2 hour per day
- 2. 1/2 hr. to 1 hour
- 3. 1 hr. to 1-1/2 hours
- 4. 1-1/2 hrs. to 2 hours
- 5. 2 hrs. to 2-1/2 hours
- 6. 2-1/2 hrs. to 3 hours
- 7. 3 hours or more

11. On the average, how much time do you spend driving at night?

- 1. up to 1/2 hour per night
- 2. 1/2 hr. to 1 hour
- 3. 1 hr. to 1-1/2 hours
- 4. 1-1/2 hrs. to 2 hours
- 5. 2 hrs. to 2-1/2 hours
- 6. 2-1/2 hrs. to 3 hours
- 7. 3 hours or more

12. In the past 12 months, how many tickets did you receive for moving traffic violations such as speeding, going through a red light, stop sign, etc?

Tickets

13. How many of the tickets were because of an accident?

Tickets

TRAFFIC ACCIDENTS

The next questions are about any accidents you had in the past year (12 months) while you were driving a car, a truck, or a motorcycle. By accidents we mean any incident involving a motor vehicle where there was some damage to any car or other property or any personal injury.

14. During the past year (12 months) have you been involved in any accidents while being the driver (whether or not you were responsible)?

- 1. NO. If NO, go on to page 5.
- 2. YES.

15. If YES, how many accidents altogether have you had in the past 12 months? (Include any accidents while you were in the driver's seat.)

Accidents in the past 12 months

List the following information about each accident (those in the past 12 months)

16. Accident A (the most recent one): DATE: _____ Month _____ Year

Location: _____

17. Property Damage:
- _____ 1. No damage
 - _____ 2. Minor damage (under \$200)
 - _____ 3. Moderate or major damage (needing much repair: \$200 up to value of any car involved)
 - _____ 4. Total damage (repairs would cost as much as the car is worth, including other cars involved)

18. Injuries:
- _____ 1. No injuries
 - _____ 2. Minor injuries (requiring no medical attention or only one treatment)
 - _____ 3. Major injuries (requiring hospitalization or repeated treatment)
 - _____ 4. Death - fatality

19. Accident B (the second recent one): DATE: _____ Month _____ Year

Location: _____

20. Property Damage:
- _____ 1. No damage
 - _____ 2. Minor damage (under \$200)
 - _____ 3. Moderate or major damage (needing much repair: \$200 up to value of any car involved)
 - _____ 4. Total damage (repairs would cost as much as the car is worth, including other cars involved)

21. Injuries:
- _____ 1. No injuries
 - _____ 2. Minor injuries (requiring no medical attention or only one treatment)
 - _____ 3. Major injuries (requiring hospitalization or repeated treatment)
 - _____ 4. Death - fatality

22. Accident C (the third recent one): DATE: _____ Month _____ Year

Location: _____

23. Property Damage: 1. No damage
 2. Minor damage (under \$200)
 3. Moderate or major damage (needing much repair: \$200 up to value of any car involved)
 4. Total damage (repairs would cost as much as the car is worth, including other cars involved)

24. Injuries: 1. No injuries
 2. Minor injuries (requiring no medical attention or only one treatment)
 3. Major injuries (requiring hospitalization or repeated treatment)
 4. Death - fatality

25. Accident D (the fourth recent one): DATE _____ Month _____ Year

Location: _____

26. Property Damage: 1. No damage
 2. Minor damage (under \$200)
 3. Moderate or major damage (needing much repair: \$200 up to value of any car involved)
 4. Total damage (repairs would cost as much as the car is worth, including other cars involved)

27. Injuries: 1. No injuries
 2. Minor injuries (requiring no medical attention or only one treatment)
 3. Major injuries (requiring hospitalization or repeated treatment)
 4. Death - fatality

Following are a number of statements. Read each statement and check whether it is true as applied to you or false as applied to you.

Remember to give your own opinion of yourself.

	TRUE	FALSE
28. People who continuously pester you are asking for a punch in the nose	_____	_____
29. Before voting I thoroughly investigate the qualifications of all the candidates	_____	_____
30. I have known people who pushed me so far that we came to blows.	_____	_____
31. I can remember being so angry that I picked up the nearest thing and broke it.	_____	_____
32. On occasion I have had doubts about my ability to succeed in life	_____	_____
33. It makes my blood boil to have somebody make fun of me.	_____	_____
34. My table manners at home are as good as when I eat out in a restaurant	_____	_____
35. At times I have really insisted on having things my own way	_____	_____
36. I can't help getting into arguments when people disagree with me	_____	_____
37. I have never deliberately said something that hurt someone's feelings.	_____	_____
38. I never hesitate to go out of my way to help someone in trouble	_____	_____
39. I sometimes feel resentful when I don't get my way.	_____	_____
40. No matter who I'm talking to, I'm always a good listener.	_____	_____
41. There are a number of people who seem to dislike me very much.	_____	_____
42. There have been occasions when I felt like smashing things.	_____	_____
43. If somebody annoys me, I am apt to tell him what I think of him.	_____	_____

The following questions are concerned with your family, occupation, financial situation, and health.

YOUR FAMILY

44. How often do you have problems with your wife that make you seriously irritated, angry or aggravated?

- 0. Not relevant or not appropriate (single, divorced, etc.)
- 1. About every day or every other day
- 2. About once or twice a week
- 3. About once to three times a month
- 4. About once to several times a year
- 5. Never

45. How serious and disturbing do you find it?

- 0. Not relevant
- 1. Extremely disturbing
- 2. Considerably disturbing
- 3. Moderately disturbing
- 4. A little disturbing
- 5. Not at all disturbing

46. How often do you have problems with your children that make you seriously angry, aggravated or worried?

- 0. Not relevant or not appropriate (no children)
- 1. About every day or every other day
- 2. About once or twice a week
- 3. About once to three times a month
- 4. About once to several times a year
- 5. Never

47. How disturbing do you find it?

- 0. Not relevant
- 1. Extremely disturbing
- 2. Considerably disturbing
- 3. Moderately disturbing
- 4. A little disturbing
- 5. Not at all disturbing

48. How often do you have problems with your parents and/or in-laws that make you seriously angry, worried or aggravated?

- 0. Not relevant or not appropriate
- 1. About every day or every other day
- 2. About once or twice a week
- 3. About once to three times a month
- 4. About once to several times a year
- 5. Never

49. How serious and disturbing do you find it?

- 0. Not relevant
- 1. Extremely disturbing
- 2. Considerably disturbing
- 3. Moderately disturbing
- 4. A little disturbing
- 5. Not at all disturbing

50. How satisfied are you with your family life (whether you are single, married, divorced, or widowed)?

- 1. Completely dissatisfied
- 2. Very dissatisfied
- 3. Dissatisfied
- 4. Satisfied
- 5. Very satisfied
- 6. Completely satisfied

FINANCIAL SITUATION

51. How often are you worried that you will never be able to catch up financially?

- 1. All the time
- 2. Often
- 3. Sometimes
- 4. Seldom
- 5. Never

52. How often are you concerned about not making as much money as you need or want to?

- 1. All the time
- 2. Often
- 3. Sometimes
- 4. Seldom
- 5. Never

YOUR JOB (If you do not have a job, go to page number 8.)

53. How often do you find yourself tense while at your job, having no time to relax for a while?

- 1. About every day or every other day
- 2. About once or twice a week
- 3. About once to three times a month
- 4. About once to several times a year
- 5. Never

54. How serious and disturbing do you find it?

- 1. Extremely disturbing
- 2. Considerably disturbing
- 3. Moderately disturbing
- 4. A little disturbing
- 5. Not at all disturbing

55. How often do you have problems with your bosses, subordinates or co-workers that make you seriously irritated, angry, or aggravated?

- 1. About every day or every other day
- 2. About once or twice a week
- 3. About once to three times a month
- 4. About once to several times a year
- 5. Never

56. How serious and disturbing do you find it?

- 1. Extremely disturbing
- 2. Considerably disturbing
- 3. Moderately disturbing
- 4. A little disturbing
- 5. Not at all disturbing

SCHOOL (If you are not a student go to page number 9.)

57. How often do you feel that you are being torn by conflicting demands in your school work?

- 1. About every day or every other day
- 2. About once or twice a week
- 3. About once to three times a month
- 4. About once to several times a year
- 5. Never

58. How serious and disturbing do you find it?

- 1. Extremely disturbing
- 2. Considerably disturbing
- 3. Moderately disturbing
- 4. A little disturbing
- 5. Not at all disturbing

59. How often do you feel overwhelmed by your work load, with too many things needing to be done?

- 1. About every day or every other day
- 2. About once or twice a week
- 3. About once to three times a month
- 4. About once to several times a year
- 5. Never

60. How serious and disturbing do you find it?

- 1. Extremely disturbing
- 2. Considerably disturbing
- 3. Moderately disturbing
- 4. A little disturbing
- 5. Not at all disturbing

61. How often do you have problems with teachers or students that make you seriously irritated, angry, or aggravated?

- 1. About every day or every other day
- 2. About once or twice a week
- 3. About once to three times a month
- 4. About once to several times a year
- 5. Never

62. How serious and disturbing do you find it?

- 1. Extremely disturbing
- 2. Considerably disturbing
- 3. Moderately disturbing
- 4. A little disturbing
- 5. Not at all disturbing

63. How satisfied are you with your achievement in school?

- 1. Completely dissatisfied
- 2. Very dissatisfied
- 3. Dissatisfied
- 4. Satisfied
- 5. Very satisfied
- 6. Completely satisfied

YOUR HEALTH

During the past year or at the present time, have you suffered from any of the following?

- | | YES | NO |
|--|-------|-------|
| 64. Ulcers | _____ | _____ |
| 65. Frequent headaches | _____ | _____ |
| 66. Trouble falling asleep at night. | _____ | _____ |
| 67. Upset stomach, acid stomach,
indigestion, gasses, heartburn, etc. | _____ | _____ |
| 68. Fainting spells or dizziness | _____ | _____ |
| 69. Frequent loss of memory. | _____ | _____ |
| 70. Attacks of nausea or vomiting. | _____ | _____ |
| 71. I sweat very easily even on cool days. | _____ | _____ |
| 72. My sleep is fitful and disturbed | _____ | _____ |
| 73. There seems to be a lump in my
throat much of the time. | _____ | _____ |
| 74. My skin seems to be unusually
sensitive or itchy | _____ | _____ |
75. How often do you take tranquilizers (prescription or non-prescription)?
1. About every day or every other day
 2. About once or twice a week
 3. About once to three times a month
 4. About once to several times a year
 5. Never
76. How many cigarettes do you smoke on an average day? _____ Cigarettes
77. How often did you have a drink of any alcoholic beverage during the past year?
1. About every day
 2. About every other day
 3. About twice a week
 4. About once a week
 5. About once to three times a month
 6. About once to several times a year
 7. Never
78. How many drinks did you usually have on those days or on those occasions when you drank? (By "one drink," we mean one 12-ounce bottle of beer; one cocktail or highball; one 4-ounce glass of wine, etc.)
- On an average day when I drank, I drank about _____ drinks per day.

79. How many times have you been sick or injured during the past 12 months?

____ Times. If you were not injured or sick go to question 83.

80. If injured, was it because of a traffic accident you were involved in as a driver?

___ 1. Yes ___ 2. No

81. How disturbing to your life were these sicknesses or injuries?

- ___ 1. Extremely disturbing
- ___ 2. Considerably disturbing
- ___ 3. Moderately disturbing
- ___ 4. A little disturbing
- ___ 5. Not at all disturbing

82. How serious were these sicknesses or injuries?

- ___ 1. Extremely serious
(my life was in danger)
- ___ 2. Very serious
- ___ 3. Moderately serious
- ___ 4. Not serious at all
(like common cold, minor infections)

83. How often are you seriously worried or aggravated by your health?

- ___ 1. About every day or every other day
- ___ 2. About once or twice a week
- ___ 3. About once to three times a month
- ___ 4. About once to several times a year
- ___ 5. Never

84. How disturbing do you find it?

- ___ 1. Extremely disturbing
- ___ 2. Considerably disturbing
- ___ 3. Moderately disturbing
- ___ 4. A little disturbing
- ___ 5. Not at all disturbing

Read each of the following statements and check as it applies to you.

85. I feel that I have a number of good qualities.

- ___ 1. Strongly agree
- ___ 2. Somewhat agree
- ___ 3. Somewhat disagree
- ___ 4. Strongly disagree

86. I feel I do not have much to be proud of.

- ___ 1. Strongly agree
- ___ 2. Somewhat agree
- ___ 3. Somewhat disagree
- ___ 4. Strongly disagree

87. All in all, I am inclined to feel that I am a failure.

- ___ 1. Strongly agree
- ___ 2. Somewhat agree
- ___ 3. Somewhat disagree
- ___ 4. Strongly disagree

88. On the whole, I am satisfied with myself.

- ___ 1. Strongly agree
- ___ 2. Somewhat agree
- ___ 3. Somewhat disagree
- ___ 4. Strongly disagree

89. At times I think I am no good at all.

- 1. Strongly agree
- 2. Somewhat agree
- 3. Somewhat disagree
- 4. Strongly disagree

90. I am able to do things as well as most other people.

- 1. Strongly agree
 - 2. Somewhat agree
 - 3. Somewhat disagree
 - 4. Strongly disagree
-

91. How often do you feel that life is not worth living?

- 1. Always
- 2. Often
- 3. Sometimes
- 4. Seldom
- 5. Never

92. Have there been occasions where life seemed to you so bad that you felt like taking your life (committing suicide)?

- 1. On many occasions (often)
 - 2. On several occasions
 - 3. On a few occasions
 - 4. Once only
 - 5. Never
-

93. In the past year, have you thought of committing suicide?

- 1. YES 2. NO

94. If YES, how seriously did you consider it?

- 1. Very seriously
 - 2. Somewhat seriously
 - 3. Not seriously
-

95. Have you ever attempted to commit suicide?

- 1. Yes
- 2. No

96. If YES, was it during the past 12 months?

- 1. Yes
 - 2. No
-

97. How many times during the past year have you become so angry that you threw or broke things?

- 1. None
- 2. Once only
- 3. Twice only
- 4. Three times only
- 5. Four times or more

98. How many times during the past year have you been involved in a fist fight?

- 1. None
- 2. Once only
- 3. Twice only
- 4. Three times only
- 5. Four times or more

99,100 ABOUT YOUR DRINKING BEHAVIOR

Below is a series of questions related to your drinking in the past four years. Please answer each question by checking the appropriate column.

	YES	NO
101. Do you feel you are a normal drinker? (By normal we mean you drink less than or as much as most other people.)	_____	_____
102. Do friends or relatives think you are a normal drinker?	_____	_____
103. Have you ever attended a meeting of Alcoholics Anonymous?	_____	_____
104. Have you ever lost friends or girl friends because of your drinking?	_____	_____
105. Have you ever lost your job or gotten into trouble at work because of drinking?	_____	_____
106. Have you ever neglected your obligations, your family, or your work for two or more days in a row because you were drinking?	_____	_____
107. After heavy drinking have you ever had Delirium Tremens (D.T.'s) or severe shaking, or heard voices or seen things that weren't really there?	_____	_____
108. Have you ever gone to anyone for help about your drinking?	_____	_____
109. Have you ever been in a hospital because of drinking?	_____	_____
110. Have you ever been arrested for drunk driving, driving while intoxicated, or driving under the influence of alcoholic beverages?	_____	_____

(If YES, how many times? _____)

The following questions are concerned with you and your feelings about the world around you.

111. How often are you disturbed by events that are suddenly developing like violent demonstrations, riots, rise in crime, increasing levels of noise and pollution, etc?

- 1. About every day or every other day
- 2. About once or twice a week
- 3. About once to three times a month
- 4. About once to several times a year
- 5. Never

112. How disturbing do you find it?

- 1. Extremely disturbing
- 2. Considerably disturbing
- 3. Moderately disturbing
- 4. A little disturbing
- 5. Not at all disturbing

113. How often do you feel that someone holds a grudge (resentment) against you?

- 1. Always
- 2. Often
- 3. Sometimes
- 4. Seldom
- 5. Never

114. How often do you feel that someone is trying to spoil things for you?

- 1. Always
- 2. Often
- 3. Sometimes
- 4. Seldom
- 5. Never

115. As compared to the tension and stress I had two years ago, now I feel...

- 1. Much more tension and stress
- 2. Somewhat more tension and stress
- 3. About the same tension and stress
- 4. Somewhat less tension and stress
- 5. Much less tension and stress

116. How often do you feel that things are rigged (arranged) against you?

- 1. Always
- 2. Often
- 3. Sometimes
- 4. Seldom
- 5. Never

117. How often do you feel envious of other people?

- 1. Always
- 2. Often
- 3. Sometimes
- 4. Seldom
- 5. Never

118. How often do you feel that your life is full of unnecessary, annoying stress and tension?

- 1. About every day or every other day
- 2. About once or twice a week
- 3. About once to three times a month
- 4. About once to several times a year
- 5. Never

119. How disturbing do you find it?

- 1. Extremely disturbing
- 2. Considerably disturbing
- 3. Moderately disturbing
- 4. A little disturbing
- 5. Not at all disturbing

Following are a number of statements. Read each statement and check YES if it generally applies to you or NO if it generally does not apply to you. If you find it absolutely impossible to decide check the line headed (?), but use this answer as little as possible.

	YES	(?)	NO
120. Do you sometimes feel happy, sometimes depressed, without any apparent reason? . . .	_____	_____	_____
121. Do you have frequent ups and downs in mood, either with or without apparent cause?	_____	_____	_____
122. Are you inclined to be moody?	_____	_____	_____
123. Does your mind often wander while you are trying to concentrate?	_____	_____	_____
124. Are you frequently "lost in thought" even when supposed to be taking part in a conversation?	_____	_____	_____
125. Are you sometimes bubbling over with energy and sometimes very sluggish?	_____	_____	_____

Below is a list of statements. Please read each statement carefully and check the appropriate column for each one as it applies to you.

	None of the time (1)	A little of the time (2)	Some of the time (3)	Good part of the time (4)	Most of the time (5)
126. I enjoy the things I'm doing . . .					
127. I am restless and can't keep still					
128. I feel down-hearted and blue . . .					
129. My life is pretty full					
130. I am irritable					
131. I have crying spells or feel like it.					
132. I feel that I am useful and needed					
133. My appetite is poor.					
134. I get tired for no reason.					
135. I feel hopeful about the future. .					
136. I have trouble sleeping at night .					
137. I feel that others would be better off if I were dead.					
138. I feel tense					
139. I don't seem to get what's coming to me					
140. I feel I get a raw deal out of life.					
141. I feel nervous					
142. I feel other people always seem to get the breaks.					
143. These days I am pretty calm. . . .					
144. I am a tense or "highly-strung" individual					
145. I am worried					

Check true or false as applies to you

TRUE FALSE

146. I am sometimes irritated by people who ask favors of me. . . . _____
147. Whoever insults me or my family is asking for some kind of a fight _____
148. When I really lose my temper, I am capable of slapping someone. _____
149. I am always careful about my manner of dress _____
150. I sometimes try to get even, rather than forgive and forget _____
151. I often feel like a powder keg ready to explode. _____
152. I am always courteous, even to people who are disagreeable . . _____
153. If somebody hits me first I let him have it. _____
154. There have been times when I was quite jealous of the good fortune of others. _____

155. Do you get upset by the difficulties in obtaining medical care?

- _____ 1. Extremely upset
- _____ 2. Considerably upset
- _____ 3. Moderately upset
- _____ 4. A little upset
- _____ 5. Not at all upset

156. When you drive, how often do you wear seat belts?

- _____ 1. Always
- _____ 2. Often
- _____ 3. Sometimes
- _____ 4. Seldom
- _____ 5. Never

157. From time to time we hear about various products that are found to be unsafe or even dangerous, such as certain foods, medicine or cars. How disturbing do you find it?

- _____ 1. Extremely disturbing
- _____ 2. Considerably disturbing
- _____ 3. Moderately disturbing
- _____ 4. A little disturbing
- _____ 5. Not at all disturbing

Please read the description of each event and check the column NO if it did not happen to you in the past 12 months and check the column YES if it did happen to you. If you check YES continue to answer the questions along the line.

If Yes, continue below along the line

Check the correct box in terms of impact and pressure on you or adjustment it required

Events in the past 12 months:	No	Yes	how many times? or Continuous (check below)	Was the event		Little	Some	Considerable	Great Deal
				Desirable	Undesirable				
1. Got married.....									
2. Got separated from wife or husband.....									
3. Marital reconciliation (got back together) with husband or wife.....									
4. Got divorced.....									
5. Wife (or girlfriend) became pregnant.....									
6. Gained a new family member (e.g., a new baby, a relative moving in, etc.).....									
7. Loss of wife or husband through death.....									
8. Death of a close family member.....									
9. Son or daughter leaving or returning home....									
10. Son or daughter married.....									
11. Had disturbing troubles with my wife.....									
12. Had disturbing troubles with my children....									
13. Had disturbing troubles with parents, in-laws, or other family members.....									
14. Wife started or stopped working outside the home.....									
15. Major changes in family get-togethers.....									

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Again, check either YES or NO for the following events.

If Yes, continue below along the line

Check the correct box in terms of impact and pressure on you or adjustment it required

Events in the past 12 months:	No	Yes	how many times? or Continuous (check below)	Was the event		Little	Some	Considerable	Great Deal
				Desirable or	Undesirable				
30. Sexual problems or difficulties.....									
31. Involved in a lawsuit other than in connection with traffic violations or accident.....									
32. Involved in a lawsuit in connection with traffic violations or accidents.....									
33. Arrested or convicted of violations of the law other than those related to traffic problems.....									
34. Arrested or convicted of violations of the law related to traffic problems.....									
35. Held in jail for more than 48 hours.....									
36. Considerable improvement in financial situation.....									
37. Considerable problems in financial situation.									
38. Took a new mortgage or loan.....									
39. Falling behind mortgage or loan payments; receiving notification of a foreclosure on a mortgage or a loan, receiving a letter of indebtedness, or property repossessed or wages garnisheed.....									
40. Started going with someone steadily.....									
41. Became engaged.....									
42. Broke up an engagement or broke up with someone I dated steadily.....									

Again, check either YES or NO for the following events.

If Yes, continue below along the line

Check the correct box in terms of impact and pressure on you or adjustment it required

Events in the past 12 months:	No	Yes	how many times? or Continuous (check below)	Was the event		Little	Some	Considerable	Great Deal
				Desirable or	Undesirable				
43. Change in place of residence.....									
44. Began new school, graduated or quit school, or changed school.....									
45. Outstanding personal honor or achievement....									
46. Had disturbing troubles with close friends...									
47. Death of a close friend.....									
48. Other (explain):.....									

Generally speaking, how much "pressure" did all these new adjustments together put on you? By pressure, we mean how much thought and attention you had to give. CHECK ONE.

- ___ 0. Not relevant, I had no new adjustments within the past 12 months.
- ___ 1. No pressure at all -- never thought about them
- ___ 2. A little
- ___ 3. Moderate amount
- ___ 4. A lot
- ___ 5. Very great pressure -- thought about them all the time

Location # _____

Interview# _____

B.Date _____
Mon. / Day / Year

For the purpose of this research only we need your name and driving license number in order to obtain your driving record from the Secretary of State. Again we guarantee that your answers to this questionnaire will be kept confidential. This page will be separated from the rest of the questionnaire. This questionnaire will be identified only by the interview number. Anonymity will thus be assured.

My Name: _____
(First) (Full Middle Name) (Last)

My Driver's License Number: _____ / _____ / _____ / _____ / _____ / _____
(State)

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