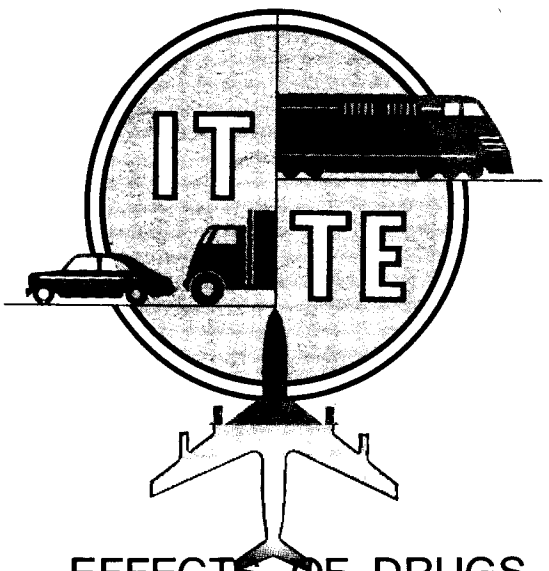

FINAL REPORT

EFFECTS OF DRUGS AND ALCOHOL ON DRIVER PERFORMANCE

UCLA-ENG-7302
MAY 1972

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Prepared for National Highway Traffic Safety Administration
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Addendum

This report presents the results of a series of experiments to determine if three drugs; marihuana, librium and dexedrine have any effect on human performance in a divided attention laboratory task and the UCLA driving simulator. This study was a continuation of a previous NHTSA contract # FH-11-7305 where alcohol was shown to have an affect on both the laboratory task and the simulator. Each drug was evaluated in an individual experiment where the drug, alcohol, and their respective placebos were given as treatments in a factorial design.

The results of the experiment showed the following:

1) Only one divided attention laboratory task was conducted, librium and alcohol. Librium had no effect on performance but alcohol affected performance as was reported in the earlier study.

2) In the marihuana driver simulator experiment there was no statistically significant effect of marihuana or alcohol.

3) In the librium experiment on the driver simulator, librium showed a significant decrement at the 0.05 probability level. However the percent change in performance was only 4.76%. On the other hand, alcohol showed no significant effect with a 26.8% change in performance.

4) In the dexedrine study, statistical significance for either dexedrine or alcohol was marginal, i.e. 0.10 probability level.

On the basis of these results it is the opinion of NHTSA that no conclusion can be made on the effect of these drugs on driver performance. The reason for the lack of significance appears to be due to the large

variation in performance scores of the subjects and group of subjects for the different experiments. This could be corrected in subsequent studies by, as the authors concluded, more careful screening and selection of subjects or as a separate alternative, better control of the subjects during the time that the subject is participating in the experiment.

More studies should be conducted on these drugs using better control over the subjects.

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16. Abstract

Reports and discusses the methodology and results of experiments in a driving simulator and soundproof chamber which tested the effects of Alcohol, Librium, Dexedrine and Marihuana on human driving performance. Although a trend was found for divided attention reaction time in the simulator as affected by marihuana, the results are statistically inconclusive. Librium also increased the reaction time in the simulator. Dexedrine DECREASED reaction time in the simulator and the combination of dexedrine with alcohol produced reaction times no different than placebo drives. Vehicle control scores were not effected except as an increase in variability. It is concluded that Marihuana and Librium require more study and Dexedrine tends to offset the effects of alcohol on reaction time.

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FINAL REPORT

EFFECTS OF DRUGS AND ALCOHOL ON DRIVER PERFORMANCE

Prepared for

U.S. Department of Transportation

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The Effects of Drugs and Alcohol in Combination with Drugs on Driver Performance

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PREFACE

This report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. FH-11-7499, entitled "The Effects of Drugs and Alcohol in Combination with Drugs on Driver Performance." The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of the U.S. Department of Transportation, National Highway Traffic Safety Administration.

The authors acknowledge the assistance of Thomas Jelmeland in the simulator scores software development, and of Tom Collins in the application of Biomedical computer programs. Computing assistance was obtained from Health Sciences Computing Facility, University of California, Los Angeles, sponsored by N.I.H. Special Research Resources Grant RR-3.

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1. INTRODUCTION AND SUMMARY

This study is only part of a larger program of research into the ways that various drugs (commonly used) affect driving safety. Therefore, it is based on the results of earlier projects that showed the effects of alcohol to be primarily on human attention, not on the vehicle control skills such as steering and speed control, except to increase the variability of these scores in the UCLA Driving Simulator.

For this reason, the present report deals with two types of laboratory measures: one has to do with two auditory tasks simultaneously presented; the other is comprised of two visual tasks (one of which is simulator driving) simultaneously presented. Because these research tasks are conducted in separate laboratories, they actually constitute two studies complete unto themselves.

Four different drugs (and drug-alcohol combinations) were studied in these two separate laboratories, making in all eight sub-studies, each related to the overall hypotheses and research strategy of the project. The report therefore deals with the overall concepts, describes each sub-study, then discusses the total implications of the results.

Evidence was found for an effect on driving behavior of marihuana. Although a trend was found for the visual subsidiary task as affected by marihuana, the results are statistically inconclusive. No effect was found on vehicle control scores and no tests were conducted on the auditory tests of attention.

Librium was shown to increase reaction time to the visual subsidiary task in the driving simulator laboratory, and Librium with alcohol increased reaction time even further. However, no Librium effect was found in the auditory

test of divided attention nor were there any marked changes in vehicle control scores under Librium even when combined with alcohol.

Dexedrine was found to decrease reaction time to the visual subsidiary task and the combination of Dexedrine with alcohol produced reaction times equal to the sober (placebo) drive sessions. Due to equipment failure, no data were analyzed for the auditory tests of divided attention under Dexedrine or marihuana.

These results support the following conclusions:

a. Marihuana affects visual divided attention while driving, but more data are needed to determine these effects more clearly.

b. Librium affects visual divided attention while driving, but does not affect auditory divided attention. Alcohol and Librium together appear to increase reaction time more than either alone. These results need further study.

c. Dexedrine does decrease reaction time while driving and when combined with alcohol does offset the alcohol effect on reaction time while driving. However, there is indication of some disruption of the normal pattern of divided attention reaction time relative to task loading.

2. THE PROBLEM

The U.S. population is increasingly a drug and medication taking society and also an automobile driving society. The combination of these two practices is producing an increase of hazardous drivers on the highways. This problem is the subject of the present study.

A nationwide survey done in 1957 (1) indicated that the purchase of drugs and medicines outside of the hospital amounted to 1.5 billion dollars, or accounted for 15% of the total amount spent for personal health services. In that same year, the American Institute of Public Opinion found that 7% of the surveyed population admitted to using tranquilizers. A decade later, a survey conducted by the Social Research Group of George Washington University (2) indicated that 26% of the surveyed population admitted to using tranquilizers. This represents almost four times the usage rate of the earlier survey.

Self-medication practices have increased considerably (3), resulting partly from the increased sophistication that people have about the substances that are available for purchase over the counter.

By far the most widely known drug related to traffic safety is alcohol. This problem dates back to antiquity where early Roman history relates a ban on drunken chariot drivers. This drug was the subject of previous studies in this UCLA series (4) sponsored by the U.S. Department of Transportation.

A frequently overlooked, yet important, factor is the synergistic effect of alcohol with many other drugs in which one potentiates the effect of the other, so that what might be a relatively safe amount of either alone, when combined in an unplanned way could result in adverse effects on driving as well as other behavior (5, 6, 7).

It is characteristic of other drugs, as distinguished from alcohol, that most of those with adverse effects produce these with relatively small doses. Furthermore, most are not easily or conveniently detected in the living subject, and many of them are slowly metabolized, resulting in long-term effects of relatively small doses.

While many types of drugs are possible offenders in creating impaired driving capability by themselves or in combination, this study will deal with a commonly used tranquilizer (Librium), a commonly used stimulant (Dexedrine), and a commonly used narcotic (marihuana). Of the first of these, Buttiglieri, Case et al., in a textbook chapter (8), state:

"The series of benzodiazapine compounds is continuing to grow. The two best known derivatives are chlordiazepoxide (Librium) and diazepam (Valium). They both have mild sedative effects and are used mainly in treatment of anxiety. There is, in addition, a muscle relaxant effect, especially with Valium. There is considerable interest at present in their use for the treatment of alcoholism, especially in withdrawal symptoms and acute intoxication. Persons taking these medications must be concerned over possible drowsiness, fainting, and dizziness. There may be some special hazard in their effect on driving; but, as with so many of the drugs, this question requires further investigation (9).

The second drug (Dexedrine) is discussed as follows by these authors:

"Amphetamine and related compounds have become one of the most popular groups of self-administered drugs today. Amphetamine and dextroamphetamine (Benzedrine, Dexedrine) are potent central nervous system stimulants, the effect depending on the dose, the personality, and the current mental state. Usual effects are alertness,

wakefulness, elevated mood, improvement in simple task performance, and decreased sense of fatigue. These have been used illicitly for increasing the performance of athletes and race horses but whatever gain is achieved is only temporary and must be repaid out of the total economy of the organism. Prolonged use or large doses are followed very often by depression and fatigue. Amphetamine, methamphetamine, and similar compounds have been widely used as appetite suppressants and represent a serious health hazard. If used at all, they should be under strict medical supervision (10). These drugs are becoming an integral part of the drug culture of the younger generation of today where they are, among other terms, referred to as 'uppers' (11). Because of the widespread use, both acute and chronic intoxication is seen frequently. The effects commonly include restlessness, dizziness, tremor, hyperactive reflexes, overtalkativeness, irritability, and sleeplessness. Anxiety, confusion, panic, and even hallucinations may occur since psychotic reaction often of a paranoid type can develop with the large doses currently in use among individuals habituated to the drug (12)."

The last of the three (marihuana) is classed as an hallucinogen and is discussed by Buttiglieri, Case et al. in their chapter as follows:

"Marihuana is a mild hallucinogen which, however, is classified legally as a narcotic (13). We are in a rather peculiar position today of living in a society where the use of these drugs has become extremely widespread particularly in the youthful age groups, but where objective knowledge is meager and where research is severely limited by legal restrictions."

Marihuana is also known as Cannabis and is described as such by these authors:

"Cannabis is a very ancient drug obtained from the common hemp. In the Middle East and North Africa, the resinous extract is called 'hashish.' In India the material obtained from different parts of the plant are called 'bhang' and 'ganja.' In the United States the term marihuana is used for any part of the plant which is used to produce psychic change (14). The physiological effects are minimal in terms of effect on driving, although the subjective effect may vary from a dreamy reverie to various changes in perception, including that for time and space, to the extreme of vivid hallucinations. The response is very much determined by the personality of the user and the immediate situation; but there may be marked alterations of mood which may vary from extreme well-being and joyousness to hilarity and occasionally depression."

The driving and traffic safety implications of these responses seem obvious but just as with alcohol, even though effects seem important it has not been possible to clearly isolate and demonstrate them in a driving situation.

This is partly due to the oversimplified attempts that have been made to measure the driving task. Brake pedal reaction time is not greatly affected by the moderate doses we suspect are killing highway users. Steering ability also is not altered unless it is artifically increased in difficulty so as to place it far outside the range of driving task difficulty.

Driving judgment and multiple contingency assessment are much more difficult to assess and are the focus of this study, as it attempts to quantify those elusive qualities of highway driving and determine the effects of three drugs in comparison to and in combination with alcohol, the known killer.

3. BACKGROUND

3.1 Alcohol

The history of studies on alcohol and driving performance was described in an earlier report (15) of this total UCLA research program. A series of studies by Borkenstein (16) has clearly established that blood alcohol levels of 0.10% and 0.15% are associated with "an astonishing" 6- and 25-fold increase in morbidity, respectively. Zylman (17) has critically reviewed these studies and performed further analysis of the data.

Drivers with BAL's of 0.10% will not usually show any marked outward evidence of impaired driving capability. This was clearly revealed in initial research at UCLA ITTE where drivers were intoxicated and then had their performance measured in the UCLA Driving Simulator (18). It was not until a secondary visual task was added that the evidence of alcohol effects became clear. The underlying concept put forth by Moskowitz (15) is that driving is a task that requires a division of attention. In other words, the driver's single track mental system is used by the alert driver to sample the driving environment both outside and inside the vehicle and look for cues that will enable him to correctly predict and anticipate what lies ahead. Eye movement studies at Ohio State (19, 20) support this contention and also show marked changes under alcohol and fatigue.

The divided attention concept of why alcohol increases accident likelihood explains why simple reaction time may not be affected or may even be improved. The alcohol apparently serves to narrow the field of attention which can actually improve the ability to respond to a simple and expected change in the environment. The UCLA

work is showing that this holds true for auditory stimuli as well as for visual (21), which is evidence that the behavioral impairment takes place in the central nervous system and in particular reduces the driver's information handling capability. This concept helps to explain why visual acuity is not affected by BAL's of 0.10%.

When the driving task is considered in terms of the impairment in mental processing and environment sampling rate decrease caused by alcohol, it is readily understood how drunk drivers can fail to perform safely. They can fail by completely "not seeing" obstacles or other vehicles because their visual scanning rate is simply too slow. They can, and do, fluctuate speed greatly and erratically because their rate of speed monitoring is too slow to detect speed changes as efficiently as normal. Their steering performance may not vary greatly but it can demand nearly all of their limited attention whereas normally (sober) they need devote only a fraction of their attention to steering and have a great deal of attention available to devote to the detection and processing of other cues from the environment.

3.2 Marihuana

The evidence on the effects of smoking marihuana is being accumulated in a myriad of studies that are in various states of completion. A landmark study (22) by N.E. Zinberg and A.T. Weil at Boston University School of Medicine was so important to the public that an explanatory article was published 11 May 1969 in the New York Times Magazine (23) where the authors told of their approach to the study of marihuana effects. They set forth procedures and research policies that were aimed at the

ordinary or average user and administered the drug in the way that users take it, namely smoking in deep inhalations that are held for approximately 20 seconds, then exhaled. Their conclusions indicated that an 18-mg cigarette caused "a moderate increase in heart rate, but not enough to make subjects conscious of a rapid pulse, and it reddened whites of eyes. It had no effect on pupil size, blood sugar, or respiratory rate. Possibly the drug has a few other effects on the body..." They conclude that the lack of major physical effects points to "the uniqueness of hemp among psychoactive drugs" and makes it unlikely that marihuana has any serious detrimental effects in either short-term or long-term usage. A recently completed survey of world-wide reports led its author W.H. McGlothlin to similar conclusions.

The Weil et al. report also studies psychological reactions and concluded that "no one has shown any specific way in which a person, high on marihuana, is different from one who is not." They found no evidence of difference on an attention test (Continuous Performance Test) and a slight improvement on the Digit Symbol Substitution Test "even though they started out from good baseline scores." Apparently even the users themselves were surprised at how well they could perform when under the influence or "stoned."

Zinberg and Weil go on to state, "Apparently, getting high on marihuana is a much more subtle experience than getting high on alcohol... This hypothesis is consistent with the evidence that marihuana seems to affect little in the brain besides the highest center of thought, memory and perception. It has no general stimulating or depressive reaction on the nervous system (hence the absence of neurological as opposed to psychological changes during a high), no influence on lower centers like those controlling the mechanical aspects of speech and coordi-

nation (hence no slurred words or staggering gait). As a result it seems possible to ignore the effects of marihuana on consciousness, to adapt to them, and to control them to a significant degree... Users appear to be able to compensate 100 percent for the nonspecific adverse effects of ordinary doses of marihuana on ordinary psychological performance (including driving), according to the findings of a soon-to-be-published study..."

The study to which they refer was done by Crancer et al. (24) using a driver training simulator with special films of driving situations. Hulbert (one of the principal investigators of the present study) personally visited the Crancer study after it was completed. The findings of the important studies by Weil et al. and Crancer et al. are included in the research approach for the present study described in a later part of this report. Crancer compared the driving performance of 36 chronic marihuana users under three conditions:

a. No drug.

b. Marihuana smoked to a "normal social high" using 1.7 gm marihuana containing 1.3% THC.

c. Alcohol at a predicted blood level of 0.10% which is the legally recognized level of presumptive intoxication in many states.

Crancer did not store his marihuana in a refrigerated environment and may have thereby lost some potency in the drug. Driving performance was evaluated in a simulator with an observer placed behind the driver recording driver reactions on a checklist at pre-selected points in the movie. Speedometer, steering, braking, accelerator and signal errors were then totalled.

The total scores for subjects experiencing a normal social marihuana high did not differ significantly from their performance under control conditions. A sig-

nificant difference was found only in the number of speedometer errors. Since the speed of the movie is not under the subject's control, speedometer errors are related solely to the time spent monitoring the speedometer and in a previous study were not correlated with actual driving performance. In contrast these subjects, when intoxicated with alcohol, scored significantly greater errors in all categories when compared with their pre-drug scores. In addition, when retested, four chronic users showed no change in performance smoking three times as much marihuana.

Crancer's study suggests that persons can drive safely while high on marihuana. A closer look at Crancer's research, however, reveals that his equipment is relatively unsophisticated, and his subjects had no control over their simulated drive. Thus, for example, at a specific point in the movie, the car turned left whether or not the subject turned the steering wheel to the left. If he did not, a steering error was checked. Similarly, he had no control of the speed. Thus, the subject's illusion of actually driving the car was rapidly dispelled. In addition, although Crancer aimed for a blood alcohol level of 0.10%, careful calculation shows that the amount of alcohol given to each subject would have produced a blood alcohol level of 0.18% and a state of severe intoxication. In view of these deficiencies in equipment and experimental design, Crancer's findings, which imply that driving performance is not impaired by marihuana, must be considered suggestive rather than conclusive.

W.H. McGlothlin, in a recent report (25), states: "In summary, of the psycho-motor responses measured, those most strongly affected by Cannabis are ataxia and hand steadiness. With regard to other measures, the percentage impairment is largest for naive users, large

doses, and complex tasks.

Effect on Driving. The widespread use of marijuana has focused attention on its possible effects on driving skills. Survey results have indicated that marijuana users receive more traffic tickets than do non-users (26, 27). Similar results have been derived from the traffic records of persons arrested for marijuana use, although the accident rate was not above average (28). Of course, these findings are simply correlates of marijuana use and do not indicate a causal relationship. The user's own assessment of the effect of marijuana intoxication on driving performance is apparently related to age-related involvement in the current marijuana controversy -- 17% of a sample of student and other young marijuana users felt their driving was impaired by the drug (29) in comparison to 72% of a sample who began using marijuana some 20 years ago (30).

"One study compared the effects of alcohol (1.2g/kg body weight) and smoked marijuana (22 mg THC) on driving simulator performance (24). The alcohol dose significantly impaired simulator scores while the marijuana treatment produced minimal changes. Moskowitz et al. have examined the effect of marijuana on attentional aspects of driving, i.e., the ability to attend to peripheral cues while carrying out central tracking tasks (31). Smoked marijuana containing 15 mg THC significantly impaired this function in laboratory tests of both the visual and auditory modalities. The extent of decrement was approximately equivalent to that produced by a blood alcohol level of about 0.07%, i.e., the consumption of about 5 ounces of 80 proof liquor."

Recent unpublished results of Moskowitz's work at UCLA indicates that impairment due to marihuana is different in nature from that due to alcohol. Peripheral

attention and vision are affected differently and perhaps more seriously.

3.3 Divided Attention

3.3.1 The Hypothesis

Previous studies at UCLA (15, 18) have produced a rationale that considers driving as a divided-attention task. These studies have shown that divided-attention capability is reduced by alcohol both in an auditory task and in the simulated driving task. Studies done by others also indicate that it is the lack of ability to maintain simultaneously two aspects of driving that reveals performance decrement. For example, maintaining constant speed and steering simultaneously is affected by tranquilizing drugs. Kaluger (19) and Belt (20) at Ohio State also found similar results with alcohol and with fatigue. So there is some evidence that the dual aspects of driving are negatively affected by a variety of factors. Then the argument follows that if divided attention has been shown to be affected by alcohol, and alcohol has been shown to relate to increased likelihood of being involved in injury-producing accidents, then what needs to be established is some relationship between the UCLA laboratory tests of divided attention and those aspects of the driving task that might be causing accidents. This approach to the problem led to the creation of a subsidiary task in the Driving Simulation Laboratory.

3.3.2 The Subsidiary Task

The creation of this subsidiary task is thoroughly discussed in a recent ITTE report (18). It is described in the Procedure section (4.1.3) of this report, and therefore needs only be briefly mentioned here. The conclusions of that report are that while alcohol at the 0.10% level does not markedly affect driving scores in the Simulator, except to increase their variability (which is important), the addition of this subsidiary task did in fact as reported in (18) clearly show sensitivity to 0.10% BAL.

The subsidiary task as it was developed has two goals. First, it provides a task with a definite onset. In other words, the stimulus comes on at a very definite time: it is a light which comes on and to which the driver must react. This is in contrast to the more realistic traffic situations which occur in the motion picture driving scene, which do not have a very clear or definite beginning because they develop over time and space just as they do in actual driving. Therefore one goal of this subsidiary task is to produce a stimulus with a very clear and definite onset. Another goal of the subsidiary task is to produce a signal which, while it interrupts and becomes parallel to the driving, is not so strong a stimulus that it becomes a primary task. This is what the research work reported in (18) describes. Several subsidiary tasks and variations of subsidiary tasks were investigated before settling on this one.

3.3.3 Task Loading

The data that establish the fact that the secondary or subsidiary task is indeed a true secondary task have been developed in the following way. Since the onset of the secondary task is completely controllable, it was placed at certain locations along the 31-mile driving scene, at four different types of locations determined to have four different levels of task loading or task involvement.

Those sections of the 31 miles where there was no other traffic, and where the road was straight and level, constituted the lowest level of performance required from the driver. It left a maximum amount of what Broadbent and his fellow-researchers have called "spare mental capacity." It thus became the lowest of the four levels of task involvement.

The second level was chosen to represent those sections of the highway where there were curves or highway signs or intersections, or a straight level road with on-coming vehicles, but nothing very important happening to demand a high level of the driver's attention.

The next highest or third level of task loading involves combinations of other vehicles, roadway signs, curves, crossroads, intersections, with those factors occurring not alone but in combination. This represents a somewhat higher level of task loading, because there are several simultaneously occurring things for the driver to attend to.

The fourth or highest level were those situations wherein there were not only all of the factors involved in the third level, but some degree of threat or some unusual situation such as a car coming from a side road or some of the staged incidents that were created, such

as a large box tumbling off an approaching pickup truck or a swerving truck that looks as though it might be coming across the centerline of the road head-on at the driver.

Many experiences of the UCLA ITTE research staff with the 31 miles of driving scene in the Driving Simulator led to the preliminary selection of a number of roadway areas which were candidates for inclusion in the final selection of sections of roadway to be representative of each of the four levels of task involvement described above.

Three independent ratings of these candidate sections were made and compared. Only those sections of roadway on which there was complete agreement among the independent raters were included in the final selection.

Since these clearcut sections of types of traffic situations occurred at specific locations along the road, there was a need to insert additional occurrences of the subsidiary task. This was to provide a mixed assignment of the occurrence, in time, of the subsidiary task and therefore eliminate any way in which the drivers could begin to interpret or associate the occurrence of the subsidiary task with any particular type of roadway scene. In individual test sessions there was the usual mixing of films, i.e. of the order in which various sections of the roadway scene appeared; and some scenes appear in only one set of films. This is described more fully in Section 4. - Procedure.

3.4 Driving Simulation Laboratory

The ITTE Driving Simulation Laboratory (DSL) has been described in a previous report in this series (18), and was used in exactly the same way in the present study in order to permit comparisons among results of all studies in this series of drug studies.

4. PROCEDURE

4.1 Strategy and Approach

4.1.1 Strategy

The research strategy of this study was to determine the effect of the selected drugs on the driving task by using alcohol as a "comparison" drug. This strategy was chosen in light of the fact that other than alcohol, the drugs selected for the experiment do not have a history of field study data. Therefore, the experiment was designed to use the already well established research as well as field evidence relating alcohol to traffic accident involvement. The effects of the "no-data" drugs were compared to the effects of alcohol generated under the same experimental conditions. Then, by using the known relationship of alcohol to traffic accidents, the relationships of the other drugs to accident involvement could be determined.

4.1.2 Approach

Following the logic of the research strategy, the research approach developed for this project had three major facets. The first facet was related to the primary overall goal of the project, which was to establish whatever relationship possible between the various drugs chosen and the driving task. This overall approach then was to relate experimental alcohol-induced human performance decrement data to existing highway traffic field data which showed increased blood alcohol level associated with increased potential for involvement in injury-producing traffic accidents.

The next facet in the approach was to cope with the fact that as stated earlier there is no traffic accident data on the other drugs of interest (Librium, Dexedrine, marihuana) which can relate them directly to accident involvement. Therefore, it was planned to determine whether or not there were measurable effects of these drugs in the divided-attention laboratory, and then to see if those effects were also revealed in reaction-time scores on the subsidiary task in the Driving Simulation Laboratory. To the extent that these effects were similar to alcohol it would be possible to infer that there was also an effect similar to that of alcohol in the actual driving situation.

In addition to using alcohol as a comparison drug in the manner described above, the third facet of the approach endeavored to obtain data on the combination effect of these various drugs with alcohol. This is an additional and somewhat separate evaluation. The reason for this additional effort is that it is clear from field surveys that it is needed.

4.1.3 Subsidiary Task

All drivers were tested on this task which consists of the rapid discrimination of one of four light conditions. There are two small light boxes, with two colored bulbs in each box (amber and green). The two boxes are mounted above the driver's head near the junction of the roof line and the front window of the DSL vehicle. They are separated from each other by 12 inches, and are spaced equally on each side of the subject's line of sight. They are within and close to the edges of his peripheral vision.

On each side of the steering column is a response

lever. Each lever can be pushed upward or pulled downward. The two levers, each with two positions, make possible four distinct responses by means of which the subject can turn off any one of the four lights. The task is as follows: at 77 points during each drive, one of the four lights goes on, and remains on until either turned off by the subject through appropriate lever actuation, or until 10 seconds has passed without the driver moving the appropriate lever, at which point the light automatically goes out.

The points along the drive at which the lights are actuated are the same for all subjects, independent of differences in their behavior in handling the car, such as differing speeds. This is accomplished by placing a photoelectric cell in the film gate of the projector. The photo cell sends an impulse to a paper tape drive which advances for each film frame and the paper tape drive, in turn, controls the four lights. An electric counter and printer are used to record the points at which the lights go on. In essence, the system moves in synchrony with the film projector and controls the stimulus presentation. Two equivalent test films were created in this fashion.

Prior to running subjects in the Simulator, three independent observers rated the 77 points, at which one of the four lights went on, for each of the films, as to their introspective view of the attentional demands of the driving task. Their observations were averaged, and placed on a four-point scale, ranging from very little attentional demand,1 to a very great attentional demand,4.

4.1.4 Driving Simulation Laboratory

After a 10-minute training period with the subsidiary task, all subjects were instructed in the proper operation of the driving simulator. As described in an earlier report (18), the Driving Simulation Laboratory is comprised of an actual automobile placed in front of an extremely wide-angle motion picture projection screen, curved to fill approximately 160° of the forward visual angle of the subject's field of view. A rear screen shows a matching scene that is viewed in the rear view mirror. The rear wheels of the vehicle rest upon the rollers of a chassis dynomometer and are free to rotate. The subject is instructed in the operation of the vehicle controls, and then is told to start the car and drive at his own desired rate within a range of 20 to 70 miles per hour. His apparent driving speed, which is related to the speed of the projectors, is thus determined by the driver as he controls the speed of the engine of the car. A single 35-mm, 160-degree projector creates the front scene and a synchronized 16-mm projector shows the rearward scene. The front wheels are free to turn and these determine the azimuth rotation movement of the front projection system, so that within a small range (three feet of lateral movement) a realistic simulation of the results of turning the steering wheel is obtained. The significant point is that the subject sits in a standard automobile and faces a scene that gives him the illusion that the vehicle is responding to his manipulation of its controls, thus creating overall an unusually realistic simulation of the driving situation.

All the while he is "driving," of course, the subject's performance is being closely monitored, and continuous records of his physical actions and physiologi-

cal condition are being generated for subsequent analysis. These measured items are described in detail in the Results section, 5.

4.1.5 DSL Training Run

After the subject had learned the subsidiary task and had been instructed in operating the simulator vehicle, he received a 20-minute training session in which he "drove" the vehicle along a winding, two-lane mountain road while at the same time responding to the lights in the subsidiary task. This drive served to eliminate those subjects with unusual susceptibility to motion sickness as well as to familiarize them further with the DSL vehicle. Accepted subjects were then programmed for four test sessions, spaced one week apart, at the same time of day and same day of the week in order to control for any factors correlated with diurnal or weekly cycles.

Following completion of the DSL training run, the Librium and Dexedrine subjects were taken into another testing area which contained a soundproof booth (SPB).

4.1.6 Soundproof Booth

The apparatus was designed to measure the subject's information-processing capacity in both a divided-attention and concentrated-attention or vigilance situation utilizing auditory stimuli. The subject was seated in a comfortably upholstered chair located in a large sound-isolation chamber. A pair of high fidelity earphones were placed over the subject's ears. Each earphone was connected separately to one channel of a two-channel audio tape recorder. The

tape recorder and the experimenters were in another room, and communication with the subject was by intercom.

All instructions and the attention tasks were pre-recorded on tape. On one channel of the tape was a series of bursts of random noise three seconds in duration and separated by seven-second intertrial silent intervals. Half of the noise bursts were chosen at random to contain a 1000-cycle/second tone of one-second duration recorded at an amplitude of 15 Db below the level of the noise burst. The position of the one-second tone within the three-second noise burst was randomly chosen. To prevent clicks, both the noise bursts and the tones were started and stopped gradually, using 50-millisecond envelopes of changing amplitudes.

On the second channel, a series of lists of six randomly-chosen digits was recorded. The six numbers occurred at a rate of one every half-second. Between each list was an intertrial interval of seven seconds. The three seconds required for each list began simultaneously with the three-second noise burst on the first channel.

During the experiment, channel one containing the noise burst and occasionally the tone was presented to the left ear, and the second channel containing the numbers was presented to the right ear.

Several tapes were prepared for the training and experimental sessions. Each tape contained two sets of 20 trials for practice purposes and two sets of 50 trials for the test conditions, for a total of 140 trials on each tape. Each tape began with instructions regarding the vigilance or concentrated-attention task. This task was to report verbally the absence or presence of the tone in each noise burst while ignoring the presence of the numbers. The instructions were followed by 20 practice

trials, with the correct response recorded on the tape after a delay for the subject's report. Then 50 test trials of the vigilance task were presented, with no information feedback on performance. The tape then continued with instructions for the divided-attention task. This task was first to repeat back the six numbers in correct order and then to report the presence or absence of a tone in the noise burst. Again 20 practice trials were presented, with feedback of results, followed by 50 test trials without feedback.

The physical stimuli were the same on all trials on both tasks -- six digits in one ear and a noise burst with occasionally a tone in the other. The only difference between tasks was the specification regarding what the subject had to report about these stimuli.

Following completion of the SPB training session, the subject was excused and reminded of his appointment the following week for the first of his four test sessions.

4.2 General Experimental Procedure

The procedures followed in conducting the three sub-experiments (Librium/alcohol, Dexedrine/alcohol and marihuana/alcohol) had much in common. However, there were enough procedural differences of significance to warrant separate discussion of each. A common element of all three experiments was the use of the UCLA Driving Simulator to generate driving performance scores. However, the soundproof chamber was used only for the Librium and Dexedrine. The subjects were recruited through advertisements and were paid for their services.

Balanced Latin square designs were used for all three drugs in order to counterbalance order effects due

to repeated runs on the Driving Simulator and in the soundproof booth. Appropriate analyses of variance statistical tests were performed to evaluate significance of subsidiary task and soundproof booth data. For the vehicle control scores, t-tests and analyses of variance were performed. Finally, all subjects were initially subjected to a screening procedure to eliminate those who would not be appropriate candidates for the study. Details of these procedures for each drug are given in the following sections.

Eight drivers were included in the Librium study to complete two replications of the 4x4 Latin square design:

	Run 1	Run 2	Run 3	Run 4
Alcohol				
Placebo				
Librium				
Librium and Alcohol				

Sixteen drivers included in the Dexedrine study completed four replications of the 4x4 Latin square:

	Run 1	Run 2	Run 3	Run 4
Alcohol				
Placebo and Dexedrine				
Dexedrine and Alcohol				

Twelve drivers were included in the marihuana study to complete three replications of the 4x4 Latin

square:

	Run 1	Run 2	Run 3	Run 4
Smoked marihuana and liquid placebo				
Smoked placebo and liquid marihuana				
Smoked placebo and alcohol				
Smoked placebo and liquid placebo				

Later a supplemental test session was conducted using some of the marihuana subjects who were given both smoked marihuana and liquid marihuana.

4.3 Librium and Alcohol

4.3.1 Subject Procurement

Notices were placed on bulletin boards in UCLA campus buildings asking for volunteer subjects to participate in a research study. The notices stated that only males, 21 and over, with valid California driver's licenses, need apply, and that subjects would be paid $50.00 for completing the study.

When potential subjects called in response to the notice, they were asked the following questions regarding their medical history:

a. Do you have high blood pressure?

b. Do you have pressure in your eyes?

c. Do you have a thyroid condition?
d. Have you ever had glaucoma?
e. Are you allergic to any drugs?
f. Do you have diabetes?

A "yes" answer to any of these questions disqualified the applicant. Of the 32 applicants responding to the ad, 19 qualified for the study. They were told that the study necessitated taking a mild tranquilizer, and that alcohol would be consumed during the course of the study. They were also told that the entire series of tests would take from 20 to 25 hours.

Of the 19 qualified applicants, 10 subjects were subsequently dropped: two were excused because they did not want to take drugs; one quit after the first week because he felt he was being "slowed down" too much by the drug (he was on placebo); two quit due to nausea with emesis on their first alcohol run; two were excused due to motion sickness; one was dropped due to lack of cooperation; one failed to return to complete the experiment; and one was dropped from the analysis because he had been re-run too many times.

Thus, a total of nine subjects completed the full experiment; all were students, with an age range of 21 to 28 years and a mean age of 23.1 years.

4.3.2 Subject Preparation

Each subject was involved in the experiment for five weeks. Each week the subject was given a week's supply of tablets (either 10-mg Librium capsules or an identical-appearing placebo). These were in a bottle labelled with the subject's name and instructions to

take one tablet three times daily (morning, noon and afternoon). The label also requested that the subject return the bottle to the experiment office. Each week when the subject returned he was given a bottle of tablets for the following week. As a check, on several occasions, subjects were given an extra tablet intentionally; in all cases, the extra tablet was called to the attention of the experimenter by the subject at the end of the week.

The subject was scheduled for testing at the same time and same day of the week for five consecutive weeks. At the time of his first session, which was a training run, the subject was asked to sign an "Experimental Participant Release" similar to that shown in Appendix A.

4.3.3 Test Session Procedure

For each of the four test sessions, the subjects were instructed not to eat for four hours, and not to consume alcoholic beverages for 12 hours, prior to coming in. Each subject, of course, had been taking his pills (either placebo or Librium) regularly for the week preceding each test session. The prohibitions on food and beverage intake were to insure rapid absorption of the alcohol and to help obtain more uniform absorption rates among the subjects. Compliance was noted on a Treatment Data Sheet as shown in Appendix C.

There were four experimental conditions:

a. Placebo/no alcohol

b. Placebo/alcohol

c. Librium/no alcohol

d. Librium/alcohol

All subjects were exposed to all four of these conditions, with the order in which they were given randomly assigned to each subject.

Alcohol dosage was 1 oz. of 80-proof Vodka per 25 lb. of body weight, equivalent to 0.828 gm of alcohol per kg of body weight. For an alcohol session, the subject received an appropriate amount of alcohol mixed in an equal amount of pure orange juice, with one ice cube. For a no-alcohol session, the subject received orange juice to equal the total volume of liquid in the alcohol drink, plus one ice cube.

All drinks were administered in the "Treatment Room," a pleasantly-appointed waiting room adjacent to the DSL. The drinks were given 50 minutes prior to testing in the DSL: the subject was given 20 minutes to finish his drink, then remained in the Treatment Room for 30 minutes, reading and/or listening to music. Following this, the subject's blood alcohol level (BAL) was measured using a Breathalyzer, the respiration belt was attached to his chest, and he was immediately brought into the DSL for the test run, except in the case of one subject, who was taken to the SPB first, then to the DSL following the booster drink described in the following paragraph. A registered nurse was in attendance at all times to administer the treatment and to make the physiological measurements.

In the DSL, the subject drove for 40 minutes to one hour, depending on his choice of speed, viewing a composite film of mountain, freeway and city street driving randomly selected from one of the two equivalent films. The subject was then taken back to the Treatment Room for another BAL measurement, and then a "booster" of 1 oz. of 80-proof Vodka mixed with 1 oz. of orange juice (if he was in an alcohol session) or 2 oz. of orange juice (if he was in a no-alcohol session). In the event the subject was experiencing nausea, the booster was not given.

The subject was then taken to the room housing the soundproof booth (SPB), where he completed the tests described earlier, using a set of taped stimuli that were different from those he had experienced in the training session.

Following completion of testing in the SPB, each subject was taken back to the Treatment Room, where another BAL measurement was taken. The subject was then given food to eat (sandwiches and drinks of his choice). Following this, he was released if he had had a no-alcohol session, or kept in the Treatment Room until his BAL decreased to 0.03% if he had had an alcohol session, and then released. He was paid his $50.00 at the completion of his last test session.

4.4 Dexedrine and Alcohol

4.4.1 Subject Procurement

An advertisement was placed in the UCLA Placement Center for male students to participate in a driving simulation experiment for $2.50/hour. When applicants called, they were informed that subjects had to be 21 years of age or older, with valid driver's license for any state. Also, if they had ever been in the DSL before, they were disqualified. Applicants were further informed that they would be required to take a one-hour interview, and that the total time involved in the experiment would be approximately 20 to 25 hours. Following this, they were scheduled for an interview.

At the appointed time, the applicant was given a personal interview for about 10 minutes to explore the

applicant's medical history, experience with drugs, alcohol and so on. The interview questions are given in Appendix B. At the time of the interview, the subject was told that he would have to be available for 4 to 5 hours on one day a week for 5 weeks, and that he would be paid at the end of the 5 weeks. A General Information Sheet (Appendix C) was also filled out for the subject.

Following the interview, the subject was administered an MMPI in order to weed out those individuals with character disorders. Upon completion of the MMPI, the subject was told he would be contacted in a few days, and then excused.

The MMPI results were scored, profiled and interpreted. According to the pattern of their responses, applicants were placed into three categories: "Good," "Questionable," and "Do Not Use." The interview forms for the applicants with "Good" MMPI's were then evaluated, and if a subject had some experience with alcohol and was not a drug abuser he was called and scheduled for a training run.

Forty-two student applicants were interviewed; of these, 15 subjects qualified for the study and were trained. Of these, 10 completed the study. The other five were lost due to nausea or failure to return.

An additional group of subjects was obtained with the cooperation of the Long Beach, California, Naval Hospital, which made available Navy corpsmen for the study. Ten corpsmen were trained, six of whom completed the study. The other four were lost due to nausea or inability to meet the schedule. All were males, over 21, and licensed drivers. No interview or MMPI was administered to the corpsmen.

Thus a total of 16 subjects completed the Dexedrine/alcohol experiment.

4.4.2 Training Session

At the time of the first scheduled session following the interview session, the subject read and signed a consent and release form (Appendix A). Then he was weighed and his blood pressure taken. If his diastolic pressure was over 85, he was disqualified. All this was done in the Treatment Room.

The subject then was fitted with the respiration belt, entered the DSL and was given a 10-minute training session on the subsidiary task, followed by a 20-minute training in operating the DSL vehicle.

If the subject had no adverse reaction to the DSL, he was taken to the soundproof booth and given a 40-minute training session there. Following this, the subject returned to the Treatment Room and was scheduled for his four experimental sessions. He was told, as in the Librium/alcohol experiment, not to eat anything for four hours nor drink any alcoholic beverages for 12 hours prior to his next session. He was also told he could not smoke during the experimental sessions. He selected the food he wished to have ready for him after the experimental sessions from a list of sandwiches. Finally, he was told he would have to remain in the Treatment Room following the experimental sessions until his BAL returned to 0.03%.

4.4.3 Test Session Procedure

When the subject arrived at the Treatment Room for an experimental session, he was allowed to rest for 10 minutes. During this time he completed a Short Drug Effects Questionnaire (SDEQ), to provide information on

his personal reactions to the use of drugs. This SDEQ is shown in Appendix D.

Next, the subject's blood pressure (both arms) and pulse rate were measured and recorded, as well as his BAL. He was then given a drink: the contents of the drink depended on which of the four experimental conditions was in effect for that session:

a. Placebo/no alcohol
b. Placebo/alcohol
c. Dexedrine/no alcohol
d. Dexedrine/alcohol

If the session called for alcohol, the drink contained (as in the Librium/alcohol experiment) 1 oz. of 80-proof Vodka for every 25 lb. of body weight, mixed with an equal amount of orange juice. For a placebo session, the drink consisted of orange juice in an amount equal in volume to the alcohol drink.

The subject was told he had no more than 30 minutes to finish the drink, and the time of finishing was recorded. The subject was then given his drug (or placebo). The drug was three 5-mg tablets of amphetamine (Dexedrine), while the placebo was three tablets of identical appearance. A double-blind procedure was followed -- the drugs were prepared ahead of time by non-experimental personnel, placed in an envelope and marked with the subject's number and test session number. These drug treatments were prepared using a Latin square statistical design.

Thirty minutes after he took the drug, the subject's blood pressure, pulse and BAL were again taken and recorded, the respiration belt was attached, and he went immediately to either the DSL or SPB for testing -- some subjects went to the DSL first and then the SPB, others followed the reverse order. The DSL and SPB test sessions

followed the same procedures as in the Librium/alcohol experiment. Following the DSL or SPB session, the subject returned to the Treatment Room where a BAL measurement was made immediately, followed by blood pressure and pulse measurements.

The subject then was given an alcohol or placebo "booster" drink. Fifteen minutes after the booster, BAL, pulse and blood pressure measurements were again made, and the subject was taken to the SPB (or DSL) for the second part of the test session. Following this, the subject returned to the Treatment Room and again was given a Breathalyzer test followed by blood pressure and pulse measurements. A registered nurse administered these tests to all subjects in all experiments.

The subject was then given a Long Drug Effects Questionnaire (LDEQ) to complete and was allowed to eat. The LDEQ is shown in Appendix E. If the subject was in a placebo/no alcohol session, he was also given a confidential questionnaire to fill out, to obtain biographical background information that would be of use in interpreting his performance. This confidential questionnaire is shown in Appendix F. Finally, if the subject was not in an alcohol session, he was allowed to leave following completion of the confidential questionnaire and answering the questions listed below. If he was in an alcohol session, his BAL was checked every hour until it returned to 0.03%. Before leaving, each subject was asked the following questions, and his answers were recorded on the MAD Treatment Data Sheet as shown in Appendix C.

a. How many hours since you last consumed solid foods?

b. How many hours since you last consumed beverages?

c. During the past week have you consumed al-

coholic beverages? If yes, how many ounces?

d. During the past week have you taken any drugs, prescription or otherwise? If yes, what and how much?

The subject was then allowed to select his sandwiches for the next session. The four test sessions were scheduled at one week intervals (same time and same day of week, if possible). If a subject had to repeat a run due to equipment malfunction, he was rescheduled one week later, and the treatment was repeated.

4.5 Marihuana and Alcohol

4.5.1 Subject Procurement

Subjects were all UCLA students, obtained in similar fashion to that used in the previously described Dexedrine/alcohol experiment. All were males over 21 with valid driver's licenses. They were chosen on the basis of their MMPI profiles and personal interview data (Appendix B). Selection criteria included a "good" or "reasonably good" MMPI profile, plus a drug history of having used hallucinogenics no more than three times in the past year but a familiarity with marihuana usage (10 times minimum), plus good physical health.

When subjects were scheduled for their initial training session, they were told that there would be a minimum of four test sessions following the training session, that they would be required to stay for a minimum of four hours for each session, and that they would be paid $2.50/hour for their participation in the study plus $2.50 for the interview. Payment would be made only at the completion of the full series of sessions. Appli-

cants who failed to meet all criteria were given $2.50 for participating in the interview and excused.

4.5.2 Training Session

When the subject appeared for his training session he was taken to the Treatment Room where he read and signed a consent and release form (Appendix A). At the same time, a General Information Sheet (Appendix C) was filled out for the subject. The subject was weighed, in order to compute the alcohol dosage and marihuana extract dosage. The procedure of the treatments was explained to the subject, i.e., that he would receive a drink followed by either 1 or 2 cigarettes, that he would then drive in the DSL, and that afterwards he would have to remain in the Treatment Room until he was "down." "Down" was to be interpreted as occurring no sooner than four hours after arrival plus whatever time was required for the subject's BAL to return to 0.03% and his pulse to return to within 15 beats per minute of what it had been prior to his treatment. The subject was told that his breath and pulse samples would be taken at various times during his stay and that there would be questionnaires to be filled out both before and after his drive.

The subject was then taken to the DSL for the training session on the subsidiary task and simulator vehicle. He was returned to the Treatment Room, scheduled for his next four (experimental) sessions, told about the eating and drinking prohibitions prior to coming in again, and given the list of sandwiches to select from.

4.5.3 Test Session Procedure

There were four different treatments. In each treatment the subject was required to both drink and smoke, but since the protocol differed for each treatment, the treatment times varied accordingly. The treatments were as follows:

Treatment	Smoke	Drink
1	Marihuana (dosage: 200 micrograms Delta-9THC per kg body weight)	Placebo
2	Placebo (post-extracted marihuana	Marihuana extract (dosage: 310 micrograms Delta-9THC per kg body weight)
3	Placebo (post-extracted marihuana	Alcohol (0.69 gm per kg body weight)
4	Placebo (post-extracted marihuana	Placebo

The dosage levels were achieved in the following ways:

Alcohol drink: 1 oz. of 80-proof Vodka for each 30 lb of body weight, mixed with an equal amount of Mai-Tai mix, plus a placebo marihuana extract in the proportion of 1 cc per 80 lb of body weight.

Placebo drink: Same as above, except alcohol replaced by an equal amount of Mai-Tai mix.

Marihuana extract drink: Same as the placebo drink, except that placebo marihuana extract was replaced with an equal amount of active marihuana extract (1 cc/80 lb body weight, necessary to administer a dose of 310 micrograms per kg body weight, based on a 1.13% Delta-9THC assay for the liquid marihuana extract).

Marihuana smoke: Two hand-rolled, standard length

cigarettes, each containing approximately ½ gram of smoked marihuana material, necessary to administer a dose of 200 micrograms/kg body weight, based on a 1.5% Delta-9THC assay for the smoked marihuana material.

Placebo smoke: One or two hand-rolled, standard length cigarettes, each containing approximately ½ gram of detoxified smoked marihuana material.

The treatments, as well as the films the subject would be viewing in the DSL, were randomized according to a Latin square statistical design. Three Latin squares were to be completed for the study.

When the subject arrived for a test session, he was allowed to rest for 10 minutes, during which time he filled out the SDEQ, and then his pulse was recorded as a baseline measure. He was then given his drink, and told that he had a maximum of 30 minutes in which to finish it. The time of beginning and of completion of the drink was recorded. A registered nurse was present at all times.

Immediately upon completion of the drink, the subject began his smoke. For his placebo session, the subject smoked two placebo cigarettes, and for his smoke session two marihuana cigarettes. For both the marihuana extract and alcohol sessions, he smoked one placebo cigarette. In each case, the time of the beginning and completion of the smoke was recorded. The subject could not differentiate between the marihuana and placebo cigarettes on the basis of appearance or feel. In every case, the subject was given a maximum of 10 minutes to smoke a cigarette (20 minutes maximum if his treatment called for smoking two cigarettes). All cigarettes were smoked to completion; they were placed in a special holder that permitted total reduction to ash. The smoking procedure for all cigarettes was identical, and was as follows:

a. 3-second "drag"

b. 20-second "hold"

c. 15-second exhalation and relaxation period

d. 3-second "drag," etc.

Immediately upon completion of the smoke, the subject's pulse and BAL were recorded -- except in the extract sessions, in which the smoke was followed by a 50 minute rest period to allow for ingestion of the extract. Subjects were allowed a small amount to eat during this time, if they so desired.

The respiration belt was then fitted on the subject and he was escorted to the DSL. The start time of his entry into the DSL was recorded on the MAD Treatment Data Sheet, see Appendix C. After the subject's drive, he was returned to the Treatment Room and the time of his return was recorded.

Immediately upon his return to the Treatment Room, pulse and BAL were once again measured and recorded and the subject was given the LDEQ to complete. Thereafter, the subject was fed and required to remain to the completion of the four hours plus whatever time was required for his pulse and BAL to return to the levels previously stated as prerequisites for his release. If the subject was in a placebo condition, he was given the previously-mentioned confidential questionnaire to fill out.

Before the subject was dismissed, he was asked the number of hours since he had last consumed solids; the number of hours since he had last consumed beverages; if during the week he had consumed any alcoholic beverages, and if so, how much; if during the past week the subject had taken any drugs, and if so, what and how much. This information was recorded on the data sheet. The subject was then allowed to select sandwiches for the next session.

Subjects were scheduled for test sessions one week apart. If a subject had to repeat a session due to equipment malfunction, he was rescheduled one week later and the treatment was repeated.

A record book was maintained containing the following items for each subject for each session:

a. Date of session
b. Treatment
c. Film viewed
d. Status of session (good or lost)
e. Time of arrival
f. Time of departure
g. Total time
h. Observations, notes and comments
i. Contents of drink
j. Weight of subject

4.6 Supplemental Experiment

After the experiment had been underway for some time, it was decided (with the concurrence of DOT) to add a fifth treatment condition, a combination of alcohol and marihuana extract. The treatment protocol for this marihuana/alcohol experiment was to be the same as for the marihuana extract runs. Three different dosage levels were to be used for this (fifth) test session, as follows:

a. 1/3 the original alcohol dosage + 2/3 the original marihuana extract dosage.

b. 1/2 the original alcohol dosage + 1/2 the original marihuana extract dosage.

c. 2/3 the original alcohol dosage + 1/3 the original marihuana extract dosage.

The three different levels were based on the dosage levels for the subjects as determined for the other experimental sessions.

Since three Latin Squares were to be completed for the four-session marihuana study, one Latin Square could be attempted with each of these various treatment levels.

Attempts were made to contact the 14 subjects who were already completed or in the process of being completed, to persuade them to come in or remain with the study for the additional test. Of these, 11 were contacted and agreed to do so; 4 were given dosage level a., 3 were given dosage level b., and 4 were given level c.

5. RESULTS

5.1 Soundproof Booth

The soundproof booth (auditory task) was used on the Librium and Dexedrine studies. It was not used on the Marihuana study, and due to equipment malfunctions, only the Librium data could be analyzed. Tables 31-34 show the results of alcohol, Librium, and alcohol with Librium on both "concentrated attention" and "divided attention" scores. Table 31 shows some alcohol effect on concentrated attention in terms of a decrease in percent correct scores from a mean of 83.75 to 76.50. Combined Librium and alcohol mean is 77.75 but Librium alone is 81.50, almost identical to the placebo score. Divided attention scores show the expected overall decrease compared to concentrated attention scores. The same pattern of alcohol effect and combined Librium-alcohol effect is shown as for concentrated attention scores; however, Tables 32 and 33 reveal that these effects are significant only at the 0.25 level of confidence on the concentrated attention task while the effects on the divided attention task are significant at the 0.05 level. Apparently these effects are largely due to alcohol. The Librium data show little evidence of effect on percent correct scores although the differences are in the same direction as for the effects of alcohol, namely a decrease compared with placebo data.

5.2 Vehicle Control

Vehicle control scores are shown in Appendix G. They do not reveal any marked effects either on the "drive" scores or on the "event" scores for any of the drugs under study.

5.3 Subsidiary Task

5.3.1 Scoring

This score is presented in terms of driver response times as tallied in three different ways:

a. "All Responses Including Omissions" is a gross accumulation of response times including those when the driver initially made an incorrect response or made no response at all, in which case a time of 9.9 seconds was recorded for that event.

b. "All Responses Excluding Omissions" does not include any event score when the driver failed to respond and therefore is more indicative of reaction time when the stimulus is detected.

c. "All Initially Correct Responses" does not include those events to which an incorrect response (error) was made. This is closer to "pure" reaction time.

The subsidiary task data were analyzed using Biomedical Computer Programs BMDX63 and BMDO5V. These routines (32, 33) perform general linear hypothesis and multivariate general linear hypothesis analyses of variance. The following tables are labeled with the appropriate program used. Details of these programs, including the algorithm used, are given in Appendix H.

Tables 1, 8, 13 show the purely alcohol effect for each of the three groups that were studied. Increases up to 16.5% in response time are shown as compared with the placebo times.

Tables 2, 3, 9, 15 show that there are increases in response time when drivers are given only marihuana or Librium, and a decrease when given only Dexedrine. The

analyses of variance in Tables 2, 3, 9, and 15 show that the purely marihuana effects are significant at the 0.25 level or better, the purely Librium effect at the 0.05 level, and the purely Dexedrine effect at the 0.05 level. These effects are clearer when the order effect of drug administration (prior treatment) is considered as a base line.

Tables 7 and 9 show that for the combination of Librium and alcohol there is an increase in response time compared with that for Librium alone. For the combination of Dexedrine with alcohol, as shown in Tables 14 and 15, there is a decrease in response time compared to that for alcohol alone and little difference from the placebo condition. The confounding which is present by virtue of the experimental design, reveals little or no treatment effect over the order effect on the combination of marihuana and alcohol as shown in Tables 28, 29, and 30.

5.3.2 Task Loading

The subsidiary task results are presented in terms of four levels of task loading in Tables 4-6, 10-12, 16-18. The placebo (P-P) rows of data in these tables show that all three groups of drivers while on placebos displayed a general increase in response time as the task load increased. This effect is significant at the 0.05 level of significance.

The tables also show that, for each drug in turn, the drug effects are produced across the four levels of task loading and in some instances appear to have more effect at the higher levels of task loading and to disrupt the orderly progression of reaction time increase from low to

high task load levels. This disruption is particularly clear when comparing Dexedrine effects mixed with alcohol effects. Apparently response time is returned to near placebo levels, but the orderly progression is disrupted.

Due to the unavoidable confounding of the order effect with the drug treatment effect, no task-loading analysis was performed on the marihuana in combination with the alcohol data.

Table 1

SUBSIDIARY TASK REACTION TIME, MARIHUANA STUDY, ALCOHOL DRINK GIVEN WITH PLACEBO SMOKE

RESPONSE CATEGORIES	REACTION TIME (SECONDS)		PERCENT CHANGE	DEGREES OF FREEDOM		F	LEVEL OF SIGNI-FICANCE
	PLACEBO DRINK AND SMOKE	ALCOHOL DRINK WITH PLACEBO SMOKE		NUME-RATOR	DENOM-INATOR		
All responses including omissions	1.2796	1.2933	1.07	1	8	1.797	.25
All responses excluding omissions	1.2157	1.2445	2.37	1	8	1.023	-
All initially correct responses	1.1825	1.2087	2.22	1	8	1.317	-
Number of omissions	4	3					

Table 2

SUBSIDIARY TASK REACTION TIME, MARIHUANA STUDY, PLACEBO DRINK GIVEN WITH MARIHUANA SMOKE

RESPONSE CATEGORIES	REACTION TIME (SECONDS)		PERCENT CHANGE	DEGREES OF FREEDOM		F	LEVEL OF SIGNIFICANCE
	PLACEBO DRINK AND SMOKE	PLACEBO DRINK WITH MARIHUANA SMOKE		NUMERATOR	DENOMINATOR		
All responses including omissions	1.2796	1.2975	1.40	1	8	1.853	.25
All responses excluding omissions	1.2157	1.2658	4.12	1	8	2.149	.25
All initially correct responses	1.1825	1.2312	4.12	1	8	1.870	.25
Number of omissions	4	2					

Table 3

SUBSIDIARY TASK REACTION TIME, MARIHUANA STUDY, MARIHUANA EXTRACT DRINK GIVEN WITH PLACEBO SMOKE

RESPONSE CATEGORIES	REACTION TIME (SECONDS)		PERCENT CHANGE	DEGREES OF FREEDOM		F	LEVEL OF SIGNIFICANCE
	PLACEBO DRINK AND SMOKE	MARIHUANA EXTRACT DRINK WITH PLACEBO SMOKE		NUMERATOR	DENOMINATOR		
All responses including omissions	1.2796	1.3028	1.81	1	8	2.179	.25
All responses excluding omissions	1.2157	1.2870	5.86	1	8	3.608	.10
All initially correct responses	1.1825	1.2397	4.84	1	8	3.787	.10
Number of omissions	4	1					

Table 4

SUBSIDIARY TASK BMDX63 STATISTICS, MARIHUANA STUDY, ALL RESPONSES INCLUDING OMISSIONS

Source of Variation	Degrees of Freedom		F	Level of Significance
	Numerator	Denominator		
Order	3	8	0.436	-
Treatments	3	6	0.621	-
Load	3	6	5.933	.05

Task Load Level:	1 (Low)				2				3				4 (High)			
Treatments*	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.
	N	D			N	D			N	D			N	D		
A-P/P-P	1	8	0.170	-	1	8	0.675	-	1	8	3.142	.25	1	8	1.627	.25
P-S/P-P	1	8	0.991	-	1	8	1.359	-	1	8	1.894	.25	1	8	3.266	.25
E-P/P-P	1	8	1.604	.25	1	8	1.841	-	1	8	0.518	-	1	8	1.678	.25

* Alcohol drink given with placebo smoke, placebo drink given with marihuana smoke, and marihuana extract drink given with placebo smoke, each session-combination compared with scores from placebo drink and smoke session.

Paired Reaction Times, Task Load Level vs. Treatment Condition across All Subjects; Sample Size (n), Mean Reaction Time (t, seconds), standard deviation (SD, seconds); session-combination scores:

Task Load Level:	1			2			3			4		
Treatments	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)
P-P	12	1.1763	0.1432	17	1.2977	0.2445	11	1.3065	0.3175	10	1.3434	0.4402
A-P	12	1.1673	0.1249	17	1.2191	0.2063	11	1.4100	0.4222	10	1.4268	0.3462
P-S	12	1.2409	0.1444	17	1.2071	0.1134	11	1.3216	0.2527	10	1.4928	0.7204
E-P	12	1.2598	0.1771	17	1.2946	0.1925	11	1.1637	0.1195	10	1.5194	0.4039

Table 5

SUBSIDIARY TASK BMDX63 STATISTICS, MARIHUANA STUDY, ALL RESPONSES EXCLUDING OMISSIONS

Source of Variation	Degrees of Freedom		F	Level of Significance
	Numerator	Denominator		
Order	3	8	0.351	-
Treatments	3	6	1.424	-
Load	3	6	9.117	.05

Task Load Level:	1 (Low)				2				3				4 (High)			
Treatments*	DF N	DF D	F	Sig.	DF N	DF D	F	Sig.	DF N	DF D	F	Sig.	DF N	DF D	F	Sig.
A-P/P-P	1	8	0.170	-	1	8	1.509	-	1	8	0.624	-	1	8	1.560	.25
P-S/P-P	1	8	0.976	-	1	8	2.279	.25	1	8	1.955	.25	1	8	3.645	.10
E-P/P-P	1	8	1.386	-	1	8	3.593	.10	1	8	0.518	-	1	8	4.176	.10

* Alcohol drink given with placebo smoke, placebo drink given with marihuana smoke, and marihuana extract drink given with placebo smoke, each session-combination compared with scores from placebo drink and smoke session.

Paired Reaction Times, Task Load Level vs. Treatment Condition across All Subjects; Sample Size (n), Mean Reaction Time (t, seconds), standard deviation (SD, seconds); session-combination scores:

Task Load Level:	1			2			3			4		
Treatments	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)
P-P	12	1.1763	0.1432	17	1.2017	0.1556	11	1.1603	0.0841	10	1.3434	0.4402
A-P	12	1.1673	0.1249	17	1.2191	0.2063	11	1.2665	0.2661	10	1.3500	0.1877
P-S	12	1.2409	0.1444	17	1.2071	0.1134	11	1.3216	0.2527	10	1.3498	0.3323
E-P	12	1.2598	0.1771	17	1.2946	0.1925	11	1.1637	0.1195	10	1.4394	0.3801

Table 6

SUBSIDIARY TASK BMDX63 STATISTICS, MARIHUANA STUDY, ALL INITIALLY CORRECT RESPONSES

Source of Variation	Degrees of Freedom		F	Level of Significance
	Numerator	Denominator		
Order	3	8	0.202	-
Treatments	3	6	1.254	-
Load	3	6	19.178	.01

Task Load Level:	1 (Low)				2				3				4 (High)			
Treatments*	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.
	N	D			N	D			N	D			N	D		
A-P/P-P	1	8	0.339	-	1	8	1.552	.25	1	8	0.997	-	1	8	1.766	.25
P-S/P-P	1	8	0.863	-	1	8	2.515	.25	1	8	2.916	.25	1	8	0.926	-
E-P/P-P	1	8	1.557	.25	1	8	3.707	.10	1	8	0.818	-	1	8	5.982	.05

* Alcohol drink given with placebo smoke, placebo drink given with marihuana smoke, and marihuana extract drink given with placebo smoke, each session-combination compared with scores from placebo drink and smoke session.

Paired Reaction Times, Task Load Level vs. Treatment Condition across All Subjects; Sample Size (n), Mean Reaction Time (t, seconds), standard deviation (SD, seconds): session-combination scores:

Task Load Level:	1			2			3			4		
Treatments	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)
P-P	12	1.1481	0.1439	17	1.1857	0.1797	11	1.1496	0.1044	10	1.2732	0.2744
A-P	12	1.1326	0.0756	17	1.2078	0.2399	11	1.1660	0.1201	10	1.3790	0.2464
P-S	12	1.2242	0.1422	17	1.1676	0.1099	11	1.3186	0.2999	10	1.2774	0.2337
E-P	12	1.2389	0.1593	17	1.2687	0.1977	11	1.1594	0.1061	10	1.3323	0.3267

Table 7

SUBSIDIARY TASK REACTION TIME, LIBRIUM STUDY, ALCOHOL DRINK GIVEN WITH LIBRIUM PILL

RESPONSE CATEGORIES	REACTION TIME (SECONDS)		PERCENT CHANGE	DEGREES OF FREEDOM		F	LEVEL OF SIGNI-FICANCE
	PLACEBO DRINK AND PILL	ALCOHOL DRINK WITH LIBRIUM PILL		NUME-RATOR	DENOM-INATOR		
All responses including omissions	0.9484	1.2022	26.8	1	4	0.241	-
All responses excluding omissions	0.9484	1.1357	19.7	1	4	0.035	-
All initially correct responses	0.9251	1.0722	15.9	1	4	2.224	.25
Number of omissions	0	3					

Table 8

SUBSIDIARY TASK REACTION TIME, LIBRIUM STUDY, ALCOHOL DRINK GIVEN WITH PLACEBO PILL

RESPONSE CATEGORIES	REACTION TIME (SECONDS)		PERCENT CHANGE	DEGREES OF FREEDOM		F	LEVEL OF SIGNI-FICANCE
	PLACEBO DRINK AND PILL	ALCOHOL DRINK WITH PLACEBO PILL		NUME-RATOR	DENOM-INATOR		
All responses including omissions	0.9484	1.0304	8.65	1	4	1.544	-
All responses excluding omissions	0.9484	0.9843	3.79	1	4	0.360	-
All initially correct responses	0.9251	0.9546	3.19	1	4	0.000	-
Number of omissions	0	2					

Table 9

SUBSIDIARY TASK REACTION TIME, LIBRIUM STUDY, PLACEBO DRINK GIVEN WITH LIBRIUM PILL

RESPONSE CATEGORIES	REACTION TIME (SECONDS)		PERCENT CHANGE	DEGREES OF FREEDOM		F	LEVEL OF SIGNIFICANCE
	PLACEBO DRINK AND PILL	PLACEBO DRINK WITH LIBRIUM PILL		NUMERATOR	DENOMINATOR		
All responses including omissions	0.9484	0.9935	4.76	1	4	4.938	.05
All responses excluding omissions	0.9484	0.9709	2.37	1	4	9.436	.05
All initially correct responses	0.9251	0.9235	-0.173	1	4	0.958	-
Number of omissions	0	1					

Table 10

SUBSIDIARY TASK BMDX63 STATISTICS, LIBRIUM STUDY, ALL RESPONSES INCLUDING OMISSIONS

Source of Variation	Degrees of Freedom		F	Level of Significance
	Numerator	Denominator		
Order	3	4	1.677	-
Treatments	3	2	2.375	-
Load	3	2	34.248	.05

Task Load Level:	1 (Low)				2				3				4 (High)			
Treatments*	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.
	N	D			N	D			N	D			N	D		
A-L/P-P	1	4	1.326	-	1	4	0.291	-	1	4	0.690	-	1	4	1.114	-
A-P/P-P	1	4	1.136	-	1	4	1.263	-	1	4	0.360	-	1	4	2.361	-
P-L/P-P	1	4	3.636	.25	1	4	2.438	-	1	4	1.514	-	1	4	2.615	-

*Alcohol drink with Librium pill, alcohol drink with placebo pill, and placebo drink with Librium pill, session-combination scores compared with those from placebo drink and placebo pill session.

Paired Reaction Times, Task Load Level vs. Treatment Condition across All Subjects; Sample Size (n), Mean Reaction Time (t, seconds), standard deviation (SD, seconds); session-combination scores:

Task Load Level:	1			2			3			4		
Treatments	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)
P-P	12	0.8998	0.0699	17	0.9364	0.1255	11	0.9624	0.1122	10	1.0082	0.1606
A-L	12	1.0560	0.2253	17	1.2599	0.3685	11	1.2672	0.3616	10	1.2078	0.2741
A-P	12	0.9385	0.0544	17	1.1007	0.4227	11	0.9559	0.0869	10	1.1079	0.2523
P-L	12	0.9344	0.1158	17	1.0052	0.2700	11	0.9539	0.0747	10	1.0879	0.2047

Table 11

SUBSIDIARY TASK BMDX63 STATISTICS, LIBRIUM STUDY, ALL RESPONSES EXCLUDING OMISSIONS

Source of Variation	Degrees of Freedom		F	Level of Significance
	Numerator	Denominator		
Order	3	4	1.815	-
Treatments	3	2	2.631	-
Load	3	2	77.986	.05

Task Load Level:	1 (Low)				2				3				4 (High)			
Treatments*	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.
	N	D			N	D			N	D			N	D		
A-L/P-P	1	4	1.326	-	1	4	0.001	-	1	4	0.690	-	1	4	1.114	-
A-P/P-P	1	4	1.136	-	1	4	0.086	-	1	4	0.360	-	1	4	2.361	.25
P-L/P-P	1	4	3.636	.25	1	4	4.494	.10	1	4	0.767	-	1	4	2.615	.25

*Alcohol drink given with Librium pill, alcohol drink given with placebo pill, placebo drink given with Librium pill, each session-combination scores compared with those from placebo drink and pill sessions.

Paired Reaction Times, Task Load Level vs. Treatment Condition across All Subjects; Sample Size (n), Mean Reaction Time (t, seconds), standard deviation (SD, seconds); session-combination scores:

Task Load Level:	1			2			3			4		
Treatments	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)
P-P	12	0.8998	0.0699	17	0.9364	0.1255	11	0.9624	0.1122	10	1.0082	0.1606
A-L	12	1.0560	0.2253	17	1.1261	0.2470	11	1.1631	0.3011	10	1.2078	0.2741
A-P	12	0.9385	0.0544	17	0.9592	0.1082	11	0.9559	0.0869	10	1.1079	0.2523
P-L	12	0.9344	0.1158	17	0.9382	0.0855	11	0.9539	0.0747	10	1.0879	0.2047

Table 12

SUBSIDIARY TASK BMDX63 STATISTICS, LIBRIUM STUDY, ALL INITIALLY CORRECT RESPONSES

Source of Variation	Degrees of Freedom		F	Level of Significance
	Numerator	Denominator		
Order	3	4	1.147	-
Treatments	3	2	1.019	-
Load	3	2	50.461	.05

Task Load Level:	1 (Low)				2				3				4 (High)			
Treatments*	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.
	N	D			N	D			N	D			N	D		
A-L/P-P	1	4	1.726	-	1	4	0.662	-	1	4	2.475	.25	1	4	0.833	-
A-P/P-P	1	4	1.723	-	1	4	0.014	-	1	4	1.043	-	1	4	4.066	.25
P-L/P-P	1	4	2.911	.25	1	4	1.781	-	1	4	0.099	-	1	4	0.493	-

*Alcohol drink given with Librium pill, alcohol drink given with placebo pill, placebo drink given with Librium pill, session-combination scores compared with those of placebo drink and pill session.

Paired Reaction Times, Task Load Level vs. Treatment Condition across All Subjects; Sample Size (n), Mean Reaction Time (t, seconds), standard deviation (SD, seconds); session-combination scores:

Task Load Level:	1			2			3			4		
Treatments	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)
P-P	12	0.8759	0.0743	17	0.9260	0.1311	11	0.9528	0.1364	10	0.9334	0.0872
A-L	12	1.0234	0.2759	17	1.0901	0.2783	11	1.0556	0.1996	10	1.0857	0.2165
A-P	12	0.9171	0.0417	17	0.9564	0.1285	11	0.9246	0.1029	10	1.0398	0.3072
P-L	12	0.9220	0.1174	17	0.8941	0.0476	11	0.9106	0.0591	10	0.9926	0.1561

Table 13

SUBSIDIARY TASK REACTION TIME, DEXEDRINE STUDY, ALCOHOL DRINK GIVEN WITH PLACEBO PILL

RESPONSE CATEGORIES	REACTION TIME (SECONDS)		PERCENT CHANGE	DEGREES OF FREEDOM		F	LEVEL OF SIGNIFICANCE
	PLACEBO DRINK AND PILL	ALCOHOL DRINK WITH PLACEBO PILL		NUMERATOR	DENOMINATOR		
All responses including omissions	1.1505	1.3401	16.5	1	12	3.215	.10
All responses excluding omissions	1.1505	1.2846	11.7	1	12	3.680	.10
All initially correct responses	1.0850	1.2129	11.8	1	12	5.386	.05
Number of omissions	0	5					

Table 14

SUBSIDIARY TASK REACTION TIME, DEXEDRINE STUDY, ALCOHOL DRINK GIVEN WITH DEXEDRINE PILL

RESPONSE CATEGORIES	REACTION TIME (SECONDS)		PERCENT CHANGE	DEGREES OF FREEDOM		F	LEVEL OF SIGNI-FICANCE
	PLACEBO DRINK AND PILL	ALCOHOL DRINK WITH DEXEDRINE PILL		NUME-RATOR	DENOM-INATOR		
All responses including omissions	1.1505	1.1493	-0.104	1	12	0.001	-
All responses excluding omissions	1.1505	1.1493	-0.104	1	12	0.001	-
All initially correct responses	1.0850	1.0959	1.00	1	12	0.404	-
Number of omissions	0	0					

Table 15

SUBSIDIARY TASK REACTION TIME, DEXEDRINE STUDY, PLACEBO DRINK GIVEN WITH DEXEDRINE PILL

RESPONSE CATEGORIES	REACTION TIME (SECONDS)		PERCENT CHANGE	DEGREES OF FREEDOM		F	LEVEL OF SIGNI-FICANCE
	PLACEBO DRINK AND PILL	PLACEBO DRINK WITH DEXEDRINE PILL		NUME-RATOR	DENOM-INATOR		
All responses including omissions	1.1505	1.0749	-6.57	1	12	3.331	.10
All responses excluding omissions	1.1505	1.0636	-7.55	1	12	7.654	.05
All initially correct responses	1.0850	1.0110	-6.82	1	12	4.954	.05
Number of omissions	0	1					

Table 16

SUBSIDIARY TASK BMDX63 STATISTICS, DEXEDRINE STUDY, ALL RESPONSES INCLUDING OMISSIONS

Source of Variation	Degrees of Freedom		F	Level of Significance
	Numerator	Denominator		
Order	3	12	0.546	-
Treatments	3	10	1.782	.25
Load	3	10	3.617	.10

Task Load Level:	1 (Low)				2				3				4 (High)			
Treatments*	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.
	N	D			N	D			N	D			N	D		
A-P/P-P	1	12	2.850	.25	1	12	3.119	.10	1	12	3.234	.10	1	12	0.327	-
A-D/P-P	1	12	2.165	.25	1	12	0.000	-	1	12	1.017	-	1	12	4.665	.05
P-D/P-P	1	12	0.646	-	1	12	3.039	.25	1	12	0.082	-	1	12	3.151	.10

*Alcohol drink given with placebo pill, alcohol drink given with dexedrine pill, placebo drink given with dexedrine pill, session-combination scores compared with placebo drink and pill session scores.

Paired Reaction Times, Task Load Level vs. Treatment Condition across All Subjects; Sample Size (n), Mean Reaction Time (t, seconds), standard deviation (SD, seconds); session-combination scores:

Task Load Level:	1			2			3			4		
Treatments	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)
P-P	12	1.0582	0.0670	17	1.1011	0.1485	11	1.1045	0.1184	10	1.3990	0.3969
A-P	12	1.3453	0.2648	17	1.3018	0.2305	11	1.2865	0.1993	10	1.4570	0.4490
A-D	12	1.1557	0.1434	17	1.0955	0.0832	11	1.1587	0.1025	10	1.2233	0.2106
P-D	12	1.0211	0.0525	17	1.0354	0.1121	11	1.0873	0.0940	10	1.1921	0.3174

Table 17

SUBSIDIARY TASK BMDX63 STATISTICS, DEXEDRINE STUDY, ALL RESPONSES EXCLUDING OMISSIONS

Source of Variation	Degrees of Freedom		F	Level of Significance
	Numerator	Denominator		
Order	3	12	0.393	-
Treatments	3	10	4.201	.05
Load	3	10	7.352	.01

Task Load Level:	1 (Low)				2				3				4 (High)			
Treatments*	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.
	N	D			N	D			N	D			N	D		
A-P/P-P	1	12	3.170	.10	1	12	3.739	.10	1	12	3.234	.10	1	12	0.039	-
A-D/P-P	1	12	2.165	.25	1	12	0.000	-	1	12	1.0175	-	1	12	4.665	.10
P-D/P-P	1	12	0.646	-	1	12	3.039	.25	1	12	0.082	-	1	12	9.595	.10

*Alcohol drink given with placebo pill, alcohol drink given with dexedrine pill, placebo drink given with dexedrine pill, session-combination scores compared with placebo drink and pill session scores.

Paired Reaction Times, Task Load Level vs. Treatment Condition across All Subjects; Sample Size (n), Mean Reaction Time (t, seconds), standard deviation (SD, seconds); session-combination scores:

Task Load Level:	1			2			3			4		
Treatments	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)
P-P	12	1.0582	0.0670	17	1.1011	0.1485	11	1.1045	0.1184	10	1.3990	0.3969
A-P	12	1.1974	0.1351	17	1.2704	0.1587	11	1.2865	0.1993	10	1.4076	0.3334
A-D	12	1.1557	0.1434	17	1.0955	0.0832	11	1.1587	0.1025	10	1.2233	0.2106
P-D	12	1.0211	0.0525	17	1.0354	0.1121	11	1.0873	0.0940	10	1.1386	0.2075

Table 18

SUBSIDIARY TASK BMDX63 STATISTICS, DEXEDRINE STUDY, ALL INITIALLY CORRECT RESPONSES

Source of Variation	Degrees of Freedom		F	Level of Significance
	Numerator	Denominator		
Order	3	12	0.185	-
Treatments	3	10	3.904	.05
Load	3	10	14.018	.01

Task Load Level:	1 (Low)				2				3				4 (High)			
Treatments*	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.	DF		F	Sig.
	N	D			N	D			N	D			N	D		
A-P/P-P	1	12	3.428	.10	1	12	5.217	.05	1	12	5.221	.05	1	12	0.777	-
A-D/P-P	1	12	1.113	-	1	12	0.051	-	1	12	2.110	.25	1	12	0.309	-
P-D/P-P	1	12	2.102	.25	1	12	3.410	.10	1	12	0.143	-	1	12	10.716	.10

*Alcohol drink given with placebo pill, alcohol drink given with dexedrine pill, placebo drink given with dexedrine pill, session-combination scores compared with placebo drink and pill session scores.

Paired Reaction Times, Task Load Level vs. Treatment Condition across All Subjects; Sample Size (n), Mean Reaction Time (t, seconds), standard deviation (SD, seconds); session-combination scores:

Task Load Level:	1			2			3			4		
Treatments	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)	n	t (sec)	SD (sec)
P-P	12	1.0396	0.0792	17	1.0488	0.0609	11	1.0541	0.1211	10	1.2484	0.3616
A-P	12	1.1239	0.1094	17	1.2123	0.1638	11	1.2074	0.1691	10	1.3560	0.2739
A-D	12	1.0811	0.1139	17	1.0399	0.0726	11	1.1119	0.0755	10	1.2072	0.2168
P-D	12	0.9728	0.0444	17	0.9901	0.0962	11	1.0593	0.1039	10	1.0510	0.1073

Table 19

SUBSIDIARY TASK BMD05V STATISTICS, LATIN SQUARES, MARIHUANA STUDY, ALL RESPONSES INCLUDING OMISSIONS

4 x 4 Basic Latin Square

Source	df	SS	MS	F-ratio	Sig-Level
Error	24	2.031	0.0846	-	-
Group	3	0.790	0.263	3.108	0.05
Sessions	3	0.381	0.127	1.501	0.25
Treat.	3	0.254	0.0846	1.00	-
Rec'd.	6	0.529	0.088	1.040	-
Subjects	8	4.976	0.622	7.352	0.01

Table 20

SUBSIDIARY TASK BMD05V STATISTICS, LATIN SQUARES, MARIHUANA STUDY, ALL RESPONSES EXCLUDING OMISSIONS

4 x 4 Basic Latin Square

Source	df	SS	MS	F-ratio	Sig-Level
Error	24	1.156	0.048	-	-
Group	3	0.386	0.129	2.687	0.10
Session	3	0.146	0.049	1.020	-
Treat.	3	0.084	0.025	0.521	-
Rec'd	6	0.398	0.066	1.375	-
Subjects	8	3.505	0.438	9.125	0.01

Table 21

SUBSIDIARY TASK BMDO5V STATISTICS, LATIN SQUARES, MARIHUANA STUDY, ALL INITIALLY CORRECT RESPONSES

4 x 4 Basic Latin Square

Source	df	SS	MS	F-ratio	Sig-Level
Error	24	1.178	0.049	-	-
Group	3	0.210	0.070	1.428	0.25
Session	3	0.160	0.053	1.081	-
Treat.	3	0.142	0.047	0.969	-
Rec'd.	6	0.532	0.089	1.816	0.25
Subjects	8	2.891	0.361	6.367	0.01

Table 22

SUBSIDIARY TASK BMDO5V STATISTICS, LATIN SQUARES, LIBRIUM STUDY, ALL RESPONSES INCLUDING OMISSIONS

4 x 4 Basic Latin Square

Source	df	SS	MS	F-ratio	Sig-Level
Error	12	0.547	0.046	-	-
Group	3	0.628	0.209	4.550	0.05
Session	3	0.188	0.063	1.370	-
Treat.	3	0.292	0.097	2.100	0.25
Rec'd.	6	0.320	0.053	1.150	-
Subjects	4	0.510	0.128	2.790	0.10

Table 23

SUBSIDIARY TASK BMDO5V STATISTICS, LATIN SQUARES, LIBRIUM STUDY, ALL RESPONSES EXCLUDING OMISSIONS

4 x 4 Basic Latin Square

Source	df	SS	MS	F-ratio	Sig-Level
Error	12	0.158	0.0132	-	-
Group	3	0.439	0.146	11.05	0.01
Session	3	0.095	0.032	2.420	0.25
Treat.	3	0.184	0.061	4.630	0.05
Rec'd.	6	0.100	0.017	1.290	-
Subjects	4	0.337	0.084	6.370	0.01

Table 24

SUBSIDIARY TASK BMDO5V STATISTICS, LATIN SQUARES, LIBRIUM STUDY, ALL INITIALLY CORRECT RESPONSES

4 x 4 Basic Latin Square

Source	df	SS	MS	F-ratio	Sig-Level
Error	12	0.220	0.018	-	-
Group	3	0.419	0.139	7.730	0.01
Session	3	0.086	0.029	1.610	0.25
Treat.	3	0.114	0.038	2.120	0.25
Rec'd.	6	0.081	0.013	0.723	-
Subjects	4	0.453	0.113	6.280	0.01

Table 25

SUBSIDIARY TASK BMDO5V STATISTICS, LATIN SQUARES, DEXEDRINE STUDY, ALL RESPONSES INCLUDING OMISSIONS

4 x 4 Basic Latin Square

Source	df	SS	MS	F-ratio	Sig- Level
Error	36	1.9854	.0550983	-	-
Group	3	.22566	.07522	1.368	-
Session	3	.14413	.048043	<1	-
Treat.	3	.60501	.20167	3.66	.05
Rec'd.	6	.22892	.038153	<1	-
Subjects	12	1.613	0.134	2.436	0.05

Table 26

SUBSIDIARY TASK BMDO5V STATISTICS, LATIN SQUARES, DEXEDRINE STUDY, ALL RESPONSES EXCLUDING OMISSIONS

4 x 4 Basic Latin Square

Source	df	SS	MS	F-ratio	Sig-Level
Error	36	0.97969	.027214	-	-
Group	3	.14966	.049887	1.83	.25
Session	3	.06534	.02178	<1	-
Treat.	3	.41362	.13787	5.07	.01
Rec'd.	6	.11401	.019002	<1	-
Subjects	12	1.369	0.114	4.22	0.01

Table 27

SUBSIDIARY TASK BMDO5V STATISTICS, LATIN SQUARES, DEXEDRINE STUDY, ALL INITIALLY CORRECT RESPONSES

4 x 4 Basic Latin Square

Source	df	SS	MS	F-ratio	Sig-Level
Error	36	.75385	0.0209403	-	-
Group	3	.06362	.02121	1.01	-
Session	3	.04072	.01357	<1	-
Treat.	3	.37257	.12419	5.93	.01
Rec'd.	6	.09243	.01541	<1	-
Subjects	12	0.923	0.076	3.80	0.01

Table 28

SUBSIDIARY TASK REACTION TIME, MARIHUANA STUDY, SUBJECTS VERSUS TREATMENTS ACROSS EVENTS

RESPONSE CATEGORIES		TREATMENTS				
		Pla/Pla	Alc/Pla	Smk/Pla	Ext/Pla	Alc/Ext
All responses including omissions	N Mean Std. dev.	550 1.2796 0.9778	538 1.2930 0.9409	550 1.2975 0.7932	549 1.3028 0.7322	529 1.2147 0.6235
All responses excluding omissions	N Mean Std. dev.	546 1.2157 0.6340	535 1.2445 0.6804	548 1.2658 0.5950	548 1.2870 0.6315	528 1.1981 0.4930
All initially correct responses	N Mean Std. dev.	473 1.1825 0.5162	451 1.2087 0.5744	467 1.2312 0.5429	499 1.2397 0.5643	471 1.1665 0.4246

Table 29

SUBSIDIARY TASK REACTION TIME, MARIHUANA STUDY, EVENTS VERSUS TREATMENTS ACROSS SUBJECTS

RESPONSE CATEGORIES		TREATMENTS				
		Pla/Pla	Alc/Pla	Smk/Pla	Ext/Pla	Alc/Ext
All responses including omissions	N	550	538	550	549	529
	Mean	1.2796	1.2930	1.2975	1.3028	1.2147
	Std. dev.	0.9778	0.9409	0.7932	0.7322	0.6235
All responses excluding omissions	N	546	535	548	548	528
	Mean	1.2157	1.2445	1.2658	1.2870	1.1981
	Std. dev.	0.6340	0.6804	0.5950	0.6315	0.4930
All initially correct responses	N	473	451	467	499	471
	Mean	1.1825	1.2087	1.2312	1.2397	1.1665
	Std. dev.	0.5162	0.5744	0.5429	0.5643	0.4246

Table 30

SUBSIDIARY TASK REACTION TIME, MARIHUANA STUDY, SUBJECTS VERSUS RUNS ACROSS EVENTS

RESPONSE CATEGORIES		RUNS				
		1	2	3	4	5
All responses including omissions	N Mean Std. dev.	550 1.3771 1.0653	550 1.2195 0.6054	548 1.2473 0.6277	539 1.3299 1.0482	529 1.2147 0.6235
All responses excluding omissions	N Mean Std. dev.	546 1.3140 0.7711	549 1.2035 0.4759	547 1.2313 0.5044	535 1.2651 0.7354	528 1.1981 0.4930
All initially correct responses	N Mean Std. dev.	493 1.2598 0.6205	466 1.1616 0.3869	469 1.2173 0.5192	462 1.2224 0.6311	471 1.1665 0.4246

Table 31

SOUNDPROOF BOOTH STATISTICS, LIBRIUM

			Pla	Alc	Lib	Lib/Alc
Concentrated Attention	% Correct	Mean:	83.75	76.50	81.50	77.75
		SD:	5.42	15.22	6.98	11.89
	Delta-prime	Mean:	2.10	1.79	1.97	1.70
		SD:	0.57	1.10	0.56	0.73
	Beta	Mean:	1.10	2.81*	1.22	0.99
		SD:	0.44	4.28	0.80	0.56
Divided Attention	% Correct (Total)	Mean:	57.75	43.25	52.50	44.00
		SD:	21.24	20.24	19.35	24.51
	Delta-prime	Mean:	1.87	1.32	1.84	1.35
		SD:	0.63	0.70	0.65	0.65
	Beta	Mean:	0.98	0.82	0.88	0.90
		SD:	0.45	0.28	0.60	0.31
	Det. % Correct	Mean:	81.00	72.75	79.00	72.50
		SD:	8.94	10.85	10.24	9.26
	# % Correct	Mean:	66.25	56.00	65.25	56.00
		SD:	23.20	24.89	21.39	29.29

* Without extreme score, Mean = 1.21 SD = 0.76

Table 32

SOUNDPROOF BOOTH STATISTICS, LIBRIUM,
CONCENTRATED ATTENTION, PERCENT CORRECT

	Source	df	SS	MS	F-ratio	Sig.-level
4x4 Basic Latin Square	Error	12	807.0	67.3	-	-
	Group	3	866.5	288.8	4.29	0.05
	Session	3	288.5	96.1	1.43	-
	Treatment	3	268.5	89.5	1.33	-
	Residual	6	572.0	95.3	1.42	-
	Subjects	4	1077.0	269.2	4.00	0.05
4x4 Latin Square with Prior Treatment Effect	Error	15(12)	807.0	67.3	-	-
	Group	3	849.0	283.0	4.21	0.05
	Session	3	257.0	85.6	1.27	-
	Treatment	3	373.0	124.0	1.84	0.25
	Prior Treatment	3	339.0	113.0	1.68	0.25
	Subjects	4	1078.0	270.0	4.01	0.05
4x4 Latin Square with Prior Treatments as a Base Line	Error	15(12)	807.0	67.3	-	-
	Group	3	143.0	47.6	0.71	-
	Session	3	289.0	96.3	1.43	-
	Treatment	3	307.0	102.0	1.52	0.25
	Prior Treatment Base Line	3	427.0	142.0	2.11	0.25
	Subjects	4	1077.0	269.0	4.00	0.05

Table 33

SOUNDPROOF BOOTH STATISTICS, LIBRIUM, DIVIDED ATTENTION, PERCENT CORRECT

	Source	df	SS	MS	F-ratio	Sig.-level
4x4 Basic Latin Square	Error	12	1275	106	-	-
	Group	3	8067	2689	25.37	0.01
	Session	3	350	117	1.10	-
	Treatment	3	1171	390	3.68	0.05
	Residual	6	465	77.5	0.73	-
	Subjects	4	4541	1135	10.70	0.01
4x4 Latin Square with Prior Treatment Effect	Error	15(12)	1275	106	-	-
	Group	3	7431	2477	23.37	0.01
	Session	3	392	131	1.24	-
	Treatment	3	1453	484	4.57	0.05
	Prior Treatment	3	445	148	1.40	-
	Subjects	4	4321	1080	10.19	0.01
4x4 Latin Square with Prior Treatments as a Base Line	Error	15(12)	1275	106	-	-
	Group	3	1912	637	6.01	0.01
	Session	3	349	116	1.09	-
	Treatment	3	1252	417	3.93	0.05
	Prior Treatment Base Line	3	383	128	1.21	-
	Subjects	4	4541	1135	10.71	0.01

Table 34

SOUNDPROOF BOOTH STATISTICS, LIBRIUM, DIVIDED ATTENTION, INTERACTIONS, PERCENT CORRECT

Measure	F-ratio	Significance
Order	2.37	0.25
Treatments	29.17	0.05
Order X Treatments	1.57	-
Librium/Alcohol X Placebo	5.92	0.10
Alcohol X Placebo	45.46	0.01
Librium X Placebo	1.00	-
Alcohol X Librium	5.68	0.10
Librium/Alcohol X Librium	1.78	0.25
Librium/Alcohol X Alcohol	0.01	-

6. DISCUSSION AND CONCLUSIONS

6.1 General

The results of this study indicate that it has been successful in measuring some change in performance as a function of the various drugs and combinations of drugs tested. The data seem to be indicative not only of an increase in subsidiary task reaction time but also of some disruption of the normally orderly relationship between the driving task and reaction time to the visual subsidiary task that represents unexpected or suddenly occuring traffic events. This indication is shown by the change in pattern as well as by an increase in reaction time of the subsidiary task scores when they were analyzed in terms of the four levels of driving task load.

The driving-safety importance of these differences can now be discussed in comparison with the effects of alcohol; alcohol being the one drug in the group for which field studies have already established a significant relationship with the likelihood of accident involvement.

For the most part, it appears that Dexedrine, when taken alone, improves (decreases) reaction time as compared with the palcebo runs and with the alcohol runs. The alcohol runs showed the expected increase in reaction time; the combination of Dexedrine with alcohol apparently restored the reaction time to palcebo level, but there still remains the disruption of the relationship with the task loading level. This disruption is apparent in the alcohol, the Dexedrine, and the combination of Dexedrine with alcohol. The discovery of this disruption is relevant to certain other findings in concurrent studies. Perhaps the most important relationship in these other concurrent studies is between visual peripheral

attention and alcohol. This difference is also being found in marihuana by other researchers in the field (34). Their findings support the possibility that differences may be even more pronounced for marihuana than for alcohol.

The significance of the visual field studies is that the lack of spare mental capacity is associated with a narrowing of the perceptual field of attention. In other words, it seems that two factors are involved; one is a reduction in the rate of sampling the external environment, due to a slowdown in the central nervous systems processing of visual or auditory information (such as in the case of the soundproof chamber). The second factor is an actual narrowing of the visual field.

The overall result of the work that has been analyzed to date is summarized as follows:

a. On Dexedrine, alcohol continued to show the same effects on the subsidiary task as it did before. However, it did not show the direction of the differences to the same statistical degree.

b. Librium data were inconclusive but the direction of the differences were similar to that of alcohol and a potentiation when alcohol and Librium are combined.

c. Dexedrine shows a somewhat different result: while the drivers on alcohol showed the same decrement as before, their runs on Dexedrine alone showed a <u>decrease</u> in reaction time.

The Dexedrine result is similar to the results that were obtained in a study using certain cold remedies, with and without antihistamines. The cold remedies without antihistamine showed an improvement -- a decrease -- in reaction time, apparently due to the stimulants in these remedies.

The Dexedrine when combined with alcohol shows no change in reaction time in the subsidiary task as compared against the placebo runs. The results of the earlier cold remedy study and of the Librium portion of the study are consistent with each other. This is because the cold remedy contains stimulants which are apparently offset in those preparations containing antihistamine; the antihistamines overrule the stimulant effect. When the antihistamine is removed the stimulant effect remains and is revealed in decreased reaction time to the subsidiary task. However, with cold remedies, there was some displacement of the relationship to the levels of task loading. This is also found with Librium, Dexedrine, and marihuana.

The overall conclusion that can be reached at this point in the study is that marihuana affects reaction time in a direction similar to that of alcohol, but that there is some lack of comparison when it comes to the behavior of these subjects on their placebo runs. There are several possible explanations of such differences. For example, there was an overall longer reaction time as well as more variability on the placebo runs, for the marihuana group, than for the other two groups (Librium and Dexedrine). There was also more variability in this study than existed in the cold-remedy group of subjects.

More work should be conducted in an attempt to clear up these differences in behavior on the placebo run. Attention should be given to the possibility that differences in behavior of the marihuana subjects on the placebo run could be due to the fact that the placebo for marihuana is a much more effective placebo because it is not readily distinguishable from the marihuana containing the active THC ingredient. This could account for greater differences in performance on placebo runs. Another possible factor is that, of the marihuana subjects, those who are accustomed to using marihuana may be a more suggestible

group than the other groups of subjects. Combining this possibility of greater suggestibility with a less detectable placebo could explain the results.

Subsequent studies should include data collected with two kinds of control: one where subjects receive the same kind of placebo as before (a cigarette made from inactive material) and another run when they are administered no smoke at all. In this way the subjects would know they receive nothing on one of their runs. The comparison between these two runs could then reveal any suggestibility factor.

Subjects in subsequent studies should be more carefully screened and chosen. They should be somewhat older students, more likely graduates or employees. They should also have scored 65% or better in accuracy on the divided attention task before they are accepted into the Driving Simulator testing group. Therefore, they should be a more stable group, in performance, both in terms of reaction time to the divided attention task and in general, because of their greater maturity and reliability in normal everyday pursuits. In addition, they might be expected to be somewhat less suggestible, although to date there is no hard evidence to back up this assumption.

The Librium results are not clear; however, there is a possibility that upon running another group of subjects, they might produce cleaner results. Also, the important question has been raised as to whether the Librium would have this type of effect, or to this degree, if indeed the subjects were anxious people rather than ordainary students who presumably were not anxious in the clinical sense of the word. Therefore, it is hoped that it will be possible to obtain support for testing additional subjects on Librium who have been classified as clinically anxious. This would also produce another set of data for a cross-validation type of comparison with the present results.

The Dexedrine results are based upon 16 subjects, which is twice the number of subjects used in the Librium study; therefore, more confidence may be placed in the results. The results also came out in what can be considered an expected direction, namely decreasing reaction time when Dexedrine only is ingested, and the tendency to off-set the increased reaction time due to alcohol when Dexedrine and alcohol are combined.

Therefore, it appears that although it is inconclusive at this time that marihuana effects driving, it does show indications of impairing performance in a way similar to alcohol.

It further appears that marihuana should not be permitted while driving any more than is alcohol; in spite of the fact that the dose level effects remain more obscure than alcohol. On the trial runs of marihuana in combination with alcohol, there was no evidence of a potentiation effect.

The publication of such conclusions should await the collection and analysis of the next set of data currently being generated at ITTE, which should be available in the fall of 1972. As for Librium, it is not yet clear that this drug by itself also affects drivers in an unfortunate way similar to alcohol. Specifically, there appears to be an increase in reaction time to the subsidiary task and an even further increase when combined with alcohol than with either Librium or alcohol alone.

As far as Dexedrine is concerned, it seems that it does improve (decrease) reaction time, but it also tends to disrupt the normal relationship between the driving task and mental capacity. This relationship is not as clear as the researchers would like it, and as funds become available the data that has been collected will be analyzed further for the possibility of better understanding the

relationship between increased reaction time and disrupted relationship with task load level and driving safety. At this time, it would appear that Dexedrine should not be recommended until such time as more evidence becomes available. As far as the possibility of off-setting the deleterious effects of alcohol, this should remain only as a possibility until further, more detailed analysis can be made of the data or additional data collected.

The overall conclusion is that while results are statistically inconclusive, there is a trend of all three of these drugs alone and in combination with alcohol to in some way affect the driver's ability to share his attention and respond in a normal way while driving in the UCLA Driving Simulator. One can conclude that because this disruption of the normal ability is similar to that produced by 0.10% BAL, it is very likely to be related to increased probability of accident involvement. Consideration of the ways in which these effects may be operating led to the following hypothesis about brain levels, drugs and driving.

6.2 Brain Levels, Drugs and Driving

It has been well established that as humans learn physical skills such as walking, running or playing tennis, the coordination between nerves and muscles is at first ragged and unpredictable. Then, with practice, it becomes graceful and reliable. Studies have shown that this progression from rough to smooth performance is accomplished by shifting nervous system control from the upper brain centers to the lower brain and brain stem.

The control of these actions that are routinely practiced and well learned requires less and less conscious attention for successful performance; less and less effort is required to respond to even minimal cues. As a result, increasing confidence is gained (35).

These considerations may account for many of the difficulties associated with drugs and driving.

The ITTE research program has produced evidence that the activity of divided attention which is controlled by higher brain centers is affected at lower dosage levels of both drugs and alcohol than are the vehicle-control scores which are controlled by lower brain centers. In other words, this present research project has shown that the nature of the effect on driving is to produce performance decrements in higher brain centered activities such as CNS processing time of information inputs rather than lower brain centered activities such as learned motor skills. The relevance to traffic accident causation has been shown indirectly by means of the following research findings:

a. Subsidiary task (visual) scores.

b. Comparison of blood levels to field-test results (for alcohol).

c. Comparison with alcohol effects in the same drivers (for other drugs).

These findings have a profound implication on highway safety practices. For example, the sobriety tests in most states are based on physical skills (lower brain centered) which are not affected until fairly high levels of BAL are reached. Even the chemical tests are set at the 0.10% level or higher.

To make matters worse, drivers expecting to be affected in physical ways (lower brain centered) may set personal criteria (to drive or not) based on their subjective awareness of a deficit in physical performance. However, when they do not experience motor-skill degradation they then judge themselves as fit. This places them in double jeopardy, so to speak, because they then are not even looking for a deficit in the critical upper brain centered processes.

The nature of the deficit in the higher brain centers is little understood even by researchers. Drivers may only experience it as a sudden awareness of another vehicle on a collision course and blame the other driver for "darting out in front" of them. Researchers seeking driving effects in the lower brain center types of vehicle control (physical skills) are often disappointed since these are often not influenced by normal dosages. The disappointed researcher then tends to increase the skill level requirement of his tests beyond that actually used in driving. The drivers in turn tend to disregard performance decrements revealed by these increased demands on their skill because they recognize that these demands have been unnaturally exaggerated.

Other drugs, when combined with alcohol, can produce a potentiation. When this happens the effects are greater than the sum of the two individual doses. This can result in total effects that are even more subtle than either drug alone because the driver may assume he has only to be wary of the alcohol. He does not "read" the effects of the other drugs, nor of the combination.

Other factors such as age and experience probably interact with the three facts noted above to produce strong likelihoods that:

a. Inexperienced drivers are more severely affected because more of their control is taking place in the higher brain centers.

b. Habitual drinkers or marihuana users learn to cope to some degree; the constantly impaired skills are adapted to by the lower centers.

c. Inexperienced drivers who are also inexperienced drinkers will constitute a particularly hazardous group. This fact was revealed by a recent study (36) that came to our attention after this hypothesis was formulated.

d. Older drivers gradually lose the lower brain center control skills and must use an increasing proportion of higher center activity.

e. Older, inexperienced drivers are <u>most</u> severely affected.

f. Occasional drinkers or marihuana users will be affected more than habitual ones by the same dosage.

Future work needs to be done to demonstrate how these effects of drugs on higher brain centers may actually cause drivers not only to respond more slowly but also to totally fail to detect hazardous situation cues. Visual search studies have the potential of revealing such effects.

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8. APPENDICES

Appendix A. Experimental Participant Release

SUBJECT CONSENT AND RELEASE FOR
PSYCHOPHYSIOLOGICAL STUDY

I, the undersigned, agree and consent to participate in a scientific experiment designed to determine the effects of cannabis (marijuana) and alcohol intoxication. I understand that this experiment will be carried on in a psychophysiology laboratory located at UCLA and that appropriate legal approval has been obtained. I further understand that during the course of my participation in these studies I may be asked to smoke or drink substances which may or may not contain cannabis (marijuana) or alcohol and that, as a result, I may experience some degree of cannibis (marijuana) or alcohol intoxication.

I do hereby affirm that I have read the above, and do release the State of California, UCLA, and those scientists and their assistants conducting these experiments from all liability of any ill effect which I may experience as a result of participation in this experiment.

_____	_____
Witness	Subject
_____	_____
Date	Date

Appendix B. Subject Interview Forms

I.D. No._____

Date_____

Interview

Name_____

Addresses_____

Phone Numbers_____

Availability for experimental sessions: (dates, months)

_____

Best days (5-hour duration)_____

Best hours free_____

Can you be available between 8 a.m. and 1 p.m. Yes_____ No_____

1. Age_____

2. Race_____

3. Are you a student: Yes_____ No_____

Health:

a. Have you ever had a serious illness? Yes_____ No_____

Kind_____ When_____

b. Do you now have a serious illness? Yes_____ No_____

Kind_____

c. Do you take any medication at present? Yes_____ No_____

Kind_____

d. Have you ever had a serious emotional illness? Yes_____ No_____

Were you hospitalized? Yes_____ No_____

e. Has anyone in your immediate family been hospitalized for psychiatric reasons? Yes_____ No_____

f. Have you ever been in psychotherapy? Yes_____ No_____

g. Are you now in psychotherapy? Yes_____ No_____

I.D. No._____

5. Considering beer, wine and distilled liquor, about how many drinks do you average per week?_____

6. Has there ever been a period when you averaged five or more drinks in one sitting, two or more times a week? Yes_____ No_____
When was it?_____
Do you currently, on occasion, have 5 or more drinks at one sitting? Yes_____ No_____
How often? once a year or less _____
2 - 11 times a year_____
once a month_____
once a week_____
two or more times a week_____.

7. Except for medically prescribed use, have you ever used in the past or present, sedatives such as seconal, nembutal, phenobarbitol, doriden, etc.? Yes_____ No_____
Regularly_____
Fairly frequently_____
Occasionally_____
Rarely_____

8. Except for medically prescribed use, have you ever used in the past or present, stimulants such as dexamyl, dexedrine, elavil, preludin, ritalin, etc.? Yes_____ No_____
Regularly_____
Fairly frequently_____
Occasionally_____
Rarely_____

9. Have you ever used marijuana? Yes_____ No_____
Hashish? Yes_____ No_____
When did you first use marijuana?_____
Have you used marijuana 10 times or more? Yes_____ No_____
How often do you smoke it? Daily_____ 3-6 times per week_____
1 - 2 times per week_____ 1 - 4 times a month_____
less than once a month_____
Have you ever had a serious unfavorable reaction to marijuana?
Yes_____ No_____

I.D. No._____

0. Have you ever taken:	Yes	No	Total No. of Times	No. of times in Last 12 months
LSD	___	___	_____	_____
Other hallucinogens (Peyote, mescaline, DMT, etc.)	___	___	_____	_____

1. Grade point average in college_____.

2. Would you be willing to participate in an experiment involving drugs (marijuana, amphetamines, tranquillizers, etc.), alcohol or a combination of drugs and alcohol? Yes___ No___

(Appropriate legal approval has been obtained for all experiments in which you would be asked to participate.)

Appendix C. General Information Sheet and Treatment Data Sheet

GENERAL INFORMATION SHEET - DRIVING SIMULATION LABORATORY

SUBJECT CODE __ __ __ __ __ __ DATE _____

ADDRESS CARD

NAME: _____ _____
(Last) (First)

ADDRESS: _____

CITY: _____

PHONE: _____ CAL. DR. LICENSE: __ __ __ __ __ __ __ __

FILM CARD

BTC	___	___	___	___	MC	___	___	___	___
BTC	___	___	___	___	MC	___	___	___	___
BTC	___	___	___	___	S	___	___	___	___
BTC	___	___	___	___	S	___	___	___	___
BTC	___	___	___	___	S	___	___	___	___
SH	___	___	___	___	DVA	___	___	___	___
SH	___	TOR	___	TTC	DVA	___	___	___	___
SH	___	TOR	___	TTC	DVA	___	___	___	___
AVE	___	WW	___	TTC	DQ	___	IR	SE	___
AVE	___	BE	___	TTC	DQ	TC	RV	V	___
AVE	___	___	___	___	DS	A	MS	___	___
MC	___	___	___	___	OTHER: _____				

__ __ __ __ __ __
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__ __ __ __ __
__ __ __ __ __
__ __ __ __ __
__ __ __

INFORMATION CARD

SEX _____ AGE _____

SIMULATOR YES ____ NO ____

EXPERIMENTER _____

PROJECTIONIST _____

CONTROLLER _____

VISION INFORMATION

DEFECTS None ____ M ____ H ____ A ____ O ____

GLASSES None ____ SL ____ B ____ T ____ C ____

RESTRICTION YES ____ NO ____

VISION TEST _____

DRIVING EXPERIENCE

DRIVER _____ NON-DRIVER _____

YEARS DRIVEN _____

MILES PER YEAR _____

PERCENT URBAN DRIVING _____

CAR MAKE _____ MODEL _____ YEAR _____

TRANSMISSION:STD.____ STEERING:STD.____ BRAKES:STD.____

AUTO.____ POWER____ POWER____

ILLNESS INFORMATION

	VI	N	D	H	O
CAR					
CINERAMA					
SEASICK					
AIRSICK					
SWINGS					
ROLLERCOASTERS					
EYESTRAIN					
FLU, ETC.					
EATING					
DRINKING					
OTHER					

NO PAST HISTORY _____

REACTION TO DSL None___VI___N___D___H___

E___O___

MAD DATA SHEET

Subject Name_____ Subject Number 1 2 3 4 5

Date 6 7 8 9 10 11

Session 12

Body Weight 13 14 15

Pulse 16 17 18

Treatment 19

Alcohol/Extram Consumed 20 21 22

Consumption Started 23 24 : 25 26

Ended 27 28 : 29 30

Smoke Started 31 32 : 33 34

Ended 35 36 : 37 38

Pulse 39 40 41

Blood Alcohol . 42 43 44

Time 45 46 : 47 48

Pulse 49 50 51

Blood Alcohol . 52 53 54

Time 55 56 : 57 58

DSL Started 59 60 : 61 62

Pulse 63 64 65

Blood Alcohol . 66 67 68

Time 69 70 : 71 72

Number of Hours Since Last Consumed Solids and/or Beverages 73 74

During the past week have you:
Consumed any Alcoholic Beverages (oz.)_____ 75 76 77

Taken any Drugs (prescription/other) No__ Yes__ 78

What_____How Much_____

Appendix D. Short Drug Effects Questionnaire

SDEQ

Name of Subject [redacted] Subject Number 0 1 6 0 3 (1 2 3 4 5)

Date 0 5 1 7 7 1 (6 7 8 9 10 11)

Session 1 (12)

1. Does your head feel,	stuffier	Yes	(No)	13
	clearer	Yes	(No)	14
2. Do colors seem,	duller	Yes	(No)	15
	brighter	Yes	(No)	16
3. Does your body feel more,	tense	Yes	(No)	17
	relaxed	Yes	(No)	18
	sluggish	Yes	(No)	19
	energetic	Yes	(No)	20
4. Do you feel you have,	less control over your body	Yes	(No)	21
	more control over your body	Yes	(No)	22
5. Are you,	hungrier than usual	Yes	No	23
	less hungry than usual	(Yes)	No	24
6. Do you feel,	worse than usual	Yes	(No)	25
	better than usual	Yes	(No)	26
	more relaxed	Yes	(No)	27
	more tense	Yes	(No)	28
	happier	Yes	(No)	29
	sadder	Yes	(No)	30
	more afraid	Yes	(No)	31
	less afraid	Yes	(No)	32
	more wide awake	Yes	(No)	33
	sleepier	Yes	(No)	34
	more nervous	Yes	(No)	35
	more calm and steady	Yes	(No)	36

7.	Do you feel,	more free than usual	(Yes)	No	37
		less free than usual	Yes	No	38
8.	Is it,	easier to concentrate	Yes	(No)	39
		harder to concentrate	Yes	(No)	40
9.	Are your thoughts moving,	slower	Yes	(No)	41
		faster	Yes	(No)	42
10.	Do you feel,	less like paying close attention to something	Yes	(No)	43
		more like paying close attention to something	Yes	(No)	44
11.	Do you feel,	you can't hold on to thoughts as well	Yes	(No)	45
		you can hold on to thoughts better	Yes	(No)	46
12.	Do you feel afraid of losing control over your thoughts		Yes	(No)	47
13.	Do you feel your judgment is,	worse	Yes	(No)	48
		better	Yes	(No)	49
14.	Do you feel your memory is,	better	Yes	(No)	50
		worse	Yes	(No)	51
15.	Do you feel as if you were in a dream		Yes	(No)	52
16.	Does time seem to be going,	faster	Yes	(No)	53
		slower	Yes	No	54
17.	Do you feel more,	suspicious than usual	Yes	(No)	55
		trusting than usual	Yes	(No)	56
18.	Do you feel more,	carefree than usual	(Yes)	No	57
		worried than usual	Yes	(No)	58
19.	Do you feel,	at peace with the world	Yes	(No)	59
		angrier than usual	Yes	(No)	60

Appendix E. Long Drug Effects Questionnaire

Instructions for Subjective Drug Effects Questionnaire

These are some questions about how you have been feeling. Please indicate how you have been feeling since you took the drug. For example, you will be asked if your head felt lighter -- if it felt lighter than it usually feels, say yes for lighter. Then you will be asked if it felt heavier -- if it felt heavier than it usually feels, say yes for heavier. If if felt neither lighter nor heavier but the same as usual, say no for both.

Some of these questions will have meaning for you and others may not. We use this same list to see the effects of a number of different drugs on many different people. Just answer these as well as you can in terms of how you felt as compared with the way you usually feel.

Name of Subject [redacted] Subject Number 0 1 6 0 5
(1 2 3 4 5)

Date 0 5 1 9 7 1
(6 7 8 9 10 11)

Session 1
(12)

The first group of questions has to do with how you have been feeling physically during the last 4 hours.

Comparing it with the way you usually feel:

1. Did your head feel,	heavier	Yes	No	19
	lighter	Yes	No	20
	stuffier	Yes	No	22
	clearer	Yes	No	23
2. Did your head ache?		Yes	No	25
3. Did you feel a heavy pressure on the sides or top of your head?		Yes	No	26
4. Did your eyelids feel as if they were closing?		Yes	No	27
5. Did your eyes feel strained?		Yes	No	28
6. Did your mouth feel,	drier	Yes	No	29
	wetter	Yes	No	30
7. Did your lips feel,	more numb	Yes	No	32
	more sensitive	Yes	No	33
	stiffer	Yes	No	35
	looser	Yes	No	36
8. Did your throat feel,	wetter	Yes	No	38
	drier	Yes	No	39
9. Did your eyesight seem,	better, clearer than usual	Yes	No	41
	worse, more blurred than usual	Yes	No	42
	clearer in the middle than around the edges of your vision	Yes	No	44

10.	Did things look,	closer	Yes (No)	45
		farther away	Yes (No)	46
11.	Did colors seem,	duller	Yes No	48
		brighter	(Yes) No	49
12.	Did something that you looked at stand out very clearly?		Yes (No)	51
13.	Did things that are usually still seem to be moving?		(Yes) No	52
14.	Did you see any imaginary things?		Yes (No)	53
15.	Did you see images when your eyes were closed?		(Yes) No	54
16.	Did your hearing seem,	worse than usual	Yes No	55
		better than usual	(Yes) No	56
17.	Did sounds seem,	farther away	Yes No	58
		closer	(Yes) No	59
18.	Did your ears seem under pressure		Yes (No)	61
19.	Did your voice sound,	closer	Yes (No)	62
		farther away	Yes (NO)	63
		slower	(Yes) No	65
		faster	Yes No	66
		smoother	Yes (No)	68
		slurred	Yes (No)	69
20.	Did something that you listened to stand out very clearly?		(Yes) No	70
21.	Did your sense of smell seem,	sharper	Yes No	71
		duller	(Yes) No	72
22.	Have you been noticing the way your body feels,			
		less than you usually do	Yes No	74
		more than you usually do	(Yes) No	75

23. Did your body feel.	more unsteady	(Yes) No	77
	steadier	Yes No	78
	hotter	Yes No	80
		Card 2	
	colder	Yes No	19
	more tense	Yes No	21
	more relaxed	(Yes) No	22
	more sluggish	Yes (No)	24
	more energetic	Yes (No)	25
	lighter	Yes No	27
	heavier	(Yes) No	28
	smaller	Yes (No)	30
	larger	Yes (No)	31
	better than usual	Yes (No)	33
	worse than usual	Yes (No)	34
24. Did your movements seem,	faster	Yes No	36
	slower	(Yes) No	37
25. Did you feel you had,	less control over your body	(Yes) No	39
	more control over your body	Yes No	40
26. Did you become afraid of losing control over your body?		Yes (No)	42
27. Did you feel as if part of your body wasn't connected to the rest of your body?		Yes (No)	43
28. Did your arms or legs feel,	jumpier	Yes (No)	44
	stronger	Yes (No)	45
	weaker	Yes (No)	46
	tighter	Yes (No)	48
	looser	Yes (No)	49

Did your arms or legs feel,	more numb	Yes	(No)	51
	more sensitive	Yes	(No)	52
	heavier	Yes	(No)	54
	lighter	Yes	(No)	55
	tingling	(Yes)	No	57
29. Did your hands or feel feel funny or strange?		(Yes)	No	58
30. Did you become,	more aware of your skin	Yes	(No)	59
	less aware of your skin	Yes	(No)	60
31. Did your skin feel,	funny	Yes	(No)	62
	tingling	Yes	(No)	63
	drier	(Yes)	No	64
	more perspiring	Yes	(No)	65
32. Did your heartbeat feel,	slower	Yes	(No)	67
	faster	Yes	(No)	68
33. Did your breathing feel,	lighter	Yes	(No)	70
	heavier	Yes	(No)	71
34. Did your stomach feel,	heavier	Yes	No	73
	lighter	(Yes)	No	74
	more jittery	Yes	(No)	76
	more pleasant	Yes	(No)	77
35. Did you feel sick to your stomach?		Yes	(No)	78
36. Did you become,	hungrier than usual	(Yes)	No	79
	less hungry than usual	Yes	No	80

The next group of questions has to do with some of your feelings and the mood you have been in.

Card 3

Comparing it with the way you usually feel:

37.	Did you notice your feelings,	more than usual	(Yes) No	20
		less than usual	Yes (No)	21
38.	Did you feel,	worse than usual	Yes (No)	23
		better than usual	(Yes) No	24
		more relaxed	Yes (No)	26
		more tense	Yes (No)	27
39.	Have you felt,	happier	(Yes) No	29
		sadder	Yes (No)	30
		more afraid	Yes (No)	32
		less afraid	Yes (No)	33
		more wide awake	(Yes) No	35
		sleepier	Yes (No)	36
		pleasantly tired and sleepy	(Yes) No	38
40.	Have you felt,	more nervous	Yes (No)	39
		more calm and steady	(Yes) No	40
41.	Have you felt,	not a care in the world	Yes (No)	42
		more worried	Yes (No)	43
		more irritable	Yes (No)	45
		less irritable	Yes (No)	46
		more excited	Yes (No)	48
		dreamier	(Yes) No	49
42.	Did you feel,	down in the dumps	Yes (No)	50
		on top of the world	Yes (No)	51
		more at peace with the world	Yes (No)	53
		angrier	Yes (No)	54

43.	Did you feel, extreme well-being	Yes (No)	56
	extreme anxiety	Yes (No)	57
	dopey	(Yes) No	59
	dizzy	Yes No	60
	high	(Yes) No	61
	more sober than usual	Yes No	62
44.	Did you have a weird feeling?	(Yes) No	64
45.	Did you feel as if you were floating?	(Yes) No	65
46.	Did you feel, more free than usual	(Yes) No	66
	less free than usual	Yes No	67
	more serious	Yes No	69
	sillier	(Yes) No	70
47.	Did you feel, like crying	Yes (No)	72
	like laughing	Yes (No)	73
	as if you see the comical side of things more	(Yes) No	75
	like smiling or laughing at nothing particular	Yes No	76
48.	Did you have, a greater feeling of dislike for others	Yes No	77
	a greater feeling of love for others	(Yes) No	78
49.	Did things seem, less pleasing than usual	Yes No	80

Card 4

	more pleasing than usual	(Yes) No	19
50.	Did you feel as if you had, done something big and satisfying	Yes (No)	21
51.	Did you feel as if you had, more control over your feelings	Yes (No)	22
	less control over your feelings	Yes (No)	23

52. Did you feel afraid of losing control over your feelings? Yes (No) 25

53. Did you, like having people around more Yes (No) 26

like having people around less Yes (No) 27

like to talk less (Yes) No 29

like to talk more Yes No 30

54. Did you feel, talking was easier (Yes) No 32

talking was harder Yes No 33

55. Did it seem, harder than usual to describe in words how you felt (Yes) No 35

easier than usual to describe in words how you felt Yes No 36

The next group of questions has to do with how your thinking has seemed to you.

Comparing it with the way you usually are:

56. Did your thinking seem, fuzzier Yes (No) 38

clearer Yes (No) 39

57. Did it become, easier to concentrate Yes No 41

harder to concentrate (Yes) No 42

58. Did thoughts move, slower Yes (No) 44

faster Yes (No) 45

59. Did you have, more things on your mind Yes No 47

less things on your mind (Yes) No 48

60. Did your imagination become, less lively than usual Yes No 50

more lively than usual (Yes) No 51

61. Did you feel, less like paying close attention to something (Yes) No 53

more like paying close attention to something (Yes) No 54

62. Did you keep thinking about some particular thing? Yes (No) 56

63. Did some things have a different meaning for you? (Yes) No 57

64. Did you feel that you, couldn't hold on to thoughts as well (Yes) No 58

could hold on to thoughts better Yes No 59

65. Did you feel that you had, more control over your thoughts Yes (No) 61

less control over your thoughts Yes (No) 62

66. Did you feel afraid of losing control over your thoughts? Yes (No) 64

67. Did you feel that your judgment was, worse (Yes) No 65

better Yes No 66

68. Did you feel that your memory was, better Yes No 68

worse (Yes) No 69

The next group of questions has to do with the way you have been seeing yourself and things and happenings around you.

Comparing it with the way you usually are:

69. Did you become, more aware of yourself (Yes) No 71

less aware of yourself Yes No 72

less aware of things around you Yes No 74

more aware of things around you (Yes) No 75

70. Did people, look different Yes (No) 77

seem more cheerful than usual (Yes) No 78

seem more sad than usual Yes No 79

Card 5

71. Did things in the room look different? (Yes) No 19

72. Did things seem more real than usual? Yes No 20

73. Did things seem more unreal than usual? (Yes) No 21

74. Did you feel, like a different person — Yes (No) — 23

as if you were in a dream — Yes (No) — 24

controlled by something outside of yourself — (Yes) No — 25

75. Did you notice the passing of time, more than you usually do — Yes (No) — 26

less than you usually do — Yes (No) — 27

76. Did you, have a better sense of time — Yes No — 29

lose your sense of time — (Yes) No — 30

77. Did time seem to be going, faster — Yes (No) — 32

slower — Yes (No) — 33

78. Did you like answering these questions? — Yes No — 35

79. Did you dislike answering these questions? — (Yes) No — 36

80. Do you think this drug was:

weak_____ medium_____ strong__✓___ — 38

if weak:
somewhat_____
very_____

if strong:
somewhat_____
very__✓___

81. Was this experience pleasant? — Yes No — 39

if yes, somewhat_____ very__✓___

82. Was this experience unpleasant? — Yes No — 40

if yes, somewhat_____ very_____

83. Were you physically uncomfortable? — Yes No — 41

if yes, somewhat_____ very_____

84. Were you physically comfortable? — Yes No — 42

if yes, somewhat__✓___ very_____

What drug do you think you have taken? Marijuana

What do you think you have had to drink? Rum Punch

Please compare the strength of what you have been getting to what you have used in the past.

Drug: This was stronger ✓ about the same ____ weaker ____

Drink: This was stronger ____ about the same ____ weaker ✓

How intoxicated do you feel?

Not at all ____
Slightly ____
Moderately ✓
Very ____

Appendix F. Confidential Questionnaire

C O N F I D E N T I A L

All information in this questionnaire will be held confidential. Please answer each question carefully. Your cooperation is greatly appreciated.

NAME_____

PLEASE PLACE A CHECK (✓) NEXT TO THE ANSWER THAT IS CORRECT FOR YOU.

1. Race or Ethnic Group:
   ___1) Caucasian
   ___2) Mexican-American
   ___3) Negro
   ___4) Oriental
   ___5) American-Indian
   ___6) Other

6

2. Until you were 16 years old, with whom did you live most of the time?

   ___1) both parents
   ___2) one parent
   ___3) relative (s)
   ___4) guardian (s)
   ___5) orphanage or other institution
   ___6) other _____ (specify)

7

3. If you did not live with both parents most of the time, was the reason:

   ___1) divorce or separation
   ___2) one parent died
   ___3) both parents died
   ___4) court order
   ___5) father not at home
   ___6) other _____ (specify)

8

4. Before you were 13, how often were you punished for doing wrong?

   ___1) often
   ___2) once in a while
   ___3) seldom
   ___4) never

9

5. How would you describe your childhood?

   ___1) happy
   ___2) unhappy
   ___3) sometimes happy and sometimes unhappy
   ___4) other _____ (specify)

10

6. What was your father's occupation _____

   Describe his work._____

   _____

11

7. What is your occupation and job title?_____

Describe the work you do? (briefly)_____

_____ 12

8. How many jobs did you have prior to your enlistment?

___one to two jobs (1)
___three to four (2)
___five to six (3)
___more than six (4)

13

9. How much do you like your present job?

___1) a lot
___2) some
___3) very little
___4) not at all

14

10. How much stress and strain is there in your present job?

___1) a lot
___2) some
___3) very little
___4) not at all

15

11. What is the total yearly salary?

___1) less than $3000
___2) above $3000 - $6000
___3) above $6000 - less $9000
___4) above $9000 - less $12,000
___5) don't know

16

12. Are you presently single, married, divorced or widowed?

___1) married
___2) separated
___3) divorced
___4) widowed
___5) common-law
___6) never married

17

13. How far were you able to go in school?

___1) between grades 1 & 6
___2) between grades 7 & 9
___3) between grades 10 & 12
___4) received a high school diploma
___5) had some college
___6) received a bachelor's degree
___7) completed graduate school
___8) have a professional degree of some type

18

14. How often do you drive a car?

___1) three or more times a day
___2) daily
___3) several times a week
___4) on the average once a week or less often

19

15. When you drive on the average how many miles per day do you usually travel?_____

20 21

16. What is the average number of hours you drive during daytime?

___1) less than one hour
___2) one hour
___3) two hours
___4) three hours
___5) more than three hours
___6) don't travel during daytime

22

17. What is the average number of hours you drive at nighttime?

___1) less than one hour
___2) one hour
___3) two hours
___4) three hours
___5) more than three hours
___6) don't travel during nighttime

23

18. What type of roadway do you drive most on during weekdays?

___1) freeways
___2) small city streets (mostly stop signs)
___3) large city streets (mostly signal lights)
___4) small country roads
___5) state highways (not freeways)
___6) don't drive on weekdays

24

19. What type of roadway do you drive most on during weekends?

___1) freeways
___2) small city streets (mostly stop signs)
___3) large city streets (mostly signal lights)
___4) small country roads
___5) state highways (not freeways)
___6) don't drive on weekends

25

20. In general, how often do you drive your car while you are angry or upset?

___1) daily
___2) several times a week
___3) once a week
___4) every two weeks
___5) once a month or less often
___6) never

26

21. How often does driving itself upset you?

___1) often
___2) sometimes
___3) rarely
___4) never

27

22. How does getting angry or upset effect your driving?

___1) may not drive as well as usual
___2) may drive just the same as usual
___3) may drive better than usual
___4) don't drive when upset

28

23. How often do you drive around in your car to blow-off steam?

___1) often
___2) sometimes
___3) rarely
___4) never

29

24. How often do you like to drive fast?

___1) often
___2) sometimes
___3) rarely
___4) never

30

25. Which one of these statements best describes your car?

___1) it's only a means of transportation
___2) it represents the type of person I am
___3) it is a necessity but a pain in the neck
___4) a source of pleasure as well as transportation
___5) other_____
(specify)
___6) don't own a car

31

26. How many accidents were you involved in during your lifetime when you were the driver?_____

32 33

27. How many of these do you think were largely your fault, no matter how they were actually reported?_____

34 35

28. How many of these accidents caused an overall damage of $300 or more?_____

36 37

29. How many of these accidents were very minor accidents (small dents under $250)? _____

38 39

30. How did your last accident occur?

___1) my mind was on something else, didn't see in time
___2) the other car caused it
___3) something else caused it (an uninvolved car, a person crossing street, etc.)
___4) I fell asleep
___5) other _____
(specify)
___6) mechanical problems (such as brakes)
___7) drove carelessly
___8) had been drinking at the time
___9) never in an accident

40

31. What type of driving habits do you have that could lead to an accident?

___1) you sometimes speed
___2) your mind wanders
___3) you often follow a car too closely
___4) you often take your eyes off the road
___5) you sometimes run stop signs or light signals
___6) you often drive after taking a drink
___7) other_____
___8) none that you are aware of

41

32. Did any of the following events occur before your last accident? (Please check each statement)

	Yes A Week Before	Yes A week to a Month	Yes A month to Two Months	No	
1. Engagement or marriage	____	____	____	____	42
2. New responsibility or tasks at work or school	____	____	____	____	43
3. New financial debt	____	____	____	____	44
4. New baby or pregnancy	____	____	____	____	45
5. Death of a loved one	____	____	____	____	46
6. Divorce or separation	____	____	____	____	47
7. Break-up of a close friendship or argument with a close friend or spouse.	____	____	____	____	48
8. Problems at school or work	____	____	____	____	49
9. Trouble with the law	____	____	____	____	50
10. Vacation	____	____	____	____	51
11. Change of Job	____	____	____	____	52
12. Change of residence	____	____	____	____	53
____never in an accident					54

Appendix G. Vehicle Control Scores

COMPILE DRIVE STATISTICS FOR ALL SUBJECTS

DATE = 08/18/71

MARIHUANA

		(A)	(B)	(C)	(D)	PLA/PL (CGRUP) 12 SUBS		EXT/PL (TGRUP) 12 SUBS		DIFFERENCE (CG-TG) 12 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
(F-TEST CR BOUN --		0.19,	0.29,	3.47,	5.32)										
(T-TEST CR BOUN --		-3.11,	-2.20,	2.20,	3.11)										
						MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
AVG SPEED DURING THE DRIVE (MPH)	(1)					28.386	6.666	24.290	9.020	4.096	11.667	0.55	0.	1.16	0.
S.D. OF SPEED DURING THE DRIVE (MPH)	(2)					7.408	3.442	7.830	4.065	-0.421	5.778	0.72	0.	-0.24	0.
AVG SPD DURING THE DRIVE (FLM FRMS/SEC)	(3)					21.645	3.270	21.305	4.297	0.340	6.100	0.58	0.	0.19	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES	(4)					0.821	2.482	2.649	4.550	-1.828	5.537	0.30	0.	-1.10	0.
AVG ACCEL POSITION (PR CT DEPRESSED)	(5)					9.924	1.373	10.318	1.629	-0.394	2.184	0.71	0.	-0.60	0.
S.D. OF ACCEL POSITION (PR CT DEPRESSED)	(6)					3.554	1.600	2.917	0.498	0.637	1.410	10.32	0.01	1.50	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES	(7)					0.385	0.292	0.438	0.509	-0.053	0.596	0.33	0.	-0.30	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES	(8)					0.108	0.074	0.105	0.097	0.004	0.105	0.58	0.	0.12	0.
NO. OF BRK PRESSES DURING THE DRIVE	(9)					10.583	12.433	4.833	4.200	5.750	11.395	8.76	0.01	1.67	0.
MAX PRESSURE DURING BRK PRS (PR CT MAX)	(10)					20.667	19.497	30.146	33.435	-9.479	42.953	0.34	0.	-0.73	0.
AVERAGE STEERING WHEEL POSITION (DEGS)	(11)					-29.281	19.904	-33.636	20.064	4.355	14.977	0.98	0.	0.96	0.
AVG TIME BET STR REVS OF 5 PR CT (SECS)	(12)					1.335	1.984	1.214	1.306	0.120	1.743	2.31	0.	0.23	0.
AVG DIF BETWEEN STR AND COMP (DEGS)	(13)					16.800	6.468	17.213	5.478	-0.413	4.571	1.39	0.	-0.30	0.
S.D. OF DIF BETWEEN STR AND COMP (DEGS)	(14)					23.604	3.693	27.351	8.353	-3.747	9.010	0.20	-0.05	-1.38	0.
MAX RATE OF CHG OF STEERING (DEGS/SEC)	(15)					-55.273	494.475	35.120	459.505	-90.392	673.889	1.16	0.	-0.44	0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES	(16)					0.926	0.852	0.786	0.554	0.140	0.660	2.37	0.	0.71	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES	(17)					0.309	0.152	0.259	0.076	0.049	0.143	3.96	0.05	1.15	0.
MAX TIME BET STR REVS OF 5 DEGS (SECS)	(18)					42.725	18.605	106.696	181.879	-63.971	181.130	0.01	-0.01	-1.17	0.
AVG STR RATE GOING INTO CRVS (DEG/SEC)	(19)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV TIM FRM STRT OF STR TO MAX STR (SEC)	(20)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT BEF TURN (MPH)	(21)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG SPD CHG DURING TURNS (MPH)	(22)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT AFT TURN (MPH)	(23)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM ACC LET-UP TO STRT OF TRN (SEC)	(24)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM END OF TRN TO ACC PRESS (SECS)	(25)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG GSR BASE RATE DUR DRV (DIG UNITS)	(26)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG DRIFT OF GSR BASE RATE (DIG UN/SEC)	(27)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TOT NO. OF GSR REACTIONS DURING THE DRV	(28)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG MAG OF GSR REACTIONS (DIG UNITS)	(29)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG LENGTH OF BREATHS (SECONDS)	(30)					1.960	0.278	2.125	0.495	-0.164	0.516	0.32	0.	-0.89	0.
S.D. OF LENGTH OF BREATHS (SECONDS)	(31)					0.639	0.226	0.786	0.322	-0.146	0.432	0.49	0.	-1.12	0.
AVG DEPTH OF BREATHS (DIG UNITS)	(32)					404.627	114.031	456.066	103.090	-51.438	111.548	1.22	0.	-1.53	0.
S.D. OF DEPTH OF BREATHS (DIG UNITS)	(33)					317.432	84.586	339.188	88.138	-21.756	76.385	0.92	0.	-0.94	0.
TOT NO. OF BREATHS DURING THE DRIVE	(34)					497.583	91.097	493.833	155.432	3.750	194.434	0.34	0.	0.06	0.
BRTHS WHR EXH TIM .LT. INH TIM (PR CT)	(35)					49.200	4.790	46.933	5.375	2.266	8.011	0.79	0.	0.94	0.
AVG BRTH DEP/WID RATIO (DIG UN/CNT IND)	(36)					214.342	64.388	229.195	61.841	-14.853	84.255	1.08	0.	-0.58	0.
SD OF BRTH DEP/WID RAT (DIG UN/CNT IND)	(37)					163.383	42.843	163.156	41.977	0.227	43.471	1.04	0.	0.02	0.
LENGTH OF DRIVE (SECONDS)	(38)					2906.000	465.278	3017.500	667.610	-111.500	868.138	0.49	0.	-0.43	0.
LENGTH OF DRIVE (FILM FRAMES)	(39)					61514.000	3500.376	61498.000	2517.167	16.000	4878.761	1.93	0.	0.01	0.
LEN OF PTH OF CAR FOR DRV (EQ FLM FRMS)	(40)					66787.199	3854.456	66781.983	4000.235	5.318	5067.209	0.93	0.	0.00	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS	(41)					1.087	0.042	1.085	0.034	0.002	0.026	1.56	0.	0.19	0.

COMPILED DRIVE STATISTICS FOR ALL SUBJECTS

MARIHUANA

DATE = 08/18/71

	(A)	(B)	(C)	(D)
(F-TEST CR BOUN --	0.19,	0.29,	3.47,	5.32)
(T-TEST CR BOUN --	-3.11,	-2.20,	2.20,	3.11)

		PLA/PL (CGRUP) 12 SUBS		SAK/PL (TGRUP) 12 SUBS		DIFFERENCE (CG-TG) 12 SUBS		---F-TEST--- NULL HYPOTH SD(C)=SD(T)		---T-TEST--- NULL HYPOTH MU(C)=MU(T)	
		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
AVG SPEED DURING THE DRIVE (MPH)	(1)	28.386	6.666	22.452	8.400	5.934	10.568	0.63	0.	1.86	0.
S.D. OF SPEED DURING THE DRIVE (MPH)	(2)	7.408	3.442	7.852	4.343	-0.443	5.914	0.63	0.	-0.25	0.
AVG SPD DURING THE DRIVE (FLM FRMS/SEC)	(3)	21.645	3.270	20.849	4.160	0.796	4.764	0.62	0.	0.55	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES	(4)	0.821	2.482	1.616	2.367	-0.795	3.764	1.10	0.	-0.70	0.
AVG ACCEL POSITION (PR CT DEPRESSED)	(5)	9.924	1.373	10.261	1.637	-0.337	2.509	0.70	0.	-0.45	0.
S.D. OF ACCEL POSITION (PR CT DEPRESSED)	(6)	3.554	1.600	3.228	1.357	0.326	2.375	1.39	0.	0.45	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES	(7)	0.385	0.292	0.617	0.717	-0.232	0.739	0.17	-0.01	-1.04	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES	(8)	0.108	0.074	0.128	0.146	-0.019	0.163	0.26	-0.05	-0.39	0.
NO. OF BRK PRESSES DURING THE DRIVE	(9)	10.583	12.433	6.333	6.860	4.250	12.397	3.28	0.	1.14	0.
MAX PRESSURE DURING BRK PRS (PR CT MAX)	(10)	20.667	19.497	26.979	29.366	-5.312	37.515	0.44	0.	-0.56	0.
AVERAGE STEERING WHEEL POSITION (DEGS)	(11)	-29.281	19.904	-28.161	12.507	-1.120	13.335	2.53	0.	-0.28	0.
AVG TIME BET STR REVS OF 5 PR CT (SECS)	(12)	1.335	1.984	0.411	1.421	0.924	2.476	1.95	0.	1.24	0.
AVG DIF BETWEEN STR AND COMP (DEGS)	(13)	16.800	6.468	15.323	5.439	1.477	4.797	1.41	0.	1.02	0.
S.D. OF DIF BETWEEN STR AND COMP (DEGS)	(14)	23.604	3.693	24.863	6.927	-1.259	5.141	0.28	-0.05	-0.81	0.
MAX RATE OF CHG OF STEERING (DEGS/SEC)	(15)	-55.273	494.475	99.040	468.183	-154.312	401.363	1.12	0.	-1.28	0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES	(16)	0.926	0.852	1.189	1.400	-0.263	1.296	0.37	0.	-0.67	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES	(17)	0.309	0.152	0.346	0.300	-0.037	0.278	0.26	-0.05	-0.44	0.
MAX TIME BET STR REVS OF 5 DEGS (SECS)	(18)	42.725	18.605	48.510	20.854	-5.784	21.575	0.80	0.	-0.89	0.
AVG STR RATE GOING INTO CRVS (DEG/SEC)	(19)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV TIM FRM STRT OF STR TO MAX STR (SEC)	(20)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT BEF TURN (MPH)	(21)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG SPD CHG DURING TURNS (MPH)	(22)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT AFT TURN (MPH)	(23)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM ACC LET-UP TO STRT OF TRN (SEC)	(24)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM END OF TRN TO ACC PRESS (SECS)	(25)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG GSR BASE RATE DUR DRV (DIG UNITS)	(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG DRIFT OF GSR BASE RATE (DIG UN/SEC)	(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TOT NO. OF GSR REACTIONS DURING THE DRV	(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG MAG OF GSR REACTIONS (DIG UNITS)	(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG LENGTH OF BREATHS (SECONDS)	(30)	1.960	0.278	2.157	0.472	-0.197	0.606	0.35	0.	-1.08	0.
S.D. OF LENGTH OF BREATHS (SECONDS)	(31)	0.639	0.226	0.780	0.311	-0.141	0.426	0.52	0.	-1.10	0.
AVG DEPTH OF BREATHS (DIG UNITS)	(32)	404.627	114.031	419.244	138.257	-14.616	147.165	0.68	0.	-0.33	0.
S.D. OF DEPTH OF BREATHS (DIG UNITS)	(33)	317.432	84.586	306.681	121.790	10.751	162.575	0.48	0.	0.22	0.
TOT NO. OF BREATHS DURING THE DRIVE	(34)	497.583	91.097	487.917	125.834	9.667	161.404	0.52	0.	0.20	0.
BRTHS WHR EXH TIM .LT. INH TIM (PR CT)	(35)	49.200	4.790	48.060	5.540	1.140	8.253	0.75	0.	0.46	0.
AVG BRTH DEP/WID RATIO (DIG UN/CNT IND)	(36)	214.342	64.388	209.587	75.775	5.755	77.587	0.72	0.	0.25	0.
SD OF BRTH DEP/WID RAT (DIG UN/CNT IND)	(37)	163.383	42.843	149.477	53.496	13.906	72.987	0.64	0.	0.63	0.
LENGTH OF DRIVE (SECONDS)	(38)	2906.000	465.278	3039.750	558.413	-133.750	633.965	0.69	0.	-0.70	0.
LENGTH OF DRIVE (FILM FRAMES)	(39)	61514.000	3500.376	61329.000	6134.194	185.000	7679.884	0.33	0.	0.08	0.
LEN OF PTH OF CAR FOR DRV (EQ FLM FRMS)	(40)	66787.199	3654.456	66321.289	6777.569	465.919	9077.484	0.17	-0.01	0.17	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS	(41)	1.087	0.042	1.079	0.037	0.008	0.032	1.27	0.	0.85	0.

COMPILED DRIVE STATISTICS FOR ALL SUBJECTS — MARIJUANA — DATE = 08/18/71

		PLA/PL (CGRUP) 12 SUBS		ALC/PL (TGRUP) 12 SUBS		DIFFERENCE (CG-TG) 12 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
(A) (B) (C) (D)		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
(F-TEST CR BOUN -- 0.19, 0.29, 3.47, 5.32)											
(T-TEST CR BOUN -- -3.11,-2.20, 2.20, 3.11)											
AVG SPEED DURING THE DRIVE (MPH)	(1)	28.386	6.666	27.186	8.544	1.200	7.005	0.61	0.	0.57	0.
S.D. OF SPEED DURING THE DRIVE (MPH)	(2)	7.408	3.442	7.645	4.111	-0.236	3.141	0.70	0.	-0.25	0.
AVG SPD DURING THE DRIVE (FILM FRMS/SEC)	(3)	21.645	3.270	23.987	4.430	-2.341	4.997	0.54	0.	-1.55	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES	(4)	0.821	2.482	1.465	3.158	-0.644	1.750	0.62	0.	-1.22	0.
AVG ACCEL POSITION (PR CT DEPRESSED)	(5)	9.924	1.373	10.762	2.206	-0.838	1.708	0.39	0.	-1.63	0.
S.D. OF ACCEL POSITION (PR CT DEPRESSED)	(6)	3.554	1.600	3.593	0.994	-0.040	1.521	2.59	0.	-0.09	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES	(7)	0.385	0.292	0.290	0.113	0.095	0.325	6.61	0.01	0.97	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES	(8)	0.108	0.074	0.096	0.050	0.013	0.078	2.24	0.	0.54	0.
NO. OF BRK PRESSES DURING THE DRIVE	(9)	10.583	12.433	7.500	8.271	3.083	13.238	2.26	0.	0.77	0.
MAX PRESSURE DURING BRK PRS (PR CT MAX)	(10)	20.667	19.497	22.612	27.997	-1.946	23.085	0.48	0.	-0.28	0.
AVERAGE STEERING WHEEL POSITION (DEGS)	(11)	-29.281	19.904	-32.612	22.266	3.331	11.012	0.80	0.	1.00	0.
AVG TIME BET STR REVS OF 5 PR CT (SECS)	(12)	1.335	1.984	0.528	1.457	0.807	2.534	1.85	0.	1.06	0.
AVG DIF BETWEEN STR AND COMP (DEGS)	(13)	16.800	6.468	15.747	6.479	1.053	3.785	1.00	0.	0.92	0.
S.D. OF DIF BETWEEN STR AND COMP (DEGS)	(14)	23.604	3.693	23.245	4.459	0.358	4.012	0.69	0.	0.30	0.
MAX RATE OF CHG OF STEERING (DEGS/SEC)	(15)	-55.273	494.475	121.118	494.121	-176.391	820.635	1.00	0.	-0.71	0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES	(16)	0.926	0.852	0.554	0.315	0.372	0.888	7.31	0.01	1.39	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES	(17)	0.309	0.152	0.228	0.055	0.081	0.149	7.78	0.01	1.81	0.
MAX TIME BET STR REVS OF 5 DEGS (SECS)	(18)	42.725	18.605	42.596	20.244	0.129	24.712	0.84	0.	0.02	0.
AVG STR RATE GOING INTO CRVS (DEG/SEC)	(19)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV TIM FRM STRT OF STR TO MAX STR (SEC)	(20)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT REF TURN (MPH)	(21)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG SPD CHG DURING TURNS (MPH)	(22)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT AFT TURN (MPH)	(23)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM ACC LET-UP TO STRT OF TRN (SEC)	(24)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM END OF TRN TO ACC PRESS (SECS)	(25)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG GSR BASE RATE DUR DRV (DIG UNITS)	(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG DRIFT OF GSR BASE RATE (DIG UN/SEC)	(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TOT NO. OF GSR REACTIONS DURING THE DRV	(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG MAG OF GSR REACTIONS (DIG UNITS)	(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG LENGTH OF BREATHS (SECONDS)	(30)	1.960	0.278	2.188	0.470	-0.227	0.369	0.35	0.	-2.04	0.
S.D. OF LENGTH OF BREATHS (SECONDS)	(31)	0.639	0.226	0.799	0.388	-0.160	0.326	0.34	0.	-1.62	0.
AVG DEPTH OF BREATHS (DIG UNITS)	(32)	404.627	114.031	457.299	110.291	-52.672	135.299	1.07	0.	-1.29	0.
S.D. OF DEPTH OF BREATHS (DIG UNITS)	(33)	317.432	84.586	329.460	94.246	-12.028	106.183	0.81	0.	-0.38	0.
TOT NO. OF BREATHS DURING THE DRIVE	(34)	497.583	91.097	402.083	92.458	95.500	110.473	0.97	0.	2.87	0.05
BRTHS WHR EXH TIM .LT. INH TIM (PR CT)	(35)	49.200	4.790	48.671	3.713	0.528	3.585	1.66	0.	0.49	0.
AVG BRTH DEP/WID RATIO (DIG UN/CNT IND)	(36)	214.342	64.388	220.998	43.037	-6.656	61.129	2.24	0.	-0.36	0.
SD OF BRTH DEP/WID RAT (DIG UN/CNT IND)	(37)	163.383	42.843	162.420	39.535	0.963	46.157	1.17	0.	0.07	0.
LENGTH OF DRIVE (SECONDS)	(38)	2906.000	465.278	2561.500	466.383	344.500	499.199	1.00	0.	2.29	0.05
LENGTH OF DRIVE (FILM FRAMES)	(39)	61514.000	3500.376	59404.333	1263.949	2109.667	3659.059	7.67	0.01	1.91	0.
LEN OF PTH OF CAR FOR DRV (EQ FLM FRMS)	(40)	66767.199	3654.456	63607.743	2284.921	3175.456	4075.473	2.56	0.	2.59	0.05
RATIO OF EQ FLM FRMS TO REAL FLM FRMS	(41)	1.087	0.042	1.071	0.036	0.016	0.028	1.39	0.	1.86	0.

COMPILED EVENT STATISTICS FOR ALL SUBJECTS ACROSS ALL EVENTS
RESULTS OF DISTRIBUTION OF THE INDIVIDUAL SUBJECT MEANS

MARIHUANA

DATE = 08/18/71

	(A)	(B)	(C)	(D)	PLA/PL (CGRUP) 12 SUBS		EXT/PL (TGRUP) 12 SUBS		DIFFERENCE (CG-TG) 12 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
(F-TEST CR BOUN --	0.19,	0.29,	3.47,	5.32)										
(T-TEST CR BOUN --	-3.11,	-2.20,	2.20,	3.11)										
					MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
SPD AT THE BEGINNING OF THE EVENT (MPH)				(1)	26.515	6.570	23.136	8.336	3.378	10.967	0.62	0.	1.02	0.
SPD AT THE END OF THE EVENT (MPH)				(2)	26.478	6.866	23.300	8.283	3.178	11.315	0.69	0.	0.93	0.
MINIMUM SPEED DURING THE EVENT (MPH)				(3)	21.145	7.679	16.860	10.373	4.286	13.943	0.55	0.	1.02	0.
MAXIMUM SPEED DURING THE EVENT (MPH)				(4)	34.006	7.614	36.224	8.636	-2.218	10.330	0.78	0.	-0.71	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES				(5)	0.821	2.543	2.700	4.672	-1.879	5.681	0.30	0.	-1.10	0.
AVERAGE SPEED DURING THE EVENT (MPH)				(6)	26.689	6.575	23.002	8.452	3.687	11.176	0.61	0.	1.09	0.
AVG SPD DURING THE EVENT (FILM FRMS/SEC)				(7)	22.047	3.752	21.683	3.930	0.364	5.531	0.91	0.	0.22	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES				(8)	0.370	0.252	0.447	0.432	-0.077	0.498	0.34	0.	-0.51	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES				(9)	0.092	0.074	0.099	0.076	-0.007	0.092	0.96	0.	-0.25	0.
TIME TO 1ST COMPLETE ACC LET-UP (SECS)				(10)	0.656	0.606	0.672	0.818	-0.017	0.979	0.55	0.	-0.06	0.
AVG ACCEL POSITION (PR CT DEPRESSED)				(11)	9.726	1.709	10.080	1.668	-0.354	2.072	1.05	0.	-0.57	0.
TIM TO 1ST ACC LET-UP OF 3 PR CT (SECS.				(12)	2.696	0.491	2.759	0.594	-0.063	0.691	0.68	0.	-0.23	0.
MAX POSITION OF ACCEL (PR CT DEPRESSED)				(13)	14.341	3.340	14.043	1.697	0.298	2.931	3.87	0.05	0.34	0.
TIM FRM ACC LET-UP TO 1ST BRK PRS (SEC)				(14)	0.044	0.180	-0.011	0.160	0.054	0.189	1.25	0.	0.95	0.
TIM TO 1ST BR PRS FRM STRT OF EVT (SEC)				(15)	0.431	0.534	0.466	0.373	-0.035	0.709	2.04	0.	-0.16	0.
MAX AMT OF BRK PRESSURE (PR CT OF MAX)				(16)	4.504	3.594	3.047	2.884	1.457	4.775	1.55	0.	1.01	0.
TIME TO DEP DIST IN BREATHING (SECS)				(17)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO WID DIST IN BREATHING (SECS)				(18)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVERAGE BREATHING RATE (BREATHS/SEC)				(19)	0.485	0.073	0.455	0.109	0.030	0.136	0.45	0.	0.74	0.
SEQUENCE NO. OF LAST MAN EVT MARKER				(20)	116.587	92.328	99.646	69.638	16.941	134.977	1.76	0.	0.42	0.
TIME OF LAST MAN EVT MARKER (SECS)				(21)	1134.763	228.520	1197.983	296.658	-63.220	375.960	0.59	0.	-0.56	0.
TIME AT THE BEGINNING OF EVT (SECS)				(22)	1172.039	223.569	1230.489	312.531	-58.450	394.463	0.51	0.	-0.49	0.
TIME AT THE END OF EVT (SECS)				(23)	1186.707	225.601	1245.150	314.927	-58.443	397.800	0.51	0.	-0.49	0.
LENGTH OF THE EVENT (SECONDS)				(24)	14.669	2.365	14.661	2.790	0.007	3.739	0.72	0.	0.01	0.
LENGTH OF THE EVENT (FILM FRAMES)				(25)	300.107	15.239	300.049	15.399	0.058	0.909	0.98	0.	0.21	0.
GSR BASE RATE FOR THE EVENT (DIG UNITS)				(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO A GSR CHG OF THE STD AMT (SECS)				(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO THE MAXIMUM GSR CHANGE (SECS)				(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX GSR CHG DURING THE EVT (DIG UNITS)				(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG POSITION OF THE STR WHL (DEGS)				(30)	-32.234	21.616	-37.418	21.253	5.184	17.110	1.03	0.	1.00	0.
AVG RATE OF CHG OF STR WHL (DEG/SEC)				(31)	157.517	27.078	153.757	19.617	3.759	26.130	1.91	0.	0.48	0.
TIME TO BEG OF STR INTO A TURN (SECS)				(32)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE GOING INTO TURN (DEG/SEC)				(33)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX TURN OF THE STR WHL (DEGS)				(34)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE COMING OUT OF TURN (DG/SC)				(35)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES				(36)	1.241	1.473	1.033	0.716	0.208	1.188	4.24	0.05	0.58	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES				(37)	0.378	0.181	0.339	0.084	0.039	0.175	4.68	0.05	0.74	0.
STEER REVS OF 15 DEG PER 25 FILM FRAMES				(38)	0.266	0.096	0.238	0.045	0.028	0.093	4.57	0.05	1.00	0.
LEN OF PTH OF CAR IN EVT (EQ FLM FRMS)				(39)	332.179	22.282	330.911	22.789	1.267	7.844	0.96	0.	0.54	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS				(40)	1.116	0.042	1.112	0.030	0.005	0.032	1.96	0.	0.48	0.
AVG DIF BETWEEN STR AND STR COMP (DEGS)				(41)	53.422	18.255	53.508	16.918	-0.087	13.659	1.16	0.	-0.02	0.
MAX DIF BETWEEN STR AND STR COMP (DEGS)				(42)	-10.100	88.560	-29.345	87.418	19.745	51.909	1.03	0.	1.26	0.

COMPILED EVENT STATISTICS FOR ALL SUBJECTS ACROSS ALL EVENTS
RESULTS OF DISTRIBUTION OF THE INDIVIDUAL SUBJECT MEANS

MARIHUANA

DATE = 08/18/71

	(A)	(B)	(C)	(D)	PLA/PL (CGRUP) 12 SUBS		SMK/PL (TGRUP) 12 SUBS		DIFFERENCE (CG-TG) 12 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
(F-TEST CR BOUN --	0.19,	0.29,	3.47,	5.32)										
(T-TEST CR BOUN --	-3.11,	-2.20,	2.20,	3.11)										
					MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
SPD AT THE BEGINNING OF THE EVENT (MPH)				(1)	26.925	7.042	21.587	7.969	5.338	10.771	0.78	0.	1.64	0.
SPD AT THE END OF THE EVENT (MPH)				(2)	26.881	7.288	20.847	8.180	6.034	11.528	0.79	0.	1.74	0.
MINIMUM SPEED DURING THE EVENT (MPH)				(3)	21.539	8.023	14.258	9.222	7.281	13.267	0.76	0.	1.82	0.
MAXIMUM SPEED DURING THE EVENT (MPH)				(4)	34.330	8.009	34.675	10.770	-0.345	12.000	0.55	0.	-0.10	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES				(5)	0.813	2.545	1.803	2.613	-0.991	4.010	0.95	0.	-0.82	0.
AVERAGE SPEED DURING THE EVENT (MPH)				(6)	27.004	7.024	21.331	7.823	5.673	10.476	0.81	0.	1.80	0.
AVG SPD DURING THE EVENT (FLM FRMS/SEC)				(7)	22.347	3.964	21.723	3.792	0.624	4.159	1.09	0.	0.50	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES				(8)	0.386	0.280	0.537	0.559	-0.151	0.556	0.25	-0.05	-0.90	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES				(9)	0.094	0.074	0.098	0.096	-0.003	0.111	0.60	0.	-0.10	0.
TIME TO 1ST COMPLETE ACC LET-UP (SECS)				(10)	0.583	0.602	0.609	0.932	-0.026	0.781	0.42	0.	-0.11	0.
AVG ACCEL POSITION (PR CT DEPRESSED)				(11)	9.811	1.702	9.476	1.244	0.335	2.506	1.87	0.	0.44	0.
TIM TO 1ST ACC LET-UP OF 3 PR CT (SECS.				(12)	2.692	0.516	2.714	0.746	-0.022	1.066	0.48	0.	-0.07	0.
MAX POSITION OF ACCEL (PR CT DEPRESSED)				(13)	14.529	3.564	13.465	2.190	1.064	4.663	2.65	0.	0.76	0.
TIM FRM ACC LET-UP TO 1ST BRK PRS (SEC)				(14)	0.055	0.148	0.035	0.261	0.019	0.292	0.32	0.	0.22	0.
TIM TO 1ST BR PRS FRM STRT OF EVT (SEC)				(15)	0.490	0.601	0.696	0.730	-0.206	0.885	0.46	0.	-0.77	0.
MAX AMT OF BRK PRESSURE (PR CT OF MAX)				(16)	5.305	4.199	8.415	10.452	-3.109	11.640	0.16	-0.01	-0.89	0.
TIME TO DEP DIST IN BREATHING (SECS)				(17)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO MID DIST IN BREATHING (SECS)				(18)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVERAGE BREATHING RATE (BREATHS/SEC)				(19)	0.493	0.058	0.459	0.082	0.035	0.127	0.69	0.	0.90	0.
SEQUENCE NO. OF LAST MAN EVT MARKER				(20)	124.533	98.529	128.136	70.947	-3.603	115.256	1.93	0.	-0.10	0.
TIME OF LAST MAN EVT MARKER (SECS)				(21)	1231.378	175.851	1334.477	237.636	-103.099	322.221	0.55	0.	-1.06	0.
TIME AT THE BEGINNING OF EVT (SECS)				(22)	1270.278	174.974	1401.766	267.065	-131.488	335.971	0.43	0.	-1.30	0.
TIME AT THE END OF EVT (SECS)				(23)	1285.470	176.733	1417.588	269.813	-132.119	338.466	0.43	0.	-1.29	0.
LENGTH OF THE EVENT (SECONDS)				(24)	15.192	2.249	15.822	3.394	-0.631	2.745	0.44	0.	-0.76	0.
LENGTH OF THE EVENT (FILM FRAMES)				(25)	314.578	8.537	315.263	8.775	-0.685	1.132	0.95	0.	-2.01	0.
GSR BASE RATE FOR THE EVENT (DIG UNITS)				(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO A GSR CHG OF THE STD AMT (SECS)				(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO THE MAXIMUM GSR CHANGE (SECS)				(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX GSR CHG DURING THE EVT (DIG UNITS)				(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG POSITION OF THE STR WHL (DEGS)				(30)	-31.427	21.135	-29.162	11.469	-2.265	16.886	3.40	0.	-0.44	0.
AVG RATE OF CHG OF STR WHL (DEG/SEC)				(31)	156.890	27.833	160.077	31.703	-3.188	32.009	0.77	0.	-0.33	0.
TIME TO BEG OF STR INTO A TURN (SECS)				(32)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE GOING INTO TURN (DEG/SEC)				(33)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX TURN OF THE STR WHL (DEGS)				(34)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE COMING OUT OF TURN (DG/SC)				(35)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES				(36)	1.257	1.627	1.454	1.406	-0.197	1.624	1.34	0.	-0.40	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES				(37)	0.356	0.161	0.392	0.242	-0.035	0.219	0.44	0.	-0.54	0.
STEER REVS OF 15 DEG PER 25 FILM FRAMES				(38)	0.242	0.077	0.234	0.093	0.008	0.102	0.68	0.	0.26	0.
LEN OF PTH OF CAR IN EVT (EQ FLM FRMS)				(39)	348.249	12.945	347.239	14.871	1.010	11.985	0.76	0.	0.25	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS				(40)	1.115	0.034	1.106	0.035	0.009	0.029	0.96	0.	1.04	0.
AVG DIF BETWEEN STR AND STR COMP (DEGS)				(41)	53.038	15.103	47.992	15.236	5.046	14.545	1.41	0.	1.19	0.
MAX DIF BETWEEN STR AND STR COMP (DEGS)				(42)	-8.914	87.155	-23.473	81.424	14.559	49.625	1.15	0.	0.97	0.

COMPILED EVENT STATISTICS FOR ALL SUBJECTS ACROSS ALL EVENTS
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MARIJUANA

DATE = 08/18/71

(A) (B) (C) (D)
(F-TEST CR BOUN -- 0.19, 0.29, 3.47, 5.32)
(T-TEST CR BOUN -- -3.11,-2.20, 2.20, 3.11)

		PLA/PL (CGRUP) 12 SUBS		ALC/PL (TGRUP) 12 SUBS		DIFFERENCE (CG-TG) 12 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
SPD AT THE BEGINNING OF THE EVENT (MPH)	(1)	27.186	6.519	25.753	8.057	1.433	6.054	0.65	0.	0.78	0.
SPD AT THE END OF THE EVENT (MPH)	(2)	27.016	7.094	25.073	7.827	1.943	7.377	0.82	0.	0.87	0.
MINIMUM SPEED DURING THE EVENT (MPH)	(3)	21.598	7.986	18.782	9.838	2.817	8.407	0.66	0.	1.11	0.
MAXIMUM SPEED DURING THE EVENT (MPH)	(4)	34.356	7.912	36.891	10.207	-2.535	7.969	0.60	0.	-1.06	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES	(5)	0.800	2.502	1.585	3.512	-0.785	1.880	0.51	0.	-1.39	0.
AVERAGE SPEED DURING THE EVENT (MPH)	(6)	27.056	6.992	25.405	7.877	1.651	6.682	0.79	0.	0.82	0.
AVG SPD DURING THE EVENT (FLM FRMS/SEC)	(7)	22.377	3.929	24.672	4.909	-2.296	5.165	0.64	0.	-1.47	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES	(8)	0.387	0.280	0.295	0.143	0.092	0.292	3.84	0.05	1.04	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES	(9)	0.093	0.074	0.090	0.046	0.003	0.067	2.63	0.	0.15	0.
TIME TO 1ST COMPLETE ACC LET-UP (SECS)	(10)	0.602	0.644	0.403	0.593	0.200	0.576	1.18	0.	1.15	0.
AVG ACCEL POSITION (PR CT DEPRESSED)	(11)	9.832	1.739	9.990	2.183	-0.158	1.701	0.63	0.	-0.31	0.
TIM TO 1ST ACC LET-UP OF 3 PR CT (SECS.	(12)	2.562	0.430	1.963	0.709	0.599	0.807	0.37	0.	2.46	0.05
MAX POSITION OF ACCEL (PR CT DEPRESSED)	(13)	14.519	3.599	14.989	3.092	-0.471	2.146	1.36	0.	-0.73	0.
TIM FRM ACC LET-UP TO 1ST BRK PRS (SEC)	(14)	0.042	0.173	0.041	0.190	0.001	0.237	0.82	0.	0.01	0.
TIM TO 1ST BR PRS FRM STRT OF EVT (SEC)	(15)	0.472	0.586	0.772	0.687	-0.301	0.619	0.73	0.	-1.61	0.
MAX AMT OF BRK PRESSURE (PR CT OF MAX)	(16)	5.105	4.063	7.551	8.039	-2.445	7.174	0.26	-0.05	-1.13	0.
TIME TO DEP DIST IN BREATHING (SECS)	(17)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO MID DIST IN BREATHING (SECS)	(18)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVERAGE BREATHING RATE (BREATHS/SEC)	(19)	0.491	0.065	0.436	0.078	0.055	0.084	0.70	0.	2.17	0.
SEQUENCE NO. OF LAST MAN EVT MARKER	(20)	123.352	98.016	123.015	91.575	0.338	103.649	1.15	0.	0.01	0.
TIME OF LAST MAN EVT MARKER (SECS)	(21)	1231.831	191.019	1205.007	218.981	26.824	191.418	0.76	0.	0.46	0.
TIME AT THE BEGINNING OF EVT (SECS)	(22)	1269.727	186.368	1235.032	216.622	34.696	220.112	0.74	0.	0.52	0.
TIME AT THE END OF EVT (SECS)	(23)	1284.769	188.195	1248.729	219.445	36.039	222.311	0.74	0.	0.54	0.
LENGTH OF THE EVENT (SECONDS)	(24)	15.041	2.324	13.698	3.018	1.344	2.636	0.59	0.	1.69	0.
LENGTH OF THE EVENT (FILM FRAMES)	(25)	311.818	9.426	312.531	9.590	-0.713	0.525	0.97	0.	-4.50	-0.01
GSR BASE RATE FOR THE EVENT (DIG UNITS)	(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO A GSR CHG OF THE STD AMT (SECS)	(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO THE MAXIMUM GSR CHANGE (SECS)	(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX GSR CHG DURING THE EVT (DIG UNITS)	(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG POSITION OF THE STR WHL (DEGS)	(30)	-30.584	21.989	-32.983	22.645	2.399	13.332	0.94	0.	0.60	0.
AVG RATE OF CHG OF STR WHL (DEG/SEC)	(31)	157.612	27.455	154.593	22.047	3.018	30.379	1.55	0.	0.33	0.
TIME TO BEG OF STR INTO A TURN (SECS)	(32)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE GOING INTO TURN (DEG/SEC)	(33)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX TURN OF THE STR WHL (DEGS)	(34)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE COMING OUT OF TURN (DG/SC)	(35)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES	(36)	1.272	1.621	0.727	0.390	0.545	1.594	17.30	0.01	1.14	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES	(37)	0.354	0.163	0.291	0.085	0.064	0.167	3.64	0.05	1.26	0.
STEER REVS OF 15 DEG PER 25 FILM FRAMES	(38)	0.244	0.080	0.215	0.055	0.029	0.068	2.09	0.	1.42	0.
LEN OF PTH OF CAR IN EVT (EQ FLM FRMS)	(39)	345.332	14.687	342.176	13.429	3.156	7.098	1.20	0.	1.47	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS	(40)	1.115	0.035	1.110	0.031	0.006	0.029	1.23	0.	0.67	0.
AVG DIF BETWEEN STR AND STR COMP (DEGS)	(41)	53.410	18.601	50.443	19.198	2.967	11.687	0.94	0.	0.82	0.
MAX DIF BETWEEN STR AND STR COMP (DEGS)	(42)	-9.194	87.908	-24.322	87.617	15.128	54.443	1.01	0.	0.92	0.

COMPILED DRIVE STATISTICS FOR ALL SUBJECTS

MARIHUANA AND ALCOHOL

DATE= 09/09/71

	(A)	(B)	(C)	(D)	PLA/PL (CGRUP) 11 SUBS		ALC/EX (TGRUP) 11 SUBS		DIFFERENCE (CG-TG) 11 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
(F-TEST CR BOUN --	0.17,	0.27,	3.72,	5.85)										
(T-TEST CR BOUN --	-3.17,	-2.23,	2.23,	3.17)										
					MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
AVG SPEED DURING THE DRIVE (MPH)				(1)	24.724	7.381	27.278	4.767	-2.554	10.443	2.40	0.	-0.77	0.
S.D. OF SPEED DURING THE DRIVE (MPH)				(2)	7.626	4.007	6.050	3.507	1.576	4.884	1.31	0.	1.02	0.
AVG SPD DURING THE DRIVE (FLM FRMS/SEC)				(3)	21.720	2.707	21.099	3.709	0.621	3.352	0.53	0.	0.59	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES				(4)	1.003	2.581	0.065	0.045	0.939	2.582	48.31	0.01	1.15	0.
AVG ACCEL POSITION (PR CT DEPRESSED)				(5)	8.787	2.191	7.852	2.912	0.935	3.586	0.57	0.	0.82	0.
S.D. OF ACCEL POSITION (PR CT DEPRESSED)				(6)	3.160	0.898	3.121	1.252	0.039	1.027	0.51	0.	0.12	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES				(7)	0.371	0.300	0.207	0.139	0.164	0.343	4.68	0.05	1.51	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES				(8)	0.109	0.083	0.057	0.035	0.052	0.082	5.56	0.05	2.01	0.
NO. OF BRK PRESSES DURING THE DRIVE				(9)	9.455	13.131	3.273	3.466	6.182	11.831	14.35	0.01	1.65	0.
MAX PRESSURE DURING BRK PRS (PR CT MAX)				(10)	18.341	21.034	11.955	14.601	6.386	27.837	2.08	0.	0.73	0.
AVERAGE STEERING WHEEL POSITION (DEGS)				(11)	-29.532	24.935	-33.041	27.261	3.509	17.464	0.84	0.	0.64	0.
AVG TIME BET STR REVS OF 5 PR CT (SECS)				(12)	1.091	2.036	1.113	2.034	-0.022	2.161	1.00	0.	-0.03	0.
AVG DIF BETWEEN STR AND COMP (DEGS)				(13)	18.724	5.849	22.341	5.989	-3.618	7.953	0.95	0.	-1.44	0.
S.D. OF DIF BETWEEN STR AND COMP (DEGS)				(14)	23.728	3.837	26.562	13.486	-2.833	11.351	0.08	-0.01	-0.79	0.
MAX RATE OF CHG OF STEERING (DEGS/SEC)				(15)	-138.503	520.782	172.385	406.185	-310.888	675.387	1.64	0.	-1.46	0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES				(16)	1.171	0.937	0.985	1.092	0.186	0.719	0.74	0.	0.82	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES				(17)	0.340	0.162	0.308	0.247	0.032	0.211	0.43	0.	0.48	0.
MAX TIME BET STR REVS OF 5 DEGS (SECS)				(18)	42.591	19.829	163.540	270.857	-120.950	282.190	0.01	-0.01	-1.36	0.
AVG STR RATE GOING INTO CRVS (DEG/SEC)				(19)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV TIM FRM STRT OF STR TO MAX STR (SEC)				(20)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT REF TURN (MPH)				(21)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG SPD CHG DURING TURNS (MPH)				(22)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT AFT TURN (MPH)				(23)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM ACC LET-UP TO STRT OF TRN (SEC)				(24)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM END OF TRN TO ACC PRESS (SECS)				(25)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG GSR BASE RATE DUR DRV (DIG UNITS)				(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG DRIFT OF GSR BASE RATE (DIG UN/SEC)				(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TOT NO. OF GSR REACTIONS DUPING THE DRV				(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG MAG OF GSR REACTIONS (DIG UNITS)				(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG LENGTH OF BREATHS (SECONDS)				(30)	2.026	0.334	1.926	0.149	0.101	0.372	5.01	0.05	0.86	0.
S.D. OF LENGTH OF BREATHS (SECONDS)				(31)	0.689	0.267	0.663	0.231	0.026	0.331	1.34	0.	0.25	0.
AVG DEPTH OF BREATHS (DIG UNITS)				(32)	363.330	82.128	379.713	117.996	-16.382	93.690	0.48	0.	-0.55	0.
S.D. OF DEPTH OF BREATHS (DIG UNITS)				(33)	287.983	66.187	317.312	110.073	-29.330	91.023	0.36	0.	-1.02	0.
TOT NO. OF BREATHS DUPING THE DRIVE				(34)	489.182	83.790	508.455	92.102	-19.273	95.552	0.83	0.	-0.64	0.
BRTHS WHR EXH TIM .LT. INH TIM (PR CT)				(35)	48.717	4.926	47.855	3.454	0.862	5.713	2.03	0.	0.48	0.
AVG BRTH DEP/WID RATIO (DIG UN/CNT IND)				(36)	186.926	43.241	201.640	55.001	-14.714	53.592	0.62	0.	-0.87	0.
SD OF BRTH DEP/WID RAT (DIG UN/CNT IND)				(37)	147.360	31.834	164.304	53.285	-16.944	42.691	0.36	0.	-1.26	0.
LENGTH OF DRIVE (SECONDS)				(38)	2921.636	334.427	2940.182	537.788	-18.545	473.708	0.39	0.	-0.12	0.
LENGTH OF DRIVE (FILM FRAMES)				(39)	62629.363	2674.076	60070.454	2696.169	2558.909	3814.053	0.98	0.	2.24	0.05
LEN OF PTH OF CAR FOR DRV (EQ FLM FRMS)				(40)	68702.487	2972.784	66894.621	3197.576	1807.866	4401.447	0.87	0.	1.01	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS				(41)	1.098	0.039	1.114	0.027	-0.016	0.037	2.11	0.	-1.37	0.

COMPILED EVENT STATISTICS FOR ALL SUBJECTS ACROSS ALL EVENTS
RESULTS OF DISTRIBUTION OF THE INDIVIDUAL SUBJECT MEANS

MARIJUANA AND ALCOHOL

DATE: 09/20/71

	(A)	(B)	(C)	(D)	PLA/PL (CGRUP) 11 SUBS		ALC/EX (TGRUP) 11 SUBS		DIFFERENCE (CG-TG) 11 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
(F-TEST CR BOUN --	0.17,	0.27,	3.72,	5.85)										
(T-TEST CR BOUN --	-3.17,	-2.23,	2.23,	3.17)										
					MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
SPD AT THE BEGINNING OF THE EVENT (MPH)				(1)	23.653	7.458	27.209	5.863	-3.556	9.354	1.62	0.	-1.20	0.
SPD AT THE END OF THE EVENT (MPH)				(2)	23.519	7.565	26.869	5.542	-3.350	9.358	1.86	0.	-1.12	0.
MINIMUM SPEED DURING THE EVENT (MPH)				(3)	17.873	9.385	21.969	5.265	-4.096	11.658	3.18	0.	-1.11	0.
MAXIMUM SPEED DURING THE EVENT (MPH)				(4)	33.959	9.193	31.374	6.480	2.586	7.151	2.01	0.	1.14	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES				(5)	1.005	2.605	0.044	0.036	0.961	2.598	25.31	0.01	1.17	0.
AVERAGE SPEED DURING THE EVENT (MPH)				(6)	23.359	7.801	26.959	5.657	-3.600	9.699	1.90	0.	-1.17	0.
AVG SPD DURING THE EVENT (FLM FRMS/SEC)				(7)	22.133	3.395	23.536	4.017	-1.402	4.599	0.71	0.	-0.96	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES				(8)	0.307	0.239	0.173	0.119	0.134	0.264	4.04	0.05	1.61	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES				(9)	0.068	0.061	0.043	0.035	0.026	0.061	3.02	0.	1.33	0.
TIME TO 1ST COMPLETE ACC LET-UP (SECS)				(10)	0.903	0.801	0.926	0.792	-0.022	0.892	1.02	0.	-0.08	0.
AVG ACCEL POSITION (PR CT DEPRESSED)				(11)	8.462	2.543	7.816	2.867	0.646	3.468	0.79	0.	0.59	0.
TIM TO 1ST ACC LET-UP OF 3 PR CT (SECS.				(12)	2.363	0.569	1.856	0.706	0.507	0.962	0.65	0.	1.67	0.
MAX POSITION OF ACCEL (PR CT DEPRESSED)				(13)	12.834	3.925	11.289	3.911	1.545	4.732	1.01	0.	1.03	0.
TIM FRM ACC LET-UP TO 1ST BRK PRS (SEC)				(14)	0.009	0.182	-0.046	0.190	0.055	0.290	0.92	0.	0.60	0.
TIM TO 1ST BR PRS FRM STRT OF EVT (SEC)				(15)	0.451	0.566	0.309	0.529	0.142	0.599	1.15	0.	0.75	0.
MAX AMT OF BRK PRESSURE (PR CT OF MAX)				(16)	5.192	5.641	4.325	6.212	0.867	6.270	0.82	0.	0.44	0.
TIME TO DEP DIST IN BREATHING (SECS)				(17)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO MID DIST IN BREATHING (SECS)				(18)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVERAGE BREATHING RATE (BREATHS/SEC)				(19)	0.473	0.092	0.498	0.038	-0.025	0.104	5.93	0.01	-0.77	0.
SEQUENCE NO. OF LAST MAN EVT MARKER				(20)	120.777	99.102	86.608	59.319	34.169	129.773	2.79	0.	0.83	0.
TIME OF LAST MAN EVT MARKER (SECS)				(21)	1209.895	198.586	1167.269	329.175	42.626	224.817	0.36	0.	0.60	0.
TIME AT THE BEGINNING OF EVT (SECS)				(22)	1248.489	200.258	1226.320	263.870	22.169	190.746	0.58	0.	0.37	0.
TIME AT THE END OF EVT (SECS)				(23)	1263.183	202.206	1240.160	265.896	23.023	192.744	0.58	0.	0.38	0.
LENGTH OF THE EVENT (SECONDS)				(24)	14.694	2.226	13.840	2.576	0.854	2.490	0.75	0.	1.09	0.
LENGTH OF THE EVENT (FILM FRAMES)				(25)	307.783	13.915	308.018	14.093	-0.235	0.679	0.97	0.	-1.09	0.
GSR BASE RATE FOR THE EVENT (DIG UNITS)				(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO A GSR CHG OF THE STD AMT (SECS)				(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO THE MAXIMUM GSR CHANGE (SECS)				(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX GSR CHG DURING THE EVT (DIG UNITS)				(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG POSITION OF THE STR WHL (DEGS)				(30)	-31.206	27.049	-34.267	28.159	3.061	17.566	0.92	0.	0.55	0.
AVG RATE OF CHG OF STR WHL (DEG/SEC)				(31)	173.385	33.912	172.385	29.526	1.000	29.227	1.32	0.	0.11	0.
TIME TO BEG OF STR INTO A TURN (SECS)				(32)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE GOING INTO TURN (DEG/SEC)				(33)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX TURN OF THE STR WHL (DEGS)				(34)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE COMING OUT OF TURN (DG/SC)				(35)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES				(36)	1.866	2.076	1.417	1.564	0.449	1.557	1.76	0.	0.91	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES				(37)	0.451	0.299	0.331	0.206	0.120	0.348	2.11	0.	1.09	0.
STEER REVS OF 15 DEG PER 25 FILM FRAMES				(38)	0.276	0.108	0.199	0.073	0.077	0.113	2.18	0.	2.16	0.
LEN OF PTH OF CAR IN EVT (EQ FLM FRMS)				(39)	345.245	21.725	347.274	19.068	-2.029	10.746	1.30	0.	-0.60	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS				(40)	1.130	0.042	1.132	0.026	-0.002	0.039	2.57	0.	-0.18	0.
AVG DIF BETWEEN STR AND STR COMP (DEGS)				(41)	59.194	17.412	49.551	12.549	7.357	15.430	1.93	0.	1.46	0.
MAX DIF BETWEEN STR AND STR COMP (DEGS)				(42)	8.662	95.111	29.285	103.583	-20.603	57.579	0.94	0.	-1.13	0.

COMPILE DRIVE STATISTICS FOR ALL SUBJECTS — LIBRIUM — DATE 08/18/71

(F-TEST CR BOUN -- 0.11, 0.20, 5.00, 8.85)
(T-TEST CR BOUN -- -3.50,-2.36, 2.36, 3.50)

		PL/PL (CGRUP) 8 SUBS		AL/PL (TGRUP) 8 SUBS		DIFFERENCE (CG-TG) 8 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
AVG SPEED DURING THE DRIVE (MPH)	(1)	40.598	9.033	42.800	4.846	-2.202	10.571	3.47	0.	-0.55	0.
S.D. OF SPEED DURING THE DRIVE (MPH)	(2)	8.646	2.187	8.952	2.174	-0.306	2.496	1.01	0.	-0.32	0.
AVG SPD DURING THE DRIVE (FLM FRMS/SEC)	(3)	22.713	3.188	24.830	2.779	-2.116	3.120	1.32	0.	-1.39	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES	(4)	0.030	0.014	0.030	0.017	0.001	0.010	0.66	0.	0.19	0.
AVG ACCEL POSITION (PR CT DEPRESSED)	(5)	11.188	1.003	11.945	0.627	-0.757	0.763	2.56	0.	-2.62	-0.05
S.D. OF ACCEL POSITION (PR CT DEPRESSED)	(6)	2.751	0.765	3.399	0.644	-0.647	0.763	1.41	0.	-2.24	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES	(7)	0.271	0.202	0.357	0.102	-0.086	0.220	3.92	0.	-1.04	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES	(8)	0.087	0.071	0.113	0.053	-0.026	0.045	1.80	0.	-1.57	0.
NO. OF BRK PRESSES DURING THE DRIVE	(9)	6.875	10.517	5.250	5.717	1.625	6.363	3.38	0.	0.68	0.
MAX PRESSURE DURING BRK PRS (PR CT MAX)	(10)	8.156	5.244	5.662	4.684	2.494	5.735	1.25	0.	1.15	0.
AVERAGE STEERING WHEEL POSITION (DEGS)	(11)	-20.921	1.832	-24.137	1.722	3.217	2.439	1.13	0.	3.49	0.05
AVG TIME BET STR REVS OF 5 PR CT (SECS)	(12)	1.019	2.041	0.618	1.361	0.401	2.655	2.25	0.	0.40	0.
AVG DIF BETWEEN STR AND COMP (DEGS)	(13)	9.717	3.172	9.378	1.264	0.338	2.716	6.30	0.05	0.33	0.
S.D. OF DIF BETWEEN STR AND COMP (DEGS)	(14)	28.447	16.359	23.896	4.346	4.551	15.435	14.17	0.01	0.78	0.
MAX RATE OF CHG OF STEERING (DEGS/SEC)	(15)	357.176	300.759	4.538	492.266	352.638	478.828	0.37	0.	1.95	0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES	(16)	0.603	0.479	0.662	0.573	-0.059	0.498	0.70	0.	-0.31	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES	(17)	0.270	0.151	0.300	0.162	-0.030	0.086	0.87	0.	-0.93	0.
MAX TIME BET STR REVS OF 5 DEGS (SECS)	(18)	123.508	227.187	44.485	28.120	79.022	234.612	65.28	0.01	0.89	0.
AVG STR RATE GOING INTO CRVS (DEG/SEC)	(19)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV TIM FRM STRT OF STR TO MAX STR (SEC)	(20)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT BEF TURN (MPH)	(21)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG SPD CHG DURING TURNS (MPH)	(22)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT AFT TURN (MPH)	(23)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM ACC LET-UP TO STRT OF TRN (SEC)	(24)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM END OF TRN TO ACC PRESS (SECS)	(25)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG GSR BASE RATE DUR DRV (DIG UNITS)	(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG DRIFT OF GSR BASE RATE (DIG UN/SEC)	(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TOT NO. OF GSR REACTIONS DURING THE DRV	(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG MAG OF GSR REACTIONS (DIG UNITS)	(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG LENGTH OF BREATHS (SECONDS)	(30)	1.744	0.673	1.751	0.683	-0.006	0.906	0.97	0.	-0.02	0.
S.D. OF LENGTH OF BREATHS (SECONDS)	(31)	0.614	0.254	0.570	0.222	0.043	0.371	1.31	0.	0.31	0.
AVG DEPTH OF BREATHS (DIG UNITS)	(32)	434.505	202.287	240.420	153.157	194.084	312.972	1.74	0.	1.64	0.
S.D. OF DEPTH OF BREATHS (DIG UNITS)	(33)	406.166	170.821	273.928	222.628	132.238	363.787	0.59	0.	0.96	0.
TOT NO. OF BREATHS DURING THE DRIVE	(34)	387.250	151.342	358.250	149.729	29.000	245.624	1.02	0.	0.31	0.
BRTHS WHR EXH TIM .LT. INH TIM (PR CT)	(35)	44.431	17.194	42.656	16.322	1.775	23.549	1.11	0.	0.20	0.
AVG BRTH DEP/WID RATIO (DIG UN/CNT IND)	(36)	222.460	100.768	124.741	82.493	97.719	165.116	1.49	0.	1.57	0.
SD OF BRTH DEP/WID RAT (DIG UN/CNT IND)	(37)	206.486	86.660	145.111	120.980	61.376	195.078	0.52	0.	0.83	0.
LENGTH OF DRIVE (SECONDS)	(38)	2770.375	417.697	2405.125	282.920	365.250	524.350	2.18	0.	1.84	0.
LENGTH OF DRIVE (FILM FRAMES)	(39)	61647.375	2054.459	59128.375	4554.242	2522.000	4000.181	0.20	0.	1.56	0.
LEN OF PTH OF CAR FOR DRV (EQ FLM FRMS)	(40)	63660.667	2175.661	61051.698	4619.323	2608.970	4582.794	0.22	0.	1.52	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS	(41)	1.033	0.006	1.033	0.007	0.000	0.008	0.74	0.	0.13	0.

COMPILE DRIVE STATISTICS FOR ALL SUBJECTS — LIBRIUM — DATE = 03/19/71

(A) (B) (C) (D)
(F-TEST CR BOUN -- 0.11, 0.20, 5.00, 8.85)
(T-TEST CR BOUN -- -3.50,-2.36, 2.36, 3.50)

		PL/PL (CGRUP) 8 SUBS		PL/OR (TGRUP) 8 SUBS		DIFFERENCE (CG-TG) 8 SUBS		---F TEST--- NULL HYPOTH SD(C)=SD(T)		---T TEST--- NULL HYPOTH MU(C)=MU(T)	
		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
AVG SPEED DURING THE DRIVE (MPH)	(1)	40.598	9.033	40.534	5.193	0.064	5.180	3.03	0.	0.03	0.
S.D. OF SPEED DURING THE DRIVE (MPH)	(2)	8.646	2.187	10.300	4.191	-1.654	5.323	0.27	0.	-0.82	0.
AVG SPD DURING THE DRIVE (FLM FRMS/SEC)	(3)	22.713	3.188	23.558	2.545	-0.845	3.016	1.57	0.	-0.74	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES	(4)	0.030	0.014	0.024	0.011	0.007	0.005	1.64	0.	3.49	0.0
AVG ACCEL POSITION (PR CT DEPRESSED)	(5)	11.188	1.003	11.025	0.871	0.163	1.080	1.33	0.	0.40	0.
S.D. OF ACCEL POSITION (PR CT DEPRESSED)	(6)	2.751	0.765	3.017	0.701	-0.266	0.783	1.19	0.	-0.90	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES	(7)	0.271	0.202	0.378	0.273	-0.107	0.343	0.55	0.	-0.83	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES	(8)	0.087	0.071	0.111	0.069	-0.024	0.072	1.07	0.	-0.90	0.
NO. OF BRK PRESSES DURING THE DRIVE	(9)	6.875	10.517	5.125	6.900	1.750	3.992	2.32	0.	1.16	0.
MAX PRESSURE DURING BRK PRS (PR CT MAX)	(10)	8.156	5.244	6.537	5.043	1.619	7.544	1.08	0.	0.57	0.
AVERAGE STEERING WHEEL POSITION (DEGS)	(11)	-20.921	1.832	-21.252	2.757	0.332	3.747	0.44	0.	0.23	0.
AVG TIME BET STR REVS OF 5 PR CT (SECS)	(12)	1.019	2.041	0.876	1.371	0.142	2.651	2.22	0.	0.14	0.
AVG DIF BETWEEN STR AND COMP (DEGS)	(13)	9.717	3.172	9.828	3.645	-0.111	4.688	0.76	0.	-0.06	0.
S.D. OF DIF BETWEEN STR AND COMP (DEGS)	(14)	28.447	16.359	28.021	13.172	0.426	20.172	1.54	0.	0.06	0.
MAX RATE OF CHG OF STEERING (DEGS/SEC)	(15)	357.176	300.759	-292.413	493.426	649.589	563.397	0.37	0.	3.05	0.0
STEER REVS OF 5 DEGS PER 25 FILM FRAMES	(16)	0.603	0.479	0.503	0.271	0.100	0.330	3.11	0.	0.80	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES	(17)	0.270	0.151	0.238	0.087	0.031	0.116	3.04	0.	0.72	0.
MAX TIME BET STR REVS OF 5 DEGS (SECS)	(18)	123.508	227.187	138.238	228.975	-14.730	333.887	0.98	0.	-0.12	0.
AVG STR RATE GOING INTO CRVS (DEG/SEC)	(19)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV TIM FRM STRT OF STR TO MAX STR (SEC)	(20)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT BEF TURN (MPH)	(21)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG SPD CHG DURING TURNS (MPH)	(22)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT AFT TURN (MPH)	(23)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM ACC LET-UP TO STRT OF TRN (SEC)	(24)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM END OF TRN TO ACC PRESS (SECS)	(25)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG GSR BASE RATE DUR DRV (DIG UNITS)	(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG DRIFT OF GSR BASE RATE (DIG UN/SEC)	(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TOT NO. OF GSR REACTIONS DURING THE DRV	(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG MAG OF GSR REACTIONS (DIG UNITS)	(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG LENGTH OF BREATHS (SECONDS)	(30)	1.744	0.673	2.075	0.212	-0.331	0.834	10.07	0.01	-1.05	0.
S.D. OF LENGTH OF BREATHS (SECONDS)	(31)	0.614	0.254	0.704	0.085	-0.090	0.307	8.83	0.05	-0.78	0.
AVG DEPTH OF BREATHS (DIG UNITS)	(32)	434.505	202.287	261.222	148.259	173.283	194.438	1.86	0.	2.36	0.
S.D. OF DEPTH OF BREATHS (DIG UNITS)	(33)	406.166	170.921	263.502	169.884	142.665	187.061	1.01	0.	2.02	0.
TOT NO. OF BREATHS DURING THE DRIVE	(34)	387.250	151.342	414.125	66.067	-26.875	130.715	5.25	0.05	-0.54	0.
BRTHS WHR EXH TIM .LT. INH TIM (PR CT)	(35)	44.431	17.194	51.159	2.791	-6.728	16.976	37.95	0.01	-1.05	0.
AVG BRTH DEP/WID RATIO (DIG UN/CNT IND)	(36)	222.460	100.768	135.105	79.849	87.355	101.166	1.59	0.	2.28	0.
SD OF BRTH DEP/WID RAT (DIG UN/CNT IND)	(37)	206.486	86.860	136.025	85.826	70.461	94.403	1.02	0.	1.97	0.
LENGTH OF DRIVE (SECONDS)	(38)	2770.375	417.697	2625.250	316.179	145.125	457.104	1.75	0.	0.84	0.
LENGTH OF DRIVE (FILM FRAMES)	(39)	61647.375	2054.459	61060.250	2095.992	587.125	2703.720	0.96	0.	0.57	0.
LEN OF PTH OF CAR FOR DRV (EQ FLM FRMS)	(40)	63680.467	2175.561	63045.509	2034.251	635.157	2793.981	1.14	0.	0.58	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS	(41)	1.033	0.006	1.033	0.010	-0.	0.010	0.39	0.	-0.	-0.

COMPILED DRIVE STATISTICS FOR ALL SUBJECTS — LIBRIUM — DATE: 08/18/7

		(A)	(B)	(C)	(D)	PL/PL (CGRUP) 8 SUBS		AL/DR (TGRUP) 8 SUBS		DIFFERENCE (CG-TG) 8 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
(F-TEST CR BOUN --		0.11,	0.20,	5.00,	8.85)										
(T-TEST CR BOUN --		-3.50,	-2.36,	2.36,	3.50)										
						MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
AVG SPEED DURING THE DRIVE (MPH)	(1)					40.598	9.033	40.405	5.432	0.193	11.901	2.77	0.	0.04	0.
S.D. OF SPEED DURING THE DRIVE (MPH)	(2)					8.646	2.187	9.559	2.866	-0.912	4.026	0.58	0.	-0.60	0.
AVG SPD DURING THE DRIVE (FLM FRMS/SEC)	(3)					22.713	3.188	24.831	2.510	-2.118	4.257	1.61	0.	-1.32	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES	(4)					0.030	0.014	0.035	0.030	-0.005	0.023	0.21	0.	-0.56	0.
AVG ACCEL POSITION (PR CT DEPRESSED)	(5)					11.168	1.003	11.737	0.834	-0.548	1.066	1.45	0.	-1.36	0.
S.D. OF ACCEL POSITION (PR CT DEPRESSED)	(6)					2.751	0.765	3.891	1.279	-1.140	1.287	0.36	0.	-2.34	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES	(7)					0.271	0.202	0.347	0.172	-0.076	0.148	1.38	0.	-1.35	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES	(8)					0.087	0.071	0.106	0.054	-0.019	0.025	1.73	0.	-1.98	0.
NO. OF BRK PRESSES DURING THE DRIVE	(9)					6.875	10.517	6.500	7.382	0.375	5.384	2.03	0.	0.18	0.
MAX PRESSURE DURING BRK PRS (PR CT MAX)	(10)					8.156	5.244	6.637	3.831	1.519	5.590	1.87	0.	0.72	0.
AVERAGE STEERING WHEEL POSITION (DEGS)	(11)					-20.921	1.832	-25.818	13.159	4.898	12.690	0.02	-0.01	1.02	0.
AVG TIME BET STR REVS OF 5 PR CT (SECS)	(12)					1.019	2.041	0.469	0.856	0.549	2.380	5.68	0.05	0.61	0.
AVG DIF BETWEEN STR AND COMP (DEGS)	(13)					9.717	3.172	11.052	5.208	-1.335	6.454	0.37	0.	-0.55	0.
S.D. OF DIF BETWEEN STR AND COMP (DEGS)	(14)					28.447	16.359	31.375	20.880	-2.929	28.996	0.61	0.	-0.27	0.
MAX RATE OF CHG OF STEERING (DEGS/SEC)	(15)					357.176	300.759	-8.358	515.839	365.534	480.598	0.34	0.	2.01	0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES	(16)					0.603	0.479	0.884	0.772	-0.281	0.968	0.38	0.	-0.77	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES	(17)					0.270	0.151	0.369	0.300	-0.099	0.355	0.25	0.	-0.74	0.
MAX TIME BET STR REVS OF 5 DEGS (SECS)	(18)					123.508	227.187	42.451	30.054	81.057	234.844	57.14	0.01	0.91	0.
AVG STR RATE GOING INTO CRVS (DEG/SEC)	(19)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV TIM FRM STRT OF STR TO MAX STR (SEC)	(20)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT BEF TURN (MPH)	(21)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG SPD CHG DURING TURNS (MPH)	(22)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT AFT TURN (MPH)	(23)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM ACC LET-UP TO STRT OF TRN (SEC)	(24)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM END OF TRN TO ACC PRESS (SECS)	(25)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG GSR BASE RATE DUR DRV (DIG UNITS)	(26)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG DRIFT OF GSR BASE RATE (DIG UN/SEC)	(27)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TOT NO. OF GSR REACTIONS DURING THE DRV	(28)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG MAG OF GSR REACTIONS (DIG UNITS)	(29)					0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG LENGTH OF BREATHS (SECONDS)	(30)					1.744	0.673	1.827	0.751	-0.083	0.955	0.80	0.	-0.23	0.
S.D. OF LENGTH OF BREATHS (SECONDS)	(31)					0.614	0.254	0.606	0.291	0.007	0.385	0.76	0.	0.05	0.
AVG DEPTH OF BREATHS (DIG UNITS)	(32)					434.505	202.287	292.496	258.795	142.009	392.039	0.61	0.	0.96	0.
S.D. OF DEPTH OF BREATHS (DIG UNITS)	(33)					406.166	170.821	254.469	210.538	151.697	335.491	0.66	0.	1.20	0.
TOT NO. OF BREATHS DURING THE DRIVE	(34)					387.250	151.342	332.250	161.765	55.000	266.817	0.88	0.	0.55	0.
BRTHS WHR EXH TIM .LT. INH TIM (PR CT)	(35)					44.431	17.194	44.926	17.656	-0.496	22.119	0.95	0.	-0.06	0.
AVG BRTH DEP/WID RATIO (DIG UN/CNT IND)	(36)					222.460	100.768	148.712	127.069	73.748	201.739	0.63	0.	0.97	0.
SD OF BRTH DEP/WID RAT (DIG UN/CNT IND)	(37)					206.486	86.860	130.263	107.123	76.223	174.609	0.66	0.	1.15	0.
LENGTH OF DRIVE (SECONDS)	(38)					2770.375	417.697	2474.500	263.424	295.875	449.392	2.51	0.	1.75	0.
LENGTH OF DRIVE (FILM FRAMES)	(39)					61647.375	2054.459	60848.250	2691.080	799.125	4120.889	0.59	0.	0.51	0.
LEN OF PTH OF CAR FOR DRV (FC FLM FRMS)	(40)					63690.667	2175.891	62938.586	2856.566	745.111	4124.018	0.58	0.	0.48	0.
RATIO OF FC FLM FRMS TO REAL FLM FRMS	(41)					1.033	0.006	1.034	0.005	-0.001	0.007	1.53	0.	-0.44	0.

COMPILED EVENT STATISTICS FOR ALL SUBJECTS ACROSS ALL EVENTS
RESULTS OF DISTRIBUTION OF THE INDIVIDUAL SUBJECT MEANS

DATE: 10/15/71

(A) (B) (C) (D)
(F-TEST CR BOUN -- 0.11, 0.20, 5.00, 8.85)
(T-TEST CR BOUN -- -3.50,-2.36, 2.36, 3.50)

	PL/PL (CGRUP) 8 SUBS		AL/PL (TGRUP) 8 SUBS		DIFFERENCE (CG-TG) 8 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
	MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
SPD AT THE BEGINNING OF THE EVENT (MPH) (1)	37.383	7.660	39.156	4.078	-1.773	8.288	3.53	0.	-0.57	0.
SPD AT THE END OF THE EVENT (MPH) (2)	37.522	7.609	39.272	4.545	-1.750	8.271	2.80	0.	-0.56	0.
MINIMUM SPEED DURING THE EVENT (MPH) (3)	33.105	8.046	35.094	5.159	-1.989	8.420	2.43	0.	-0.63	0.
MAXIMUM SPEED DURING THE EVENT (MPH) (4)	40.820	7.616	42.763	3.831	-1.943	8.328	3.95	0.	-0.62	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES (5)	0.021	0.014	0.021	0.013	-0.000	0.008	1.29	0.	-0.13	0.
AVERAGE SPEED DURING THE EVENT (MPH) (6)	37.219	7.777	39.474	4.901	-2.255	8.691	2.52	0.	-0.69	0.
AVG SPD DURING THE EVENT (FLM FRMS/SEC) (7)	23.572	3.066	25.647	2.599	-2.075	2.879	1.39	0.	-1.91	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES (8)	0.278	0.224	0.421	0.262	-0.143	0.384	0.73	0.	-0.99	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES (9)	0.081	0.079	0.118	0.050	-0.036	0.061	2.52	0.	-1.58	0.
TIME TO 1ST COMPLETE ACC LET-UP (SECS) (10)	0.124	0.280	0.235	0.311	-0.111	0.124	0.81	0.	-2.36	0.
AVG ACCEL POSITION (PR CT DEPRESSED) (11)	10.960	0.913	11.694	0.874	-0.734	0.623	1.09	0.	-3.12	-0.05
TIM TO 1ST ACC LET-UP OF 3 PR CT (SECS. (12)	1.896	0.697	2.063	0.464	-0.167	0.615	2.26	0.	-0.72	0.
MAX POSITION OF ACCEL (PR CT DEPRESSED) (13)	14.745	1.155	16.059	1.509	-1.314	1.115	0.59	0.	-3.12	-0.05
TIM FRM ACC LET-UP TO 1ST BRK PRS (SEC) (14)	0.081	0.114	0.092	0.081	-0.010	0.106	1.99	0.	-0.26	0.
TIM TO 1ST BR PPS FRM STRT OF EVT (SEC) (15)	0.417	0.553	0.617	0.766	-0.200	0.452	0.52	0.	-1.17	0.
MAX AMT OF BRK PRESSURE (PR CT OF MAX) (16)	9.210	15.879	4.398	4.523	4.813	13.999	12.33	0.01	0.91	0.
TIME TO DEP DIST IN BREATHING (SECS) (17)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO MID DIST IN BREATHING (SECS) (18)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVERAGE BREATHING RATE (BREATHS/SEC) (19)	0.410	0.163	0.419	0.173	-0.008	0.286	0.89	0.	-0.08	0.
SEQUENCE NO. OF LAST MAN EVT MARKER (20)	62.318	53.895	74.472	62.967	-12.154	50.543	0.73	0.	-0.64	0.
TIME OF LAST MAN EVT MARKER (SECS) (21)	928.702	430.937	920.574	399.541	8.127	366.482	1.16	0.	0.06	0.
TIME AT THE BEGINNING OF EVT (SECS) (22)	1122.914	219.948	1047.093	249.565	75.821	176.727	0.78	0.	1.14	0.
TIME AT THE END OF EVT (SECS) (23)	1136.240	222.059	1059.776	251.527	76.464	178.598	0.78	0.	1.13	0.
LENGTH OF THE EVENT (SECONDS) (24)	13.327	2.315	12.683	2.144	0.643	2.139	1.17	0.	0.80	0.
LENGTH OF THE EVENT (FILM FRAMES) (25)	303.871	14.957	303.884	15.373	-0.012	0.767	0.95	0.	-0.04	0.
GSR BASE RATE FOR THE EVENT (DIG UNITS) (26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO A GSR CHG OF THE STD AMT (SECS) (27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO THE MAXIMUM GSR CHANGE (SECS) (28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX GSR CHG DURING THE EVT (DIG UNITS) (29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG POSITION OF THE STR WHL (DEGS) (30)	-23.680	4.027	-27.582	4.727	3.902	6.748	0.73	0.	1.53	0.
AVG RATE OF CHG OF STR WHL (DEG/SEC) (31)	129.105	13.838	134.498	20.486	-5.393	12.611	0.46	0.	-1.13	0.
TIME TO BEG OF STR INTO A TURN (SECS) (32)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE GOING INTO TURN (DEG/SEC) (33)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX TURN OF THE STR WHL (DEGS) (34)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE COMING OUT OF TURN (DG/SC) (35)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES (36)	0.774	0.535	0.746	0.539	0.029	0.358	0.98	0.	0.21	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES (37)	0.316	0.160	0.361	0.141	-0.045	0.107	1.30	0.	-1.11	0.
STEER REVS OF 15 DEG PER 25 FILM FRAMES (38)	0.228	0.097	0.290	0.113	-0.063	0.095	0.73	0.	-1.75	0.
LEN OF PTH OF CAR IN EVT (EQ FLM FRMS) (39)	319.501	15.572	321.724	15.615	-1.823	3.332	0.99	0.	-1.45	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS (40)	1.066	0.009	1.079	0.017	-0.013	0.015	0.26	0.	-2.25	0.
AVG DIF BETWEEN STR AND STR COMP (DEGS) (41)	31.419	3.457	33.632	4.857	-2.213	3.794	0.51	0.	-1.54	0.
MAX DIF BETWEEN STR AND STR COMP (DEGS) (42)	-36.687	10.808	-47.138	11.042	11.450	10.714	0.96	0.	2.53	0.05

COMPILED EVENT STATISTICS FOR ALL SUBJECTS ACROSS ALL EVENTS
RESULTS OF DISTRIBUTION OF THE INDIVIDUAL SUBJECT MEANS

LIBRIUM

DATE: 08/19/71

	(A)	(B)	(C)	(D)	PL/PL (CGRUP) 8 SUBS		PL/OR (TGRUP) 8 SUBS		DIFFERENCE (CG-TG) 8 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
(F-TEST CR BOUN --	0.11,	0.20,	5.00,	8.85)										
(T-TEST CR BOUN --	-3.50,	-2.36,	2.36,	3.50)										
					MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
SPD AT THE BEGINNING OF THE EVENT (MPH)				(1)	37.483	7.222	38.566	5.879	-1.083	4.069	1.51	0.	-0.70	0.
SPD AT THE END OF THE EVENT (MPH)				(2)	37.598	7.374	38.608	5.522	-1.010	3.978	1.78	0.	-0.67	0.
MINIMUM SPEED DURING THE EVENT (MPH)				(3)	33.239	7.674	34.697	5.761	-1.458	4.415	1.77	0.	-0.87	0.
MAXIMUM SPEED DURING THE EVENT (MPH)				(4)	40.926	7.287	41.960	5.690	-1.034	3.992	1.64	0.	-0.69	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES				(5)	0.021	0.017	0.016	0.013	0.005	0.009	1.73	0.	1.28	0.
AVERAGE SPEED DURING THE EVENT (MPH)				(6)	37.318	7.417	38.454	5.666	-1.136	4.191	1.71	0.	-0.72	0.
AVG SPD DURING THE EVENT (FLM FRMS/SEC)				(7)	23.736	3.149	24.675	2.523	-0.939	1.840	1.56	0.	-1.35	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES				(8)	0.279	0.227	0.370	0.185	-0.090	0.204	1.51	0.	-1.17	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES				(9)	0.087	0.082	0.096	0.059	-0.009	0.064	1.98	0.	-0.38	0.
TIME TO 1ST COMPLETE ACC LET-UP (SECS)				(10)	0.248	0.358	0.140	0.195	0.107	0.415	3.36	0.	0.69	0.
AVG ACCEL POSITION (PR CT DEPRESSED)				(11)	10.983	0.790	10.830	0.594	0.153	0.583	1.77	0.	0.69	0.
TIM TO 1ST ACC LET-UP OF 3 PR CT (SECS.				(12)	1.826	0.642	2.274	0.618	-0.448	0.769	1.08	0.	-1.54	0.
MAX POSITION OF ACCEL (PR CT DEPRESSED)				(13)	14.831	1.105	14.883	1.977	-0.052	1.406	0.31	0.	-0.10	0.
TIM FRM ACC LET-UP TO 1ST BRK PRS (SEC)				(14)	0.088	0.126	0.081	0.076	0.007	0.116	2.72	0.	0.15	0.
TIM TO 1ST BF PRS FRM STRT OF EVT (SEC)				(15)	0.462	0.621	0.772	0.758	-0.310	0.347	0.67	0.	-2.36	0.
MAX AMT OF BRK PRESSURE (PR CT OF MAX)				(16)	9.040	15.894	3.651	4.224	5.389	16.408	14.16	0.01	0.87	0.
TIME TO DEP DIST IN BREATHING (SECS)				(17)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO MID DIST IN BREATHING (SECS)				(18)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVERAGE BREATHING RATE (BREATHS/SEC)				(19)	0.408	0.159	0.429	0.074	-0.021	0.098	4.63	0.	-0.57	0.
SEQUENCE NO. OF LAST MAN EVT MARKER				(20)	62.983	58.347	92.936	80.384	-29.953	79.212	0.53	0.	-1.00	0.
TIME OF LAST MAN EVT MARKER (SECS)				(21)	944.012	428.084	948.408	382.991	-4.396	511.349	1.25	0.	-0.02	0.
TIME AT THE BEGINNING OF EVT (SECS)				(22)	1142.213	209.795	1113.853	153.175	28.360	140.882	1.88	0.	0.53	0.
TIME AT THE END OF EVT (SECS)				(23)	1155.351	211.310	1126.814	153.405	28.537	141.768	1.90	0.	0.53	0.
LENGTH OF THE EVENT (SECONDS)				(24)	13.138	1.925	12.961	1.232	0.177	1.763	2.44	0.	0.27	0.
LENGTH OF THE EVENT (FILM FRAMES)				(25)	302.568	13.334	302.567	13.464	0.001	0.631	0.98	0.	0.01	0.
GSR BASE RATE FOR THE EVENT (DIG UNITS)				(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO A GSR CHG OF THE STD AMT (SECS)				(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO THE MAXIMUM GSR CHANGE (SECS)				(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX GSR CHG DURING THE EVT (DIG UNITS)				(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG POSITION OF THE STR WHL (DEGS)				(30)	-24.280	4.166	-22.829	2.790	-1.452	3.813	2.23	0.	-1.01	0.
AVG RATE OF CHG OF STR WHL (DEG/SEC)				(31)	128.682	12.168	127.869	8.224	0.812	6.660	2.19	0.	0.32	0.
TIME TO BEG OF STR INTO A TURN (SECS)				(32)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE GOING INTO TURN (DEG/SEC)				(33)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX TURN OF THE STR WHL (DEGS)				(34)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE COMING OUT OF TURN (DG/SC)				(35)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES				(36)	0.823	0.606	0.563	0.326	0.260	0.443	3.46	0.	1.55	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES				(37)	0.351	0.199	0.288	0.103	0.063	0.133	3.75	0.	1.26	0.
STEER REVS OF 15 DEG PER 25 FILM FRAMES				(38)	0.248	0.113	0.219	0.062	0.029	0.071	3.31	0.	1.08	0.
LEN OF PTH OF CAR IN EVT (EQ FLM FRMS)				(39)	318.523	13.467	319.398	15.127	-0.865	3.688	0.79	0.	-0.62	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS				(40)	1.066	0.006	1.070	0.015	-0.004	0.015	0.16	-0.05	-0.66	0.
AVG DIF BETWEEN STR AND STR COMP (DEGS)				(41)	31.640	3.103	31.914	5.764	-0.273	5.709	0.29	0.	-0.13	0.
MAX DIF BETWEEN STR AND STR COMP (DEGS)				(42)	-41.588	8.786	-36.952	12.121	-4.637	17.485	0.53	0.	-0.70	0.

COMPILE EVENT STATISTICS FOR ALL SUBJECTS ACROSS ALL EVENTS
RESULTS OF DISTRIBUTION OF THE INDIVIDUAL SUBJECT MEANS

EQUILIBRIUM

DATE : 08/18/71

	(A)	(B)	(C)	(D)
(F-TEST CR BOUN --	0.11,	0.20,	5.00,	8.85)
(T-TEST CR BOUN --	-3.50,	-2.36,	2.36,	3.50)

		PL/PL (CGRUP) 8 SUBS		AL/OR (TGRUP) 8 SUBS		DIFFERENCE (CG-TG) 8 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
SPD AT THE BEGINNING OF THE EVENT (MPH)	(1)	37.525	7.376	37.256	5.879	0.269	9.664	1.57	0.	0.07	0.
SPD AT THE END OF THE EVENT (MPH)	(2)	37.675	7.541	37.389	6.034	0.286	10.093	1.56	0.	0.07	0.
MINIMUM SPEED DURING THE EVENT (MPH)	(3)	33.173	7.844	32.364	5.738	0.809	10.103	1.87	0.	0.21	0.
MAXIMUM SPEED DURING THE EVENT (MPH)	(4)	41.011	7.424	41.325	6.342	-0.314	10.014	1.37	0.	-0.08	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES	(5)	0.021	0.017	0.038	0.037	-0.018	0.035	0.20	-0.05	-1.33	0.
AVERAGE SPEED DURING THE EVENT (MPH)	(6)	37.343	7.576	37.030	5.925	0.314	9.949	1.63	0.	0.08	0.
AVG SPD DURING THE EVENT (FLM FRMS/SEC)	(7)	23.831	3.283	25.618	3.274	-1.788	3.583	1.01	0.	-1.32	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES	(8)	0.272	0.223	0.347	0.164	-0.075	0.102	1.84	0.	-1.95	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES	(9)	0.084	0.082	0.099	0.059	-0.014	0.034	1.94	0.	-1.10	0.
TIME TO 1ST COMPLETE ACC LET-UP (SECS)	(10)	0.224	0.388	0.127	0.177	0.097	0.317	4.83	0.	0.81	0.
AVG ACCEL POSITION (PR CT DEPRESSED)	(11)	10.943	0.805	11.304	0.868	-0.360	0.883	0.86	0.	-1.08	0.
TIM TO 1ST ACC LET-UP OF 3 PR CT (SECS.	(12)	1.886	0.750	2.416	0.638	-0.530	0.477	1.38	0.	-2.94	-0.05
MAX POSITION OF ACCEL (PR CT DEPRESSED)	(13)	14.864	1.068	16.945	1.615	-2.081	1.518	0.44	0.	-3.63	-0.01
TIM FRM ACC LET-UP TO 1ST BRK PRS (SEC)	(14)	0.093	0.127	0.063	0.049	0.031	0.094	6.57	0.05	0.86	0.
TIM TO 1ST BR PRS FRM STRT OF EVT (SEC)	(15)	0.493	0.629	0.493	0.553	0.000	0.371	1.30	0.	0.00	0.
MAX AMT OF BRK PRESSURE (PR CT OF MAX)	(16)	9.407	15.855	6.952	4.533	2.455	14.905	12.23	0.01	0.44	0.
TIME TO DEP DIST IN BREATHING (SECS)	(17)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO MID DIST IN BREATHING (SECS)	(18)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVERAGE BREATHING RATE (BREATHS/SEC)	(19)	0.413	0.160	0.380	0.183	0.033	0.305	0.76	0.	0.29	0.
SEQUENCE NO. OF LAST MAN EVT MARKER	(20)	65.756	59.863	75.479	47.962	-9.723	65.233	1.56	0.	-0.39	0.
TIME OF LAST MAN EVT MARKER (SECS)	(21)	985.959	424.831	1025.338	159.740	-39.380	415.030	7.07	0.05	-0.25	0.
TIME AT THE BEGINNING OF EVT (SECS)	(22)	1181.599	162.447	1141.276	87.944	40.323	223.106	3.41	0.	0.48	0.
TIME AT THE END OF EVT (SECS)	(23)	1195.142	163.880	1154.219	88.791	40.923	225.070	3.41	0.	0.48	0.
LENGTH OF THE EVENT (SECONDS)	(24)	13.543	1.845	12.943	1.494	0.600	2.362	1.53	0.	0.67	0.
LENGTH OF THE EVENT (FILM FRAMES)	(25)	312.509	10.320	312.645	10.384	-0.135	1.001	0.99	0.	-0.36	0.
GSR BASE RATE FOR THE EVENT (DIG UNITS)	(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO A GSR CHG OF THE STD AMT (SECS)	(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO THE MAXIMUM GSR CHANGE (SECS)	(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX GSR CHG DURING THE EVT (DIG UNITS)	(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG POSITION OF THE STR WHL (DEGS)	(30)	-24.344	4.152	-26.744	12.269	2.400	10.854	0.11	-0.05	0.59	0.
AVG RATE OF CHG OF STR WHL (DEG/SEC)	(31)	128.975	12.963	156.913	60.233	-27.938	68.423	0.05	-0.01	-1.08	0.
TIME TO BEG OF STR INTO A TURN (SECS)	(32)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE GOING INTO TURN (DEG/SEC)	(33)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX TURN OF THE STR WHL (DEGS)	(34)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE COMING OUT OF TURN (DG/SC)	(35)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES	(36)	0.833	0.650	0.863	0.608	-0.030	0.919	1.14	0.	-0.09	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES	(37)	0.349	0.209	0.373	0.171	-0.025	0.205	1.49	0.	-0.32	0.
STEER REVS OF 15 DEG PER 25 FILM FRAMES	(38)	0.246	0.115	0.266	0.108	-0.020	0.097	1.13	0.	-0.53	0.
LEN OF PTH OF CAR IN EVT (EQ FLM FRMS)	(39)	328.835	10.171	330.027	11.154	-1.192	3.164	0.83	0.	-1.00	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS	(40)	1.065	0.007	1.069	0.008	-0.004	0.013	0.77	0.	-0.81	0.
AVG DIF BETWEEN STR AND STR COMP (DEGS)	(41)	31.554	3.110	38.452	15.176	-6.899	14.575	0.04	-0.01	-1.10	0.
MAX DIF BETWEEN STR AND STR COMP (DEGS)	(42)	-39.313	7.582	-42.887	14.326	3.575	14.359	0.28	0.	0.66	0.

COMPILED DRIVE STATISTICS FOR ALL SUBJECTS

DATE = 09/16/71

DENEDRINE

(A) (B) (C) (D)
(F-TEST CR BOUN -- 0.25, 0.35, 2.87, 4.07)
(T-TEST CR BOUN -- -2.95,-2.13, 2.13, 2.95)

		OJ/PL (CGRUP) 16 SUBS		OJ/AM (TGRUP) 16 SUBS		DIFFERENCE (CG-TG) 16 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
AVG SPEED DURING THE DRIVE (MPH)	(1)	24.812	5.198	24.622	5.061	0.191	6.546	1.06	0.	0.11	0.
S.D. OF SPEED DURING THE DRIVE (MPH)	(2)	5.953	2.750	5.697	2.035	0.256	3.481	1.83	0.	0.28	0.
AVG SPD DURING THE DRIVE (FILM FRMS/SEC)	(3)	23.401	2.334	23.602	4.917	-0.200	4.561	0.23	-0.01	-0.17	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES	(4)	0.250	0.839	0.220	0.676	0.031	1.112	1.54	0.	0.11	0.
AVG ACCEL POSITION (PR CT DEPRESSED)	(5)	7.964	6.230	5.928	3.021	2.035	6.908	4.25	0.01	1.14	0.
S.D. OF ACCEL POSITION (PR CT DEPRESSED)	(6)	2.668	1.079	2.567	1.039	0.101	1.128	1.08	0.	0.35	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES	(7)	0.159	0.111	0.147	0.084	0.012	0.095	1.72	0.	0.49	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES	(8)	0.040	0.033	0.043	0.042	-0.003	0.033	0.60	0.	-0.34	0.
NO. OF BRK PRESSES DURING THE DRIVE	(9)	5.500	7.706	6.500	7.984	-1.000	7.730	0.93	0.	-0.50	0.
MAX PRESSURE DURING BRK PRS (PR CT MAX)	(10)	15.119	18.353	12.781	14.716	2.337	18.712	1.56	0.	0.48	0.
AVERAGE STEERING WHEEL POSITION (DEGS)	(11)	-3.767	7.322	-5.252	8.784	1.485	3.024	0.69	0.	1.90	0.
AVG TIME BET STR REVS OF 5 PR CT (SECS)	(12)	0.215	1.414	0.719	1.561	-0.504	2.509	0.82	0.	-0.78	0.
AVG DIF BETWEEN STR AND COMP (DEGS)	(13)	25.351	2.339	24.302	1.213	1.049	2.569	3.72	0.05	1.58	0.
S.D. OF DIF BETWEEN STR AND COMP (DEGS)	(14)	23.164	13.811	21.551	5.216	1.613	13.687	7.01	0.01	0.46	0.
MAX RATE OF CHG OF STEERING (DEGS/SEC)	(15)	223.576	437.185	267.966	396.991	-44.390	536.936	1.21	0.	-0.32	0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES	(16)	0.477	0.287	0.537	0.349	-0.059	0.287	0.67	0.	-0.80	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES	(17)	0.224	0.125	0.262	0.133	-0.038	0.068	0.88	0.	-2.17	-0.05
MAX TIME BET STR REVS OF 5 DEGS (SECS)	(18)	61.108	75.063	50.467	69.724	10.641	109.778	1.16	0.	0.38	0.
AVG STR RATE GOING INTO CRVS (DEG/SEC)	(19)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV TIM FRM STRT OF STR TO MAX STR (SEC)	(20)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT BEF TURN (MPH)	(21)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG SPD CHG DURING TURNS (MPH)	(22)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT AFT TURN (MPH)	(23)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM ACC LET-UP TO STRT OF TRN (SEC)	(24)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM END OF TRN TO ACC PRESS (SECS)	(25)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG GSR BASE RATE DUR DRV (DIG UNITS)	(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG DRIFT OF GSR BASE RATE (DIG UN/SEC)	(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TOT NO. OF GSR REACTIONS DURING THE DRV	(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG MAG OF GSR REACTIONS (DIG UNITS)	(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG LENGTH OF BREATHS (SECONDS)	(30)	1.882	0.311	1.992	0.353	-0.110	0.495	0.78	0.	-0.86	0.
S.D. OF LENGTH OF BREATHS (SECONDS)	(31)	0.559	0.168	0.685	0.401	-0.126	0.454	0.17	-0.01	-1.07	0.
AVG DEPTH OF BREATHS (DIG UNITS)	(32)	370.438	90.175	380.963	87.796	-10.525	75.206	1.05	0.	-0.54	0.
S.D. OF DEPTH OF BREATHS (DIG UNITS)	(33)	263.745	130.259	280.562	81.502	-16.816	142.114	2.55	0.	-0.46	0.
TOT NO. OF BREATHS DURING THE DRIVE	(34)	453.937	85.465	472.375	111.266	-18.437	132.071	0.59	0.	-0.54	0.
BRTHS WHR EXH TIM .LT. INH TIM (PR CT)	(35)	44.794	7.127	49.078	5.044	-4.284	7.310	2.00	0.	-2.27	-0.05
AVG BRTH DEP/WID RATIO (DIG UN/CNT IND)	(36)	203.402	40.899	198.426	45.000	4.976	36.056	0.83	0.	0.53	0.
SD OF BRTH DEP/WID RAT (DIG UN/CNT IND)	(37)	143.075	64.256	144.330	41.600	-1.256	67.453	2.39	0.	-0.07	0.
LENGTH OF DRIVE (SECONDS)	(38)	2516.500	332.659	2776.562	571.728	-260.062	581.725	0.34	-0.05	-1.73	0.
LENGTH OF DRIVE (FILM FRAMES)	(39)	58447.625	6045.656	63023.250	4011.364	-4575.625	7594.811	2.27	0.	-2.33	-0.05
LEN OF PTH OF CAR FOR DRV (EQ FLM FRMS)	(40)	66524.518	6795.754	71582.555	4037.290	-5058.036	8544.305	2.83	0.	-2.29	-0.05
RATIO OF EQ FLM FRMS TO REAL FLM FRMS	(41)	1.138	0.010	1.136	0.014	0.002	0.019	0.51	0.	0.92	0.

COMPILED DRIVE STATISTICS FOR ALL SUBJECTS

DEXEDRINE

DATE = 09/16/71

	(A)	(B)	(C)	(D)
(F-TEST CR BOUN --	0.25,	0.35,	2.87,	4.07)
(T-TEST CR BOUN --	-2.95,	-2.13,	2.13,	2.95)

		DJ/PL (GROUP) 16 SUBS		ALC/AM (TGRUP) 16 SUBS		DIFFERENCE (CG-TG) 16 SUBS		---F TEST--- NULL HYPOTH SD(C)=SD(T)		---T TEST--- NULL HYPOTH MU(C)=MU(T)	
		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
AVG SPEED DURING THE DRIVE (MPH)	(1)	24.812	5.198	24.536	3.601	0.276	5.095	2.08	0.	0.21	0.
S.D. OF SPEED DURING THE DRIVE (MPH)	(2)	5.953	2.750	6.189	2.199	-0.236	2.410	1.56	0.	-0.38	0.
AVG SPD DURING THE DRIVE (FLM FRMS/SEC)	(3)	23.401	2.334	22.753	3.741	0.648	3.601	0.39	0.	0.70	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES	(4)	0.250	0.839	0.038	0.020	0.212	0.837	13.47	0.01	0.98	0.
AVG ACCEL POSITION (PR CT DEPRESSED)	(5)	7.964	6.230	7.605	6.060	0.359	8.617	1.06	0.	0.16	0.
S.D. OF ACCEL POSITION (PR CT DEPRESSED)	(6)	2.668	1.079	3.531	1.754	-0.863	1.587	0.38	0.	-2.11	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES	(7)	0.159	0.111	0.237	0.214	-0.079	0.186	0.27	-0.05	-1.64	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES	(8)	0.040	0.033	0.070	0.055	-0.030	0.054	0.36	0.	-2.15	-0.05
NO. OF BRK PRESSES DURING THE DRIVE	(9)	5.500	7.706	11.625	12.619	-6.125	11.152	0.37	0.	-2.13	0.
MAX PRESSURE DURING BRK PRS (PR CT MAX)	(10)	15.119	18.353	12.784	11.068	2.334	15.239	2.75	0.	0.59	0.
AVERAGE STEERING WHEEL POSITION (DEGS)	(11)	-3.767	7.322	-3.445	7.970	-0.323	3.452	0.84	0.	-0.36	0.
AVG TIME BET STR REVS OF 5 PR CT (SECS)	(12)	0.215	1.414	0.323	0.721	-0.108	1.684	3.84	0.05	-0.25	0.
AVG DIF BETWEEN STR AND COMP (DEGS)	(13)	25.351	2.339	25.022	2.423	0.329	3.578	0.93	0.	0.35	0.
S.D. OF DIF BETWEEN STR AND COMP (DEGS)	(14)	23.164	13.811	25.096	9.700	-1.933	16.606	2.03	0.	-0.45	0.
MAX RATE OF CHG OF STEERING (DEGS/SEC)	(15)	223.576	437.185	322.125	356.306	-98.549	454.689	1.51	0.	-0.84	0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES	(16)	0.477	0.287	0.687	0.621	-0.210	0.561	0.21	-0.01	-1.45	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES	(17)	0.224	0.125	0.299	0.171	-0.075	0.132	0.53	0.	-2.19	-0.05
MAX TIME BET STR REVS OF 5 DEGS (SECS)	(18)	61.108	75.063	114.230	201.596	-53.122	221.228	0.14	-0.01	-0.93	0.
AVG STR RATE GOING INTO CRVS (DEG/SEC)	(19)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV TIM FRM STRT OF STR TO MAX STR (SEC)	(20)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT BEF TURN (MPH)	(21)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG SPD CHG DURING TURNS (MPH)	(22)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AV SPD CHG DURING 200 FT AFT TURN (MPH)	(23)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM ACC LET-UP TO STRT OF TRN (SEC)	(24)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIM FRM END OF TRN TO ACC PRESS (SECS)	(25)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG GSR BASE RATE DUR DRV (DIG UNITS)	(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG DRIFT OF GSR BASE RATE (DIG UN/SEC)	(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TOT NO. OF GSR REACTIONS DURING THE DRV	(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG MAG OF GSR REACTIONS (DIG UNITS)	(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG LENGTH OF BREATHS (SECONDS)	(30)	1.882	0.311	1.965	0.090	-0.083	0.316	11.93	0.01	-1.02	0.
S.D. OF LENGTH OF BREATHS (SECONDS)	(31)	0.559	0.168	0.566	0.089	-0.006	0.164	3.57	0.05	-0.15	0.
AVG DEPTH OF BREATHS (DIG UNITS)	(32)	370.438	90.175	365.991	65.982	4.447	99.614	1.87	0.	0.17	0.
S.D. OF DEPTH OF BREATHS (DIG UNITS)	(33)	263.745	130.259	262.592	68.623	1.153	112.800	3.60	0.05	0.04	0.
TOT NO. OF BREATHS DURING THE DRIVE	(34)	453.937	85.465	467.125	86.895	-13.187	136.620	0.97	0.	-0.37	0.
BRTHS WHR EXH TIM .LT. INH TIM (PR CT)	(35)	44.794	7.127	47.651	3.645	-2.857	6.898	3.82	0.05	-1.60	0.
AVG BRTH DEP/WID RATIO (DIG UN/CNT IND)	(36)	203.402	40.899	192.372	35.980	11.030	45.659	1.29	0.	0.94	0.
SD OF BRTH DEP/WID RAT (DIG UN/CNT IND)	(37)	143.075	64.256	140.393	34.708	2.681	57.161	3.43	0.05	0.18	0.
LENGTH OF DRIVE (SECONDS)	(38)	2516.500	332.659	2761.375	483.947	-244.875	535.883	0.51	0.	-1.77	0.
LENGTH OF DRIVE (FILM FRAMES)	(39)	58447.625	8045.656	61166.437	1934.396	-2718.812	5610.131	9.77	0.01	-1.88	0.
LEN OF PTH OF CAR FOR DRV (EQ FLM FRMS)	(40)	66524.518	6798.794	69438.297	1913.221	-2913.779	6480.867	12.62	0.01	-1.75	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS	(41)	1.138	0.010	1.135	0.014	0.003	0.010	0.55	0.	1.11	0.

DATE = 09/15/71

COMPILED EVENT STATISTICS FOR ALL SUBJECTS ACROSS ALL EVENTS
RESULTS OF DISTRIBUTION OF THE INDIVIDUAL SUBJECT MEANS

DEXEDRINE

(A) (B) (C) (D)
(F-TEST CR BOUN -- 0.25, 0.35, 2.87, 4.07)
(T-TEST CR BOUN -- -2.95,-2.13, 2.13, 2.95)

		OJ/PL (CGRUP) 16 SUBS		OJ/AM (TGRUP) 16 SUBS		DIFFERENCE (CG-TG) 16 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
SPD AT THE BEGINNING OF THE EVENT (MPH)	(1)	23.985	5.906	22.859	4.324	1.126	6.217	1.87	0.	0.70	0.
SPD AT THE END OF THE EVENT (MPH)	(2)	23.477	5.866	23.175	3.985	0.302	6.210	2.17	0.	0.19	0.
MINIMUM SPEED DURING THE EVENT (MPH)	(3)	18.882	6.637	18.299	5.367	0.583	8.215	1.53	0.	0.27	0.
MAXIMUM SPEED DURING THE EVENT (MPH)	(4)	29.342	5.649	28.818	4.143	0.525	5.764	1.86	0.	0.35	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES	(5)	0.266	0.931	0.207	0.630	0.059	1.162	2.18	0.	0.20	0.
AVERAGE SPEED DURING THE EVENT (MPH)	(6)	23.717	6.319	23.072	4.084	0.645	6.554	2.39	0.	0.38	0.
AVG SPD DURING THE EVENT (FLM FRMS/SEC)	(7)	24.294	2.948	24.094	5.523	0.200	4.208	0.28	-0.05	0.18	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES	(8)	0.134	0.108	0.134	0.079	0.000	0.085	1.89	0.	0.01	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES	(9)	0.037	0.039	0.034	0.040	0.003	0.035	0.96	0.	0.33	0.
TIME TO 1ST COMPLETE ACC LET-UP (SECS)	(10)	1.079	0.582	0.914	0.593	0.165	0.901	0.96	0.	0.71	0.
AVG ACCEL POSITION (PR CT DEPRESSED)	(11)	7.353	6.150	5.540	2.943	1.813	6.887	4.37	0.01	1.02	0.
TIM TO 1ST ACC LET-UP OF 3 PR CT (SECS.	(12)	1.226	0.738	1.462	1.117	-0.235	0.976	0.44	0.	-0.93	0.
MAX POSITION OF ACCEL (PR CT DEPRESSED)	(13)	10.436	6.636	8.475	3.905	1.962	7.298	2.89	0.05	1.04	0.
TIM FRM ACC LET-UP TO 1ST BRK PRS (SEC)	(14)	-0.125	0.284	-0.006	0.295	-0.118	0.383	0.93	0.	-1.20	0.
TIM TO 1ST BR PRS FRM STRT OF EVT (SEC)	(15)	0.331	0.433	0.611	0.879	-0.280	0.521	0.24	-0.01	-2.08	0.
MAX AMT OF BRK PRESSURE (PR CT OF MAX)	(16)	4.760	5.365	5.271	5.809	-0.511	5.642	0.85	0.	-0.35	0.
TIME TO DEP DIST IN BREATHING (SECS)	(17)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO MID DIST IN BREATHING (SECS)	(18)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVERAGE BREATHING RATE (BREATHS/SEC)	(19)	0.517	0.077	0.473	0.078	0.044	0.111	0.98	0.	1.53	0.
SEQUENCE NO. OF LAST MAN EVT MARKER	(20)	165.767	83.805	134.225	81.966	31.542	107.424	1.05	0.	1.14	0.
TIME OF LAST MAN EVT MARKER (SECS)	(21)	1191.336	188.150	1162.650	260.751	28.686	157.766	0.52	0.	0.70	0.
TIME AT THE BEGINNING OF EVT (SECS)	(22)	1243.459	156.864	1219.018	233.254	24.441	158.687	0.45	0.	0.60	0.
TIME AT THE END OF EVT (SECS)	(23)	1256.954	158.401	1233.069	235.446	23.885	160.061	0.45	0.	0.58	0.
LENGTH OF THE EVENT (SECONDS)	(24)	13.495	1.816	14.050	2.610	-0.555	1.731	0.48	0.	-1.24	0.
LENGTH OF THE EVENT (FILM FRAMES)	(25)	312.604	9.546	312.108	8.910	0.496	1.369	1.15	0.	1.40	0.
GSR BASE RATE FOR THE EVENT (DIG UNITS)	(26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO A GSR CHG OF THE STD AMT (SECS)	(27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO THE MAXIMUM GSR CHANGE (SECS)	(28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX GSR CHG DURING THE EVT (DIG UNITS)	(29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG POSITION OF THE STR WHL (DEGS)	(30)	-4.484	9.249	-7.747	9.658	3.264	4.768	0.92	0.	2.65	0.05
AVG RATE OF CHG OF STR WHL (DEG/SEC)	(31)	142.023	17.236	140.994	17.181	1.028	10.817	1.01	0.	0.37	0.
TIME TO BEG OF STR INTO A TURN (SECS)	(32)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE GOING INTO TURN (DEG/SEC)	(33)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX TURN OF THE STR WHL (DEGS)	(34)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE COMING OUT OF TURN (DG/SC)	(35)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES	(36)	0.600	0.453	0.630	0.376	-0.030	0.397	1.45	0.	-0.29	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES	(37)	0.272	0.144	0.297	0.152	-0.026	0.076	0.90	0.	-1.31	0.
STEER REVS OF 15 DEG PER 25 FILM FRAMES	(38)	0.190	0.080	0.214	0.098	-0.024	0.056	0.67	0.	-1.65	0.
LEN OF PTH OF CAR IN EVT (EQ FLM FRMS)	(39)	359.688	11.780	359.310	12.821	0.378	5.511	0.84	0.	0.27	0.
RATIO OF EQ FLM FRMS TO REAL FLM FRMS	(40)	1.164	0.021	1.160	0.023	0.004	0.040	0.83	0.	0.37	0.
AVG DIF BETWEEN STR AND STR COMP (DEGS)	(41)	74.902	5.329	72.214	3.163	2.688	4.889	2.84	0.	2.06	0.
MAX DIF BETWEEN STR AND STR COMP (DEGS)	(42)	111.324	9.256	116.554	12.237	-5.230	10.762	0.46	0.	-1.88	0.

COMPILED EVENT STATISTICS FOR ALL SUBJECTS ACROSS ALL EVENTS
RESULTS OF DISTRIBUTION OF THE INDIVIDUAL SUBJECT MEANS

DEXEDRINE

DATE = 09/16/71

(A) (B) (C) (D)
(F-TEST CR BOUN -- 0.25, 0.35, 2.87, 4.07)
(T-TEST CR BOUN -- -2.95,-2.13, 2.13, 2.95)

	OJ/PL (CGRUP) 16 SUBS		ALC/AM (TGRUP) 16 SUBS		DIFFERENCE (CG-TG) 16 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
	MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
SPD AT THE BEGINNING OF THE EVENT (MPH) (1)	24.053	5.951	23.742	3.011	0.312	6.584	3.91	0.05	0.18	0.
SPD AT THE END OF THE EVENT (MPH) (2)	23.534	6.063	23.711	2.809	-0.177	6.447	4.66	0.01	-0.11	0.
MINIMUM SPEED DURING THE EVENT (MPH) (3)	18.982	6.638	18.921	2.737	0.062	7.705	5.88	0.01	0.03	0.
MAXIMUM SPEED DURING THE EVENT (MPH) (4)	29.405	5.682	27.678	2.843	1.727	5.485	4.00	0.05	1.22	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES (5)	0.262	0.920	0.024	0.014	0.238	0.922	66.50	0.01	1.00	0.
AVERAGE SPEED DURING THE EVENT (MPH) (6)	23.621	5.985	23.462	2.859	0.158	6.440	4.38	0.01	0.10	0.
AVG SPD DURING THE EVENT (FLM FRMS/SEC) (7)	24.235	2.964	23.476	3.239	0.759	2.366	0.84	0.	1.24	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES (8)	0.134	0.109	0.270	0.321	-0.136	0.316	0.11	-0.01	-1.67	0.
ACC REVS OF 5 PRCT PER 25 FILM FRAMES (9)	0.036	0.038	0.059	0.046	-0.023	0.043	0.70	0.	-2.05	0.
TIME TO 1ST COMPLETE ACC LET-UP (SECS) (10)	1.078	0.599	0.918	0.718	0.160	1.006	0.70	0.	0.62	0.
AVG ACCEL POSITION (PR CT DEPRESSED) (11)	7.374	6.173	7.345	6.197	0.029	8.494	0.99	0.	0.01	0.
TIM TO 1ST ACC LET-UP OF 3 PR CT (SECS. (12)	1.204	0.702	1.298	0.761	-0.093	0.710	0.85	0.	-0.51	0.
MAX POSITION OF ACCEL (PR CT DEPRESSED) (13)	10.450	6.615	11.866	6.970	-1.417	8.276	0.90	0.	-0.66	0.
TIM FRM ACC LET-UP TO 1ST BRK PRS (SEC) (14)	-0.115	0.284	-0.057	0.217	-0.058	0.269	1.70	0.	-0.83	0.
TIM TO 1ST BR PRS FRM STRT OF EVT (SEC) (15)	0.324	0.412	0.683	0.566	-0.359	0.421	0.53	0.	-3.30	-0.01
MAX AMT OF BRK PRESSURE (PR CT OF MAX) (16)	4.701	5.401	9.462	9.438	-4.761	8.614	0.33	-0.05	-2.14	-0.05
TIME TO DEP DIST IN BREATHING (SECS) (17)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO MID DIST IN BREATHING (SECS) (18)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVERAGE BREATHING RATE (BREATHS/SEC) (19)	0.516	0.075	0.480	0.040	0.036	0.083	3.48	0.05	1.68	0.
SEQUENCE NO. OF LAST MAN EVT MARKER (20)	165.268	83.476	111.715	55.337	53.553	135.303	2.28	0.	1.53	0.
TIME OF LAST MAN EVT MARKER (SECS) (21)	1182.998	186.438	1153.585	215.229	29.413	162.409	0.75	0.	0.70	0.
TIME AT THE BEGINNING OF EVT (SECS) (22)	1235.542	156.991	1208.778	174.220	26.764	150.549	0.81	0.	0.69	0.
TIME AT THE END OF EVT (SECS) (23)	1248.826	158.318	1223.306	174.886	25.520	149.978	0.82	0.	0.66	0.
LENGTH OF THE EVENT (SECONDS) (24)	13.284	1.551	14.528	2.662	-1.244	1.848	0.34	-0.05	-2.61	-0.05
LENGTH OF THE EVENT (FILM FRAMES) (25)	308.597	11.446	308.208	11.322	0.389	0.673	1.02	0.	2.24	0.05
GSR BASE RATE FOR THE EVENT (DIG UNITS) (26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO A GSR CHG OF THE STD AMT (SECS) (27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO THE MAXIMUM GSR CHANGE (SECS) (28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX GSR CHG DURING THE EVT (DIG UNITS) (29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG POSITION OF THE STR WHL (DEGS) (30)	-2.789	8.501	-5.188	8.593	2.399	5.970	0.98	0.	1.56	0.
AVG RATE OF CHG OF STR WHL (DEG/SEC) (31)	141.605	17.233	143.082	21.754	-1.477	13.871	0.63	0.	-0.41	0.
TIME TO BEG OF STR INTO A TURN (SECS) (32)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE GOING INTO TURN (DEG/SEC) (33)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX TURN OF THE STR WHL (DEGS) (34)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE COMING OUT OF TURN (DG/SC) (35)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES (36)	0.602	0.453	0.790	0.615	-0.188	0.608	0.54	0.	-1.20	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES (37)	0.274	0.144	0.353	0.176	-0.079	0.145	0.67	0.	-2.10	0.
STEER REVS OF 15 DEG PER 25 FILM FRAMES (38)	0.189	0.080	0.249	0.122	-0.060	0.090	0.43	0.	-2.56	-0.05
LEN OF PTH OF CAR IN EVT (ED FLM FRMS) (39)	354.717	14.016	355.000	13.019	-0.283	4.803	1.16	0.	-0.23	0.
RATIO OF ED FLM FRMS TO REAL FLM FRMS (40)	1.158	0.016	1.158	0.014	0.000	0.016	1.77	0.	0.03	0.
AVG DIF BETWEEN STR AND STR COMP (DEGS) (41)	75.245	4.697	72.944	5.960	2.301	5.288	0.68	0.	1.51	0.
MAX DIF BETWEEN STR AND STR COMP (DEGS) (42)	111.596	8.210	116.672	6.682	-5.075	6.208	1.51	0.	-2.17	-0.01

COMPILED EVENT STATISTICS FOR ALL SUBJECTS ACROSS ALL EVENTS
RESULTS OF DISTRIBUTION OF THE INDIVIDUAL SUBJECT MEANS

DATE = 09/16/71

DAYTRIP

	(A)	(B)	(C)	(D)
(F-TEST CR BOUN --	0.25,	0.35,	2.87,	4.07)
(T-TEST CR BOUN --	-2.95,	-2.13,	2.13,	2.95)

	OJ/PL (GROUP) 16 SUBS		ALC/PL (TGRUP) 16 SUBS		DIFFERENCE (DG-TG) 16 SUBS		---FTEST--- NULL HYPOTH SD(C)=SD(T)		---TTEST--- NULL HYPOTH MU(C)=MU(T)	
	MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	F	SIG	T	SIG
SPD AT THE BEGINNING OF THE EVENT (MPH) (1)	24.024	5.938	23.722	1.685	0.302	5.285	12.42	0.01	0.22	0.
SPD AT THE END OF THE EVENT (MPH) (2)	23.538	5.958	24.143	1.964	-0.605	5.523	9.20	0.01	-0.42	0.
MINIMUM SPEED DURING THE EVENT (MPH) (3)	18.908	6.664	19.122	2.239	-0.214	6.384	8.86	0.01	-0.13	0.
MAXIMUM SPEED DURING THE EVENT (MPH) (4)	29.385	5.708	28.014	2.193	1.371	5.703	6.78	0.01	0.93	0.
SPEED REVS OF 5 MPH PER 25 FILM FRAMES (5)	0.265	0.931	0.045	0.042	0.220	0.940	00.43	0.01	0.90	0.
AVERAGE SPEED DURING THE EVENT (MPH) (6)	23.570	5.999	23.730	1.922	-0.160	5.402	9.74	0.01	-0.11	0.
AVG SPD DURING THE EVENT (FILM FRMS/SEC) (7)	24.295	2.963	23.504	2.689	0.790	2.470	1.21	0.	1.24	0.
ACC REVS OF 2 PRCT PER 25 FILM FRAMES (8)	0.131	0.107	0.210	0.171	-0.079	0.125	0.39	0.	-2.44	-0.05
ACC REVS OF 5 PRCT PER 25 FILM FRAMES (9)	0.036	0.038	0.064	0.059	-0.028	0.041	0.41	0.	-2.64	-0.05
TIME TO 1ST COMPLETE ACC LET-UP (SECS) (10)	1.064	0.529	1.460	0.740	-0.396	0.814	0.51	0.	-1.88	0.
AVG ACCEL POSITION (PR CT DEPRESSED) (11)	7.348	6.149	8.108	6.396	-0.760	9.409	0.92	0.	-0.31	0.
TIM TO 1ST ACC LET-UP OF 3 PR CT (SECS. (12)	1.236	0.741	1.414	0.835	-0.178	0.571	0.79	0.	-1.21	0.
MAX POSITION OF ACCEL (PR CT DEPRESSED) (13)	10.441	6.626	13.032	7.478	-2.590	9.982	0.78	0.	-1.01	0.
TIM FRM ACC LET-UP TO 1ST BRK PRS (SEC) (14)	-0.112	0.276	-0.165	0.217	0.053	0.272	1.62	0.	0.55	0.
TIM TO 1ST BR PRS FRM STRT OF EVT (SEC) (15)	0.332	0.437	0.413	0.659	-0.081	0.467	0.44	0.	-0.67	0.
MAX AMT OF BRK PRESSURE (PR CT OF MAX) (16)	4.608	5.052	5.722	6.596	-1.114	4.877	0.59	0.	-0.88	0.
TIME TO DEP DIST IN BREATHING (SECS) (17)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO MID DIST IN BREATHING (SECS) (18)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVERAGE BREATHING RATE (BREATHS/SEC) (19)	0.518	0.077	0.471	0.030	0.048	0.079	6.52	0.01	2.32	0.05
SEQUENCE NO. OF LAST MAN EVT MARKER (20)	165.393	83.568	128.000	77.260	37.393	104.467	1.17	0.	1.39	0.
TIME OF LAST MAN EVT MARKER (SECS) (21)	1187.293	186.357	1135.279	218.343	52.014	137.080	0.73	0.	1.47	0.
TIME AT THE BEGINNING OF EVT (SECS) (22)	1239.993	153.845	1212.272	204.897	27.721	148.245	0.56	0.	0.72	0.
TIME AT THE END OF EVT (SECS) (23)	1253.438	155.087	1227.189	207.478	26.249	150.492	0.56	0.	0.68	0.
LENGTH OF THE EVENT (SECONDS) (24)	13.445	1.478	14.917	3.424	-1.472	3.206	0.19	-0.01	-1.78	0.
LENGTH OF THE EVENT (FILM FRAMES) (25)	312.593	9.371	312.134	8.927	0.459	1.337	1.10	0.	1.33	0.
GSR BASE RATE FOR THE EVENT (DIG UNITS) (26)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO A GSR CHG OF THE STD AMT (SECS) (27)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
TIME TO THE MAXIMUM GSR CHANGE (SECS) (28)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX GSR CHG DURING THE EVT (DIG UNITS) (29)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
AVG POSITION OF THE STR WHL (DEGS) (30)	-4.053	9.073	-7.944	9.427	3.891	5.550	0.93	0.	2.72	0.05
AVG RATE OF CHG OF STR WHL (DEG/SEC) (31)	141.382	16.756	140.700	14.878	0.682	10.753	1.27	0.	0.25	0.
TIME TO BEG OF STR INTO A TURN (SECS) (32)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE GOING INTO TURN (DEG/SEC) (33)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX TURN OF THE STR WHL (DEGS) (34)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
MAX STR RATE COMING OUT OF TURN (DG/SC) (35)	0.	0.	0.	0.	0.	0.	-0.	-0.	-0.	-0.
STEER REVS OF 5 DEGS PER 25 FILM FRAMES (36)	0.595	0.430	0.632	0.547	-0.037	0.249	0.62	0.	-0.58	0.
STEER REVS OF 10 DEG PER 25 FILM FRAMES (37)	0.274	0.144	0.305	0.185	-0.031	0.081	0.61	0.	-1.47	0.
STEER REVS OF 15 DEG PER 25 FILM FRAMES (38)	0.190	0.093	0.226	0.106	-0.035	0.049	0.61	0.	-2.77	-0.05
LEN OF PTH OF CAR IN EVT (60 FLM FRMS) (39)	359.109	10.091	357.622	11.639	1.487	6.570	0.75	0.	0.88	0.
RATIO OF 60 FLM FRMS TO REAL FLM FRMS (40)	1.158	0.080	1.149	0.019	0.009	0.016	1.07	0.	1.86	0.
AVG DIF BETWEEN STR AND STR COMP (DEGS) (41)	74.823	5.265	71.194	4.741	3.629	6.012	1.24	0.	2.34	0.05
MAX DIF BETWEEN STR AND STR COMP (DEGS) (42)	111.456	7.954	119.105	8.439	-7.650	11.418	0.89	0.	-2.59	-0.05

Appendix H. Biomedical Computer Programs

BMDX63
MULTIVARIATE GENERAL LINEAR HYPOTHESIS

1. GENERAL DESCRIPTION

a. This program performs a multiple regression where the dependent variable is a vector. It computes U-statistics and approximate F-statistics to test hypotheses of the form $A\beta C' = D$ where β is a matrix of regression coefficients and where A, C, and D are matrices specified by the user. Estimates of $\Gamma = A\beta C' - D$ and the covariance matrix of its estimator are also obtained. With proper specification it can be used to carry out balanced or unbalanced multivariate analyses of variance and covariance.

b. Output from this program includes:

(1) Cross-product matrix $(X, Y)'(X, Y)$

(2) Regression coefficients, $B = (X'Y)^{-1}X'Y$ and residual cross-product matrix $R = Y'Y - B'X'Y$

(3) For each hypothesis, A, C, D, $ABC'-D$, $A(X'X)^{-1}A'$ and CRC' matrices are printed.

(4) For each hypothesis, the hypothesis sum of products matrix, U-statistic, F-statistic, and degrees of freedom are printed.

2. RESTRICTIONS

With p independent variables and q dependent variables, the following restriction must be satisfied for each hypothesis being tested.

$$(p+q)^2 + [r, q]p + [p, q]r + [r, s]q + qs < 9000$$

where r is the number of rows in A, s is the number of rows in C, and $[x, y]$ denotes the larger of x and y. In any case, if $(p+q) < 55$, the inequality is satisfied. No transgenerations are available.

3. COMPUTATIONAL PROCEDURE

Let $X = (x_{ij})$ $\quad j = 1, 2, \ldots p;\ i = 1, 2, \ldots n$

and $Y = (y_{ij})$ $\quad j = 1, 2, \ldots q;\ i = 1, 2, \ldots n$

denote the independent and dependent variables respectively. The model used is

$$Y = X\beta + E$$

To estimate β and the residual cross-product matrix the following matrices are formed and printed:

a. Cross-product matrix

$$(X, Y)'(X, Y) = \left(\begin{array}{c|c} X'X & X'Y \\ \hline Y'X & Y'Y \end{array}\right)$$

b. Inverse of $X'X$

c. Regression coefficients $B = (X'X)^{-1}X'Y$

For each hypothesis of the form $A\beta C' = D$, the matrices A, C, and D are printed followed by

e. $G = ABC' - D$

f. $V = A(X'X)^{-1}A'$

g. $S = GRG'$

h. $H = G'V^{-1}G$ (the hypothesis sum of product matrix)

i. Determinant $(S) = d_1$

j. Determinant $(S+H) = d_2$

k. U-statistic $= d_1/d_2$ with degrees of freedom $(s, r, n-p)$

Approximate F-statistic

$$F = \frac{1-y}{y}\,\frac{h}{rs} \text{ with } rs \text{ and } h \text{ degrees of freedom}$$

where

$$y = U^{1/t}$$

$$t = \sqrt{\frac{r^2s^2 - 4}{r^2 + s^2 - 5}} \quad \text{if } r^2 + s^2 \neq 5$$

$$t = 1 \quad \text{if } r^2 + s^2 = 5$$

$$h = (n - p - \frac{s - r + 1}{2})t - \frac{rs}{2} + 1.$$

This gives an exact test if r or s is 1 or 2.

BMD05V
GENERAL LINEAR HYPOTHESIS

1. GENERAL DESCRIPTION

a. This program performs the calculations required for a general linear hypothesis model. The independent variables are of two general types:

(1) Variables used to specify the analysis-of-variance classifications.

(2) Variables used as covariates.

By use of these variables, the program can be used for balanced or unbalanced analysis-of-variance or covariance designs and missing-value problems.

b. The output of this program includes:

(1) Means and standard deviations of the dependent variable and means of the covariates.
(2) Sums of squares explained by hypotheses.
(3) Estimates of regression coefficients.
(4) Residual sums of squares.
(5) F-tests and degrees of freedom.
(6) Accuracy of coefficients.

c. Limitations per problem:

(1) p, number of variables used to specify analysis-of-variance design $(1 \leq p \leq 60)$
(2) q, number of covariates $(1 \leq p+q \leq 60)$
(3) d, number of sets of Design Cards $(1 \leq d \leq 999)$
(4) R_i, number of replicates for the i^{th} set of Design Cards $(1 \leq R_i \leq 99)$
(5) H, number of Hypothesis Cards $(1 \leq H \leq 57)$
(6) m, number of Transgeneration Cards $(0 \leq m \leq 60)$
(7) k, number of Variable Format Cards $(1 \leq k \leq 5)$

2. COMPUTATIONAL PROCEDURE

Let $x_1, \ldots, x_p$ denote the design variables, $x_{p+1}, \ldots, x_{p+q}$ denote the covariates, and y denote the dependent variable. The general linear hypothesis model is

$$y = \beta_1 x_1 + \cdots + \beta_\ell x_\ell + e \qquad \text{where } \ell = p+q$$

The data are read in groups. Within each group the values of the design variables $x_1, \ldots, x_p$ are constant and are read in first. These are followed by one or more sets of values of $x_{p+1}, \ldots, x_{p+q}$, y to represent the covariates $z_1, \ldots, z_q$ and the dependent variable.

Step 1. For each group the number of cases in the group, the mean and standard deviation of the dependent variable, and the means of the covariates are computed.

Let n denote the total number of cases, let X denote the $n \times \ell$ matrix of observed values of the independent variables $x_1, \ldots, x_\ell$, and let y denote the vector of observed values of the dependent variable. A hypothesis h is a vector of ℓ zeros and ones. Let X_h denote the matrix obtained from X by eliminating the j^{th} column of X if and only if the j^{th} coordinate of h is zero. Three hypotheses are automatically added to the list defined in 3.g. These have the form

0, 0, ..., 0
1, 1, ..., 1
1, 0, ..., 0

The first two are added to the beginning of the list, and the last is added to the end of the list. Note that if h_2 denotes the second hypothesis in the list, then $X_{h_2} = X$.

Step 2. For each hypothesis h the program computes:

(1) Least squares estimates β_h by solving the normal equations

$$X_h' X_h \beta_h = X_h' y$$

These equations may be singular.

(2) Sum of squares explained by hypothesis

$$SS_h = y' X_h \beta_h$$

(3) Residual sum of squares

$$R_h = y' y - y' X_h \beta_h$$

(4) Degrees of freedom of residuals

$$df_h = n - \text{Rank}\,(X_h' X_\ell)$$

(5) Accuracy of coefficients

$$a_h = X_h' X_h \beta_h - X_h' y$$

(6) F-test

$$F_h = \left[\frac{df_{h_2}}{df_h - df_{h_2}}\right] \times \left[\frac{R_h - R_{h_2}}{R_{h_2}}\right]$$