

Evaluation of Educational Treatment for Rehabilitation of Problem Drivers

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A unique rehabilitative treatment for improving the performance of problem drivers was developed and evaluated in Florida. Entitled Responsible Driving, the treatment places emphasis on group discussion of concepts and principles derived from transactional analysis, a theory of personality developed by Eric Berne, M.D. In order to test the effectiveness of the treatment, hearing officers from five Florida cities randomly assigned 432 problem drivers to an experimental treatment group, a defensive driving course group, and a control group. All subjects had lost their driver's licenses and were attempting to obtain a temporary license for some hardship reason. Safety officers from the Florida Highway Patrol taught both the experimental and the defensive driving course. In addition to written pretests and posttests for study subjects, the driving records established by each were followed for 12 months. Results showed that the experimental treatment was significantly more effective ($p = 0.05$) than no treatment in reducing the number of traffic collisions and the number of convictions for moving traffic law violations. The defensive driving course was not significantly different from any group at $p = 0.05$. Although the findings of this study may be questioned due to small sample size and the lack of rigorous supervision in its conduct, there was evidence to support the use of the new treatment for helping problem drivers improve their driving behavior. It is recommended that this treatment be evaluated in a larger, more rigorous study.

The majority of drivers will obey traffic laws most of the time either because they are aware of the value of the laws or they are afraid of getting caught and facing the consequences. However, a small percentage of drivers repeatedly disobey traffic laws, or frequently become involved in collisions, or both.

In attempts to modify errant driver behavior, highway safety authorities have used fear tactics, such as warning letters, fines, license suspension and revocation, and imprisonment. These methods have had an effect on some so-called problem drivers (1,2). However, the authorities found that fear tactics did not work for other problem drivers and even appeared to have a negative effect on them (3,4).

Therefore, other, less punitive measures have been implemented. These measures have included attempts to educate problem drivers by improving driving knowledge and skill. Other measures have attempted to improve the attitudes of problem drivers or have dealt directly with the maladaptive behavior. Each of these treatments has demonstrated short-term success when compared with results of punitive measures (5,6,7,8,9,10). Evidence of long-term effectiveness does not exist (11). One reason may be that these measures attempted to treat only a part of the problem. Driving behaviors are formed by past experiences, present conditions, and future expectations. These, in turn, are based on existing knowledge, skills, thoughts, attitudes, and emotions.

Research in the field of human factors in traffic safety in particular and in the field of human behavior in general has pointed the way toward a more comprehensive understanding of human actions. Although many studies have attempted to show the relationship between certain character traits and driving (12,13,14,15,16,17), the major conclusion with the most validity is that maladaptive driving habits and overinvolvement in traffic collisions are manifestations of drivers' life-styles (12,18,19,20). This conclusion was further substantiated by Shaw and Sichel (21). These researchers found

that total personality, rather than any one trait, was the significant predictor of how a person drives.

Another conclusion which is pertinent to helping a person make a more permanent change in driving habits has been uncovered in human behavior research. This conclusion is one of the major assumptions upon which the theory of operant conditioning rests (22) and was expanded to become a major aspect of transactional analysis, or TA (23,24,25). In effect, this assumption states that a person does not act without a payoff. According to TA theory, this payoff is a feeling, either real or artificial, positive or negative, conscious or subconscious. Most habitual behavior patterns, which appear to be maladaptive to an observer, have more positive than negative value to the individual performing the behavior. Every behavior is the end result of an internal decision-making process of thoughts and feelings.

Therefore, if an attempt is made to help a person deal more effectively with only one aspect of this process—e.g., thoughts (knowledge or attitudes), feelings, or actions—the person will need to learn how to deal with the remaining aspects. This reduces the probability that long-term change will be effected. Old habits are comfortable; new behavioral patterns are uncomfortable. Long-term changes can result only if the new patterns become internalized. Internalization of new behavior patterns can occur over a short or a long period of time, depending on an individual's willingness to learn and readiness for change (level of motivation).

A new treatment for the rehabilitation of problem drivers was developed based on these ideas (26). The treatment was tested in three Florida cities. Based on the positive results of these tryouts (27), a larger study compared the new treatment with a traditional treatment (28).

PURPOSE OF STUDY

The primary purpose of this study was to compare the short-term and long-term effectiveness of two treatments on the driving behavior of problem drivers. The two treatments were the National Safety Council's Defensive Driving Course (DDC) and the new treatment, referred to as Responsible Driving. DDC is primarily a knowledge-based course using lectures, films, and other media as the major instructional techniques. The experimental treatment focused on helping participants learn to accept responsibility for their actions, especially while driving. Using group discussion, role playing, decision-making techniques, the lecture, films, and other media, participants were invited to express their feelings and ideas while learning to increase their self-awareness, driving knowledge, and, above all, willingness to perform in a responsible manner while driving.

METHODOLOGY

All subjects for this study were selected from Florida's population of problem drivers who requested and received a hearing from a hearing officer regarding their

loss of driving privileges due to accumulated points received for traffic law violations, or collisions, or both. All subjects were permanent residents of Florida who had lost or were about to lose their driver's license for a period of 30 days or more and were attempting to obtain a restricted driver privilege for some hardship reason.

The evaluation design called for a total of 144 problem drivers to be randomly assigned to the experimental treatment, designated as group 1. Another 144 problem drivers were to be randomly assigned to a Defensive Driving Course, designated as group 2. A third block of 144 randomly selected problem drivers were to receive no treatment (control group) and were designated as group 3. Pretests and posttests were administered to all participants in each of the three study groups. It should be noted that, for group 1 and group 2, an identifiable, but differing, treatment supplemented a suspension of drivers' licenses. The pretests and posttests were administered to the control group in order to determine time and testing effects.

The experimental design employed was as follows:

Random Assignment	Pretest	Treatment	Posttest
R	O ₁	X ₁	O ₁
R	O ₂	X ₂	O ₂
R	O ₃	X ₃	O ₃

where

- X₁ = TA treatment, group 1;
- X₂ = DDC treatment, group 2;
- X₃ = no special treatment, group 3;
- O₁ = scores and driving record data from group 1;
- O₂ = scores and driving record data from group 2; and
- O₃ = scores and driving record data from group 3.

The design was considered appropriate, since the subjects within each of the three groups were not likely to be acquainted with each other previous to, during, or after completion of the treatment. Therefore, any effect on the posttest scores that might have been caused by acquaintances or cross-contamination was probably eliminated.

In the book *Experimental and Quasi-Experimental Designs for Research* (29), Campbell and Stanley rated the preceding design high on internal validity, a major concern. External validity was not a major concern since generalization of inference of such a small group cannot be claimed with confidence. Further, since the control group represented randomly assigned problem drivers from the general profile of problem drivers, generalization was somewhat built in.

Analysis of variance was used to test the null hypotheses involving mean scores on pretests and posttests of knowledge and attitudes, mean number of collisions, and mean number of violations 1 year before and 1 year after treatment for the three study groups. The Scheffé test of significance was applied to the analysis of variance results that were significant in order to isolate the groups that were significantly different. To test those null hypotheses, which involved only two variables, a t-test was used to determine significant differences. A confidence level of 0.05 was used for all tests of significance. A level of 0.10 was also used with the Scheffé test in order to avoid acceptance of null hypotheses that may have been rejected if larger numbers of subjects had been involved. Although some question might exist as to the appropriateness of applying the analysis of variance procedure to sets of data for convictions and collisions, it has been argued (30)

that empirical studies of the effects of systematic departures from normality of data analyzed using the analysis of variance do not completely invalidate application of this technique. Apparently, the effect of applying the analysis of variance to J-shaped distributions is to cause more of the potential null hypotheses to be retained than would be expected by ordinary reference to Snedecor's F-tables. In other words, application of an F-test should be viewed as a conservative procedure and slightly biased toward acceptance of the hypothesis of no significant difference.

The hypotheses tested included the following:

1. No significant difference will exist among mean scores on pretests of driving knowledge made by three groups of randomly assigned problem drivers.
2. No significant difference will exist among mean scores on posttests of driving knowledge made by three groups of randomly assigned problem drivers.
3. No significant difference will exist among means of the differences between scores on pretests and scores on posttests of driving knowledge made by three groups of randomly assigned problem drivers.
4. No significant difference will exist among mean scores on pretests of attitude-related traffic opinions made by three groups of randomly assigned problem drivers.
5. No significant difference will exist among mean scores on attitude-related traffic opinions made by three groups of randomly assigned problem drivers.
6. No significant difference will exist among the means of the differences between scores on pretests and scores on posttests of attitude-related traffic opinions by three groups of randomly assigned problem drivers.
7. No significant difference will exist among the three groups in regard to the mean number of convictions for traffic law violations received during the 12-month period immediately preceding the scheduled group treatments.
8. No significant difference will exist among the three groups in regard to the mean number of convictions for traffic law violations received during the 12-month period immediately following the scheduled group treatments.
9. No significant difference will exist among the three groups in regard to the means of the differences between the number of convictions for traffic law violations received during the 12-month period immediately preceding the scheduled group treatments and the number of convictions received during the 12-month period immediately following the scheduled group treatments.
10. No significant difference will exist among the three groups in regard to the mean number of convictions for moving traffic law violations received during the 12-month period immediately preceding the scheduled group treatments.
11. No significant difference will exist among the three groups in regard to the mean number of convictions for moving traffic law violations received during the 12-month period immediately following the scheduled group treatments.
12. No significant difference will exist among the three groups in regard to the means of the differences between the number of convictions for moving traffic law violations received during the 12-month period immediately preceding the scheduled group treatments and the number of convictions received during the 12-month period following the scheduled group treatments.
13. No significant difference will exist among the three groups in regard to the number of points received for moving traffic law violations during the 12-month

period immediately preceding the scheduled group treatments.

14. No significant difference will exist among the three groups in regard to the number of points received for moving traffic law violations during the 12-month period immediately following the scheduled group treatments.

15. No significant difference will exist among the three groups in regard to the means of the differences between the number of points received for moving traffic law violations during the 12-month period immediately preceding the scheduled group treatments and the number of points received during the 12-month period immediately following the scheduled group treatments.

16. No significant difference will exist among the three groups in regard to the mean number of collisions that involved a member as a driver during the 12-month period immediately preceding the scheduled group treatments.

17. No significant difference will exist among the three groups in regard to the mean number of collisions that involved a member as a driver during the 12-month period immediately following the scheduled group treatments.

18. No significant difference will exist among the three groups in regard to the means of the differences between the number of collisions that involved a member as a driver during the 12-month period immediately preceding the scheduled group treatments and the number of collisions during the 12-month period immediately following the scheduled group treatment.

Five instruments were used in the study as well as data obtained from Florida's driver records system to evaluate the relative effectiveness of the treatments. Three tests of knowledge were used: (a) one on general knowledge of driving, Achievement Scale on Motor Vehicle Transportation; (b) one to assess attainment of the knowledge content of the experimental treatment, Knowledge Test for Experimental DI Course; and (c) one to assess attainment of knowledge content of the DDC, Defensive Driving Course Final Examination. The Driver Reaction Scale was used to assess attitude change. There were two measures—one subjective and one objective—used to ascertain possible behavioral changes resulting from the treatment. The subjective measure was the participants' verbal responses to the follow-up evaluation. The objective measure of behavior change was the data obtained from the driver records system of the state of Florida.

A group of safety officers from the Florida Highway Patrol were identified as the most logical choice to serve as group leaders for both the DDC and the experimental treatment. Every officer was active in teaching DDC and participated in a 4-day training workshop in TA. Nine officers were selected from 17 who were trained as group leaders. These officers were selected because they worked in the four cities from which the subjects were chosen for the study. Three officers were from Orlando and two each were from Tampa, Fort Lauderdale, and Jacksonville.

Problem drivers were randomly assigned to three groups as they appeared for hearings in the four cities. Members of group 1 were assigned to the experimental treatment. Members of group 2 were assigned to the DDC. Members of group 3 were assigned to the control group and were given no treatment other than license suspension, which all subjects received.

At the hearing, the hearing officers told each member of group 1 and group 2 that participation in the course was considered part of the process for regaining

their driving privilege. In addition, the hearing officers stated:

1. The courses were designed to assist participants in improving driving performance;
2. The courses consisted of four sessions lasting from two to two-and-a-half hours per session; and
3. The locations and schedules of the courses were given.

All pretests and posttests were administered in the following manner. The hearing officers administered the pretests to all study subjects at the time of their initial interviews. Posttests for groups 1 and 2 were administered by the safety officers at the end of the treatments. For the control group (group 3), the hearing officers assigned each member an appointment date in his office for administration of the posttests. The safety officers administered the follow-up evaluation by telephone to subjects in groups 1 and 2.

The safety officers were each responsible for teaching DDC to 18 study subjects and the experimental treatment to 18 other subjects, except in one location where three officers were each responsible for teaching DDC to 12 subjects and the experimental treatment to 12 other subjects. However, administrative problems arose that led to a reduction in the sample population.

The study was conducted during a 6-month period from December 1, 1975, through June 1, 1976. One year from the end of the last treatment, the test data and the driving records of all study subjects were analyzed.

RESULTS

The first three hypotheses tested in this study related to driving knowledge. The means and standard deviations of the three groups on both the pretest and posttest for the Achievement Scale on Motor Vehicle Transportation, testing overall driving knowledge, as well as the mean differences and standard deviations, are presented in Table 1. Analysis of variance conducted on these data revealed a significant difference for both the pretest ($p = 0.03$) and posttest ($p = 0.01$) but not for the differences ($p = 0.32$). Scheffé tests revealed that, for both tests, the control group had significantly higher scores than the DDC group, while no other groups were significantly different at the 0.05 level of significance. At the 0.10 level, both the control and the experimental groups had significantly higher posttest scores than the DDC group. Therefore, the first two null hypotheses were rejected; the third hypothesis failed to be rejected.

Analysis of the results of the two tests of special knowledge revealed a significant increase from pretests to posttests (for both tests, $p = 0.01$). However, since the control group was not given these tests due to time and administrative constraints, it is impossible to say how much of the increase in learning was due to time and pretest effects.

The next three hypotheses, which were tested in this study, relate to attitude-related behavioral tendencies. Since the instrument used to assess this factor was not submitted to a test of reliability, the results should be viewed with caution. However, there was no other test of this factor available that had proved reliable. Analysis of variance of these data revealed no significant differences: for the pretest, $p = 0.13$; for the posttest, $p = 0.77$; and for the differences, $p = 0.22$. Hypotheses 4, 5, and 6, therefore, failed to be rejected.

The remaining hypotheses tested in this study related to the driving records of the subjects compiled 1 year

prior to and 1 year following treatment. Hypotheses 7, 8, and 9 related to the total number of convictions for traffic law violations received by members of each group. Table 2 presents the means and standard deviations for these results. Analysis of variance performed on these data revealed no significant difference among the groups 1 year before treatment ($p = 0.65$). However, a significant difference between the groups was found for the violations compiled 1 year after treatment ($p = 0.01$) and for the differences ($p = 0.03$). At the 0.10 level, group 1 was significantly different from group 2 (DDC) 1 year after treatment. Therefore, hypothesis 7 failed to be rejected, while hypotheses 8 and 9 were rejected. The members of the experimental group reduced the total number of violations they received to a greater extent than did the members of either the DDC or the control group.

Table 3 presents the means and standard deviations of the number of moving traffic law violations received by the three groups as well as the means and standard deviations of the differences. Analysis of variance conducted on these data showed that, although there was no significant difference among the groups 1 year before treatment ($p = 0.52$), there was a significant difference 1 year after treatment ($p = 0.01$) as well as in the differences from before to after treatment ($p = 0.04$). Scheffé tests revealed that the experimental group was significantly different from the control group at the 0.05 level for the after treatment and for the differences. Therefore, hypothesis 10 failed to be rejected, while hypotheses 11 and 12 were both rejected. The experimental group had a significantly greater reduction in moving violations than the control group.

The next three hypotheses related to the number of points received by subjects for traffic law violations during the two periods. The means and standard deviations for these data are presented in Table 4. Analysis of variance run on these data revealed that there were significant differences among the groups for all three comparisons—for the 1 year before treatment comparison, $p = 0.03$, while for both the 1 year after treatment period and for differences between the two periods, $p = 0.01$. Using a 0.05 level of significance, Scheffé tests showed that the experimental group was significantly different from the control group for all three comparisons.

Table 1. Pretest and posttest group means and standard deviations obtained from Achievement Scale on Motor Vehicle Transportation (N = 287).

Group	Pretest		Posttest		Differences	
	Mean	SD	Mean	SD	Mean	SD
1 (experimental)	22.29	4.56	23.67	4.56	1.38	4.53
2 (DDC)	21.57	5.22	22.09	5.19	0.52	5.51
3 (control)	23.42	4.16	23.95	4.03	0.53	3.41

Note: Highest possible score equals 32.

Table 2. Means and standard deviations of convictions for traffic law violations before and after completion of treatment and of the differences (N = 358).

Group	Number of Violations 1 Year Before Treatment		Number of Violations 1 Year After Treatment		Differences	
	Mean	SD	Mean	SD	Mean	SD
1 (N = 137)	3.01	1.88	0.59	0.85	(2.42)	1.97
2 (N = 109)	2.86	1.93	0.93	1.22	(1.93)	1.96
3 (N = 112)	2.80	1.80	1.01	1.37	(1.79)	1.91

Therefore, the experimental group reduced the number of points they received significantly more than the control group. It was also found that, when a 0.10 level of significance was used with the Scheffé test, the experimental group had a significantly greater reduction in point differences than the DDC group. Hypotheses 13, 14, and 15 were all rejected.

The last three hypotheses tested related to the number of collisions in which members of each group were involved during the two periods. The means and standard deviations for these results are presented in Table 5. The distributions of the number of collisions in which each group were involved are presented in Figure 1 for comparative purposes. Analysis of variance conducted on these data showed no significant differences for either the before treatment ($p = 0.23$) or the after treatment ($p = 0.07$) comparisons. However, there was a significant difference among the differences ($p = 0.03$). A Scheffé test revealed that the experimental group was significantly different from the control group at the 0.05 level.

Therefore, although hypotheses 16 and 17 failed to be rejected, hypothesis 18 was rejected. The experimental group had a significantly greater reduction in collisions after treatment than the control group.

The last data to be reviewed were the input received from the follow-up evaluation. These data were obtained from a total of 153 subjects—74 from the experimental group and 79 from the DDC group. Members of both groups responded that they felt they had benefited from the treatments.

CONCLUSIONS

Although the results of this study should be considered tentative due to the small sample size, dropouts, possible contaminations occurring during the conduct of the study, and lack of a more suitable statistical procedure for analysis of the driving records, some important findings were revealed. There was strong evidence to support the future use of the experimental treatment for helping problem drivers improve their driving behavior. The study was useful in showing that the experimental treatment was significantly more effective than no educational treatment (control group) and somewhat more effective than the DDC for this sample of problem drivers.

The experimental treatment was found to be most effective in helping problem drivers reduce total convictions for traffic law violations and violations points. The DDC group had a greater reduction than the control group for all driver record criterion variables analyzed. However, none of these were significantly different at either the 0.05 or 0.10 level of significance.

One interesting finding of this study was that all groups had a high pretest score on a test of overall knowledge and no groups made a significant improvement in their scores on the posttest. No group had a mean pretest score of less than 67 percent on this test. It would appear from this evidence that driving knowledge is not one of the critical variables applicable to most problem drivers.

Based on the results of this study and the results of the earlier tryouts of the experimental treatment, it is recommended that a larger study ascertain the effectiveness of the new treatment by comparing it with other approaches that aim to help problem drivers improve their driving behavior. It would also be of value to include in this study an analysis of which age groups, socioeconomic groups, sex, and other subgroups of the populations of problem drivers are helped most by this new treatment.

Table 3. Means and standard deviations of moving traffic law violations before and after completion of treatment and of the differences (N = 358).

Group	Number of Violations 1 Year Before Treatment		Number of Violations 1 Year After Treatment		Differences	
	Mean	SD	Mean	SD	Mean	SD
1 (N = 137)	2.60	1.58	0.41	0.64	(2.19)	1.67
2 (N = 109)	2.49	1.59	0.61	0.85	(1.88)	1.76
3 (N = 112)	2.38	1.45	0.72	0.89	(1.66)	1.56

Table 4. Means and standard deviations of violation points received before and after completion of treatment and of the differences (N = 358).

Group	Points Received 1 Year Before Treatment		Points Received 1 Year After Treatment		Differences	
	Mean	SD	Mean	SD	Mean	SD
1 (N = 137)	10.39	7.89	1.44	2.37	(8.95)	7.99
2 (N = 109)	9.17	5.90	2.15	3.26	(7.02)	6.62
3 (N = 112)	8.22	4.98	2.75	3.84	(5.47)	5.66

Table 5. Means and standard deviations of collisions before and after completion of treatment and of the differences (N = 358).

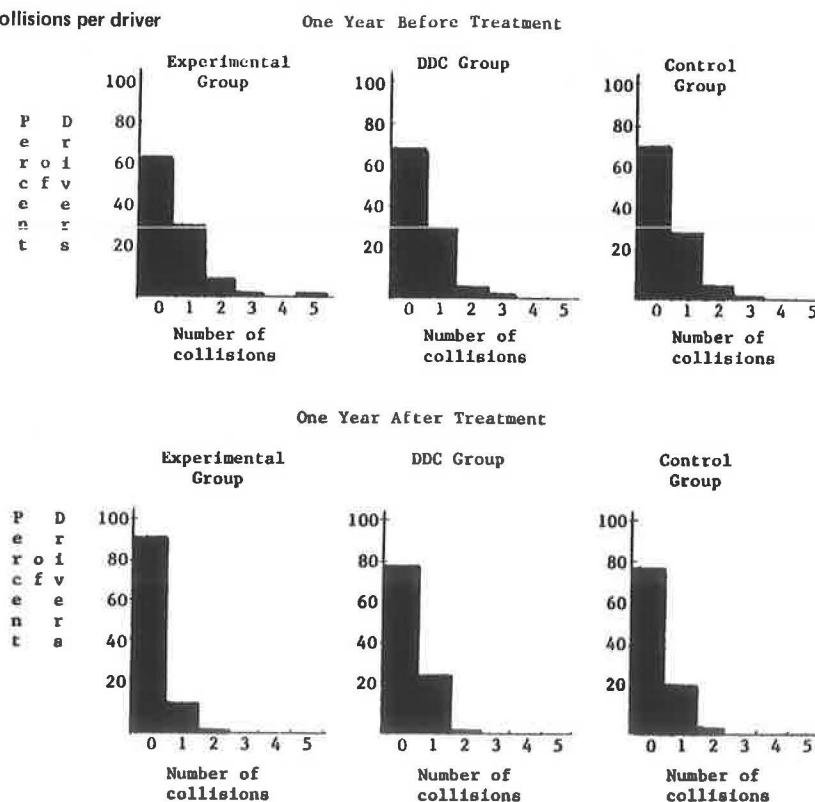
Group	Collisions 1 Year Before Treatment		Collisions 1 Year After Treatment		Differences	
	Mean	SD	Mean	SD	Mean	SD
1 (N = 137)	0.49	0.75	0.14	0.35	(0.35)	0.81
2 (N = 109)	0.40	0.61	0.23	0.44	(0.17)	0.73
3 (N = 112)	0.35	0.57	0.26	0.50	(0.09)	0.77

It is recommended that the new treatment be implemented under the direct supervision of a person well trained in its application. The treatment could be used alone or in conjunction with other treatments, such as DDC. Results of these applications should be analyzed for at least 2 years to identify the most effective treatment or combination of treatments.

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Figure 1. Distributions of the number of collisions per driver before and after treatment.



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Driver Education for Stress Conditions

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A set of driver performance training activities has been developed to prepare drivers to handle a vehicle under such stress conditions as tire failure, skid situations, off-road recovery when one or more wheels drop off pavement, and to properly steer vehicle, to evade sudden impending dangers, and to brake the vehicle without losing control. As this paper points out, when these activities are learned and practiced, improvements occur in a driver's ability to operate a vehicle and to respond to stress conditions with a high degree of success. In addition, reductions in accidents and property damage have also taken place.

The program described in this paper was developed from information obtained through a search of the literature and through experiences gained by participating in train-

ing programs previously developed by such organizations as Liberty Mutual Insurance Company, General Motors Proving Ground, and the National Safety Council.

For many years, the Liberty Mutual Insurance Company has provided information via films and workshops concerning the ability to control a vehicle in various skid situations (1). General Motors Proving Ground first developed a series of activities that were aimed at improving skills of drivers in handling emergencies (2). The National Safety Council has for many years conducted Winter Driving Techniques Workshops at Stevens Point, Wisconsin (3).

Others have conducted training programs that have