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EVALUATION OF THE COMFORT AND CONVENIENCE OF SAFETY BELT SYSTEMS IN 1980 and 1981 MODEL VEHICLES

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16. Abstract

An analysis was conducted of both user and vehicle characteristics that influence the user perceptions of safety belt system comfort and convenience. A research design was developed involving various passenger cars, vans, and pickups, and a set of drivers of different sex, weight, and height combinations. A statistical analysis of the test results using crosstabulation and analysis of variance identified height, vehicle size, type of belt system, and other factors as having a significant impact on perceptions of safety belt comfort and convenience.

An additional phase of these studies examined the compatibility of child restraint devices with existing safety belt systems. Several devices currently available on the open market were evaluated in each of the test vehicles. Problems identified include the need for special locking devices in some vehicles, the incompatibility of automatic belt systems, and bulky retractor devices.

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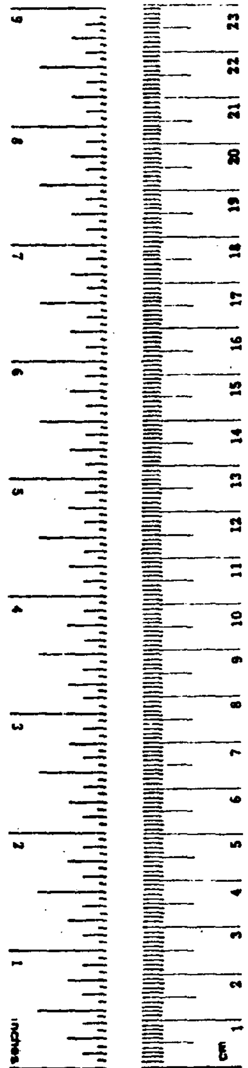
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

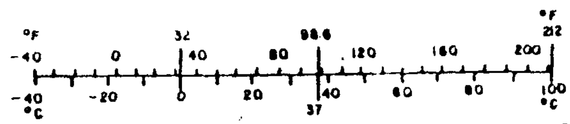
Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



**EVALUATION OF THE
COMFORT AND CONVENIENCE OF SAFETY BELT SYSTEMS
IN 1980 AND 1981 MODEL VEHICLES**

EXECUTIVE SUMMARY

This report presents the results of two studies designed to identify the comfort and convenience problem areas in 1980 and 1981 model passenger cars, vans, and pick-up trucks, and to find vehicle and user characteristics that influence comfort and convenience. In addition, the compatibility of various child restraint devices with the passenger seat belt systems was also examined.

The comfort and convenience evaluation procedure, which is patterned after one developed for an earlier study, was conducted in two parts. The December session concentrated on 1980 model vehicles including vans and pick-ups. The July session examined 1980 model passenger automobiles that would be unchanged during the 1981 model year. During both sessions, approximately 120 licensed drivers of both sexes and a range of heights and weights were selected to evaluate each test vehicle belt system. These test vehicles were selected to represent the various safety belt systems most commonly purchased in domestic and imported cars and trucks. Each evaluation consisted of a test participant using the safety belt system of one of the test vehicles. While putting on and taking off the belt system, the participant was asked to identify the extent of any problems with various comfort and convenience aspects of safety belts. Each individual participant tested the vehicles in a different randomly selected order, to eliminate the effects of always testing vehicles in the same order.

For purposes of these studies, the operation of safety belt systems was divided into seven aspects:

- **Accessibility**, relating to reaching for and grasping the safety belt latch plate;
- **Extending**, pertaining to moving the latch plate over to the buckle;
- **Buckling**, involving inserting the latch plate into the buckle;

- **Fit**, describing how the shoulder belt fits the wearer;

- **Pressure**, relating to the pressure of the belt on the wearer's chest and shoulder;

- **Releasing**, involving releasing the latch plate from the buckle; and

- **Retracting**, relating to how conveniently the system retracts out of the user's way upon exiting the vehicle.

To analyze, these aspects of safety belt comfort and convenience, indices were developed based on participant responses for each of these aspects and for overall comfort and convenience. The indices were statistically analyzed using contingency tables and analysis of variance to determine which driver and belt system characteristics had significant impact on each aspect. The major results of this analysis are:

- The problem most frequently identified by test participants was accessibility.

- In general, safety belt systems considered more comfortable and convenient by one weight group were ranked the same way by other weight groups. On the other hand, short-overweight individuals tended to rate safety belt systems as a whole lower than other participants.

- The participants in the July evaluation session indicated that all comfort and convenience aspects were equally important in an overall evaluation of a safety belt system. This finding substantiates the use of an index that weights each aspect equally.

- The user characteristics that have statistically significant impact on safety belt comfort and convenience are weight, height, and sex. Shorter and overweight subjects had more problems with safety belt systems as a whole than did others.

- Belt system and vehicle characteristics that have statistically significant impact on user comfort and convenience perceptions are vehicle size, type of belt system, type of seat, and number of vehicle doors. In general, larger vehicles, dual retractor systems, bench seats, and four-door vehicles had fewer problems.

- Belt systems satisfying the compliance tests for belt fit and pressure were found by test participants to be more acceptable.

- The main compatibility problems between safety belt systems and child restraint devices are that belts are sometimes too short and that special locking devices are sometimes required to secure a child restraint. Also, automatic systems are not compatible with child restraint devices without modifications or the addition of a special belt.

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1

INTRODUCTION

This document discusses the findings of two studies conducted by Verve Research Corporation about the comfort and convenience factors associated with safety belt usage. The first entitled "Comfort and Convenience of Safety Belt Systems in 1980 Model Vehicles" was conducted in December 1979, while the second companion study was conducted in July 1980 and concentrated on passenger cars which would not be changed for the 1981 model year. This first chapter presents some background material, the purposes of the studies, and the organization of the report.

BACKGROUND

Despite the fact that safety belts are proven safety devices that have been standard equipment in cars sold in the United States for a decade, usage rates have been consistently low. A recent survey conducted by Opinion Research Corporation [9] has shown that in 1979 less than 11 percent of observed drivers wore their safety belts. Previous studies conducted by the National Highway Traffic Safety Administration (NHTSA) have indicated that comfort and convenience problems are *the primary reasons for not wearing safety belts.*

For example, the May 1975 Westefeld and Phillips report [2] documents three separate studies that were conducted:

(1) A study among rental car customers at Miami, Chicago, and Los Angeles Airports,

(2) A study among rental car customers at Toronto International Airport, and

(3) A study among owners of private cars in the general population of vehicles.

The results indicated that of those interviewees who did not use either the lap belt or shoulder harness, the reasons given most often were:

- The belt or harness causes physical discomfort;
- A generally negative attitude toward wearing the belt or harness;
- A feeling of being trapped, confined, or restricted; and
- Opposition to wearing them on principle.

The 1976 Westefeld and Phillips study [3], which was similar to the 1975 study, also concludes that comfort is a key factor affecting safety belt usage. Significant findings show that in lighter and smaller cars front seat occupants are more likely to wear safety belts. Usage is lowest in the heavy luxury cars.

The September 1971 Marzoni report [1] presents a study of the attitudes, behaviors, and rationales of nearly 2,000 drivers who were interviewed regarding seat belt usage. By using multivariate factor analysis, almost all drivers were classified into five distinct Q-factor segments that represent five separate patterns of attitudes about seat belts:

(1) Convinced,

(2) Gambling,

(3) Phobic,

(4) Impatient, and

(5) Skeptical.

The attitude pattern associated with the "Convinced" segment included a strong emphasis on the belief that wearing a seat belt is physically comfortable.

Because comfort and convenience have been identified as important reasons why safety belts are not worn, NHTSA has conducted a series of evaluations to determine which safety belt factors cause comfort and convenience problems. These studies are based on a comparison of late model vehicles using individuals of varying anthropometric characteristics.

In the January 1979 study by Tom, et al. [7], the purpose was to learn more specifically what the comfort and convenience problem areas are and to find the factors that influence comfort and convenience. The test procedure required that each of the 114 participants evaluate each car from a representative group of 1979 models. Each evaluation, or trial, consisted of a participant using the safety belt system of one of the test cars. As the subject was putting on and taking off the belt system, he was asked if he had any problems with various comfort and convenience aspects of safety belts, and if so, to what extent. Findings show that the main problems with 1979 safety belt systems as a whole are:

- Comfort (associated with upper torso movement),
- Pressure (of the belt on occupant),
- Extending the latch plate to the buckle,
- Accessibility, and
- Fit.

Buckling the belt, releasing the latch plate from the buckle, and belt retraction created the fewest problems.

In the December 1976 study by Gordon, et al. [6], the purpose was to investigate the extent to which new design features in safety belts have reduced the confusion, inconvenience, and discomfort that were associated with the use of safety belts in older model cars. The testing procedure consisted of: noting each system's configuration, a familiarization phase of the system by each subject; and a set of questions presented to each subject while they entered and donned the seat belt, performed maneuvers with belts on, doffed the seat belt, and exited the car. Findings showed that smooth repeatable retractors with light shoulder tension appeared to be the prominent factors influencing user acceptability. Subjects also indicated that increase in safety belt usage is consistent with system improvements.

The August 1975 Breedon and Gordon study [5] used 10 subjects to evaluate selected aspects of comfort and conveinence of several seat belt designs and to compare the various safety belt systems. Each participant was asked a series of questions related to the following areas: donning the seat belt system, mobility and comfort in the system, doffing the seat belt system, and exiting from the seat belt system. Problems identified most frequently were extending the latchplate, adjusting the seat after donning the belt, and chafing of the neck and face.

In the November 1974 Pierce, et al, study [4], a new car restraint system evaluation was performed at both a gross preliminary level, to help select a reasonable number of models for more detailed examination, and at a detailed level, where specific cars were examined using selected subjects with different characteristics and taking certain critical measurements. The evaluation revealed that basic hardware components and general system concepts are reasonably satisfactory in most vehicles. However, even though a particular model had all the basic components necessary to provide a satisfactory restraint system, such factors as the layout of anchor points and webbing guides tended to be poor on most of the vehicles examined. The study also showed that women had more severe complaints about discomfort than men, which was probably due to their anatomical features and improper fit of the seat belt across the upper torso area.

The studies of safety belt systems discussed above have shown that comfort and convenience are important factors in encouraging safety belt usage and that among safety belt systems there are differences in perceived comfort and convenience.

Consequently, NHTSA has begun an effort to develop some standards for comfort and convenience. One part of this effort is the December 1978 Woodson study [8]. The purposes of this study were to determine if recommended changes to Federal Motor Vehicle Safety Standard (FMVSS) #208 are applicable to automatic as well as manual systems, and to recommend improvements or modifications to the standard.

One of the major results of the Woodson effort was the development of a series of belt system specifications that represent an envelope within which users are more likely to find no comfort and convenience problems. These specifications were developed using a series of human subjects of varying anthropometric characteristics. These subjects evaluated safety belt systems set at varying belt pressures, retraction speeds, and fits (angle across the chest). In addition, these subjects were asked to test a range of comfortable reach. Based on the results of these tests preliminary specifications were determine for belt pressure, retraction speed, fit, accessibility, and other factors.

The final phase of the study was to develop a series of physical tests applicable to safety belt systems for use as compliance standards. In this part of the effort, fiftieth percentile test dummies were used as a basis for procedures for testing:

- Belt pressure,
- Latch plate accessibility,
- Head clearance, and
- Shoulder belt fit.

PURPOSES OF THE STUDIES

Since some standards relating to safety belt comfort and convenience have been developed in the Woodson study [8], NHTSA was interested in testing these standards against how safety belt comfort and convenience are perceived by human subjects. Therefore, an important objective was to determine the relationship between subjective comfort and convenience evaluations of 1980 model cars, light trucks and vans, and quantitative measures of comfort and convenience, which may be applicable for proposed comfort and convenience standards. The specific objectives of the proposed study were:

- To develop a comfort and convenience index for belt systems in a sample of 1980 vehicles,
- To identify the good and bad aspects of safety belt system comfort and convenience in all test vehicles,
- To rank the test restraint systems according to each aspect and according to an overall rating,

- To determine the effect of user anthropometric characteristics such as weight and height on perceived comfort and convenience,

- To measure various parameters of all test safety belt systems with respect to proposed standards related to comfort and convenience,

- To determine the relationship between the consumer evaluations and the quantitative measures of belt system parameters, and

- To determine the compatibility of passenger seat belt systems with various child restraint devices (CRDs).

The purpose of the consumer evaluations conducted in July 1980 was to expand the sample of passenger automobiles tested in the first study in order to provide data on 1981 models that would be unchanged from the 1980 model year. Consequently, the driver sampling and test procedures were duplicated from the December 1979 version. Three basic changes in the specific purposes of the study were made, however:

- Quantitative measurements of belt system parameters based on proposed standards were not made and analyzed,

- Two additional child restraints were used in the compatibility evaluation, and

- A new measure of the relative importance of the various aspects of safety belt comfort and convenience was introduced.

All other study goals were essentially unchanged from the earlier study.

ORGANIZATION OF THE REPORT

To accomplish these analyses, a test design was developed involving samples of drivers and vehicles. The following chapter discusses this test design in detail. Chapter 3 describes the vehicle, child restraint device, and driver samples used in the studies. The results of the analyses using the consumer evaluations of safety belt systems and the evaluation of the CRDs are discussed in Chapters 4 and 5, respectively. Some conclusions are presented in the final chapter of this document.

2

TEST DESIGN AND PROCEDURES

Because these studies focused on how safety belt users perceive safety belt system comfort and convenience, the test design chosen required that each person from a selected sample of automobile drivers evaluate each vehicle from a representative group of 1980 models. Each interaction, or trial, consisted of a participant using the safety belt system of one of the test cars. As the subjects were putting on and taking off the belt systems, they were asked if they had any problem with various comfort and convenience aspects of the system, and if so, to what extent. In addition to these consumer evaluations, each vehicle in the December 1979 test was also rated by conducting compliance tests on safety belt fit, pressure, accessibility, and other features, and by attempting to install a sample of child restraint devices in each passenger position.

The first section of this chapter reviews the test instruments or questionnaires used in both tests to collect the evaluation and other test data for analysis. The next three sections discuss the procedures for consumer evaluation, compliance testing, and CRD testing.

TEST INSTRUMENTS

Since the studies were concerned with how safety belt system comfort and convenience are related to users and child restraint devices, a series of questionnaires was completed about each participant, child restraint device, and vehicle tested. These included:

- **Vehicle Data Forms,** which provided descriptive information about each vehicle and belt system in the test, such as the type of safety belt system, the number of doors, the stowed location of the latchplate, shoulder belt pressure measurements, and the results of various compliance tests. The results of the compliance tests were not recorded in the July test;

- **Participant Information Forms,** on which some socioeconomic data about each driver in the test was recorded. Information such as the individual's safety belt usage rate and the number of years as a driver was asked in this form;

- **Physical Data Forms,** which recorded each participant's weight, height, sex, and other physical characteristics;

- **Child Restraint Device Evaluation Form,** on which was recorded to what degree the belt system in each passenger position was compatible with each child seat;

- **Safety Belt System Evaluation Form,** on which the participant's reaction to each vehicle was recorded. Each participant was asked questions about various system features during the evaluations. For example, "How difficult or easy was it for you to grasp the latchplate?" and "Does the shoulder belt press on your body comfortably or uncomfortably?" The responses to these questions were on a scale of one to seven, where one was most inconvenient or uncomfortable, four was neutral, and seven was most convenient or comfortable, as shown on Exhibit 2-1; and

- **Safety Belt Comfort and Convenience Factors—Evaluation Form,** on which each participant was asked to rate the various aspects of safety belt usage in terms of importance in evaluating the total system.

Examples of these questionnaires are provided in Appendix A, Test Instruments. Note also that three different Safety Belt System Evaluation Forms were used, one for manual systems, one for automatic, and one for automatic with optional lap belts.

CONSUMER EVALUATION

The consumer evaluation was based on driver perception of the comfort and convenience of the safety belt systems in the individual vehicles. This section describes the test personnel involved in the studies and a typical test schedule.

Test Personnel

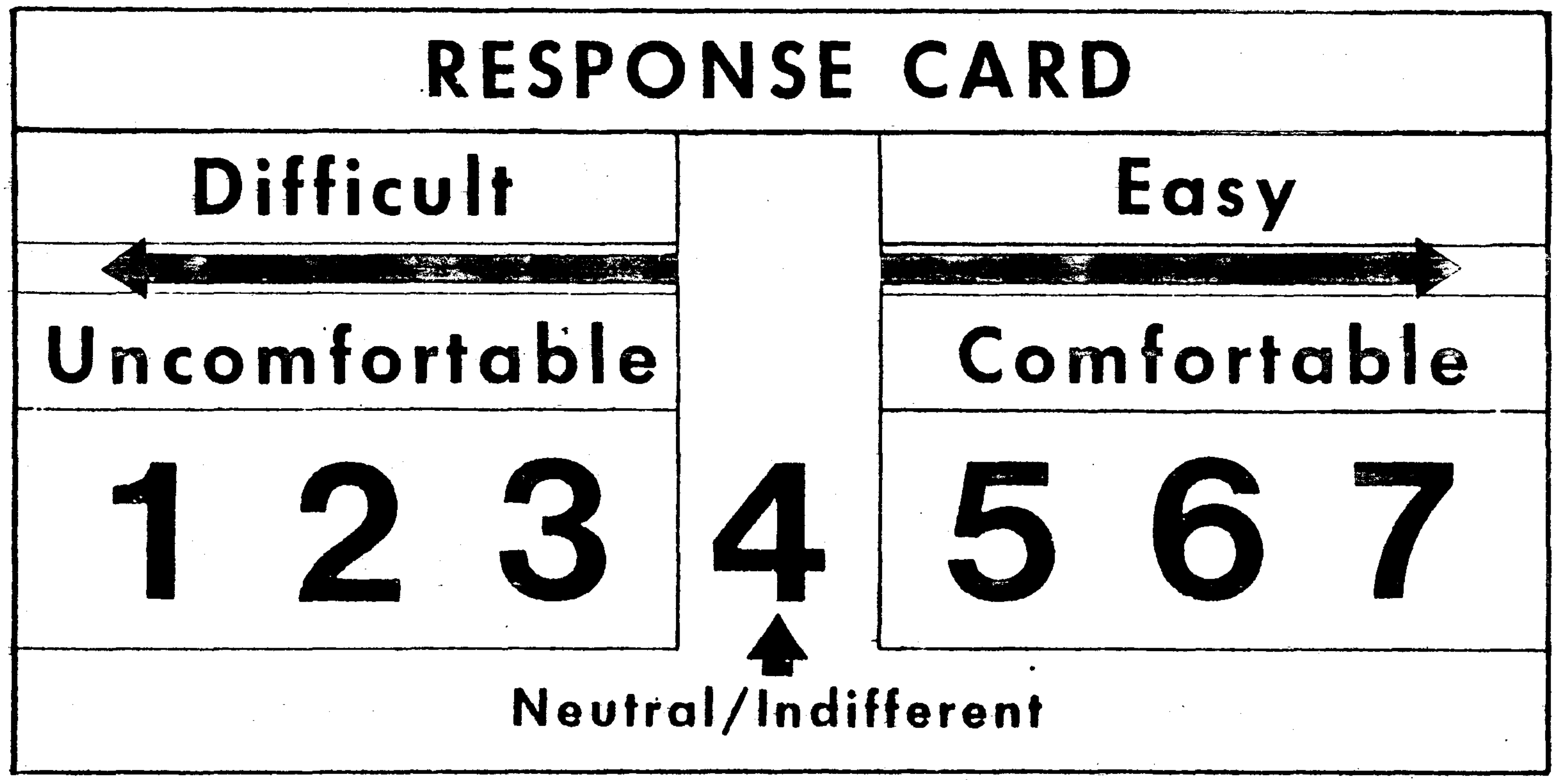
Evaluations were conducted using teams of two people: an experimenter (test assistant) and a participant (test subject). The experimenters for both tests were recruited by a Detroit-based market research company and hired for three and one-half days, including one-half day of training. The experimenters were responsible for timing, for observing, and for asking evaluation questions while recording participant responses on the evaluation forms.

The experimenters were responsible for three items during each evaluation test day. First, they recorded the participant responses to the evaluation questions. Second, they guided the participants from one car to the next to insure that the predetermined random order was maintained. Finally, the experimenters observed safety belt system problems such as belt twisting, excessive belt slack, shoulder belt fit, and incomplete belt retraction during each trial.

The participants were also recruited by the same market research company using detailed anthropometric, socioeconomic, and educational specifications (see Chapter 3). A unique group of participants was recruited for each day. Each

Exhibit 2-1

RESPONSE CARD



participant was paired with the same experimenter throughout the day. These participants entered each vehicle, donned the safety belt system, responded to the experimenter's questions, doffed the system, and exited the vehicle.

Test Schedule

The consumer evaluations for both the December and July tests took place over three days. Each test period began with an orientation session to acquaint participants with the purpose of the test, their role, and the procedures involved in evaluating the vehicles. During this session, each person completed a Participant Information Form and reviewed a Glossary of Terms and the Evaluation Schedule. Prior to and after orientation, physical data were collected and recorded for each participant.

Before commencing the evaluations, participants and experimenters were teamed up using a matched-number system. Each experimenter was also given a unique sequence of vehicles by trial number, in order to randomize the order in which the vehicles were evaluated by the different participants. A new unique test sequence was generated for each experimenter for each test period. These randomized sequences were used to reduce the effect of evaluating the vehicle systems in the same order.

Exhibit 2-2 shows the process used to develop the unique random orders, using five vehicles, five trials, and five participants as an example. The first step was to create a Latin square in which each row and each column contain each participant once and only once. In Step 2, vehicles and trial numbers were randomly assigned to each row and column, respectively. Finally, each unique list was determined by reformulating the results of Step 2. For example, for Participant A the fifth trial is with vehicle number 3, as indicated in the upper left corner of Step 2.

To conduct the test, each participant/experimentor pair evaluated each vehicle in the randomized order provided. During each evaluation, or trial, the participant was asked to sit in the vehicle, don the safety belt system, doff the system, and exit the vehicle. During this process, the experimentor observed various aspects of the procedure such as belt twisting and improper fit, read a list of questions about the participants perceptions of the belt system's comfort and convenience, and recorded all observations and participant responses on the evaluation form.

At the conclusion of this process, during the July study, each participant was asked to complete a form on which the relative importance of various aspects of comfort and convenience were measured. The purpose of this form was to develop a relative weighting scheme so that an overall index reflecting the importance of these factors can be developed.

COMPLIANCE TESTING

To determine each vehicle's basic compliance with proposed federal regulations governing comfort and convenience of safety belt systems, a series of six tests was conducted during the December 1979 test. These tests included:

Exhibit 2-2

ORDERING TECHNIQUE

Step 1
Latin Square

Trial Number

Vehicle Number	?	?	?	?	?
?	A	B	C	D	E
?	E	A	B	C	D
?	D	E	A	B	C
?	C	D	E	A	B
?	B	C	D	E	A

Step 2
Random Ordering of Trial and Vehicle Numbers

Trial Number

Vehicle Number	5	1	3	4	2
3	A	B	C	D	E
1	E	A	B	C	D
5	D	E	A	B	C
4	C	D	E	A	B
2	B	C	D	E	A

Step 3
Participant Sequence

Trial Number

Participant Number	1	2	3	4	5
A	1	2	5	4	3
B	3	4	1	5	2
C	2	5	3	1	4
D	4	1	2	3	5
E	5	3	4	2	1

- Shoulder belt fit test with 50th percentile dummy;
- Shoulder belt pressure test with 50th percentile dummy;
- Latchplate accessibility measurements for 50th percentile dummy;
- Motorized retractor rates, and head clearance using 50th percentile dummy;
- Accessibility block test; and
- Webbing retraction test.

In varying degrees, each of the tests was modified on-site to accommodate unforeseen situations. The tests as actually performed are discussed in the remainder of this section.

Shoulder Belt Fit Test With 50th Percentile Dummy

The purpose of this test is to determine how well the shoulder belt fits. A good fit is indicated when the belt falls within a certain area on the user's chest, as specified in NHTSA's proposed comfort and convenience standard. To designate the compliance envelope on the dummy's chest, one-inch blue squares were used on a white field, creating a checkerboard pattern. The dummy was then placed in each vehicle following placement procedures outlined in FMVSS #208.

In order to ease moving the dummy into and out of the vehicles, its legs were removed. This was not expected to affect dummy displacement on the seat cushion. Use of a patient lifter also contributed greatly to handling the dummy, and the sling from this device was left around the lower part of the dummy at all times, since it in no way interfered with the testing.

Once the dummy was in a vehicle, the seat was adjusted to mid-position. The safety belt was donned, and the webbing adjusted over the dummy so that it fell within the compliance envelope. Next, the dummy was rocked left to right several times until the belt moved to the shortest distance between the belt anchor points. Final location of the shoulder belt relative to the compliance envelope was then observed, recorded, and photographed. If the belt remained within the compliance envelope, the belt system passed this compliance test.

Shoulder Belt Pressure Test With 50th Percentile Dummy

After completion of the fit test, while the dummy was still set up in the vehicle, a shoulder belt pressure test was conducted. This test measures the pressure of the shouder belt on a user's chest. A strain gauge was mounted perpendicular to the dummy's chest at the point where the belt crossed the center line of the dummy, and the belt was engaged in a sling connected to the gauge. Both belt and sling were allowed to rest on the dummy's chest so as to exert no pressure on the gauge. The strain gauge was set to zero and then pulled perpendicularly away from the dummy so as to exert tension on the belt sufficient to pull it approximately one inch from the dummy's chest. To obtain a pressure reading, the shoulder belt was first grasped by hand several inches above the sling and pulled even further away from the dummy's chest. This relaxed the pressure on the sling, producing a zero reading on the gauge. The belt was then released allowing it to snap back against the sling. The static, or "resting," pressure reading on the strain gauge was observed and noted. After this process of pulling and releasing sharply was repeated several times, an observed average reading was recorded.

Latchplate Accessibility Measurement With 50th Percentile Dummy

Once the preceeding two tests were completed, the safety belt system was doffed without moving the latchplate along the webbing, thus leaving it positioned at the point where it would most likely have been found after prior belt system use by a 50th percentile person. If the latchplate went into a position at or near the roof or upper B-pillar, making it accessible using the inboard hand, the distance from the latchplate to the base of the dummy's neck was measured and recorded. If the latchplate went into a position at or near the floor or lower B-pillar, making it accessible using the outboard hand, the distance from the latchplate to a specified point near the dummy's armpit was measured and recorded.

Motorized Retractor Rates and Head Clearance

For the two test vehicles with motorized retractors, the time between closing the door and complete belt deployment was measured and recorded. Similarly, the time between opening the door and complete retraction was measured and recorded. Head clearance was derived by first deploying (articulating) the belt system to the point where it passed closest to the dummy's face. The separation between the belt webbing and the dummy's nose was then measured and recorded.

Accessibility Block Test

With the door closed, a project team member attempted to work a block of wood conforming to 95th percentile male forearm dimensions either between the seat back and side panel or between the seat pan cushion and a door-mounted armrest, depending upon normal latchplate location. Whether or not the latchplate could be reached using the test block was noted and recorded.

Webbing Retraction Test

In each vehicle, the shoulder belt was extended without being donned, and then released. Completeness of retraction was observed and recorded.

CHILD RESTRAINT DEVICE (CRD) EVALUATION

The purpose of this evaluation was to determine the compatibility between six CRDs and the passenger seat belts in each of the December test vehicles. The testing of the child restraint devices involved securing each device in each vehicle, executing a few maneuvers such as rocking the device from side to side, and recording the results on the Child Restraint Device Evaluation Form. The devices included are shown in Exhibit 2-3. Two additional restraints were evaluated in July.

Each device was tested in the front passenger seat, the middle passenger seat, and the outboard and center rear passenger seat, where appropriate. If the device was convertible, it was tested in both the infant position and the toddler position, with an evaluation form being completed for each position. These tests were conducted during the July test using an abbreviated questionnaire.

This chapter has reviewed test instruments, as well as consumer evaluation, compliance testing, and child restraint device evaluation procedures as conducted at the test site. The next chapter describes the vehicle, participant, and CRD samples used in this study.

Exhibit 2-3

CHILD RESTRAINT DEVICES TESTED

	Manufacturer	Model	Convertible	Tether
Both Tests	Questor	Kantwet Care Seat	X	
	GM	Infant Love Seat		
	Strolee	Wee Care	X	X
	Collier	Bobby Mac 2 in 1	X	
	Ford	Tot Guard		
	Century	Travel Guard	X	
July Test	GM	Child Love Seat		X
	Cosco	Safe and Easy Model 13-313	X	

3

DESCRIPTION OF THE SAMPLES

The goal of both studies was to determine factors influencing comfort and convenience of safety belt systems by having consumers of various sizes evaluate the belt systems in a sample of vehicles with a range of different characteristics. This chapter describes the selection criteria for the vehicle samples for both the December 1979 and July 1980 studies, as well as the criteria for the selection for another major test component, the sample of consumers who evaluated each vehicle.

VEHICLE SAMPLE

The vehicle sample for the December test was selected by the NHTSA based anticipated sales for 1980. The sample included 36 vehicles of various sizes, manufacturers, seat configurations, and number of doors. The sample included cars, light trucks, and vans with belt systems that were either manual, automatic, or automatic with optional lap belt. Two of the vehicles were DOT experimental designs, both were automatic systems, one motorized and the other not. Exhibit 3-1 is a list of the manufacturers providing vehicles for the test, the number of vehicles supplied, and the relative percentage of the vehicle sample that number represents.

In Exhibit 3-2, the major characteristics of the 36 vehicles in the December sample are displayed. Similarly, the results of the compliance testing are shown in Exhibit 3-3. Compliance standards are those presented in the Woodson study [8]. For example, the shoulder belt complies with the pressure standard when it exerts no more than seven tenths of a pound. Latch plate accessibility is acceptable if it is within 19-1/8 inches of the base of the dummy's neck when the latchplate is stowed high on the B-pillar, or if it is within 28 inches of the dummy's armpit when the latchplate is stowed on the floor. Motorized systems passed their special compliance tests when the retractor rate was between 1.5 and 1.9 seconds, and when the dummy's head clearance was greater than 8.5 inches from the tip of the nose. The compliance test results by vehicle are presented in Appendix B, Compliance Test Results.

Exhibit 3-1

LIST OF DECEMBER VEHICLES

Manufacturers	Number of Vehicles	Percentage of Vehicle Sample
AMC	3	8.3
Chrysler	5	13.9
Ford	7	19.4
GMC	7	19.4
BMW	1	2.8
Fiat	1	2.8
Honda	1	2.8
Mazda	1	2.8
Datsun	2	5.6
Subaru	1	2.8
Toyota	3	8.3
VW	2	5.6
Test Vehicles	2	5.6

Exhibit 3-2

DECEMBER VEHICLE CHARACTERISTICS

Characteristics		Number of Vehicles	Percentage of Vehicle Sample
Size	Subcompact	17	47.3
	Compact	2	5.5
	Midsize	5	13.9
	Large	2	5.5
	Truck	10	27.8
Doors	Two	30	83.3
	Four	6	16.7
Seat	Bench	12	33.3
	Bucket	24	66.7
Type Safety Belt System	Manual	29	80.6
	Automatic	6	16.7
	Automatic with Optional Lap Belt	1	2.8
	Continuous Loop	31	86.1
	Dual Retractor	3	8.3
	Motorized Retractor	2	5.6
	Windowshade with Automatic Release	9	25.0
	Windowshade without Automatic Release	5	13.9
	Without Windowshade	22	61.1

Exhibit 3-3

SUMMARY RESULTS OF THE COMPLIANCE TESTING

(In number of test vehicles)

Test	Pass	Fail
Shoulder belt fit	5	31
Shoulder belt pressure	11	25
Latchplate accessibility*	29	0
Accessibility block*	29	0
Webbing retraction*	23	6
Motorized retractor rates**	1	1
Motorized head clearance**	0	2

* Appropriate only for manual belt systems.

** Appropriate only for motorized automatic systems.

The vehicles for the July study were selected according to three criteria. First, because this test was to represent 1981 models, cars which will be unchanged from the 1980 model year were used. Second, just as in the earlier study, the vehicles were selected according to anticipated 1981 sales. Finally, models not tested in the December study were chosen for the July version. The only exception to these criteria was a Volkswagen Rabbit with a manual belt system. The manufacturers represented in the second test are listed in Exhibit 3–4 along with the number of vehicles provided by each manufacturer. Major characteristics of the 19 vehicles tested in July are shown in Exhibit 3–5.

CONSUMER SAMPLE

All consumer evaluators, or participants as they were referred to during the tests, were recruited for both tests by a market research company from the Detroit metropolitan area following specifications provided by the project team (see Exhibit 3–6). These participants were selected to include body types indicated in previous tests a tendency to have more frequent comfort and convenience problems. To simplify the analysis, an equal number of participants were selected to satisfy each characteristic. This factor combined with limitations imposed by the size of the testing facilities and the time allocated to the test set the maximum number of consumer evaluators at 120 for each test. Because of no–shows and unusable individuals, the final consumer samples were 115 for the December test and 114 for the July evaluations.

Each consumer completed a Participant Information Form during the orientation process. From this, additional background data were gathered, such as whether any immediate family member owned a vehicle with an automatic belt system, or an indication of the percentage of time that person typically used a safety belt while riding in a car. Out of the sample of 115 from the December test, only 3 indicated that an immediate family member owned a vehicle with an automatic belt system. Similarly, of the July participants, only 2 had an automatic belt system in a vehicle owned by their families. Exhibit 3–7 shows the range of safety belt usage for both driver samples combined. As can be seen, usage of safety belts among the sample population is low, reflecting the low usage of the overall population.

Physical data were also gathered from each consumer prior to the evaluation of the belt systems in each vehicle. A summary of that data from the December sample is presented in Exhibit 3–8, while Exhibit 3–9 shows similar data from July. Subjects with a seated girth greater than fifty–seven inches were excluded from the analysis.

Exhibit 3-4

LIST OF JULY VEHICLES

Manufacturers	Number of Vehicles	Percentage of Vehicle Sample
Chrysler	2	10.5
Ford	2	10.5
GMC	3	15.8
BMW	1	5.3
Fiat	1	5.3
Mazda	1	5.3
Datsun	2	10.5
Toyota	2	10.5
VW	3	15.8
Mercedes	1	5.3
Volvo	1	5.3

Exhibit 3-5

JULY VEHICLE CHARACTERISTICS

Characteristics		Number of Vehicles	Percentage of Vehicle Sample
Size	Subcompact	10	52.7
	Compact	2	10.5
	Midsize	3	15.8
	Large	2	10.5
	Two-seater	2	10.5
Doors	Two	12	63.2
	Four	7	36.8
Seat	Bench	3	15.8
	Bucket	16	84.2
Type Safety Belt System	Manual	18	94.7
	Automatic	1	5.3
	Continuous Loop	17	89.5
	Dual Retractor	2	10.5
	Windowshade with Automatic Release	3	15.8
	Windowshade without Automatic Release	1	5.3
	Without Automatic Release	15	78.9

Exhibit 3-6

RECRUITING SPECIFICATIONS

Total number needed = 120

Age range: 18-70

Fifteen (15) individuals in each of the following eight (8) categories:

(1) Fifteen males between 67 and 71 inches tall and weighing between 152 and 189 pounds;

(2) Fifteen females between 62 and 66 inches tall and weighing between 122 and 159 pounds;

(3) Fifteen males between 67 and 71 inches tall and weighing more than 210 pounds;

(4) Fifteen females between 62 and 66 inches tall and weighing more than 175 pounds;

(5) Fifteen males less than or equal to 66 inches tall and weighing less than or equal to 137 pounds;

(6) Fifteen females less than or equal to 61 inches tall and weighing less than or equal to 110 pounds;

(7) Fifteen males less than or equal to 66 inches tall and weighing more than 170 pounds; and

(8) Fifteen females less than or equal to 61 inches tall and weighing more than 145 pounds.

Exhibit 3-7

SAFETY BELT USAGE FOR DECEMBER AND JULY PARTICIPANTS

(Question 7 on Participant Information Form)

Usage Rate (percent)	Percentage of Participants	Usage Rate (percent)	Percentage of Participants
0	42.2		
10	24.1	60	1.7
20	12.1	70	2.6
30	4.3	80	2.6
40	1.7	90	6.0
50	0.9	100	3.4

Exhibit 3-8

MAJOR PHYSICAL CHARACTERISTICS OF THE DECEMBER PARTICIPANT SAMPLE

Characteristic		Number	% of Consumers
Sex	Male	56	48.3
	Female	60	51.7
Height	≤ 59 inches	8	6.9
	60–62 inches	28	24.1
	63–66 inches	45	38.8
	67–69 inches	21	18.1
	≥ 70 inches	14	12.1
Weight	Not Overweight	75	64.7
	Overweight	41	35.3
Seated Waist	≤ 30 inches	28	24.1
	31–36 inches	42	36.2
	37–42 inches	29	25.0
	43–48 inches	12	10.3
	49–57 inches	5	4.3

Exhibit 3-9

MAJOR PHYSICAL CHARACTERISTICS OF THE JULY PARTICIPANT SAMPLE

Characteristic		Number	% of Consumers
Sex	Male	56	49.1
	Female	58	50.9
Height	≤ 59 inches	13	11.4
	60-62 inches	21	18.4
	63-66 inches	44	38.6
	67-69 inches	24	21.1
	≥ 70 inches	12	10.5
Weight	Not Overweight	68	59.6
	Overweight	46	40.4
Seated Waist	≤ 30 inches	27	23.9
	31-36 inches	29	25.7
	37-42 inches	30	26.5
	43-48 inches	21	18.6
	49-57 inches	6	5.3

4

RESULTS AND ANALYSIS OF THE CONSUMER EVALUATIONS

This chapter discusses in detail the procedures used to analyze the data collected during the consumer evaluation process and presents the results of that analysis. An analysis of the child restraint device evaluations is presented in the next chapter.

The emphasis of the analyses presented in this chapter is to identify both the major comfort and convenience problem areas for the vehicles included in this study and the relationship between perceived comfort and convenience and various user and vehicle characteristics. The comfort and convenience aspects specifically addressed during this study were:

- **Accessibility,** relating to reaching for and grasping the safety belt latch plate;
- **Extending,** pertaining to moving the latch plate over to the buckle;
- **Buckling,** involving inserting the latch plate into the buckle;
- **Fit,** describing how the shoulder belt fits the wearer;
- **Pressure,** relating to the pressure of the belt on the wearer's chest and shoulder;
- **Releasing,** involving releasing the latch plate from the buckle; and
- **Retracting,** relating to how conveniently the system retracts out of the user's way as he exits the vehicle.

The first section of this chapter discusses the assumptions used in the data analysis. The next section reviews the indices developed from the consumer evaluations related to each of the above factors. The third section discusses the ranking of the safety belt systems according to each aspect. The statistical techniques used to determine which safety belt and user characteristics influence comfort and convenience perceptions are discussed in the fourth section, while the last section presents the results of that analysis.

ANALYTICAL ASSUMPTIONS AND OTHER NOTES

This section reviews in detail the assumptions used in the data analysis. Each assumption is described, its implications for the analysis are discussed, and a justification for making the assumption is presented.

Implicit in any analysis involving consumer opinions is that the scale used to measure those opinions is interval. This means that, in the context of the scale shown by Exhibit 2-1 (see page 9), for any individual respondent the increase in comfort or ease of use between any two points on the response scale are equal. In other words, the difference between 1 and 2 on the scale is the same as that between 4 and 5. This assumption is necessary so that aggregative comparisons between various groupings of evaluation responses can be made.

A second assumption of the analyses presented in this report is that the evaluations from the December and July tests are comparable. Three factors support this assumption. First, the test procedures used for both tests were exactly alike including experimenter training, participant briefings, and evaluation questions. Second, a comparison of Exhibits 3-8 and 3-9 (see pages 25, 26), shows that the physical characteristics of the two participant groups were almost identical. This implies that responses from one group of participants would not likely be different than the other because of differences in physical characteristics. Third, a comparison of the responses for the Volkswagen Rabbit with a manual system, the only vehicle common to both the December and July tests, showed only one statistically significant difference between the responses from the two tests. This difference occurs in the releasing indices, which show that significantly more problems in releasing were identified during the December test than during the July test. This difference may be explained by the fact that the Rabbit has a buckle release which is in a different location than that of most other systems. Since such a buckle style was tested only once in the December test, participants would be encountering that buckle release for the first time each time the Rabbit was tested. During the July test, on the other hand, a buckle release of similar type was in two other vehicles. Consequently, there was a 66 percent chance that a participant had already encountered a similar buckle and was, therefore, familiar with its operation. All other indices including overall comfort and convenience indices were not significantly different when comparing the results of the two tests.

This latter assumption that the results of the tests are comparable is necessary so that safety belt system comfort and convenience of vehicles from the two tests can be compared. Moreover, this assumption allows aggregation of all responses by other groupings such as vehicle body type and participant sex.

In addition to these assumptions, comments are appropriate about the computer procedures and about the Ford Fairmonts used in the December and July test sessions. First, the process for aggregating evaluation responses varied from that used in the 1978 study and for the data presented during the March 1980 press conference. In these previous analyses, if an individual evaluation had any missing data (that is, a response was not marked or incorrectly marked), it was not included in the calculation of a vehicle or other subgroup comfort and convenience index. For this report, on the other hand, all available responses were included by first calculating indices for each aspect and then using these results to calculate an overall index. Because of this difference in indexing procedures, the results of overall indices presented in this report may differ slightly from preliminary findings.

Lastly, an attempt was made during the July study to obtain and retest a Ford Fairmont similar to that used in the December test. However, such a Fairmont with an automatic release for its windowshade tension reliever system was not available. The vehicle obtained had a windowshade device but no automatic release. This difference hinders a direct comparison of the evaluation results for the two Fairmonts.

COMFORT AND CONVENIENCE ASPECT INDICES

To summarize the consumer evaluation responses into the seven aspects relating to safety belt operation and comfort, an indexing scheme was needed. This was especially true where more than one question relating to a particular aspect was asked. Exhibit 4-1 lists the questions on each of the three consumer evaluation forms pertaining to each aspect. Note that while the numbering systems on the three forms were different, the same questions were asked about each common aspect on the three forms. For example, the question on shoulder belt fit was number 7 on the manual form, 6 on the automatic form, and 11 for the automatic with optional lap belt.

The pressure aspect is a special case in which either question 8 or 9 on the manual form is applicable. For vehicles with windowshade devices, test participants were asked about webbing pressure both before and after the device was set. Since windowshade devices in retractor systems are designed to relieve webbing pressure for the wearer, it was expected that the participants would have on the average fewer pressure problems after the device was set than before.

To test this hypothesis, a comparison of the average responses to these questions for all vehicles with windowshade devices was made. The **a priori** hypothesis is that the average of the difference between these responses should be greater than zero, when the evaluation before the setting of the windowshade is subtracted from the evaluation of shoulder belt pressure afterwards. The results of the analysis of this difference is shown in Exhibit 4-2. Since the t-statistic is less than 1.69, the hypothesis must be rejected at a 95 percent confidence level. Even though the hypothesis was not statistically substantiated, for vehicles with windowshade devices, the post-set response was used in the analysis. The index, therefore, reflects comfort and convenience when the belt system is used as it is intended. Consequently, shoulder belt pressure evaluations should be more favorable.

The remainder of this section discusses the indices developed for analysis. Two indices, or aspect ratings, are described:

- Problem index, and
- Average index.

Exhibit 4-1

GROUPINGS OF RESPONSES FROM THE CONSUMER EVALUATION FORMS

Comfort and Convenience Aspect	Associated Question Numbers[1]		
	Manual	Automatic	Automatic with Optional Lap Belt
Accessibility[2]	1,2	—	5,6
Extending[2]	3	—	7
Buckling[2]	4,5	—	8,9
Fit	7	6	11
Pressure	6,8 or 9	5,7	10,12
Releasing[2]	12	—	15
Retracting	13	10	16

[1]For aspects relevant to all belt systems, common questions were used. However, the numbering systems may be different. Please refer to Appendix A, Test Instruments.

[2]Not applicable for automatic restraints.

Exhibit 4-2

ANALYSIS OF PRESSURE PROBLEMS
BEFORE AND AFTER SETTING THE WINDOWSHADE DEVICE

DIFF = Q9 - Q8, on the manual evaluation form

Valid observations	= 1498
Mean DIFF	= 0.411
Standard deviation DIFF	= 1.460
Standard Error of the Mean	= 0.038

$$\text{t-statistic} = \frac{\text{Mean}}{\text{Standard deviation}} = \frac{0.411}{1.460} = 0.28$$

Therefore, the difference between shoulder belt pressure evaluations before and after setting the windowshade is not significantly different from zero at a 95 percent confidence level.

In addition, some considerations about the development of a composite index reflecting all aspects of comfort and convenience are discussed.

Problem Index

The problem index is based on the percentage of trials during which difficulty or discomfort was indicated in at least one question relating to a particular aspect. For purposes of this analysis, a problem is indicated by a response of three or less on the evaluation scale shown on Exhibit 2-1 (see page 9). Exhibit 4-3 exemplifies the calculation of this index. In this example, questions A and B measure the same aspect. Trials 2, 5, and 6 each have indicated difficulty or discomfort in response to at least one question. The problem index for these 10 trials then is 30 percent. The higher the index, the more comfort and convenience problems are indicated.

Use of this index is based on the assumption that good safety belt system features do not necessarily offset bad features. No matter how easy a latch plate is to locate, for example, it is still considered inaccessible if a potential user cannot grasp it. On the other hand, an index based on an average of responses would balance good and bad evaluations.

Average Index

This rating system is an average of evaluation responses pertaining to a particular aspect. For example, if a test subject is asked N questions evaluating latch plate accessibility, the index for this aspect is calculated using the formula:

$$\text{Index} = \frac{\sum_{i=1}^{N} R_i}{N}$$

where R_i is the response to the ith question. The use of such a rating scheme implies that each question asked about a particular comfort and convenience aspect has equal weight in the subject's composite evaluation of that aspect. In other words, the effect of a bad feature may be offset by a good feature.

Composite Index

To measure the overall perceptions of comfort and convenience, a scheme similar to the average index applied to all evaluation questions can be used. However, since each question is weighted equally, the aspect with more questions will be weighted more heavily than that with fewer questions. Assuming that the evaluation only involves two aspects, for example, a straight average index can be written as:

$$\text{Index} = \frac{\sum_{i=1}^{n_1} R_i + \sum_{j=1}^{n_2} R_j}{N}$$

Exhibit 4-3

EXAMPLE OF PROBLEM INDEXING SCHEME

Trial Number	Responses*		Comfort or Convenience
	Question A	Question B	Problem
1	4	7	0
2	(1)	(3)	1
3	4	4	0
4	5	4	0
5	6	(2)	1
6	(3)	4	1
7	7	7	0
8	6	5	0
9	7	4	0
10	5	7	0

*See Exhibit 2-1.

Three out of 10, or 30 percent of these trials had a comfort of convenience problem with this aspect.

where $N = n_1 + n_2$, n_1 is the number of questions pertaining to the first aspect, and n_2 is the number of questions pertaining to the second aspect. This equation can become:

$$\text{Index} = \frac{n_1\left(\frac{\sum_{i=1}^{n_1} R_i}{n_1}\right) + n_2\left(\frac{\sum_{j=1}^{n_2} R_j}{n_2}\right)}{N}$$

Written in this form: $\left(\frac{\sum_{i=1}^{n_1} R_i}{n_1}\right)$

represents the average score for the first aspect, while $\left(\frac{\sum_{j=1}^{n_2} R_j}{n_2}\right)$

is the average score for the second aspect. Similarly, the weighting of the first aspect is $\frac{n_1}{N}$,

while the weighting of the second aspect is $\frac{n_2}{N}$.

Therefore, if $n_1 > n_2$, the first aspect is weighted more heavily than the second.

If the assumption about a subject's overall perception of comfort and convenience is that each aspect has equal impact, the straight average applies only if $n_1 = n_2$. Since this condition is not likely, an indexing scheme based on an average score for each aspect is appropriate. In this example, such a normalized average index would be expressed as

$$\text{Index} = \frac{\left(\frac{\sum_{i=1}^{n_1} R_i}{n_1}\right) + \left(\frac{\sum_{j=1}^{n_2} R_j}{n_2}\right)}{2}$$

In general form, with N questions dealing with m aspects, the index for a particular vehicle/subject combination becomes

$$\text{Index} = \frac{\sum_{j=1}^{m}\left(\frac{\sum_{i=1}^{n_j} R_{ij}}{n_j}\right)}{m}$$

where R_{ij} is the response for the ith question for the jth aspect, and $\sum_{j=1}^{m} n_j$.

Weighted Index

Because no previous research was able to substantiate that one aspect has more impact than another on user perceptions of safety belt comfort and convenience, the analysis presented in earlier reports was based on an assumption of equal weight. As part of the July study, to substantiate this assumption, all participants were asked to complete an additional questionnaire during the debriefing session.

This questionnaire, called the "Safety Belt Comfort and Convenience Factors Evaluation Form," contains the participants' assessment of how important is each aspect of safety belt comfort and convenience in determining an overall rating. An example of this form is presented in Appendix A. Presumably, the subjects had sufficient experience with safety belt systems after the evaluations to make such judgements. Participants were asked to evaluate each aspect on a 7-point scale which ranged from "Not Important" to "Very Important." This scale was then recoded to range from one to seven, respectively. This recoding facilitates the development of weights which measure in the aggregate the relative importance of each of these aspects to the July participants.

Note also that the order in which the aspects appeared on the forms was randomly generated and varied for each group of participants. This was done in an attempt to eliminate bias which may result from the order of the aspects.

Two different weighting schemes were calculated using the responses to this questionnaire. The first weighting scheme (Type A) is based on the aggregated importance of each aspect over all participants divided by the total importance for all aspects over all participants. Mathematically, this weighting is expressed as:

$$W_k = \frac{\sum_{j=1}^{120} A_{jk}}{\sum_{j=1}^{120} \sum_{k=1}^{7} A_{jk}}$$

where W_k is the weighted value for aspect K, and A_{jk} is the score for aspect K given by participant j.

The second weighting scheme (Type B) is based on the relative importance of each aspect for individual participants. For each aspect, these individual participant weights are averaged over all participants to obtain an aggregated weighting. The formula for this weighting scheme is:

$$W_k = \frac{\sum_{j=1}^{120} \left(\frac{A_{jk}}{\sum_{k=1}^{7} A_{jk}} \right)}{120}$$

where W_k is the weighted value for aspect K, and A_{jk} is the score for aspect K given by participant j.

The weights generated by these two formulae are presented in Exhibit 4-4. As shown in this exhibit, the results from the two calculations are identical. For purposes of comparison, the values resulting from a straight average weighting are also presented.

The distribution of weights for all of the aspects was fairly even. The participants from the July test felt that fit and pressure were most important while buckling and releasing were least important. The remaining aspects, accessibility, extending, and retracting, all had weighted values of 0.14 which means that the participants rated them as being of average importance. While there is some variation in weighted values, it appears that the aspects are, more or less, of equal importance in determining overall comfort and convenience.

To test this **a priori** hypothesis, an overall index based on the Type A formula was developed and compared to the composite index described in the previous section. Since the values of Type A and B weights were identical, a Type B index was not calculated. This weighted index was calculated for all combinations of vehicle and participant using the general formula

$$I = \sum_{k=1}^{7} W_k A_{ijk}$$

where A_{ijk} is the score for aspect k by participant i in vehicle j, and W_k is the weight for aspect k.

To test the hypothesis that the two indices would not be significantly different, rankings based on the weighted and composite overall indices of the test vehicles from both the December and July tests were compared using Kendall's coefficient of concordance, Kendall's W. (A detailed discussion of this statistic is presented in the following section on vehicle rankings.) Kendall's W for the comparison of these two rankings was 0.9981 with a Chi-squared of 91.82. This suggests that both sets of rankings are statistically similar. Calculation of the critical points shows that the null hypothesis can be accepted at a 95 percent level of confidence. Therefore, according to the results of the July test, the refinement of using the relative importance of each of the aspects in the calculation of an overall index of safety belt comfort and convenience does not affect other analyses.

Exhibit 4-4

ASPECT WEIGHTINGS

Aspect	Weighting Scheme		
	Type A	Type B	Average
Accessibility	0.14	0.14	.14
Extending	0.14	0.14	.14
Buckling	0.12	0.12	.14
Fit	0.17	0.17	.14
Shoulder Belt Pressure	0.16	0.16	.14
Releasing	0.13	0.13	.14
Retracting	0.14	0.14	.14
Total	1.00	1.00	.98

VEHICLE RANKINGS

Two of the main purposes of these studies are to identify the good and bad aspects of all the test safety belt systems and to rank each individual system according to each aspect and to an overall rating. Because both the average and problem indexing schemes were used to measure comfort and convenience perceptions, a comparison of the ranks based on these two indices is needed. The first part of this section presents the statistical technique used in this report to compare various rankings. The second part analyzes the ranking of test vehicles by the participant's overall perceptions of safety belt comfort and convenience, discusses similar rankings for each aspect, and compares rankings of the aspect scores for various user height–weight categories.

Statistical Procedure for Comparing Rankings

Because the indices used in this study are based on different assumptions or on different groups of users, it is interesting to determine if these alternative assumptions and user groups have an impact on the vehicle rankings. One statistic which can be used to compare the rankings is Kendall's coefficient of concordance, W. As discussed in Kendall [10 and 11], this statistic can be used to compare m rankings of n items. The coefficient of concordance is based on deviations of the rankings for the items being ranked from the expected rankings if there is no relationship between ranking systems. The formula for this statistic is thus:

$$W = \frac{S}{\frac{1}{12} m^2 (n^3 - n)}$$

where

$$S = \sum_{i=1}^{n} \left(\sum_{j=1}^{m} R_{ij} - m(n+1)/2 \right)^2$$

and R_{ij} is the rank of the ith item according to the jth ranking scheme. W has a range between 0 and 1, where 0 represents no relationship among the ranking schemes, and 1 represents a perfect relationship.

Where ties are involved two modifications to this analysis are required. First, ties must be given a rank equivalent to the arithmetic average of the rank positions held by the tied items. For example, if two items are tied for ninth place, they hold positions 9 and 10 in the ranking system and, consequently, are assigned a rank of 9.5. This adjustment is reflected in the rankings presented in this chapter. Second, the formula for W must be modified in the following way:

$$W = \frac{S}{\frac{1}{12} m^2 (n^3-n) - m \sum_{i=1}^{m} T_i}$$

where

$$T_i = \frac{1}{12} \sum_{j=1}^{l} (t_j^3 - t_j)$$

and l is the number of ranks with ties in the ith ranking scheme, and t_j is the number of ties in the jth rank with ties.

For both calculations of W, the test for significance is based on the Chi-square distribution. The Chi-square for W is calculated as m(n-1)W. The hypothesis being tested is that there is no relationship between the ranking systems. If the calculated Chi-square is greater than the critical value, the hypothesis of no community of rating is then rejected.

Comparison of Rankings

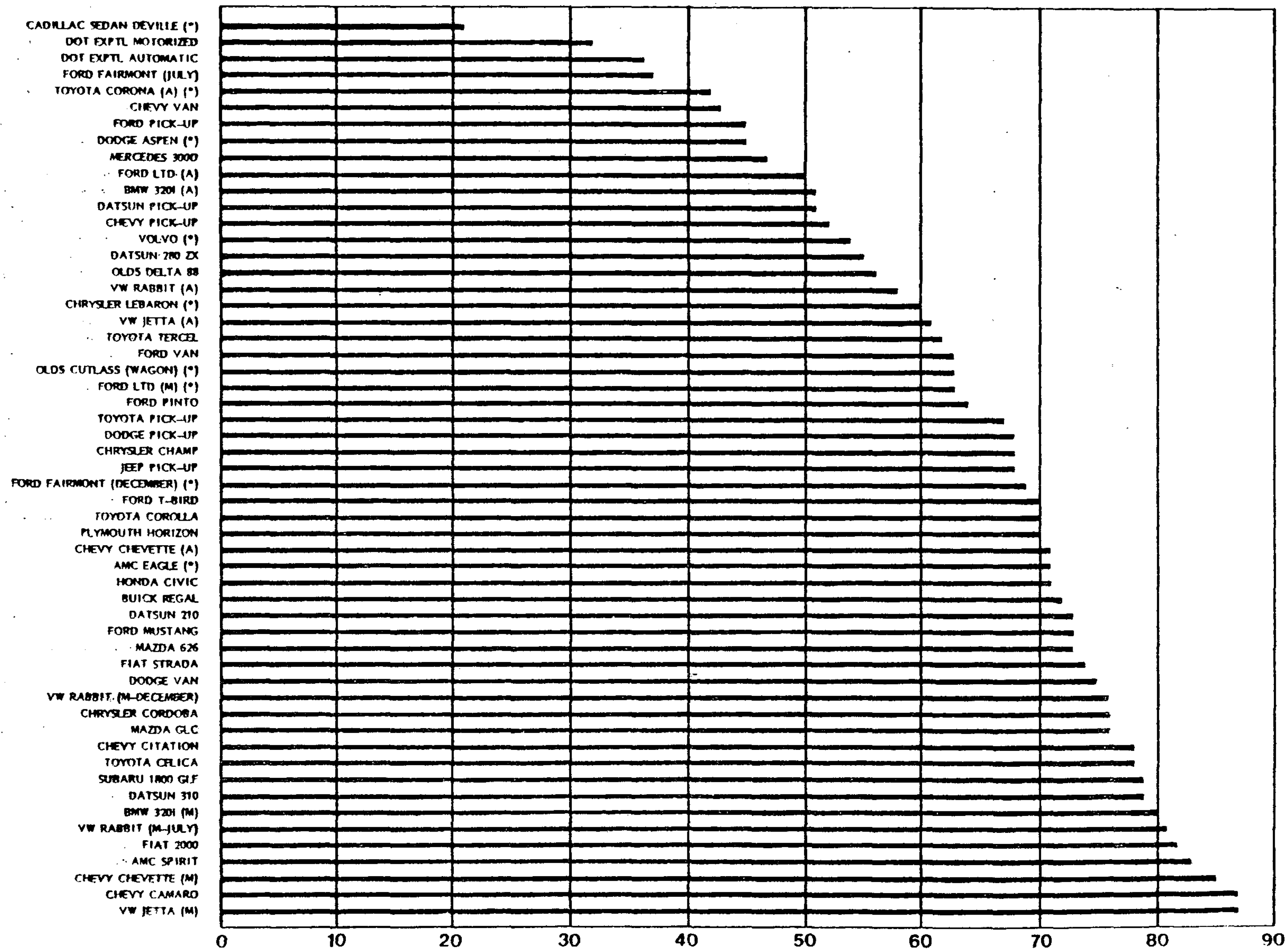
Using Kendall's coefficient of concordance, rankings of the test vehicles were compared to determine if the applications of the problem index made significant changes in the ranking when compared to the rankings based on the average index. Because the average and weighted indices rankings were not significantly different, only the average index will be included in the analyses described in this section. Similar comparisons of rankings for each comfort and convenience aspect are also presented. Finally, the test vehicle rankings by different participant weight-height categories are compared.

Overall Rankings. The rankings of the test vehicles by the composite scores for the problem and average rating schemes are presented in Exhibits 4-5 and 4-6. For purposes of comparison, the mean problem index for all vehicles was 65 percent. Similarly, for the composite average scores shown in Exhibit 4-6, the score averaged over all test vehicles was 5.0.

Three other characteristics of these indices should be clarified. First, **for the composite problem index shown in Exhibit 4-5, a lower score represents a more comfortable and convenient safety belt system.** This is because a lower score means that fewer trials included at least one response of three or less. Second, the

Exhibit 4-5

RANKING OF VEHICLES
BY COMPOSITE PROBLEM INDEX

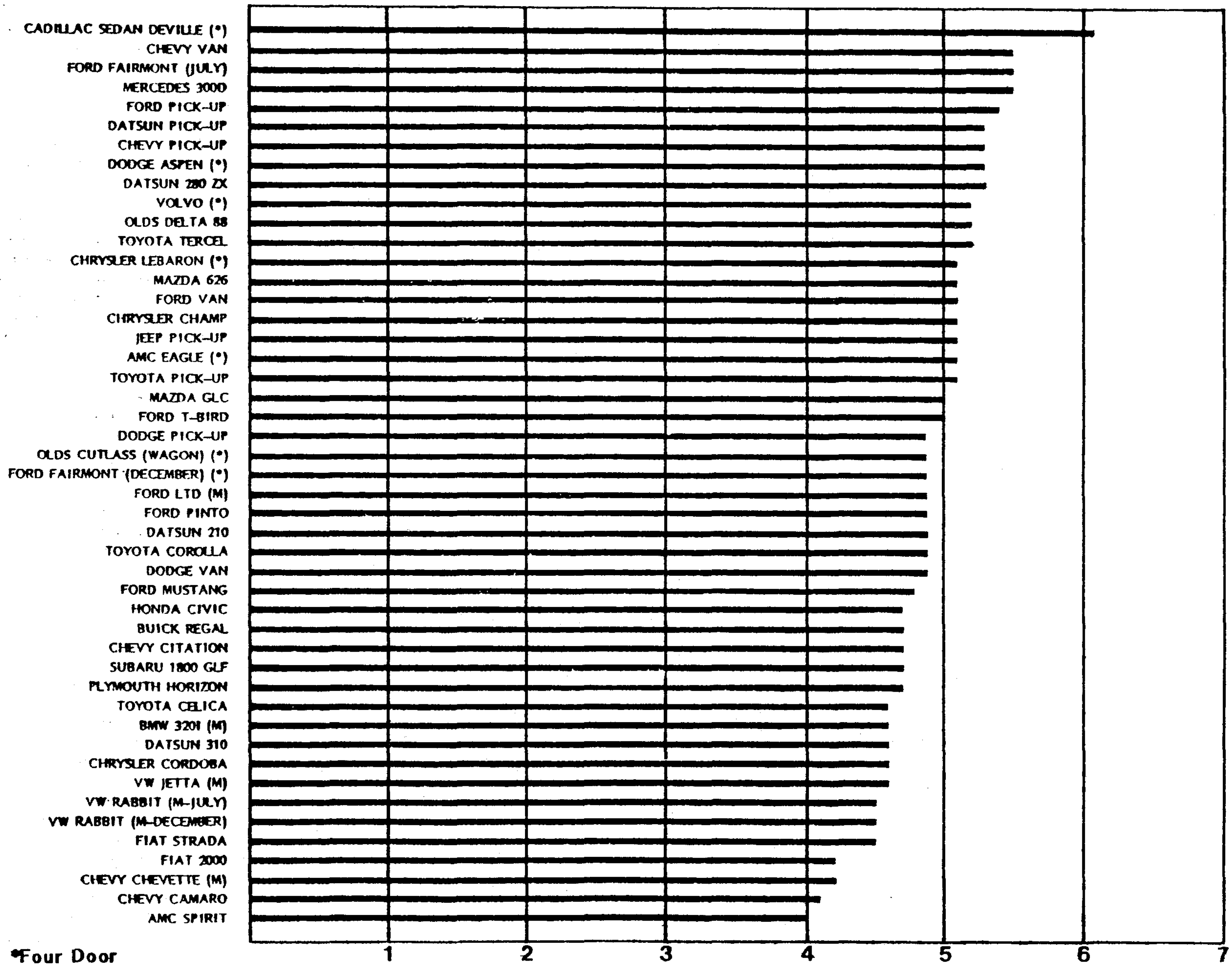


*Four Door

Percent of trials in which at least one comfort or convenience problem was identified.

Exhibit 4-6

RANKING OF VEHICLES WITH MANUAL SAFETY BELT SYSTEMS BY COMPOSITE AVERAGE INDEX



composite average index functions inversely. That is, **the higher the composite average score, the more comfortable and convenient the safety belt system.** Since the average score is based on the raw responses provided by the test participants, and since the evaluation scale used higher numbers to represent comfort and ease of use, the best possible composite average score is 7, while the worst is 1. Last, the composite average index is only used to compare manual systems in cars and trucks. Because not all aspects of safety belt usage are relevant to automatic systems, not all aspect scores could be included in the composite index. Consequently, the average for automatic systems would be based on a different number of aspects. Exhibit 4-7 shows the scores for automatic systems.

To determine if the rankings shown in Exhibits 4-5 and 4-6 are statistically similar, Kendall's W was calculated. The numeric value of this statistic is 0.879, with a modified Chi-squared of 82.641. This indicates that the hypothesis of no commonality can be rejected with a 95 percent level of confidence. In other words, the indexing scheme does not significantly affect the order in which the test vehicles are ranked for overall safety belt system comfort and convenience.

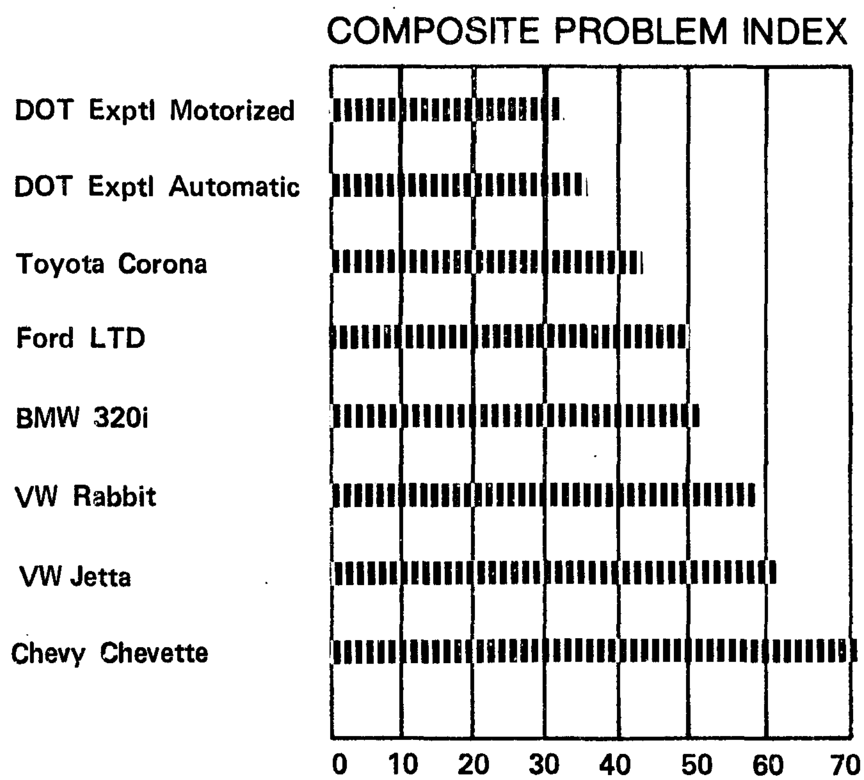
Rankings by Aspect Scores. The rankings of the test vehicles for each aspect using the problem index and the average index are presented in Exhibits 4-8 and 4-9, respectively. The numbers included in these exhibits represent a vehicle's relative ranking for a particular aspect. For example, as shown by Exhibit 4-8, the AMC Eagle ranks thirteenth best for accessibility and tied for twenty-fourth for extending, according to the problem index. The actual scores for each aspect for each test vehicle are presented in Appendix C, Detailed Results by Vehicle. For purposes of comparison, the scores over all vehicles are presented in Exhibits 4-10 and 4-11.

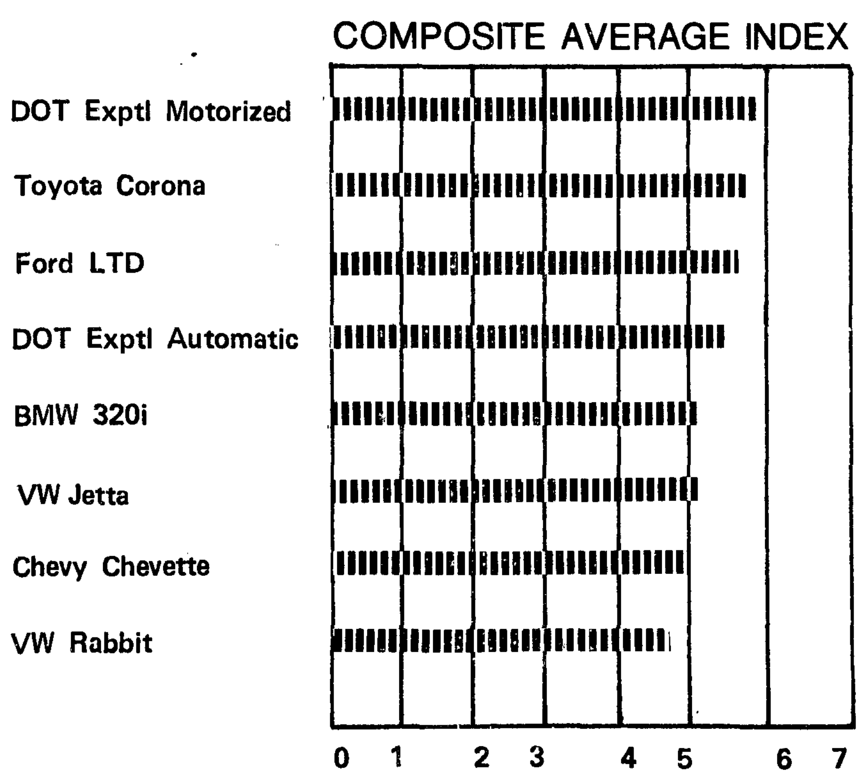
Using Kendall's coefficient of concordance, the two rankings based on the problem and average indices rankings for each of the comfort and convenience aspects were statistically compared. For each aspect, a Kendall's W and a modified Chi-square was calculated. The calculation results are shown on Exhibit 4-12. In every case, acceptance of the null hypothesis that there is no commonality between the ranking schemes was tested at the 95 percent level of confidence. The modified Chi-square statistics indicate that the null hypothesis can be rejected with 95 percent confidence for all aspects. This result combined with that shown for the overall ranking indicates that use of either index to compare vehicles is likely to yield similar results. In other words, rankings based on the assumption that a problem with any one aspect of safety belt comfort and convenience will discourage belt usage regardless of the user's opinions about the other aspects are not significantly different from rankings based on the assumption that good aspects outweigh bad aspects.

Comparison of Ranks by User Size. Earlier studies have indicated that the physical characteristics of safety belt users tend to influence their perceptions of comfort and convenience. Moreover, users of differing sizes may find different safety belt systems more comfortable and convenient. To test this hypothesis, the trials were grouped according to four participant size categories:

Exhibit 4-7

RANKING OF VEHICLES WITH AUTOMATIC SAFETY BELT SYSTEMS





RANKING OF TEST VEHICLES FOR EACH ASPECT ACCORDING TO PROBLEM INDEX

Vehicle	Entry	Accessibility	Extending	Buckling	Fit	Pressure	Releasing	Retracting
AMC Eagle	—	13	24.5	29.5	13	15	25	48.5
AMC Spirit	—	39	46	47	49	45	45	50
BMW 320i (A)	4	—	—	—	14	21	—	36
BMW 320i (M)	—	45	40	32	31	35	18	32
Buick Regal	—	17	15	2	54	52	27	43
Cadillac Sedan Deville	—	1	1	1	11.5	5	11	2
Chevy Camaro	—	23	45	41	50	50	46	55
Chevy Chevette (A)	8	—	—	—	18.5	6	—	48.5
Chevy Chevette (M)	—	43	47	31	52.5	54	30	47
Chevy Citation	—	29.5	10	6.5	39.5	31	20	54
Chevy Pick-up	—	22	10	20	35	34	7	10.5
Chevy Van	—	4	7	16	21	22	2.5	12.5
Chrysler Champ	—	34	14	14	11.5	9	1	38
Chrysler Cordoba	—	18	17	43	52.5	40	44	42
Chrysler Lebaron	—	2	13	15	36	32.5	28	39
Datsun Pick-up	—	16	22	28	3	10	37	17
Datsun 210	—	32	20.5	29.5	18.5	23	43	35
Datsun 280 ZX	—	24	12	17.5	1	1	17	31
Datsun 310	—	42	32	33	43	41	9	18
Dodge Aspen	—	3	5	12.5	39.5	36	14	4
Dodge Pick-up	—	20	30.5	8.5	24	25.5	33	51
Dodge Van	—	11.5	24.5	36	8.5	16	41	53
DOT Automatic	2	—	—	—	4.5	3	—	12.5
DOT Motorized	3	—	—	—	2	7	—	1
Fiat Strada	—	32	44	27	47.5	48.5	20.5	46
Fiat 2000	—	36	43	44	55	55	36	37
Ford Fairmont (December)	—	15	39	22.5	32	37.5	25	40
Ford Fairmont (July)	—	6	3	3	6	17.5	11	6
Ford LTD (A)	5	—	—	—	4.5	3	—	25
Ford LTD (M)	—	21	35.5	34	20	27	4.5	22.5
Ford Mustang	—	26	41	12.5	26	42.5	14	41
Ford Pick-up	—	7	2	4	28	28	7	9
Ford Pinto	—	29.5	37	24	44	42.5	2.5	20
Ford T-bird	—	28	34	19	47.5	48.5	7	33
Ford Van	—	9	30.5	26	46	44	14	7
Honda Civic	—	32	16	46	28	25.5	39	29
Jeep Pick-up	—	14	38	39	17	12	40	24
Mazda GLC	—	44	10	10	28	29	20.5	10.5
Mazda 626	—	37	4	5	30	19	16	22.5
Mercedes 300D	—	5	19	17.5	10	11	29	15.5
Olds Cutlass (Wagon)	—	10	18	6.5	34	13	34	45
Olds Delta 88	—	11.5	28	8.5	8.5	3	25	44
Plymouth Horizon	—	19	20.5	21	45	39	35	52
Subaru 1800 GLF	—	46	8	22.5	51	51	38	20
Toyota Celica	—	41	27	38	41	32.5	23	26
Toyota Corolla	—	35	33	25	33	37.5	20	28
Toyota Corona	1	—	—	—	15	8	—	4
Toyota Pick-up	—	25	42	42	7	14	32	4
Toyota Tercel	—	27	6	11	16	17.5	11	27
Volvo	—	8	26	37	23	20	4.5	8
VW Jetta (A)	7	—	—	—	22	24	—	14
VW Jetta (M)	—	47	29	35	38	53	31	15.5
VW Rabbit (A)	6	—	—	—	42	46.5	—	34
VW Rabbit (M-December)	—	38	23	45	37	46.5	47	20
VW Rabbit (M-July)	—	40	35.5	40	25	30	42	30

Exhibit 4-9

RANKING OF TEST VEHICLES FOR EACH ASPECT ACCORDING TO AVERAGE INDEX

Vehicle	Entry	Accessibility	Extending	Buckling	Fit	Pressure	Releasing	Retracting
AMC Eagle	—	9	21	26	9.5	9	24.5	49
AMC Spirit	—	39	46.5	47	49	50	45	50
BMW 320i (A)	5	—	—	—	16	17	—	35
BMW 320i (M)	—	44	42	35	37	47	17	32
Buick Regal	—	19	14	4	55	53	27	44
Cadillac Sedan Deville	—	1	1	1	1	2	1	2
Chevy Camaro	—	24.5	45	44	51	51	46	55
Chevy Chevette (A)	8	—	—	—	17	8	—	47
Chevy Chevette (M)	—	41	46.5	34	53	54	35.5	51
Chevy Citation	—	28	10	8	42	29	21.5	54
Chevy Pick-up	—	17	6	15	28	24	16	8
Chevy Van	—	2	3	7	18	16	10	16.5
Chrysler Champ	—	36	18	11	15	12	4	37
Chrysler Cordoba	—	18	19	39	52	40	44	43
Chrysler Lebaron	—	4	9	9	34.5	32	28	38
Datsun Pick-up	—	16	16	28	12	10	33	14
Datsun 210	—	31	17	29	19.5	20	40	36
Datsun 280 ZX	—	24.5	15	14	3	7	6	33
Datsun 310	—	45	38	31	48	48	18	23
Dodge Aspen	—	5	8	12	38	37	15	11
Dodge Pick-up	—	20	27	18	19.5	22	24.5	48
Dodge Van	—	8	22.5	32	8	13	44	53
DOT Automatic	3	—	—	—	9.5	5	—	13
DOT Motorized	2	—	—	—	4	4	—	1
Fiat Strada	—	33	43	30	45	49	31	46
Fiat 2000	—	34	44	45	54	55	38	39
Ford Fairmont (December)	—	15	34	24	32	38	21.5	40
Ford Fairmont (July)	—	10	4	2	13	18	2	4
Ford LTD (A)	4	—	—	—	2	1	—	12
Ford LTD (M)	—	22	40	33	30	34	9	19
Ford Mustang	—	29	41	20	23	30	23	41
Ford Pick-up	—	6.5	2	3	31	25	5	6
Ford Pinto	—	30	31	25	36	39	12	25
Ford T-bird	—	23	30	16	43	44	7	29
Ford Van	—	13	26	21	47	43	8	7
Honda Civic	—	35	22.5	46	29	27	42	27
Jeep Pick-up	—	14	35	38	14	14	39	26
Mazda GLC	—	42	12	19	24	31	19	16.5
Mazda 626	—	38	7	5	27	19	12	24
Mercedes 300D	—	3	11	10	6	11	14	9
Olds Cutlass (Wagon)	—	11	24	13	34.5	26	34	45
Olds Delta 88	—	12	25	6	7	6	20	42
Plymouth Horizon	—	21	20	22	46	41	36	52
Subaru 1800 GLF	—	47	13	23	50	42	37	21
Toyota Celica	—	43	36.5	42	44	36	26	22
Toyota Corolla	—	32	28	27	33	35	30	30
Toyota Corona	1	—	—	—	5	3	—	3
Toyota Pick-up	—	26	33	36	11	15	35.5	10
Toyota Tercel	—	27	5	17	21	21	12	28
Volvo	—	6.5	32	37	22	23	3	5
VW Jetta (A)	6	—	—	—	26	28	—	18
VW Jetta (M)	—	46	36.5	41	40	52	29	15
VW Rabbit (A)	7	—	—	—	39	46	—	31
VW Rabbit (M-December)	—	37	29	43	41	45	47	20
VW Rabbit (M-July)	—	40	39	40	25	33	43	34

Exhibit 4-10

AVERAGE SCORES FOR ALL TEST VEHICLES USING THE PROBLEM INDEX

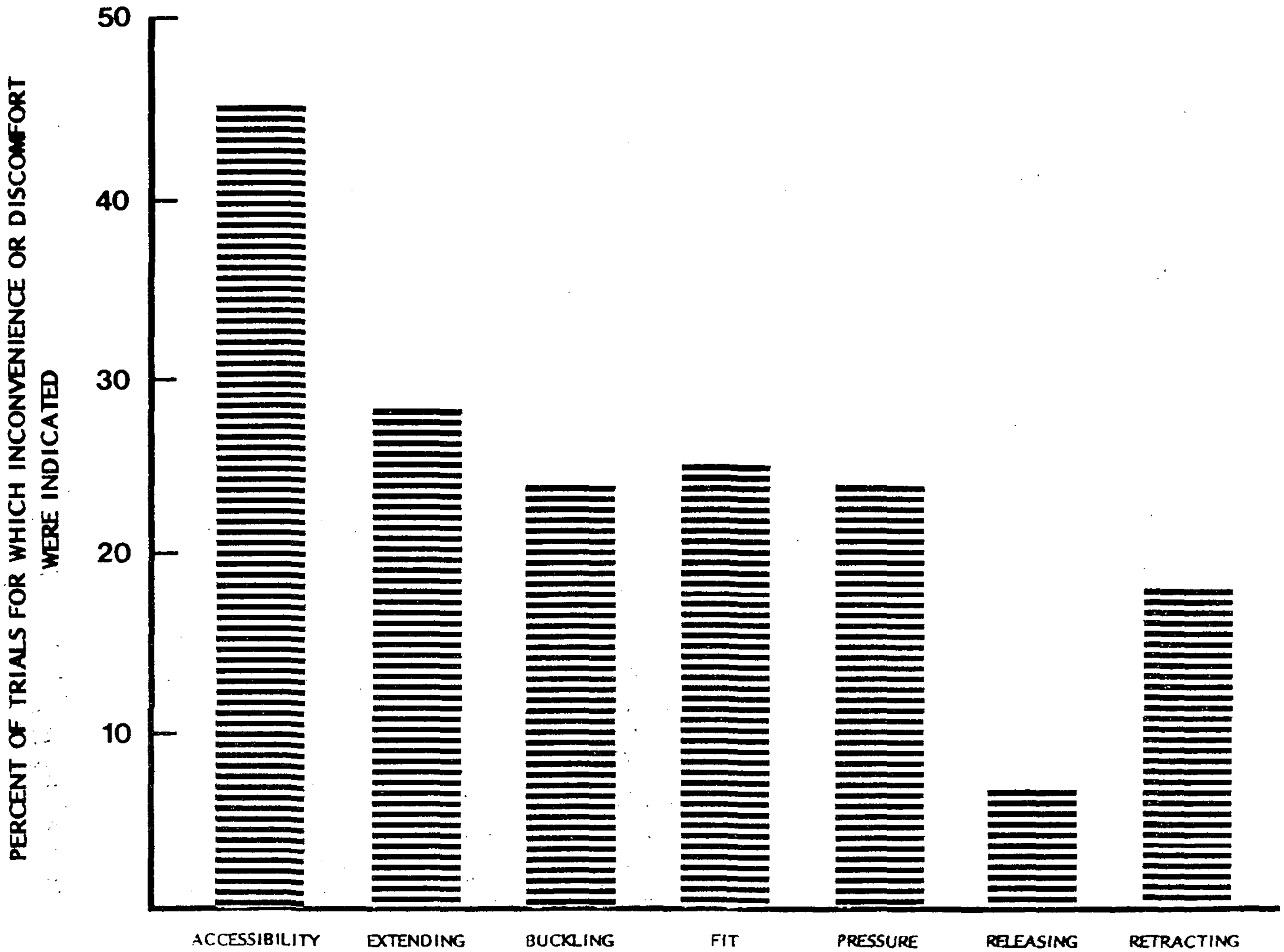


Exhibit 4–11

AVERAGE SCORES FOR ALL TEST VEHICLES USING THE AVERAGE INDEX

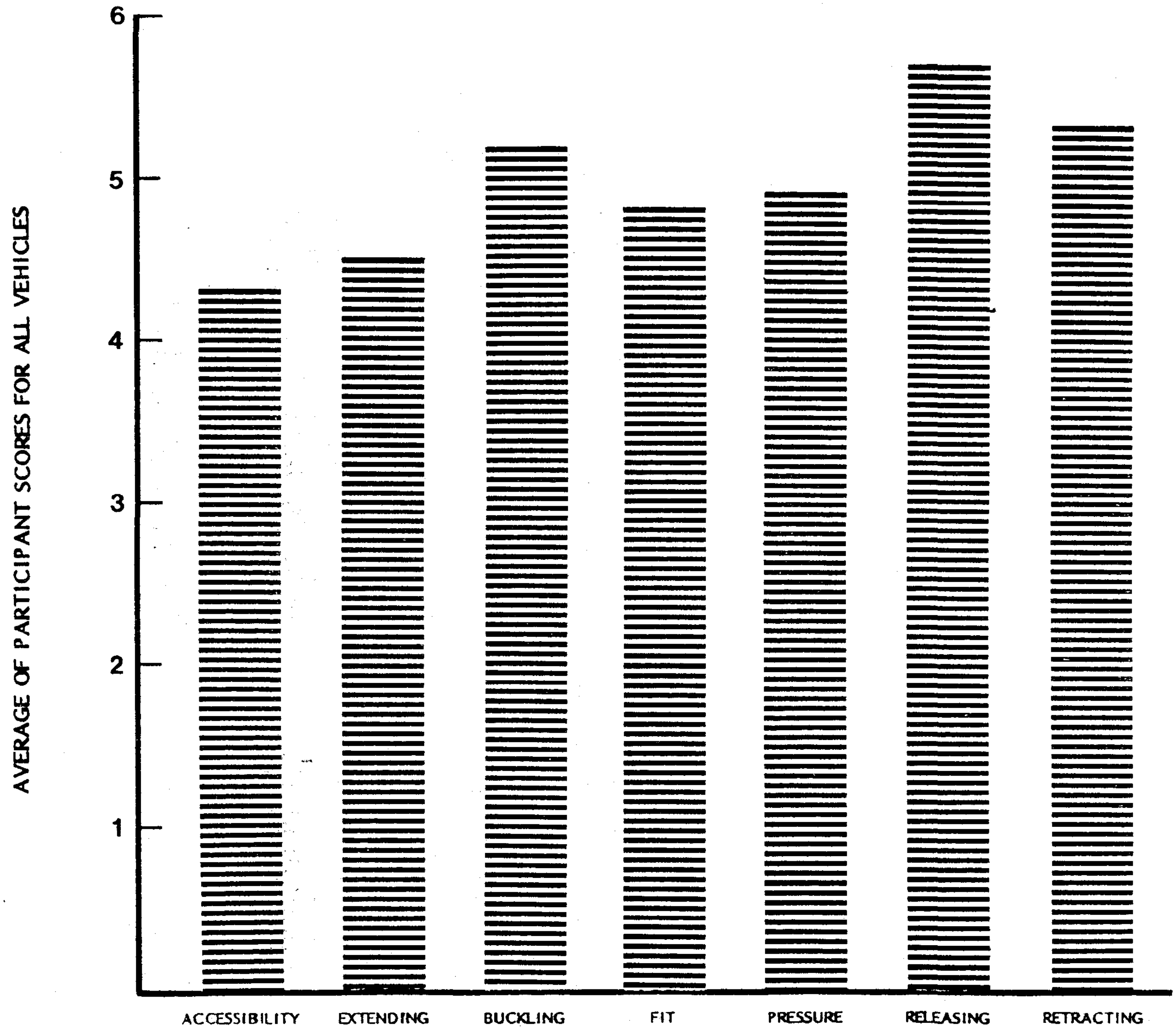


Exhibit 4–12

COMPARISON OF RANKS ACCORDING TO THE PROBLEM AND AVERAGE INDICES

Aspect	n	Kendall's W	Chi-Square	C^2	Null Hypothesis
ENTER	8	0.964	13.50	1.93	Reject
ACCESS	47	0.994	91.45	1.99	Reject
EXTEND	47	0.975	89.71	1.95	Reject
BUCK	47	0.978	89.97	1.96	Reject
FIT	55	0.983	106.20	1.97	Reject
PRESS	55	0.980	105.79	1.96	Reject
RELEASE	47	0.964	88.65	1.93	Reject
RETRACT	55	0.989	106.86	1.98	Reject

- Not overweight and less than 63 inches tall,
- Overweight and less than 63 inches tall,
- Not overweight and greater than 62 inches tall, and
- Overweight and greater than 62 inches tall.

The vehicles were then ranked for each of these groups according to the seven usage aspects being examined in this study. The results of these rankings were compared for both indexing schemes by each aspect.

The Kendall's W and Chi-square values for the various aspects of different height/weight groups according to the problem index are depicted in Exhibit 4-13. All of the comfort and convenience aspects for the problem index statistically rejected the null hypothesis that these rankings are randomly associated and have no relationship among groups. This means that for each aspect there is no statistical difference among the rankings for the different height/weight categories. Similar results were obtained when comparing the rankings of user size groups based on the average index. The relevant statistics for this comparison are also shown in Exhibit 4-13.

In conclusion, the **ranks** given for each of the vehicles within each aspect are significantly the same regardless of a user's physical make-up. Those vehicles which ranked high for one height/weight category tended to rank highly for the other three height/weight categories. Similarly, those that ranked low for one height/weight category ranked consistently low for the other height/weight categories. Note, however, that although the rankings of the test vehicles are similar across user groups, the relative levels of discomfort or inconvenience may not be alike. In other words, a vehicle ranked first by both short-overweight individuals and those of average height and weight may have significantly different evaluations of the vehicle when based on the absolute index. The vehicle rankings by aspect, by indexing scheme, and by user size groups are presented in Appendix F—Vehicle Rankings by User Size Groups.

RESULTS BY USER AND SAFETY BELT SYSTEM CHARACTERISTICS

Another purpose of this project was to identify safety belt system and user characteristics that influence user perceptions of safety belt comfort and convenience. By grouping the trials into various categories and comparing the scores, it can be determined if such a grouping has an impact on the comfort and convenience indices. For example, by comparing the scores for all trials involving males with those involving females, the effect of the user's sex on the user's comfort and convenience perceptions can be determined.

Analyses conducted to determine which characteristics or combinations of characteristics have the greatest impact are presented in this section of Chapter 4. The statistic techniques used in this analysis are presented first. Then the results

Exhibit 4–13

COMPARISON OF VEHICLE RANKS ACCORDING TO USER SIZE GROUPS:

- **Short–overweight**
- **Average height–overweight**
- **Short–not overweight**
- **Average height and weight**

AVERAGE INDEX

Aspect	n	Kendall's W	Chi–Square	C^2	Null Hypothesis
ACCESS	47	0.900	165.63	3.60	Reject
EXTEND	47	0.708	130.21	2.83	Reject
BUCK	47	0.804	147.94	3.22	Reject
FIT	55	0.749	161.83	3.00	Reject
PRESS	55	0.752	162.49	3.01	Reject
RELEASE	47	0.757	139.38	3.03	Reject
RETRACT	55	0.854	184.57	3.42	Reject
OVERALL	47	0.8634	100.15	3.4534	Reject

PROBLEM INDEX

Aspect	n	Kendall's W	Chi–Square	C^2	Null Hypothesis
ACCESS	47	0.814	149.74	3.26	Reject
EXTEND	47	0.718	132.03	2.87	Reject
BUCK	47	0.804	147.86	3.21	Reject
FIT	55	0.630	135.98	2.52	Reject
PRESS	55	0.701	151.38	2.80	Reject
RELEASE	47	0.649	119.48	2.60	Reject
RETRACT	55	0.805	173.80	3.22	Reject
OVERALL	55	0.6588	80.3296		Reject

of the univariant analyses are presented. Finally, combinations of variables which have the greatest impact are analyzed. The primary purpose of this latter analysis is to identify any two-way interactions of the independent variables which also have a significant impact on perceptions of comfort and convenience.

Statistical Analysis Tools

Two statistical techniques used in this project to determine if a statistically significant relationship exists between the aspect indices and various user and vehicle characteristics are discussed in this part. These are:

- Crosstabulation, and
- Analysis of variance.

The results of analysis using these techniques is presented in the next parts of this section.

Crosstabulations and Chi-square. A crosstabulation is a joint frequency distribution of trials among two or more classification variables. This tool is used to determine if two or more discrete variables are related. Statistical tests can be applied to the joint frequencies to show if any such relationship is statistically significant.

Within the context of this study, crosstabulation was used to analyze the impact of various user and vehicle characteristics on the problem index. This approach can be used because, for an individual trial, the index can have only two discrete values:

- Problem indicated, or
- Problem not indicated.

Consequently, since the independent variables—the user and safety belt system chcteristics—are also discrete, crosstabulation is an appropriate technique.

From among the many tests of statistical significance available using crosstabulation, the Chi-square test was selected for this project. Essentially, this test compares the actual cell frequencies with those expected, given no relationship between the variables and the existing marginal frequencies. The greater the discrepancy between the actual and expected frequencies, the larger the Chi-square, and the more likely that some systematic relationship exists between the variables. In other words, when the Chi-square that results from a crosstabulation between the problem index and some user/vehicle characteristic is large, a statistically significant relationship between the two variables can be assumed.

Analysis of Variance. While crosstabulation is appropriate when both the dependent and independent variables are categorical, if the dependent variable is metric or at least measured on an interval scale, analysis of variance (ANOVA) is the appropriate technique. Because the comfort and convenience perceptions collected during the testing phase of this study were recorded on an interval scale, ANOVA can be used to analyze the impact of user and safety belt system characteristics on the average indices for the various aspects.

The basic concept of ANOVA is to determine how much of the variation in the dependent variable, the aspect indices, is caused by the various user and vehicle characteristics. An F-test is used to determine whether any particular characteristic has a statistically significant impact on the indices. As with the Chi-square, the larger F-statistic indicates the greater level of significance.

Univariant Analysis Results

Analyses involving individual characteristics are presented here. In this discussion, the groupings are defined, the problem indices and average indices for each aspect are presented, the results of the crosstabulations and ANOVA are reveiwed, and some conclusions are drawn. Copies of the computer output from the crosstabulations and ANOVA are provided in Appendix D, Computer Output. Note that those aspects on which particular characteristics have a statistically significant impact are marked with an asterisk. For purposes of this analysis, statistical significance is defined at the 5 percent level.

In this part, user characteristics such as height, sex, weight, and safety belt usage rates were analyzed. Similarly, test vehicle characteristics such as front seat configuration, number of doors, type of safety belt system, type of windowshade device, and vehicle size were studied. Finally, the impact of passing or failing the proposed compliance standards on comfort and convenience perceptions was examined.

Height of Participant. The hypothesis being tested here is that both shorter and taller users have more comfort and convenience problems with safety belts than do users of average height. To test this hypothesis, the trials were grouped by participant height into the five categories shown in Exhibit 4-14. Note that participant height had a significant impact on all indices except for the releasing problem index. Moreover, for the extending, buckling, fit, pressure, releasing, and retracting aspects, participants taller than 69 inches and shorter than 63 inches tended to identify more problems than the 63-69 inch group. For accessibility, however, tall and short persons tended to have fewer problems than those between 63 and 69 inches tall.

Weight of Participant. Another hypothesis tested is that overweight users have more comfort and convenience problems than non-overweight users. For purposes of this study, overweight people are defined as those who weigh more than 30 percent over the average weight for their sex and height. The aspect indices for the overweight not overweight groupings are presented in Exhibit 4-15. For both indices, this grouping has a statistically significant impact on buckling, fit, and pressure. Moreover, for all these aspects, overweight participants had more problems according to both indexing schemes.

Exhibit 4–14

RESULTS BY PARTICIPANT
HEIGHT GROUPINGS–NORMALIZED AVERAGE INDEX

Category	* Access	* Extend	* Buckle	* Fit	* Pressure	* Release	* Retract	n
Less than 60 inches	4.3	4.7	5.3	4.2	4.5	5.7	5.2	458
60–62 inches	4.3	4.8	5.3	4.6	4.8	5.7	5.3	1,177
63–66 inches	4.3	4.9	5.3	5.0	5.1	5.7	5.5	2,015
67–69 inches	4.4	5.0	5.3	4.8	4.9	5.8	5.3	1,028
Greater than 69 inches	3.9	4.5	4.9	4.7	4.7	5.5	5.0	618

RESULTS BY PARTICIPANT
HEIGHT GROUPINGS–PROBLEM INDEX

Category	* Access	* Extend	* Buckle	* Fit	* Pressure	Release	* Retract	n
Less than 60 inches	41	28	25	39	33	8	20	458
60–62 inches	41	30	22	31	27	8	19	1,177
63–66 inches	44	26	24	20	19	7	16	2,015
67–69 inches	39	26	21	23	22	6	18	1,028
Greater than 69 inches	39	36	30	25	27	9	21	618

Exhibit 4-15

RESULTS BY PARTICIPANT WEIGHT GROUPINGS—NORMALIZED AVERAGE INDEX

Category	Access	Extend	* Buckle	* Fit	* Pressure	Release	Retract	n
Overweight	4.2	4.5	5.0	4.5	4.7	5.7	5.3	1,968
Not Overweight	4.3	4.6	5.3	5.0	5.0	5.7	5.3	3,337

RESULTS BY PARTICIPANT WEIGHT GROUPINGS—PROBLEM INDEX

Category	Access	* Extend	* Buckle	* Fit	* Pressure	Release	Retract	n
Overweight	43	30	27	33	28	8	17	1,968
Not Overweight	42	27	22	21	21	7	18	3,337

Weight–Height Groupings. The impact of the combination of user weight and height on the safety belt use aspects was also examined. The groupings are presented in Exhibit 4–16. For this analysis, "short" was defined as less than 63 inches tall, while the overweight definition remained the same as described above. The hypothesis being tested in this analysis is that short–overweight people tend to have more comfort and convenience problems than others. As shown by Exhibit 4–16, this grouping has a significant impact on all aspects of comfort and convenience. In addition, according to both indexing schemes, the short–overweight category has more problems with all aspects than other categories.

Sex of Participant. The **a priori** hypothesis tested in this analysis is that female safety belt users have more comfort and convenience problems than male users. Exhibit 4–17 presents the results of the aspect indices for trials grouped according to sex. The analyses show mixed results, however. Accessibility is the only aspect for which both indices indicate statistically significant effect, and for this aspect males had more problems. For all other aspects, either the average of the problem index showed **no** significant impact. Of particular interest are the analyses of the fit and shoulder belt pressure indices which show no effect for the average index, while the problem index indicates that females have significantly more problems than males. This occurred because the female responses were skewed toward the end of the uncomfortable/difficult response scale, while the male responses were skewed the other direction. Generally, however, the **a priori** hypothesis cannot be accepted.

Safety Belt Usage Rates. The hypothesis being tested in this analysis is that safety belt users have fewer comfort and convenience problems than non–users. For this test, the trials were divided by reported safety belt usage rates into the three categories shown on Exhibit 4–18. The most interesting observation that can be made from this analysis is that when usage rates do have a statistically significant impact on comfort and convenience perceptions, frequent users tended to have more problems, and those who reported between 30 and 60 percent usage rates had the fewest problems. This may indicate that frequent users become accustomed to their own belt systems and tend to be more critical of unfamiliar systems. Regardless, the **a priori** hypothesis is rejected.

Type of Safety Belt System. The next five groupings described in this section relate to safety belt system and vehicle characteristics. This first hypothesis is that dual retractor systems have fewer comfort and convenience problems than continuous loop systems. This hypothesis is generally substantiated for the accessibility, extending, buckling, releasing, and retracting aspects, as shown by Exhibit 4–19. Note that for both indexing schemes, safety belt type has a statistically significant effect on only these aspects.

Vehicle Size. The **a priori** hypothesis being examined by the groupings shown in Exhibit 4–20 is that larger cars and trucks will tend to have fewer comfort and convenience problems than smaller cars. The categories used are those developed by the Environmental Protection Agency (EPA), with the exception that mini–compacts are included as sub–compacts. According to the analyses conducted using both indexing schemes, the hypothesis is substantiated for all aspects.

Exhibit 4–16

RESULTS BY PARTICIPANT WEIGHT–HEIGHT GROUPINGS–NORMALIZED AVERAGE INDEX

Category	* Access	* Extend	* Buckle	* Fit	* Pressure	* Release	* Retract	n
Not Overweight/ Short	4.4	4.6	5.4	4.8	4.9	5.8	5.3	1,108
Overweight/ Short	4.1	4.2	4.8	3.9	4.3	5.6	5.1	530
Not Overweight/ Normal Height	4.2	4.5	5.3	5.0	5.0	5.7	5.3	2,229
Overweight/ Normal Height	4.3	4.6	5.1	4.7	4.8	5.8	5.4	1,437

RESULTS BY PARTICIPANT WEIGHT–HEIGHT GROUPINGS–PROBLEM INDEX

Category	* Access	* Extend	* Buckle	* Fit	* Pressure	Release	Retract	n
Not Overweight/ Short	38	28	20	26	24	7	19	1,108
Overweight/ Short	47	35	30	47	38	9	20	530
Not Overweight/ Normal Height	45	27	23	18	19	7	18	2,229
Overweight/ Normal Height	41	28	26	28	25	7	16	1,437

Exhibit 4–17

RESULTS BY PARTICIPANT
SEX–NORMALIZED AVERAGE INDEX

Category	* Access	* Extend	* Buckle	Fit	Pressure	* Release	* Retract	n
Male	4.1	4.5	5.1	4.8	4.9	5.6	5.3	2,566
Female	4.4	4.6	5.3	4.8	4.9	5.8	5.4	2,739

RESULTS BY PARTICIPANT
SEX–PROBLEM INDEX

Category	* Access	Extend	Buckle	* Fit	* Pressure	Release	Retract	n
Male	46	29	24	21	21	7	18	2,566
Female	39	28	24	29	26	7	18	2,739

Exhibit 4–18

RESULTS BY SAFETY BELT USAGE RATES GROUPINGS–NORMALIZED AVERAGE INDEX

Category	* Access	Extend	Buckle	* Fit	* Pressure	* Release	* Retract	n
0–20% Usage	4.3	4.5	5.2	4.8	4.9	5.8	5.3	4,739
30–60% Usage	4.5	4.6	5.2	5.1	5.1	5.6	5.5	657
70–100% Usage	3.9	4.5	5.1	4.5	4.6	5.5	5.1	762

RESULTS BY SAFETY BELT USAGE RATES GROUPINGS–PROBLEM INDEX

Category	* Access	Extend	Buckle	* Fit	* Pressure	Release	* Retract	n
0–20% Usage	42	29	24	26	24	7	18	4,739
30–60% Usage	34	24	22	16	16	7	13	657
70–100% Usage	50	28	26	30	26	9	21	762

Exhibit 4-19

RESULTS BY TYPE OF SAFETY BELT SYSTEM GROUPINGS—NORMALIZED AVERAGE INDEX

Category	* Access	* Extend	* Buckle	Fit	* Pressure	* Release	* Retract	n
Continuous Loop	4.2	4.5	5.2	4.7	4.8	5.7	5.2	5,068
Dual Retractor	4.9	5.0	5.4	4.9	5.0	6.1	6.0	450

RESULTS BY TYPE OF SAFETY BELT SYSTEM GROUPINGS—PROBLEM INDEX

Category	* Access	* Extend	* Buckle	Fit	Pressure	* Release	* Retract	n
Continuous Loop	44	29	24	26	25	8	21	5,068
Dual Retractor	27	21	19	25	21	2	5	450

Exhibit 20

RESULTS BY VEHICLE SIZE GROUPINGS—NORMALIZED AVERAGE INDEX

Category	* Access	* Extend	* Buckle	* Fit	* Pressure	* Release	* Retract	n
Sub-compact	3.6	4.3	5.0	4.7	4.8	5.6	5.3	2,269
Compact	4.8	4.6	5.4	4.9	5.0	5.9	5.1	799
Mid-size	5.1	4.9	5.6	4.9	4.9	5.9	5.4	300
Large	4.8	4.8	5.4	4.8	5.0	5.9	5.3	684
Truck	4.7	4.7	5.2	5.0	5.1	5.8	5.7	684
Van	5.1	4.8	5.3	5.0	5.0	5.8	5.2	345
Two-seater	4.0	4.3	5.0	4.6	4.4	5.7	5.2	224

RESULTS BY VEHICLE SIZE GROUPINGS—PROBLEM INDEX

Category	* Access	* Extend	* Buckle	* Fit	* Pressure	* Release	* Retract	n
Sub-compact	60	31	28	27	25	10	17	2,269
Compact	30	28	19	22	22	3	22	799
Mid-size	16	18	11	22	19	5	18	300
Large	30	25	18	27	22	6	19	684
Truck	33	28	23	19	19	7	11	684
Van	20	26	23	22	22	6	22	345
Two-seater	50	30	29	32	36	7	17	224

Seat Type. Another vehicle chacteristic analyzed for this report is the front seat configuration. The hypothesis being tested is that bench seats have fewer comfort and convenience problems than bucket seats. As Exhibit 4–21 shows, the type of seat has a statistically significant effect on all indices except the extending and retraction problem index. Moreover, in all cases, the **a priori** hypothesis is substantiated.

Number of Car Doors. Since positioning of the safety belt anchor points depends on the number of car doors, it is hypothesized that this number affects the comfort and convenience of safety belt systems. The **a priori** hypothesis tested here is that 2–door cars have more comfort and convenience problems than 4–door cars. The indices calculated from this grouping are presented in Exhibit 4–22. As shown by both indexing schemes, this grouping has a significant impact on all comfort and convenience aspects. Moreover, for each of these aspects the hypothesis can be accepted.

Type of Windowshade Device. Because windowshade devices in retractors are specifically designed to make safety belts more comfortable, it is hypothesized that a system with windowshades should have fewer problems indicated with the fit and pressure aspects. On the other hand, windowshade devices without cancellers are expected to have more retraction problems than the other groups included in Exhibit 4–23. The first hypothesis is not substantiated by the results of the analyses, as presented in Exhibit 4–23. According to both indexing schemes, safety belt systems having windowshade devices with cancellers have significantly more problems with fit than systems without windowshades, or with windowshades without cancellers. At the same time, there was no significant difference in the shoulder pressure aspect between vehicles with and without windowshades. While the second hypothesis is substantiated, it should be noted that even windowshades with cancelling devices continued to create problems for the test participants.

Type of Latchplate. Locking latchplates mechanisms are designed primarily for continuous loop safety belt systems to keep the lap portion of the belt from fitting too loosely. To do this, the mechanism typically uses friction and a movable bar that grabs the belt as it moves through the latchplate device. Because of this latter feature, it is hypothesized that systems with locking latchplates will have significantly more problems extending and retracting than those that do not. To test this hypothesis, the responses were divided into two groups according to whether or not the test vehicle had a locking latchplate. The results of both the analyses on both indices, as shown in Exhibit 4–24, support this hypothesis. Moreover, significantly more problems were identified for locking latchplate systems for the fit and relasing aspects. Conversely, the non–locking latchplate systems had more problems with accessibility.

Fit Compliance Test. The last three analyses presented were performed on the trials grouped according to the results of various proposed compliance tests. Because these measurements were conducted only during the December tests, only cases including vehicles in that test are used in these analyses. With respect to the shoulder belt fit compliance test, it is expected that vehicles that passed the test

Exhibit 4–21

RESULTS BY FRONT SEAT CONFIGURATION GROUPINGS–NORMALIZED AVERAGE INDEX

Category	* Access	* Extend	* Buckle	* Fit	* Pressure	* Release	* Retract	n
Bench	4.7	4.6	5.4	4.9	5.0	5.9	5.4	1,558
Bucket	4.1	4.5	5.1	4.7	4.8	5.7	5.3	3,747

RESULTS BY FRONT SEAT CONFIGURATION GROUPINGS–PROBLEM INDEX

Category	* Access	Extend	* Buckle	* Fit	* Pressure	* Release	Retract	n
Bench	32	27	19	21	20	5	17	1,558
Bucket	47	29	26	26	25	8	18	3,747

Exhibit 4-22

RESULTS BY NUMBER OF VEHICLE DOORS GROUPINGS—NORMALIZED AVERAGE INDEX

Category	* Access	* Extend	* Buckle	* Fit	* Pressure	* Release	* Retract	n
Two-door	4.0	4.6	5.1	4.7	4.8	5.7	5.3	4,097
Four-door	5.1	4.8	5.5	5.1	5.2	6.0	5.6	1,208

RESULTS BY NUMBER OF VEHICLE DOORS GROUPINGS—PROBLEM INDEX

Category	* Access	* Extend	* Buckle	* Fit	* Pressure	* Release	* Retract	n
Two-door	49	30	26	27	26	8	19	4,097
Four-door	20	24	17	19	17	3	14	1,208

Exhibit 4–23

RESULTS BY TYPE OF WINDOWSHADE
DEVICE–NORMALIZED AVERAGE INDEX

Category	* Access	* Extend	* Buckle	* Fit	Pressure	* Release	* Retract	n
No Window-shade	4.0	4.6	5.2	4.8	4.9	5.8	5.8	3,052
Window-shade Without Canceller	4.5	4.2	4.8	4.8	4.8	5.3	3.9	686
Window-shade With Canceller	4.6	4.6	5.5	4.6	4.8	5.8	4.8	1,215

RESULTS BY TYPE OF WINDOWSHADE
DEVICE–PROBLEM INDEX

Category	* Access	* Extend	* Buckle	* Fit	Pressure	* Release	* Retract	n
No Window-shade	47	26	24	24	23	6	9	3,052
Window-shade Without Canceller	37	36	33	27	25	15	48	686
Window-shade With Canceller	35	28	16	30	26	6	30	1,215

Exhibit 4-24

RESULTS BY TYPE OF LATCHPLATE GROUPINGS—NORMALIZED AVERAGE INDEX

Category	* Access	* Extend	Buckle	* Fit	Pressure	* Release	* Retract	n
Non-Locking	4.1	4.6	5.2	4.8	4.8	5.8	5.7	3,188
Locking	4.5	4.4	5.2	4.6	4.8	5.6	4.5	2,067

RESULTS BY TYPE OF LATCHPLATE GROUPINGS—PROBLEM INDEX

Category	* Access	* Extend	Buckle	* Fit	Pressure	* Release	* Retract	n
Non-Locking	47	26	24	25	25	6	10	3,188
Locking	36	33	24	29	26	10	34	2,067

would have significantly fewer fit problems than those that failed. The results shown in Exhibit 4–25 substantiate this hypothesis. In addition, significantly fewer problems with belt pressure also also indicated in vehicles passing the fit test.

Pressure Compliance Test. Just as vehicles that passed the fit test were expected to have fewer fit problems, vehicles that passed the proposed shoulder belt pressure compliance test were expected to have fewer pressure problems. This hypothesis is substantiated by the data presented in Exhibit 4–26. According to both indexing schemes, vehicles that passed the fit test had significantly fewer problems with both fit and pressure.

Retraction Compliance Test. The last analysis presented in this section compares the scores of the vehicles that passed the retraction compliance test with those that failed. The information shown in Exhibit 4–27 shows that the retraction test has no significant relationship to any comfort or convenience aspect except accessibility. Consequently, the hypothesis that vehicles passing the test will have fewer retraction problems must be rejected.

Results of Multivariant Analyses

The following discussion details the results of analyses showing how combinations of more than one user/vehicle characteristic may affect the consumers' evaluation of safety belt comfort and convenience. Although single characteristics that influence comfort and convenience perceptions were identified in the analysis presented in the previous section, these characteristics do not act with total independence. This dependent impact can come in two forms. First, some characteristics of belt systems or consumers may be closely related. That is, from the sample of vehicles selected for the two tests, two–door vehicles may tend to have bucket seats, while four–door vehicles have bench seats. If this condition is true, then the variable representing number of vehicle doors and that representing seat type will tend to explain the same portions of the variation in the dependent comfort and convenience indices.

The second way in which two variables can be dependent when explaining variation in the dependent indices is through two–way interaction. Such interaction occurs when the two variables combine to form a third set of groupings which uses both raw elements as classifying variables. For example, such a variable created from the number of vehicle doors and seat type variables would include the following four classes:

- Two–door, bench seat;
- Two–door, bucket seat;
- Four–door, bench seat; and
- Four–door, bucket seat.

Exhibit 4–25

RESULTS BY SHOULDER BELT FIT
COMPLIANCE TEST RESULTS–NORMALIZED AVERAGE INDEX

Category	* Access	Extend	* Buckle	* Fit	* Pressure	Release	Retract	n
Pass	4.9	4.7	5.5	5.3	5.6	5.8	5.2	569
Fail	4.3	4.6	5.2	4.7	5.1	5.7	5.2	3,557

RESULTS BY SHOULDER BELT FIT
COMPLIANCE TEST RESULTS–PROBLEM INDEX

Category	* Access	Extend	* Buckle	* Fit	* Pressure	Release	* Retract	n
Pass	26	29	19	16	13	8	13	569
Fail	42	29	24	27	29	8	21	3,557

Exhibit 4-26

RESULTS BY SHOULDER BELT PRESSURE COMPLIANCE TEST RESULTS-NORMALIZED AVERAGE INDEX

Category	* Access	Extend	* Buckle	* Fit	* Pressure	Release	* Retract	n
Pass	4.2	4.6	5.1	5.0	5.3	5.6	5.7	802
Fail	4.4	4.5	5.2	4.6	5.1	5.7	5.0	2,637

RESULTS BY SHOULDER BELT PRESSURE COMPLIANCE TEST RESULTS-PROBLEM INDEX

Category	* Access	Extend	* Buckle	* Fit	* Pressure	Release	* Retract	n
Pass	47	28	28	18	21	8	8	802
Fail	39	29	22	29	30	8	25	2,637

Exhibit 4-27

RESULTS BY WEBBING RETRACTION
COMPLIANCE TEST RESULTS—NORMALIZED AVERAGE INDEX

Category	* Access	Extend	Buckle	Fit	Pressure	Release	Retract	n
Proper Retraction	4.5	4.6	5.2	4.7	5.1	5.7	5.1	2,521
Improper Retraction	3.8	4.4	5.3	4.6	5.1	5.7	5.2	688

RESULTS BY WEBBING RETRACTION
COMPLIANCE TEST RESULTS—PROBLEM INDEX

Category	* Access	Extend	* Buckle	Fit	Pressure	Release	Retract	n
Proper Retraction	38	28	25	27	29	9	22	2,521
Improper Retraction	56	32	20	29	30	7	20	688

If this new variable explains a statistically significant amount of the variation in the dependent variable, then the impact of each of these variables is dependent on the other. Note that this two-way interaction can be significant regardless of whether one, both, or neither raw variable has a significant impact by itself.

Analytical Approach. To determine which combinations of user and belt system characteristics have the greatest impact on the comfort and convenience indices developed for these studies, a two-step analysis was conducted. The first phase of this analysis was to determine which of the characteristics were closely related. To accomplish this, crosstabulations or contingency tables comparing all pairs of independent characteristics were performed. Based on these tables, two statistics which measure the degree of association between each pair of variables were calculated. These statistics were the phi statistic (or Cramer's V if the table is larger than two-by-two) and the Lambda statistic.

The phi statistic is based on the Chi-square corrected for the number of cases included in the table. It measures the strength of the relationship between the variables under examination, such that phi equalling one indicates a perfect relationship, while a phi of zero shows no relationship.

Similarly, lambda indicates the relationship betwen two variables by estimating the accuracy with which one variable can be predicted given the second. For example, given that a vehicle is a two-door, how accurately can its seat type be predicted for the sample of vehicles included in these two studies. Like the phi statistic, lambda ranges from zero to one, where one is perfect predictibility.

By analyzing these statistics from crosstabulations of the independent variables, systematic relationships between these variables were identified. Pairs of variables with such a relationship were excluded as a pair from further analysis. However, the members of each pair were analyzed separately. On the other hand, if no systematic relationship was indicated, then it was possible that, either individually or with two-way interaction, that pair of user/vehicle characteristics would explain a statistically significant portion of the variance of the comfort and convenience indices. Consequently, such pairs were analyzed together.

This analysis to be conducted in the second step of the analytical process will involve ANOVA. Combinations of variables will be analyzed to determine which groups of characteristics tend to explain the results of the consumer evaluations. The criteria for accepting individual characteristics and two-way interactions is the F-statistic calculated for each main effect and two-way interaction effect. The level of confidence for accepting the variables or combinations is 95 percent. Variables satisfying this level of significance will be combined together to determine how much of the variance in each index is explained by the selected variables. Because of limitations of the statistical software used for this study, the maximum number of independent variables will be five.

Statistical Results. This part of the report describes the results of the analyses summarized in the previous discussion. The results of the crosstabulations are reviewed first. Then, the justification, statistical results, and conclusions of subsequent ANOVAs are presented. Copies of computer printouts for each analysis discussed are provided in Appendix D.

Cross Tabulations. The phi (Cramer's V) and lambda statistics calculated from each crosstabulation are presented in Exhibits 4-28 and 4-29, respectively. For example, the Cramer's V statistic for the characteristic pair of participant sex and safety belt usage is 0.12, while the corresponding lambda is 0.05. As is indicated by these exhibits, the two variables most closely related are type of latchplate and type of windowshade device. This relationship indicates that both variables will tend to account for the same portion of the variance in the comfort and convenience indices. Other pairs for which a strong relationship is indicated are:

- Vehicle size and seat type,
- Vehicle size and number of doors, and
- Height and sex of participants.

Consequently, these pairs of variables were not included in the same multivariant analyses.

Interestingly, the statistics for pairs of variables including a vehicle characteristic and a participant characteristic all indicate no relationship. This result was expected since the research design required each test participant to evaluate each vehicle. Therefore, for each pair, the number of cases in each cell should be proportional to the distribution of each characteristic within their respective samples.

Analyses of Variance. Based on the single variable analyses and the crosstabulations presented earlier, combinations of user/vehicle characteristics were analyzed to determine which characteristics have the most significant impact on user perceptions of safety belt comfort and convenience. For purposes of this portion of the analyses, only the average index was examined, since the problem index is not interval data. The selection process began by eliminating those variables which did not by themselves have a statistically significant impact on each of the aspect indices. Combinations of all other variables that did not include any of the four pairs of closely related characteristics were selected for each aspect index. These combinations were tested using ANOVA to determine which one had the largest impact on the variation in each index. This impact was measured by dividing the variation explained by each combination of variables by the total variance of the particular aspect. The value calculated by this procedure measures the percentage of aspect variation explained by each combination of characteristics. The combination with the largest percentage has the greatest impact on the user perception of safety belt comfort and convenience.

Exhibit 4–28

PHI/CRAMER'S V STATISTIC FROM CROSSTABULATION OF USER/VEHICLE CHARACTERISTICS

	Weight	Sex	Usage	Belt System Type	Vehicle Size	Seat Type	Number of Doors	Type Windowshade Device	Latchplate
Height	.12	.65	.18	.10	.03	.02	.02	.01	.03
Weight	—	.12	.14	0	.02	0	0	0	.01
Sex	—	—	.12	0	0	0	0	0	0
Usage	—	—	—	0	.03	.01	.02	.01	.03
Belt System Type	—	—	—	—	.57	.19	0	.12	.18
Vehicle Size	—	—	—	—	—	.77	.72	.45	.45
Seat Type	—	—	—	—	—	—	.32	.19	.22
Number of Doors	—	—	—	—	—	—	—	.19	.09
Type Windowshade Device	—	—	—	—	—	—	—	—	.95

Exhibit 4-29

SYMMETRIC LAMBDA FROM CROSSTABULATION OF USER/VEHICLE CHARACTERISTICS

	Weight	Sex	Usage	Belt System Type	Vehicle Size	Seat Type	Number of Doors	Type Windowshade Device	Latchplate
Height	0	.22	0	0	0	0	0	0	0
Weight	—	.02	0	0	0	0	0	0	0
Sex	—	—	.05	0	0	0	0	0	0
Usage	—	—	—	0	0	0	0	0	0
Belt System Type	—	—	—	—	.06	0	0	0	0
Vehicle Size	—	—	—	—	—	.31	.23	.17	.11
Seat Type	—	—	—	—	—	—	.02	0	.05
Number of Doors	—	—	—	—	—	—	—	0	0
Type Windowshade Device	—	—	—	—	—	—	—	—	.75

The results of these ANOVAs for each aspect are summarized in Exhibits 4-30 through 4-36. These exhibits show for each combination of variables the percentage of variance explained, which variables have a significant main effect, and which two-way interactions are significant. In this analysis, statistical significance is at the 95 percent level of confidence. The result for each ANOVA involving a particular dependent comfort and convenience index are presented in rows. The variables included in the ANOVA are indicated from among the main effects by either an X or a dash. For example, in Exhibit 4-30, the second analysis presented included participant height and belt usage rates, and vehicle size and type of latchplate locking device. The main effect of the latchplate variable was not statistically significant.

In addition to the main effects, statistically significant two-way interaction effects are indicated. Note that to simplify presentation on the charts, only those pairs which had a significant impact in at least one of the multivariant ANOVAs are presented. As with the main effects, an X indicates that a particular two-way interaction was significant. For example, in the second ANOVA presented in Exhibit 4-30, the participant height/belt usage and vehicle-size/latchplate interactions had a significant impact.

Finally, in the left column of Exhibits 4-30 through 4-36, the percentage of the total variation in the index which is explained by the combination of variables indicated is shown. This percentage was calculated by dividing the explained by the total sum of squared deviations from the grand mean of the dependent comfort and convenience index. This calculation provides a basis for relative comparison of the various multi-variant combinations examined. In Exhibit 4-30, for example, among those studied in this analysis, the fifth combination of variables explains the largest percentage of variation in the accessibility index. For purposes of comparison, the percentage of variation explained by the vehicles only is also presented. Examination of the results presented in Exhibits 4-30 through 4-36 leads to several general conclusions. First, the combinations of variables selected in analyses for all aspect indices explained less than 20 percent and in most cases less than 10 percent of the variance in the indices. This result is typical of studies involving consumer opinion testing and cross-sectional data.

While the overall explanatory power of these combinations of variables is low, the analyses do indicate which variables have a significant impact on the various aspect indices. The second general conclusion drawn from these analyses is that vehicle size and type of windowshade device have the strongest influence on the convenience aspects which include accessibility, extending, buckling, releasing, and retracting, while the comfort aspects of shoulder belt pressure and fit are most heavily influenced by participant weight and number of vehicle doors. Moreover, both types of aspects are significantly affected by participant height and reported safety belt usage rates. Of these variables, those representing participant physical characteristics (height and weight) and number of car doors which is a surrogate for location of the belt system anchorage points had the strongest influence on the comfort aspects. Convenience, on the other hand, is most significantly affected by system characteristics such as vehicle size and type of windowshade device in the shoulder belt retractor. Interestingly, the type of windowshade device did not have a significant impact on safety belt fit and pressure, even though the function of such mechanisms is to increase safety belt comfort.

Exhibit 4-30

SUMMARY OF RESULTS OF ANOVAs ON ACCESSIBILITY

Percentage of Total Variance Explained	Main Effects Tested	*Significant Two-Way Interactions
0.064	*Height *Usage *Belt System *Latchplate Type	Height-Usage Usage-Belt System Type
0.168	*Height *Usage *Vehicle Size Latchplate Type	Height-Usage Vehicle Size-Latchplate Type
0.112	*Height *Usage *Seat Type *No. of Doors *Latchplate Type	Height-Usage Seat Type-Number of Doors Seat Type-Latchplate Type
0.069	*Height *Usage *Belt System *Windowshade	Height-Usage Usage-Belt System Type
0.193	*Height *Usage *Vehicle Size *Windowshade	Height-Usage Usage-Vehicle Size Vehicle Size-Type Windowshade Device
0.142	*Height *Usage *Seat Type *No. of Doors *Windowshade	Height-Usage Height-Number of Doors Seat Type-Number of Doors Number of Doors-Type Windowshade Device Seat Type - Type Windowshade Device

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*Level of significance is greater than 95%.

Exhibit 4-30 (Continued)

SUMMARY OF RESULTS OF ANOVAs ON ACCESSIBILITY

Percentage of Total Variance Explained	Main Effects Tested	*Significant Two-Way Interactions
0.063	*Sex	Sex-Usage
	*Usage	Usage-Belt System Type
	*Belt System	Belt System Type-Type Windowshade Device
	*Windowshade	
0.184	*Sex	Sex-Usage
	*Usage	Vehicle Size-Type Windowshade Device
	*Vehicle Size	
	*Windowshade	
0.135	*Sex	Sex-Usage
	*Usage	Usage-Number of Doors
	*Seat Type	Seat Type-Number of Doors
	*No. of Doors	Seat Type-Type Windowshade Device
	*Windowshade	Number of Doors - Type of Windowshade Device
0.060	*Sex	Sex-Usage
	*Usage	Usage-Belt System Type
	*Belt System	
	*Latchplate Type	
0.160	*Sex	Sex-Usage
	*Usage	Vehicle Size-Latchplate Type
	*Vehicle Size	
	Latchplate Type	
0.107	*Sex	Sex-Usage
	*Usage	Seat Type-Number of Doors
	*Seat Type	Seat Type-Latchplate Type
	*No. of Doors	
	*Latchplate Type	
0.189	*Vehicle	

*Level of significance is greater than 95%.

Exhibit 4–31

SUMMARY OF RESULTS OF ANOVAs ON EXTENDING

Percentage of Total Variance Explained	Main Effects Tested	*Significant Two–Way Interactions
0.019	*Height *Belt System *Latchplate Type	None
0.047	*Height *Vehicle Size *Latchplate Type	Vehicle Size–Latchplate Type
0.028	*Height *Seat Type No. of Doors *Latchplate Type	Seat Type–Number of Doors Number of Doors–Latchplate Type
0.041	*Height *Belt System *Windowshade	Belt System Type–Type Windowshade Device
0.058	*Height *Vehicle Size *Windowshade	Vehicle Size–Type Windowshade Device
0.045	*Height *Seat Type *No. of Doors *Windowshade	Seat Type–Number of Doors Seat Type–Type Windowshade Device Number of Doors–Type Windowshade Device
0.030	*Sex *Belt System *Windowshade	Sex–Type Windowshade Device Belt System Type–Type Windowshade Device
0.043	*Sex *Vehicle Size *Windowshade	Vehicle Size–Type Windowshade Device

*Level of significance is greater than 95%.

Exhibit 4-31 (Continued)

SUMMARY OF RESULTS OF ANOVAs ON EXTENDING

Percentage of Total Variance Explained	Main Effects Tested	*Significant Two-Way Interactions
0.032	*Sex *Seat Type *No. of Doors *Windowshade	Seat Type-Number of Doors Seat Type-Type Windowshade Device Number of Doors-Type Windowshade Device
0.008	*Sex *Usage *Latchplate Type	None
0.033	*Sex *Vehicle Size *Latchplate Type	Vehicle Size-Latchplate Type
0.001	*Sex *Seat Type No. of Doors *Latchplate Type	Seat Type-Number of Doors Number of Doors-Latchplate Type
0.091	*Vehicle	

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*Level of significance is greater than 95%.

Exhibit 4–32

SUMMARY OF RESULTS OF ANOVAs ON BUCKLING

Percentage of Total Variance Explained	Main Effects Tested	*Significant Two-Way Interactions
0.057	*Height *Weight *Belt System *Windowshade	Height–Weight Belt System Type–Type Windowshade Device
0.083	*Height *Weight *Vehicle Size *Windowshade	Height–Weight Weight–Vehicle Size Vehicle Size–Type Windowshade Device
0.074	*Height *Weight *Seat Type *No. of Doors *Windowshade	Height–Weight Weight–Seat Type Weight–Number of Doors Seat Type–Number of Doors Seat Type–Type Windowshade Device Number of Doors–Type Windowshade Device
0.044	*Weight *Sex *Belt System *Windowshade	Weight–Sex Belt System Type–Type Windowshade Device
0.070	*Weight *Sex *Vehicle Size *Windowshade	Weight–Sex Weight–Vehicle Size Vehicle Size–Type Windowshade Device
0.062	*Weight *Sex *Seat Type *No. of Doors *Windowshade	Weight–Sex Weight–Seat Type Weight–Number of Doors Seat Type–Number of Doors Seat Type–Type Windowshade Device Number of Doors–Type Windowshade Device
0.114	*Vehicle	

*Level of significance is greater than 95%.

Exhibit 4-33

SUMMARY OF RESULTS OF ANOVAs ON FIT

Percentage of Total Variance Explained	Main Effects Tested	*Significant Two-Way Interactions
0.105	*Height	Height-Weight
	*Weight	Height-Usage
	*Usage	Weight-Usage
	*Vehicle Size	Weight-Number of Doors
	*Windowshade	
0.098	*Height	Height-Weight
	*Weight	Height-Usage
	*Usage	Weight-Usage
	Seat Type	Weight-Number of Doors
	*No. of Doors	Seat Type-Number of Doors
0.115	*Height	Height-Weight
	*Weight	Height-Usage
	*Usage	Weight-Usage
	*Vehicle Size	
	*Latchplate Type	
0.076	*Vehicle	

*Level of significance is greater than 95%.

Exhibit 4-34

SUMMARY OF RESULTS OF ANOVAs ON PRESSURE

Percentage of Total Variance Explained	Main Effects Tested	*Significant Two-Way Interactions
0.066	*Height	Height-Weight
	*Weight	Height-Usage
	*Usage	Weight-Usage
	Belt System	
0.080	*Height	Height-Weight
	*Weight	Height-Usage
	*Usage	Weight-Usage
	*Vehicle Size	
0.085	*Height	Height-Weight
	*Weight	Height-Usage
	*Usage	Weight-Usage
	*Seat Type	Weight-Number of Doors
	*No. of Doors	Seat Type-Number of Doors
0.076	*Vehicle	

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*Level of significance is greater than 95%.

Exhibit 4–35

SUMMARY OF RESULTS OF ANOVAs ON RELEASING

Percentage of Total Variance Explained	Main Effects Tested	*Significant Two-Way Interactions
0.038	*Height *Usage *Belt System *Latchplate Type	Height–Usage
0.068	*Height *Usage *Vehicle Size *Latchplate Type	Height–Usage Vehicle Size–Latchplate Type
0.056	*Height *Usage *Seat Type *No. of Doors *Latchplate Type	Height–Usage Seat Type–Number of Doors
0.053	*Height *Usage *Belt System *Windowshade	Height–Usage Belt System Type–Type Windowshade Device
0.077	*Height *Usage *Vehicle Size *Windowshade	Height–Usage Vehicle Size–Type Windowshade Device
0.071	*Height *Usage *Seat Type *No. of Doors *Windowshade	Height–Usage Seat Type–Number of Doors Seat Type–Type Windowshade Device Number of Doors–Type Windowshade Device

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*Level of significance is greater than 95%.

Exhibit 4-35 (Continued)

SUMMARY OF RESULTS OF ANOVAs ON RELEASING

Percentage of Total Variance Explained	Main Effects Tested	*Significant Two-Way Interactions
0.036	*Sex *Usage *Belt System *Windowshade	Sex-Usage Belt System Type-Type Windowshade Device
0.059	*Sex *Usage *Vehicle Size *Windowshade	Sex-Usage Vehicle Size-Type Windowshade Device
0.053	*Sex *Usage *Seat Type *No. of Doors *Windowshade	Sex-Usage Seat Type-Number of Doors Seat Type-Type Windowshade Device Number of Doors-Type Windowshade Device
0.023	*Sex *Usage *Belt System *Latchplate Type	Sex-Usage
0.050	*Sex *Usage *Vehicle Size *Latchplate Type	Sex-Usage Vehicle Size-Latchplate Type
0.040	*Sex *Usage *Seat Type *No. of Doors *Latchplate Type	Sex-Usage Seat Type-Number of Doors
0.098	*Vehicle	

---

*Level of significance is greater than 95%.

Exhibit 4-36

SUMMARY OF RESULTS OF ANOVAs ON RETRACTING

Percentage of Total Variance Explained	Main Effects Tested	*Significant Two-Way Interactions
0.121	*Height *Usage *Belt System *Latchplate Type	Height-Usage Usage-Latchplate Type
0.174	*Height *Usage *Vehicle Size *Latchplate Type	Height-Usage Usage-Latchplate Type
0.148	*Height *Usage *Seat Type *No. of Doors *Latchplate Type	Height-Usage Usage-Latchplate Type Seat Type-Number of Doors Seat Type-Latchplate Type
0.166	*Height *Usage *Belt System *Windowshade	Height-Usage Usage-Type Window Shade Device Belt System Type-Type Windowshade Device
0.177	*Height *Usage *Vehicle Size *Windowshade	Height-Usage Vehicle Size-Type Windowshade Device
0.178	*Height *Usage Seat Type *No. of Doors *Windowshade	Height-Usage Seat Type-Number of Doors Seat Type-Type Windowshade Device Number of Doors-Type Windowshade Device

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*Level of significance is greater than 95%.

Exhibit 4-36 (Continued)

SUMMARY OF RESULTS OF ANOVAs ON RETRACTING

Percentage of Total Variance Explained	Main Effects Tested	*Significant Two-Way Interactions
0.155	*Sex *Usage *Belt System *Windowshade	Sex-Usage Usage-Type Windowshade Device Belt System Type-Type Windowshade Device
0.163	*Sex *Usage *Vehicle Size *Windowshade	Sex-Usage Usage-Type Windowshade Device Vehicle Size-Type Windowshade Device
0.167	*Sex *Usage Seat Type *No. of Doors *Windowshade	Sex-Usage Usage-Type Windowshade Device Seat Type-Number of Doors Seat Type-Type Windowshade Device Number of Doors-Type Windowshade Device
0.113	*Sex *Usage *Belt System *Latchplate Type	Sex-Usage Usage-Latchplate Type
0.162	*Sex *Usage *Vehicle Size *Latchplate Type	Sex-Usage Usage-Latchplate Type Vehicle Size-Latchplate Type
0.139	*Sex *Usage *Seat Type *No. of Doors *Latchplate Type	Sex-Usage Usage-Latchplate Type Seat Type-Number of Doors Seat Type-Latchplate Type
0.201	*Vehicle	

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*Level of significance is greater than 95%.

A final generalization which resubstantiates the previous observation that user physical characteristics have a strong influence on comfort perceptions. Included in Exhibits 4-30 through 4-36 are the results of ANOVAs on each aspect index using vehicle as the only independent variable. Comparisons of the percentage of variance explained by this analysis with the best from among the other analyses show that using vehicles explains more of the variance for convenience aspect indices, and less for the comfort aspects. Since classifying the responses by vehicle essentially assumes that each vehicle system included in the two tests is unique, it is expected that this analysis will have more explanatory capability than other groupings. This expectation does not hold for the comfort indices (fit and pressure), indicating that user size may play a more important part in determining these aspects than vehicle characteristics.

5

ANALYSIS OF THE CHILD RESTRAINT DEVICE EVALUATIONS

The third part of this project involved determining the compatibility between child restraint devices (CRD's) and the passenger seat safety belt systems in the test vehicles. This chapter discusses some of the compatibility problems encountered, including:

- Short belts,
- Bulky retractor/latch plate combination belts,
- Need for special locking devices,
- Automatic safety belt systems, and
- Tether attachment points.

The evaluations showed that, in general, most CRD's are compatible with most vehicles. In some cases, the CRD's were too large to conveniently sit on small bucket seats or in middle-front seating positions, but most of the CRD's could be fitted in the rear seats of the vehicles, which are safer locations for transporting children. In isolated cases, particular CRD's did not fit in a particular car, in a particular seating location. In other cases, a special locking device would be advised to stabilize the seat. It is important to note that the design of the car's seat cushion and the front seat adjustment are directly linked to the severity of the problems which were observed. Parents are advised to try installing the CRD in their vehicle themselves to see if any problem exists.

SHORT BELTS

As described in Chapter 2, part of the CRD evaluation procedure was to install each device into each passenger position in the test vehicles. In the front passenger seating positions, this procedure included adjusting the car's seat position on the track. During the installation phase of the test, the front passenger seat was moved fully forward, and an attempt was made to secure the CRD using the vehicle belt system. If the belt was too short, the seat was moved back until the device could be properly secured.

Some child restraints require longer lap belts than others to fasten the device into the car. If the vehicle is equipped with a bench seat, this could be a problem for drivers who pull the seat fully forward. Several vehicles were found to have belts too short to accommodate the Ford Tot Guard and the Strolee Wee Care (infant position) when the seat was adjusted in the forward or mid-position. The remaining seats occasionally ran into belt problems. However, only the Jeep Pickup Truck (center seat) had such short belts that, even with the seat adjusted all the way back, we were unable to fasten in the Bobby Mac 2-in-1 or the Ford Tot Guard.

Rear seat belt systems were also evaluated in this study. Belt length problems were found only in the Volkswagen Jetta when installing the Ford Tot Guard. Several other CRD's just barely fit the Jetta belts.

BULKY RETRACTOR/LATCH PLATE COMBINATION BELTS

Some cars are equipped with rear seat belts of a unique design that incorporates the retractor as a moving part of the belt, rather than having it remain stationary on or under the seat. In the case of several of the child restraints, it is difficult or impossible to pass the belt through the frame to properly secure the seat, because of the excessive size of the retractor. In such cases, these restraints could only be used in the front seats of such cars.

The following vehicles are equipped with rear seat belts of this design. They are incompatible with many child seats but cannot be used at all with the Questor Kantwet Care Seat (toddler position) or the Cosco Safe 'N Easy Seat (#13-203 and 13-313). This list may not be exhaustive.

1980 Models

Datsun (all cars)
Dodge Challenger
Dodge Colt
Mazda GLC and 626
Plymouth Arrow
Plymouth Champ
Plymouth Sapporo
Subaru (all models)

1981 Models

Dodge Challenger
Mazda GLC and 626
Plymouth Arrow
Plymouth Champ
Plymouth Sapporo
Subaru (all models)

NEED FOR SPECIAL LOCKING DEVICES

Part of the CRD evaluation procedure was to attempt to move the device while it was being held by the vehicle belt system. If a belt system does not hold the CRD securely, it may allow certain child seats to become loose or to slip out of their properly secured positions. This can happen when a child is very active and plays with the vehicle belt system.

This condition existed primarily as a result of two quite different hardware incompatibilities:

- Free-sliding latch plate on a continuous-loop lap/shoulder belt system, or
- Inertial locking lap belt system.

The first problem can be easily overcome by using a locking clip (manufactured by American Safety Equipment), which secures the lap portion of the belt system around the CRD. This clip is fastened around both the lap and shoulder belt after the belt is buckled. It essentially creates enough friction at the latch plate so that it prohibits the lap belt from slipping out.

Inertial lap belts are found in the rear-outboard seats in Toyota cars. These belts lock up only during a sudden stop. It is possible to tip an untethered seat over during normal cornering maneuvers. Parents should purchase a tethered seat and install the tether or use the center rear seat (if there is one), which has a different style of belt. Some Chevrolet trucks or vans have a new style of belt in the front seat. The lap belt cannot be fastened with a locking clip and it remains free-moving except in sudden stops. With some CRD's, it may be possible to tip them during cornering. Parents should use the rear seats in these vehicles when carrying toddlers in child restraints.

AUTOMATIC SAFETY BELT SYSTEMS

With the exception of the Chevrolet Chevette, none of the automatic belt systems included among the test vehicles could accommodate CRD's. Three major incompatibilities occurred:

- Two-point systems could not secure any CRD because they lack a lap belt,
- CRD's which were secured by threading a belt system through the frame could not be installed because the 3-point belts do not detach, or
- If the CRD could be installed, it was frequently pulled out along with the belt system when the passenger door was opened.

The Chevrolet Chevette with an auxiliary belt and anchor points was the only automatic system that could accommodate CRD's.

TETHER ATTACHMENT POINTS

Two of the child restraint devices included in this evaluation required tethers to be properly secured. Consequently, part of the evaluation procedure included looking for potential tether anchor points behind the rear seat and testing the attachment of tethers to the rear belt systems when the CRD's were in the front seat. Two major problems were noted:

- In some vehicles, particularly hatchbacks, pickups, and vans, no convenient tether anchoring position was available, and

- Some vehicles with automatic locking retractors in the rear seating positions include an "unengaged zone" feature on those belt systems. Therefore, if the tether is not shortened enough to pull the rear belt beyond that zone, it will not be secure.

General Motors has pre-drilled tether holes in many of its 1978, 1979, and 1980 model sedans—they are in the rear parcel shelf. GMC will send printed instructions for tether installation in its pickup trucks, hatchbacks, and wagons.

AMC is pre-drilling tether anchor holes in its 1981 model sedans, in the rear parcel shelf. The hardware kit for the tether installation may be purchased from an AMC dealer. For information on hatchbacks and wagons, consult the CRD owner's manual or ask a dealer.

6

CONCLUSIONS

This chapter summarizes the results detailed in Chapters 4 and 5. The principal conclusions that can be derived from the analyses and evaluations are:

- The problem area identified most frequently over all trials was in latch plate accessibility. The other areas ranking from most troublesome to least troublesome were extending, fit, buckling, pressure, retracting, and releasing.

- Shorter and heavier individuals tend to have more comfort and convenience problems than others. However, all weight-height groups tended to rank the test vehicles similarly.

- Contrary to expectations, males identified more comfort and convenience problems than females.

- Dual retractor systems had fewer problems with accessibility, extending, buckling, releasing, and retracting than did continuous loop systems.

- Full-sized passenger cars, vans, and pickup trucks had significantly fewer belt-related problems.

- Bench seats and four-door vehicles tended to have fewer comfort and convenience problems than vehicles with bucket seats or two doors.

- Windowshade devices are not effective at alleviating problems with shoulder belt pressure. Moreover, even with cancelling devices, they still cause retraction problems.

- The shoulder belt fit and pressure compliance tests were found to be related to user perceptions of safety belt comfort.

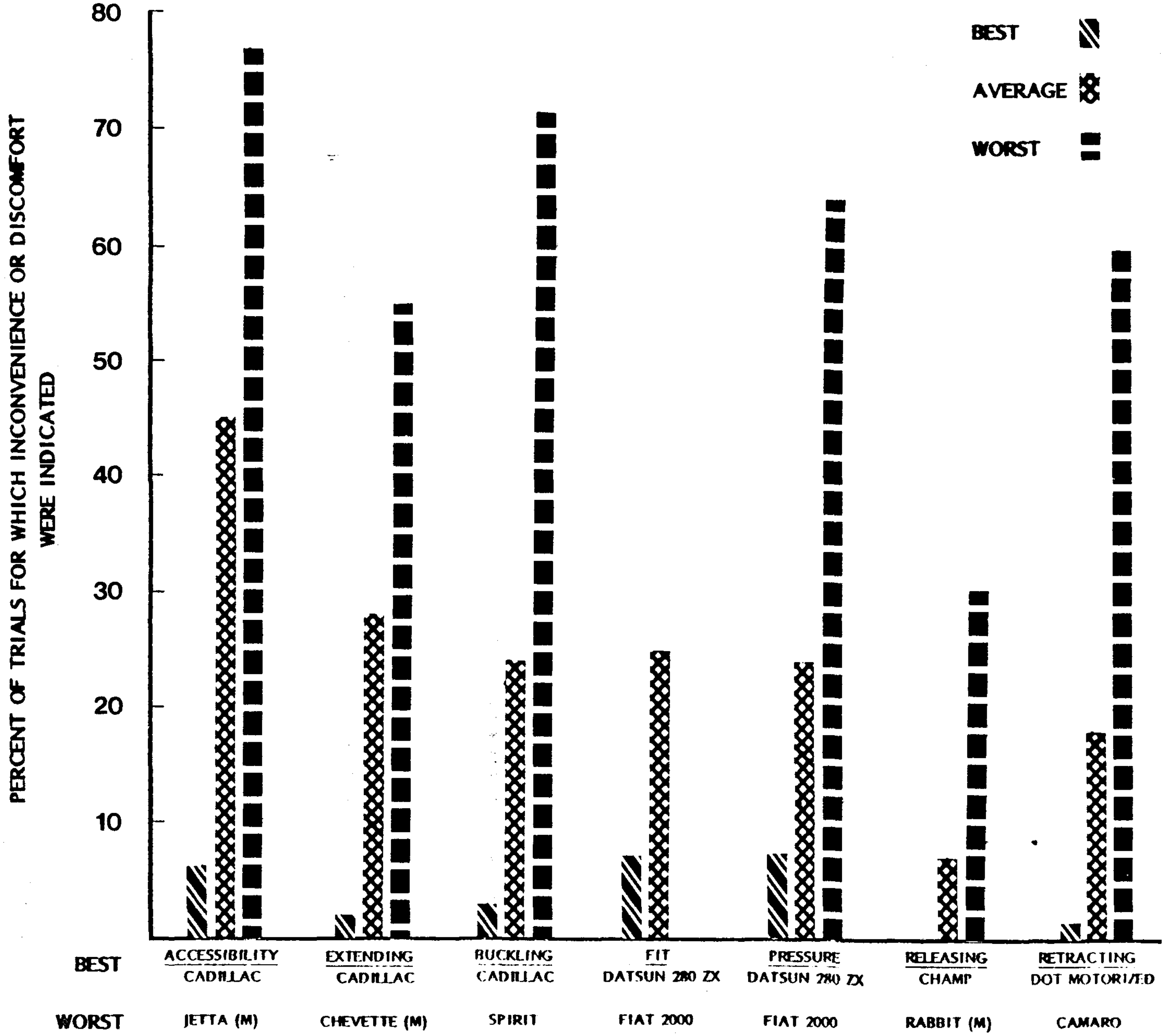
- Automatic belt systems were rated more comfortable and convenient by test participants. The two DOT experimental belt systems, which were designed to meet proposed comfort and convenience specifications, were superior to all other automatic belt systems.

- The major compatibility problems between safety belt systems and child restraint devices is that belts are sometimes too short and that special locking devices are sometimes required to secure a child restraint. Consumers, however, can reduce these problems with careful selection of child restraint devices.

Finally, examination of the study results shows that most of the cars had some good as well as bad aspects. Exhibit 6-1 compares the best and worst scores for each aspect with the average over all cars. This comparison shows that by combining the best features of cars used in this study, a safety belt system substantially better than the existing systems could be produced.

Exhibit 6-1

PERCENT OF TRIALS RATED UNCOMFORTABLE OR INCONVENIENT FOR ASPECTS OF SAFETY BELT USAGE — BEST, AVERAGE, AND WORST SCORES



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GLOSSARY

1.	Automatic System	A safety belt system which does not require manual donning. The restraints typically are designed to move away from the seat when the vehicle's door is opened and to move into proper restraint position when the door is closed.
2.	Buckle	A fastening device of the safety belt system which receives and connects with the latch plate.
3.	Buckle Release	The mechanism (usually a push button) used to disengage the latch plate from the buckle.
4.	Doffing	The process of removing the safety belt from the body to exit the vehicle.
5.	Donning	The process of putting on and securing the safety belt around the body after entering the vehicle.
6.	Latch Plate	The metal part of the safety belt system which is usually attached to the webbing and inserts into the buckle.
7.	Manual System	Safety belt system that requires user operation to "buckle-up."
8.	Retractor	A device which adjusts the length of the safety belt to fit the participant and to return the webbing once the latch plate is released.
9.	Shoulder Guide	The part of the safety belt system which keeps the upper portion of the shoulder strap in proper alignment.
10.	Stowing	The process by which the safety belt is stored after it has been doffed.
11.	Webbing	The part of the safety belt system, usually a mesh fabric, which extends across the shoulder and the lap.
12.	Windowshade Device	A mechanism in the safety belt system which reduces the slack in the shoulder restraint; (it is) an automatic device activated by simple body movements, such as a light forward motion of the upper torso or by using the hand, to relieve or eliminate tension from the shoulder harness.

Appendix A

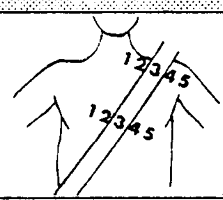
TEST INSTRUMENTS

This appendix contains copies of the instruments used to record data collected during the testing phase of this study. Included are:

- Safety Belt System Evaluation -- Manual Systems,
- Safety Belt System Evaluation -- Automatic Systems,
- Safety Belt System Evaluation — Automatic System with Optional Lap Belt,
- Vehicle Data Form,
- Physical Data Form,
- Participant Information Form, and
- Child Restraint Device Evaluation Form.

SAFETY BELT SYSTEM EVALUATION—MANUAL SYSTEMS

EXPERIMENTER NUMBER: ___ ___ ___	DATE:	PARTICIPANT NUMBER: ___ ___ ___	1-3
		CAR NUMBER: ___ ___	5-6
ENTRY TIME: ___ ___ : ___ ___		TRIAL NUMBER: ___ ___	8-9

EXPERIMENTER INSTRUCTIONS	QUESTIONS	ANSWERS	
Ask the subject to enter the vehicle, close the door, adjust the seat, and don the belt. **Note if one or two hands were required to extend the latchplate.**		1 2	23
Note if one or two hands were required to buckle the belt.		1 2	25
NOW ask questions 1 through 5.	1. How difficult or easy was it for you to grasp the latchplate? For example, was there anything blocking the path to the latchplate? Did you have to open the door to reach it?	1 2 3 4 5 6 7	27
	2. What about the distance you had to reach to get to the latchplate? Did this distance make it difficult or easy to reach the latchplate. For example, did you have to lean out of the seat because it was too far away?	1 2 3 4 5 6 7	29
	3. Was it easy or difficult to move the latchplate over to the buckle? For example, did the belt extend smoothly from the retractor?	1 2 3 4 5 6 7	31
	4. How difficult or easy was it to find the buckle? For example, was it hidden behind the seat?	1 2 3 4 5 6 7	33
	5. Was it easy or difficult to fasten the buckle? For example, was the opening in the buckle easy to locate? Was it difficult to insert the latchplate into the buckle?	1 2 3 4 5 6 7	35
Note if the belt was twisted. Correct the twisting.		YES 1 NO 2	37
Note the fit of the belt: - At the shoulder.		shoulder 1 2 3 4 5	39
- At the sternum.		sternum 1 2 3 4 5	41
Now ask question 6.	6. Does the lap belt press on your body comfortably or uncomfortably?	1 2 3 4 5 6 7	43

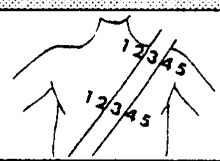
over

Ask questions 7 and 8.	7. How does the shoulder belt fit across your chest and shoulder? Does it cross your body comfortably? Does it rub against your neck or chest?	1 2 3 4 5 6 7	45
	8. Does the shoulder belt press on your body comfortably or uncomfortably?	1 2 3 4 5 6 7	47
IF the vehicle has no windowshade device, skip to question 10. Otherwise say "Set the windowshade device." **Observe if the subject was successful.**		YES 1 NO 2	49
After the device has been set properly, ask question 9.	9. Does the shoulder belt press on your body comfortably, or uncomfortably?	1 2 3 4 5 6 7	51
Say "Please reach for the glove box, and return to the normal driving position." **Note if there is now excessive slack in the shoulder belt.** Say "Please reset the windowshade."		YES 1 NO 2	53
Say "Place your hands on the steering wheel, and without turning your body look to the left rear as far as you can." Ask questions 10 and 11.	10. Does any part of the belt system interfere with your vision out of the left side of the car?	YES 1 NO 2	55
	11. What part?	None 1 Belt 2 Retractor 3 Other 4	57
Say "Please release the belt and get out of the car." **Observe whether the belt retracted fully.**		YES 1 NO 2	59
Observe if physical contact was made with the belt system.		YES 1 NO 2	61
NOW ask questions 12 and 13.	12. Was it difficult or easy to operate the button that unbuckles the belt? Was the force required to operate the button excessive?	1 2 3 4 5 6 7	63
	13. Did the belt system retract by itself, or did you have to assist it to make it retract out of your way, so you could leave the car.	1 2 3 4 5 6 7	65

(1) Check for completeness.
(2) Insert in "Completed" envelope.
(3) Leave vehicle in test condition.
(4) Wait for timekeeper's signal.

SAFETY BELT SYSTEM EVALUATION—FULLY AUTOMATIC SYSTEM

EXPERIMENTER NUMBER: ___ ___ ___	DATE:	PARTICIPANT NUMBER: ___ ___ ___	1-3
		CAR NUMBER: ___ ___	5-6
ENTRY TIME: __ __ : __ __		TRIAL NUMBER: ___ ___	8-9

EXPERIMENTER INSTRUCTION	QUESTIONS	ANSWERS	
Ask the subject to open the door. Ask question 1.	1. Does the belt system look easy or difficult to use? For example, is it clear how to get into the car?	1 2 3 4 5 6 7	11
Ask the subject to enter the car and close the door. **Note how the subject entered the car.**		Correctly 1 Sat on Belt 2 Lifted Belt 3 Unbuckled Belt 4 Stepped Over Belt 5 Stepped Under Belt 6 Other 7	13
Note if the arm or hand of the subject is entrapped by the system.		YES 1 NO 2	15
Ask questions 2 and 3.	2. Did the belt system make entering and sitting in the car difficult or easy?	1 2 3 4 5 6 7	17
	3. Did the belt system make it easy or difficult to close the door?	1 2 3 4 5 6 7	19
Ask the subject to adjust the seat. Ask question 4.	4. Did the belt system make adjusting the seat difficult or easy?	1 2 3 4 5 6 7	21
Note if the belt was twisted. Correct the twisting.		YES 1 NO 2	37
Note the fit of the belt: - At the shoulder. - At the sternum.		shoulder 1 2 3 4 5 sternum 1 2 3 4 5	39 41
IF the vehicle has a **3-point** system, ask question 5.	5. Does the lap belt press on your body comfortably or uncomfortably?	1 2 3 4 5 6 7	43
NOW ask questions 6 and 7.	6. How does the shoulder belt fit across your chest and shoulder? Does it cross your body comfortably or uncomfortably? Does it rub against your neck or chest?	1 2 3 4 5 6 7	45
	7. Does the shoulder belt press on your body comfortably or uncomfortably?	1 2 3 4 5 6 7	47

over ↳

Say "Place your hands on the steering wheel, and without turning your body look to the left rear as far as you can." Ask question 8 and 9.	8. Does any part of the belt system interfere with your vision out of the left side of the car?	YES NO 1 2	55
	9. What part?	None 1 Belt 2 Retractor 3 Other 4	57
Say "Please get out of the car." **Observe whether the belt retracted fully.**		YES NO 1 2	59
Observe if physical contact was made with the belt system.		YES NO 1 2	61
Now ask question 10.	10. Did the belt system retract by itself, or did you have to assist it to make it retract out of your way, so you could leave the car?	1 2 3 4 5 6 7	65

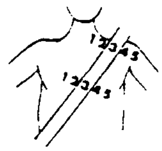
(1) Check form for completeness.
(2) Insert in "Completed" envelope.
(3) Leave vehicle in test condition.
(4) Wait for timekeeper's signal.

SAFETY BELT SYSTEM EVALUATION—AUTOMATIC SYSTEM WITH OPTIONAL LAP BELT

EXPERIMENTER NUMBER: ___ ___ ___	DATE:	PARTICIPANT NUMBER: ___ ___ ___ 1-3
		CAR NUMBER: ___ ___ 5-6
ENTRY TIME: ___ ___ : ___ ___		TRIAL NUMBER: ___ ___ 8-9

EXPERIMENTER INSTRUCTIONS	QUESTIONS	ANSWERS	
Ask the subject to open the door. Ask question 1.	1. Does the belt system look easy or difficult to use? For example, is it how to get into the vehicle?	1 2 3 4 5 6 7	11
Ask the subject to enter the car and close the door. **Note how the subject entered the car.**		Correctly 1 Sat on Belt 2 Lifted Belt 3 Unbuckled Belt 4 Stepped Over Belt 5 Stepped Under Belt 6 Other 7	13
Note if the arm or hand of the subject is entrapped by the system.		YES 1 NO 2	15
Ask questions 2 and 3.	2. Did the belt system make entering and sitting in the car difficult or easy?	1 2 3 4 5 6 7	17
	3. Did the belt system make it easy or difficult to close the door?	1 2 3 4 5 6 7	19
Ask the subject to adjust the seat. Ask question 4.	4. Did the belt system make adjusting the seat difficult or easy?	1 2 3 4 5 6 7	21
Ask the subject to put on the lap belt. **Note if one or two hands were required to extend the latchplate.**		YES 1 NO 2	23
Note if one or two hand were required to buckle the belt.		YES 1 NO 2	25
Now ask questions 5 through 7.	5. How difficult or easy was it for you to grasp the latchplate? For example, was there anything blocking the path to the latchplate? Did you have to open the door to reach it?	1 2 3 4 5 6 7	27
	6. What about the distance you had to reach to get to the latchplate? Did this distance make it difficult or easy to reach the latchplate? For example, did you have to lean out of the seat, because it was too far away?	1 2 3 4 5 6 7	29
	7. Was it easy or difficult to move the latchplate over to the buckle? For example, did the belt extend smoothly from the retractor?	1 2 3 4 5 6 7	31

over ↴

Ask questions 8 and 9.	8. How difficult or easy was it to find the buckle? For example, was it hidden behind the seat?	1 2 3 4 5 6 7	33
	9. Was it easy or difficult to fasten the buckle? For example, was the opening in the buckle easy to locate? Was it difficult to insert the latchplate into the buckle?	1 2 3 4 5 6 7	35
Note if the belt was twisted. Correct the twisting.		YES 1 NO 2	37
Note the fit of the belt: - At the shoulder.		shoulder 1 2 3 4 5	39
- At the sternum.		sternum 1 2 3 4 5	41
Now ask questions 10 through 12.	10. Does the lap belt press on your body comfortably or uncomfortably?	1 2 3 4 5 6 7	43
	11. How does the shoulder belt fit across your chest and shoulder? Does it cross your body comfortably or uncomfortably? Does it rub against your neck or chest?	1 2 3 4 5 6 7	45
	12. Does the shoulder belt press on your body comfortably or uncomfortably?	1 2 3 4 5 6 7	47
Say "Place your hands on the steering wheel, and without turning your body, look to the left rear as far as you can." Ask questions 13 and 14.	13. Does any part of the belt system interfere with your vision out of the left side of the car?	YES 1 NO 2	55
	14. What part?	None 1 Belt 2 Retractor 3 Other 4	57
Say "Please release the belt and get out of the car. **Observe whether the belt retracted fully.**		YES 1 NO 2	59
Observe if physical contact was made with the belt system.		YES 1 NO 2	61
Now ask questions 15 and 16.	15. Was it difficult or easy to operate the button that unbuckles the belt? Was the force required to operate the button excessive?	1 2 3 4 5 6 7	63
	16. Did the belt system retract by itself, or did you have to assist it to make it retract out of your way, so you could leave the car.	1 2 3 4 5 6 7	65

(1) Check form for completeness.
(2) Insert in "Completed" envelope.
(3) Leave car in test condition.
(4) Wait for timekeeper's signal.

VEHICLE DATA FORM

1. Car Number:	____ ____	1-2
2. Make/Manufacturer: AMC 01 — Mazda 08 Chrysler 02 — Datsun 09 Ford 03 — Subaru 10 GMC 04 — Toyota 11 BMW 05 — VW 12 Fiat 06 — Test Vehicle 13 Honda 07	ENTER CHOICE: ____ ____	4-5
3. Model Subcompact 1 — Fullsize 4 Compact 2 — Truck 5 Midsize 3 — Van 6	ENTER CHOICE: ____	7
4. Number of Doors:	TWO 1 — FOUR 2	9
5. Type of Front Seat:	BENCH 1 — BUCKET 2	11
6. General descriptor for belt system:	Manual 1 Automatic 2 Automatic with Optional Lap Belt 3	13
7. Specific descriptor for belt system: Continuous loop 1 Dual retractor 2 Continuous loop w/windowshade. 3 Dual retractor w/windowshade 4 Continuous loop w/windowshade and deactivator. 5 Dual retractor w/windowshade and comfort clip. 6 Other: ____________ 7	ENTER CHOICE: ____	15
8. Windowshade device?	YES 1 — NO 2	17
Automatic release?	YES 1 — NO 2	18
9. Number of retractors:	ENTER NUMBER: ____	20
10. Type of lap belt retractor:	Emergency Locking 1 Automatic Locking 2 None 3	22
11. Type of shoulder belt retractor: Vehicle locking 1 Webbing locking 2 Windowshade 3 Motorized 4 None 5	ENTER CHOICE: ____	24
12. Outboard shoulder belt retractor location: Floor 1 B-Pillar low 2 B-Pillar high 3 Roof rail 4 Door 5 Not Applicable 6	ENTER CHOICE: ____	26

13. Buckle anchorage location: Floor 1 Seat 4 Standoff 2 Not Applicable 5 Console 3	ENTER CHOICE: ____	28
14. Location of webbing guide: Seat back 1 Roof Rail 4 Headrest 2 None 5 Door Post 3	ENTER CHOICE: ____	30
15. Folding inboard armrest:	YES NO 1 2	32
16. Shoulder belt fit: - 50th Percentile Dummy Compliance	YES NO 1 2	34
- 5th Percentile Dummy Compliance	1 2	35
17. Shoulder belt pressure measurements: ____ ____ ____ ____ ____ = ____ Sum	AVERAGE __ __ . __	37-40
18. Distance of latchplate from dummy: - Reference Point	NECK ARMPIT 1 2	42
- Distance (in inches to 1/4 inch)	ENTER MEASUREMENT __ __ . __ __	44-48
19. Hand/arm accessibility: (block test)	YES NO 1 2	50
20. Webbing clearance (only required for automatic systems. Use 99.9 to indicate a manual system).	ENTER MEASUREMENT __ __ . __	52-55
21. Webbing retraction test: - Trial One	PROPER IMPROPER 1 2	57
- Trial Two	1 2	58
22. Donning time (to be filled in after subjective tests) Trial 1, Day 1 ____ Trial 3, Day 2 ____ Trial 2, Day 1 ____ Trial 1, Day 3 ____ Trial 3, Day 1 ____ Trial 2, Day 3 ____ Trial 1, Day 2 ____ Trial 3, Day 3 ____ Trial 2, Day 2	AVERAGE TIME __ __ . __	60-63
THE FOLLOWING QUESTIONS PERTAIN ONLY TO MOTORIZED RETRACTORS ON AUTOMATIC SYSTEMS		
23. Retractor rates: CLOSING DOOR OPENING DOOR Trial 1 ____ ____ Trial 2 ____ ____ Trial 3 ____ ____ Trial 4 ____ ____ Trial 5 ____ ____ TOTAL: ____	AVERAGE RATES: OPENING __ __ . __	65-68
	CLOSING __ __ . __	70-73
24. Head clearance: 1 ____ 2 ____ 3 ____ 4 ____ 5 ____ 6 ____ 7 ____ 8 ____	SHORTEST DISTANCE __ __ . __	75-78

PHYSICAL DATA FORM

PARTICIPANT'S INITIALS: ___ ___ ___	PARTICIPANT NUMBER: ___ ___ ___		1-3
	MALE	FEMALE	
1. SEX	1	2	5
2. AGE	___	___	7-8
3. WEIGHT *(in pounds)*	___ ___	___	10-12
4. HEIGHT *(in inches)*	___	___	14-15
5. SEATED HEIGHT	___	___	17-18
6. ARM LENGTH	___	___	20-21
7. SEATED WAIST	___	___	23-24
8. ANY UPPER BODY MOBILITY PROBLEMS?	YES 1	NO 2	26

IF YES, DESCRIBE:

PARTICIPANT INFORMATION FORM

PARTICIPANT'S INITIALS: ___ ___ ___	PARTICIPANT'S NUMBER: ___ ___ ___		1-3
1. MARK THE ITEM THAT INDICATES THE HIGHEST LEVEL OF EDUCATION YOU HAVE COMPLETED. *(Mark only one).*	High School Diploma	1	5
	Beyond High School	2	
2. DO YOU OR ANY MEMBERS OF YOUR IMMEDIATE FAMILY WORK IN THE AUTO INDUSTRY?	YES 1	NO 2	7
3. AT WHAT AGE DID YOU GET YOUR DRIVER'S LICENSE?	___ ___		9-10
4. DO YOU DRIVE REGULARLY (at least once a week)?	YES 1	NO 2	12
5. PLEASE PROVIDE THE MAKE, MODEL, AND YEAR OF THE CAR YOU DRIVE MOST FREQUENTLY: ___ *(Make)* ___ *(Model)* ___ *(Year)*	___ ___ ___ ___ ___ ___		14-19
6. DOES YOUR IMMEDIATE FAMILY OWN EITHER OF THESE MODEL CARS WITH AUTOMATIC SEAT BELT SYSTEMS?	Chevy Chevette	1	
	VW Rabbit	2	21
	Neither	3	

7. PLACE A MARK ON THIS DIAGRAM THAT REPRESENTS THE AMOUNT OF TIME YOU TYPICALLY USE A SAFETY BELT WHILE RIDING IN A CAR.	All the time:	*100 %*	☐
		90 %	☐
	Almost all the time:	*80 %*	☐
		70 %	☐
		60 %	☐
	About half the time:	*50 %*	☐
		40 %	☐
		30 %	☐
	Almost Never:	*20 %*	☐
		10 %	☐
	Never:	*0 %*	☐
	___ ___ ___		23-25
8. DO YOU WORK FULL TIME FOR PAY?	YES 1	NO 2	27

CHILD RESTRAINT DEVICE EVALUATION FORM

VEHICLE NUMBER:	___ ___		1-2
CHILD RESTRAINT DEVICE NUMBER:	___		4
DEVICE POSITION:	INFANT 1	CHILD 2	6
For the front passenger seat, mark the forward-most seat position, for which the belt is long enough to secure the device.	Forward	1	8
	Middle	2	
	Back	3	
	None	4	
Did the shoulder belt interfere with securing the device? If **YES**, describe below:	YES 1	NO 2	10
Is a tether required to properly secure the device? If **YES**, respond to the next two questions.	YES 1	NO 2	12
Was the tether long enough?	Yes	1	14
	No	2	
	Not Applicable	3	
To what was the tether attached?	Latchplate of Rear Belt	1	16
	Buckle of Rear Belt	2	
	Looped Over Belt	3	
	Could Not Attach	4	
	Not Applicable	5	
Rock the device. Does the vehicle system secure the device properly?	YES 1	NO 2	18
Is a locking device required?	YES 1	NO 2	20
For the front center seat, mark the forward-most seat position, for which the belt is long enough to secure the device.	Forward	1	22
	Middle	2	
	Back	3	
	None	4	
	Not Applicable	5	

Was the tether long enough?	Yes	1	24
	No	2	
	Not Applicable	3	
To what was the tether attached?	Latchplate of Rear Belt	1	28
	Buckle of Rear Belt	2	
	Looped Over Belt	3	
	Could Not Attach	4	
	Not Applicable	5	
For the rear middle seat, was the belt long enough to secure the device?	Yes	1	30
	No	2	
	Not Applicable	3	
For the rear outboard seat, was the belt long enough to secure the device?	Yes	1	32
	No	2	
	Not Applicable	3	

NOTES:

SAFETY BELT COMFORT AND CONVENIENCE FACTORS—EVALUATION FORM

Date: ______________		Participant Number: ___ ___ ___		1-3
Session	Morning ☐ Afternoon ☐			
Buckling—involving inserting the latch plate into the buckle.		Not Important — Average Importance — Very Important ☐ ☐ ☐ ☐ ☐ ☐ ☐	___	5
Retracting—relating to how conveniently the system retracts out of the user's way as he exits the vehicle.		Not Important — Average Importance — Very Important ☐ ☐ ☐ ☐ ☐ ☐ ☐	___	7
Releasing—involving releasing the latch plate from the buckle.		Not Important — Average Importance — Very Important ☐ ☐ ☐ ☐ ☐ ☐ ☐	___	9
Pressure—relating to the pressure of the belt on the wearer's chest and shoulder.		Not Important — Average Importance — Very Important ☐ ☐ ☐ ☐ ☐ ☐ ☐	___	11
Extending—pertaining to moving the latch plate over to the buckle.		Not Important — Average Importance — Very Important ☐ ☐ ☐ ☐ ☐ ☐ ☐	___	13
Fit—describing how the shoulder belt fits the wearer.		Not Important — Average Importance — Very Important ☐ ☐ ☐ ☐ ☐ ☐ ☐	___	15
Accessibility—relating to reaching for and grasping the safety belt latch plate.		Not Important — Average Importance — Very Important ☐ ☐ ☐ ☐ ☐ ☐ ☐	___	17

Appendix B

DETAILED COMPLIANCE TEST RESULTS

This appendix contains the results of the compliance testing conducted at the test site. Included are results of the following tests:

- Shoulder belt fit test,
- Shoulder belt pressure test,
- Latchplate accessibility measurements,
- Motorized retractor rates,
- Head clearance,
- Accessibility block,
- Webbing retraction, and
- Webbing clearance.

Exhibit B-1

COMPLIANCE TEST RESULTS

Vehicle	Fit Test	Pressure Test (Pounds)	Accessibility Measurements		Articulation Speed (Seconds)	Head Clearance (Inches)	Block Test	Retraction Test	Webbing Seat Clearance (Inches)
			Reference Point	Distance (Inches)					
AMC Eagle	F	1.1	N	12.5	—	—	P	P	—
AMC Spirit	F	1.1	N	15.0	—	—	P	P	—
BMW 320i	F	0.5	—	—	—	—	—	—	6.0
Buick Regal	F	1.3	N	13.0	—	—	P	P	—
Chevy Chevette (A)	F	0.8	—	—	—	—	—	—	4.8
Chevy Chevette (M)	F	2.0	N	12.3	—	—	P	P	—
Chevy Citation	F	1.1	N	14.0	—	—	P	P	—
Chevy Pick-up	F	0.9	A	17.0	—	—	P	P	—
Chevy Van	F	0.5	A	16.0	—	—	P	P	—
Chrysler Cordoba	F	1.0	N	7.0	—	—	P	P	—
Datsun Pick-up	P	1.0	N	10.0	—	—	P	P	—
Datsun 210	F	0.7	N	10.5	—	—	P	F	—
Dodge Aspen	F	1.0	N	13.3	—	—	P	P	—
Dodge Pick-up	F	1.2	N	11.3	—	—	P	F	—
Dodge Van	F	1.5	N	10.0	—	—	P	P	—
DOT Motorized	P	0.7	—	—	2.6	6.8	—	—	—
DOT Automatic	F	0.5	—	—	—	—	—	—	—
Fiat Strada	F	0.8	N	11.5	—	—	P	F	—
Ford Fairmont	F	2.0	N	11.8	—	—	—	P	—
Ford LTD	P	0.4	—	—	—	—	—	—	6.5
Ford Mustang	F	1.2	N	12.5	—	—	P	—	—
Ford Pick-up	F	1.1	N	16.5	—	—	P	P	—
Ford Pinto	F	1.0	A	15.0	—	—	F	F	—
Ford T-Bird	F	2.0	N	15.0	—	—	—	P	—
Ford Van	F	1.0	A	20.0	—	—	P	P	—
Honda Civic	F	0.5	N	12.0	—	—	P	P	—
Jeep Pick-up	F	0.5	N	11.0	—	—	P	P	—
Mazda GLC	F	0.7	N	11.0	—	—	P	P	—
Olds Delta 88	P	1.0	N	11.5	—	—	P	P	—
Plymouth Horizon	F	1.2	N	8.5	—	—	P	P	—
Subaru 1800 GLF	F	1.0	N	17.3	—	—	—	F	—
Toyota Corolla	F	0.5	N	16.5	—	—	P	F	—
Toyota Corona	F	0.8	—	—	1.8	4.0	—	—	—
Toyota Pick-up	F	0.5	A	11.5	—	—	P	P	—
VW Rabbit (A)	P	1.0	—	—	—	—	—	—	—
VW Rabbit (M)	F	0.9	N	13.5	—	—	P	P	—

Key: P-Pass/F-Fail.
N-Neck/A-Armpit.

Appendix C

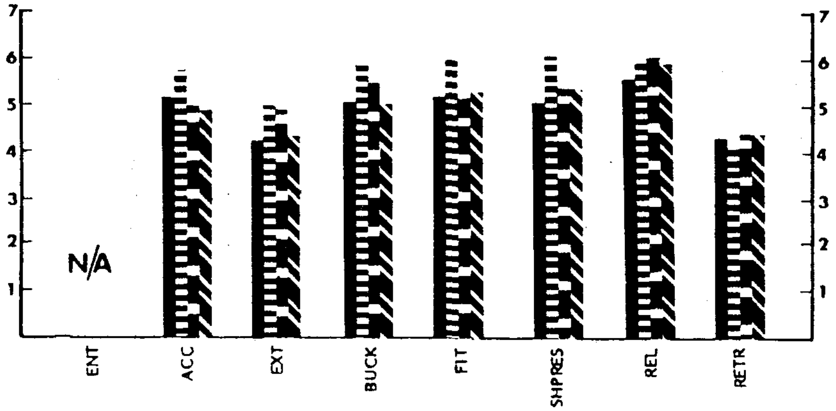
DETAILED RESULTS

This appendix presents the index scores for all aspects of safety belt comfort and convenience by vehicle. The average and problem indices are shown in separate charts.

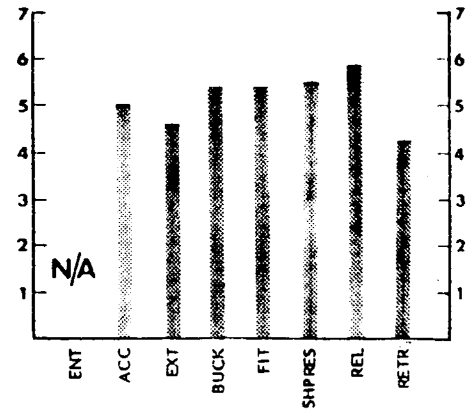
AMC EAGLE

SIZE:	COMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	4	WINDOW SHADE DEVICE:	YES
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	YES

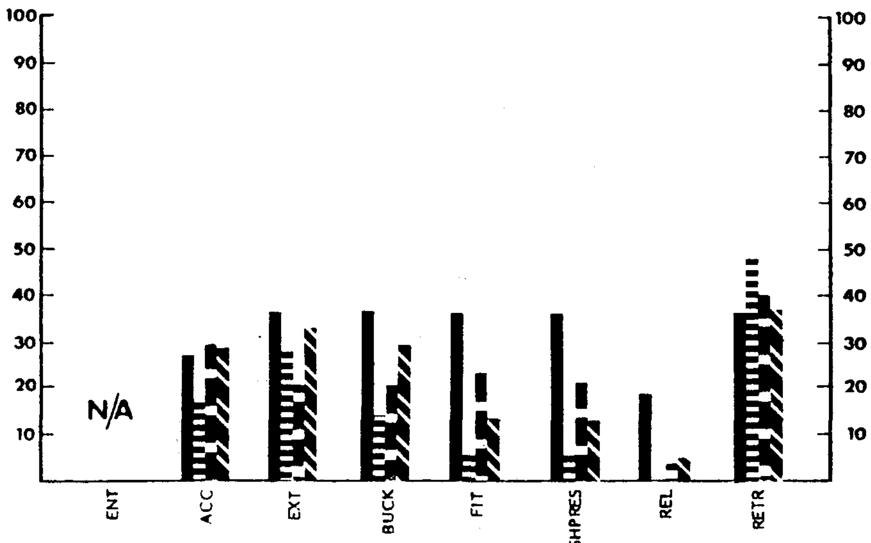
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



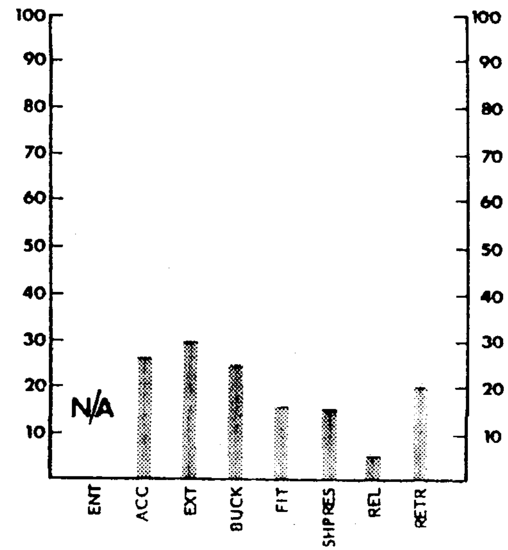
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

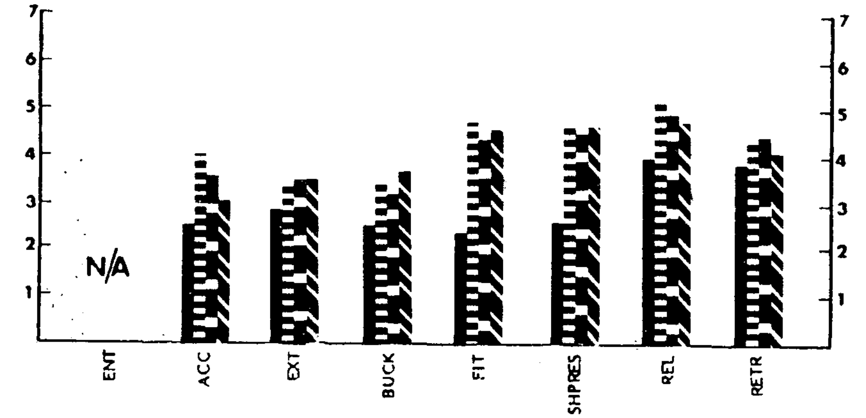
PERCENT Twisted 19.1 Slack 7.3
Not Fully Retracted 55.8

AMC SPIRIT

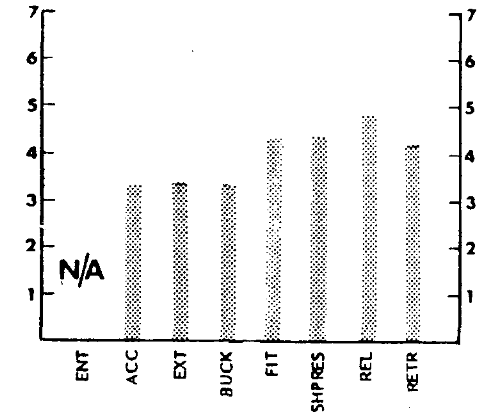
SIZE: SUBCOMPACT
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: YES
LATCHPLATE LOCKING DEVICE: YES

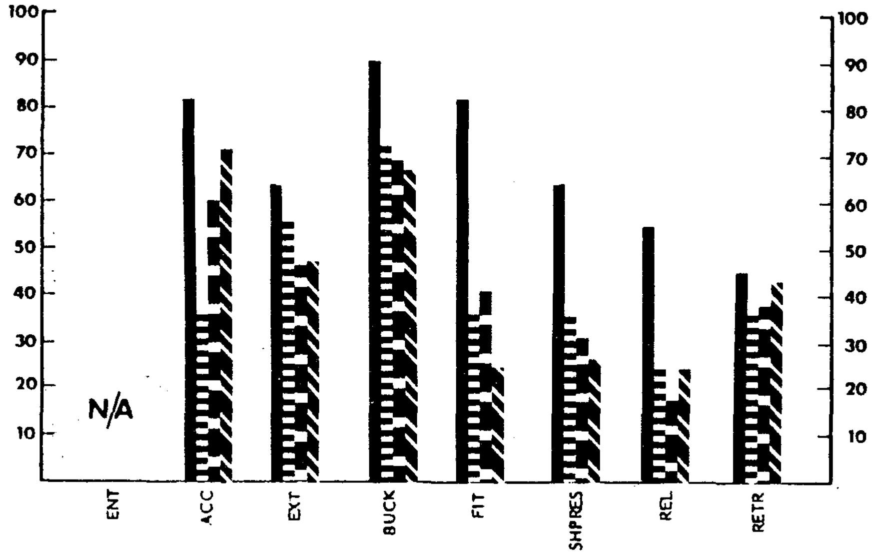
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



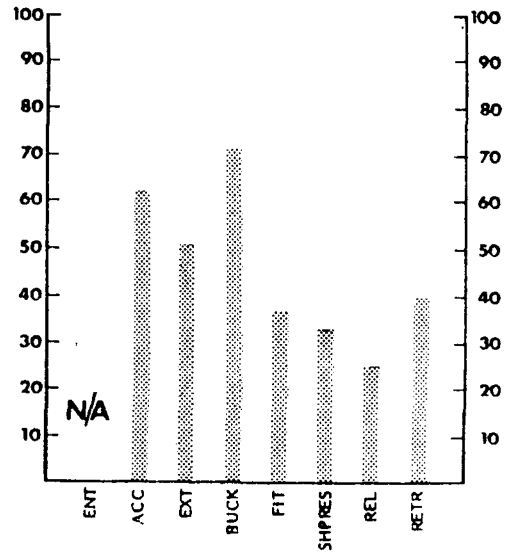
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



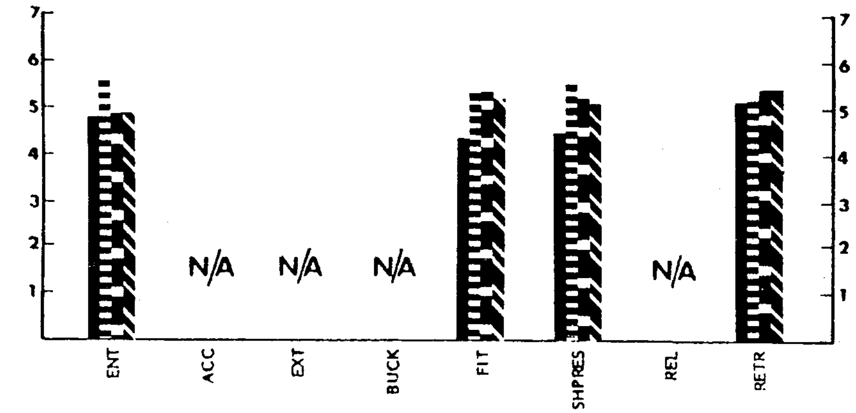
KEY Short/Overweight · Short/Not Overweight · Average/Overweight · Average/Not Overweight

PERCENT Twisted 15.2 Slack 9.3
Not Fully Retracted 48.7

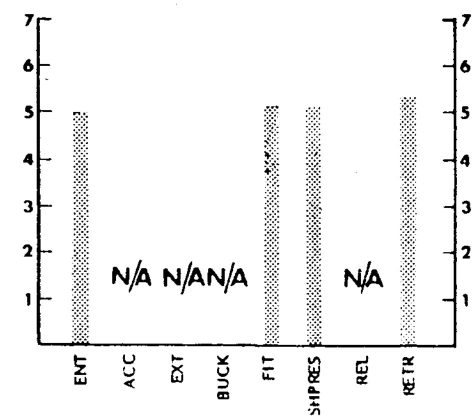
BMW 320i

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	AUTOMATIC, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	N/A

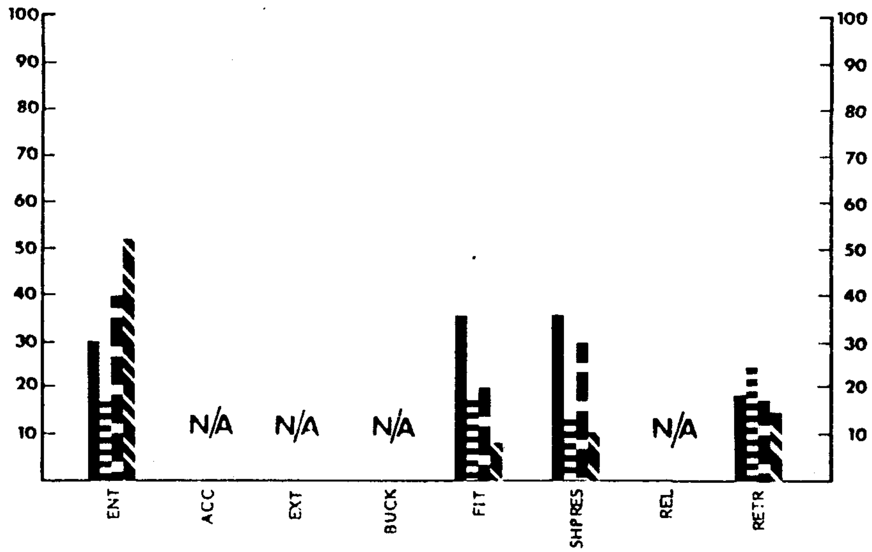
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



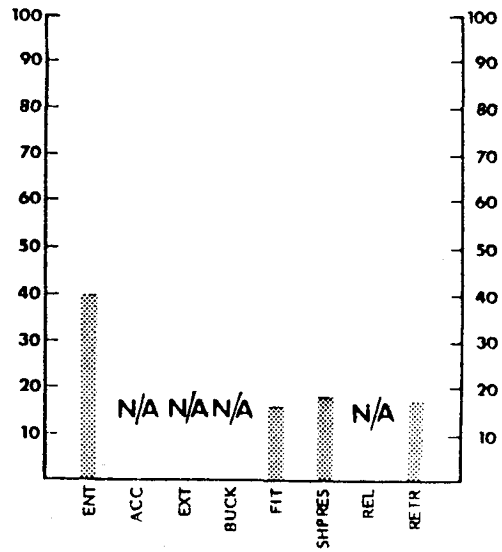
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



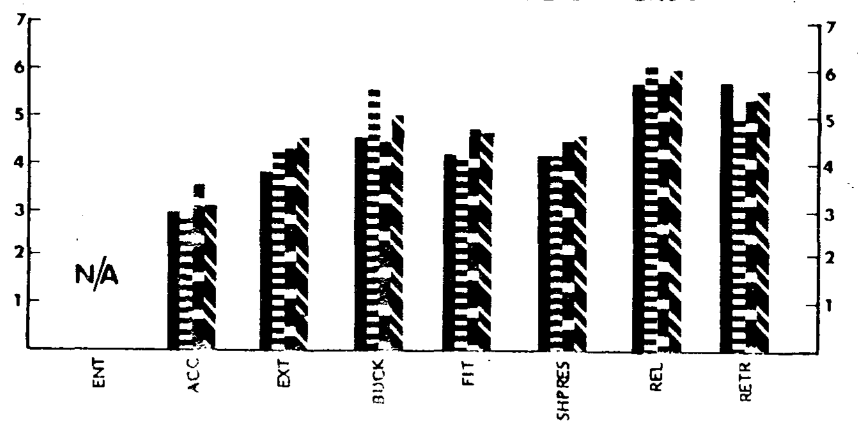
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 11.4 Slack N/A
Not Fully Retracted 14.0

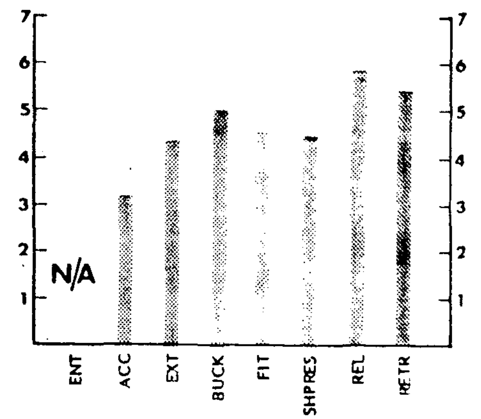
BMW 320i

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	

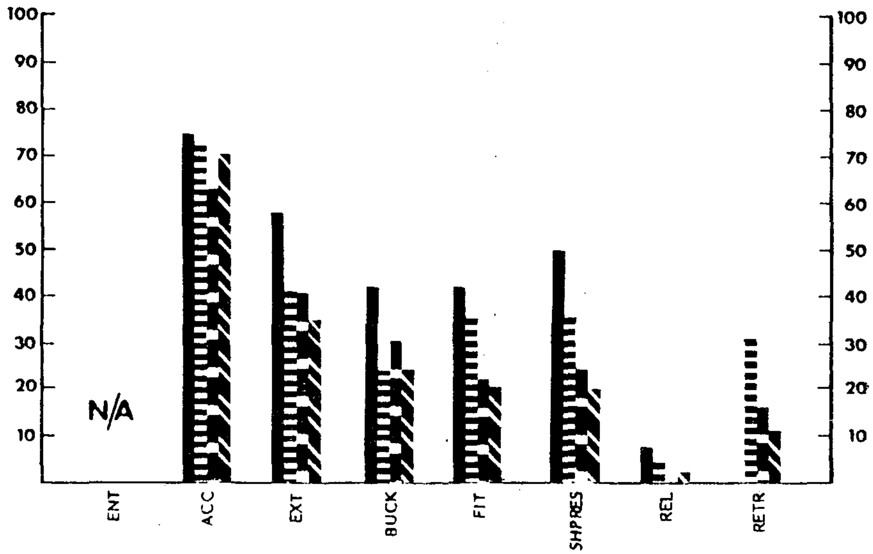
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



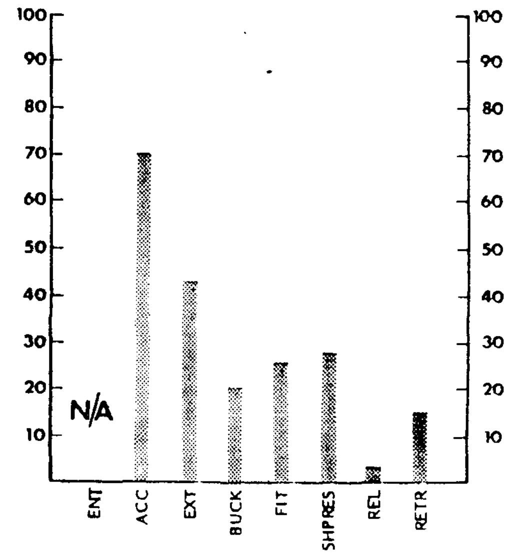
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



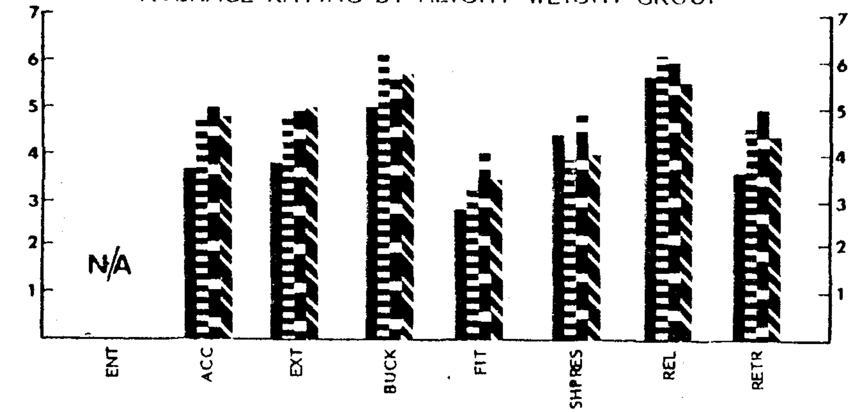
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 10.4 Slack N/A
Not Fully Retracted 85.2

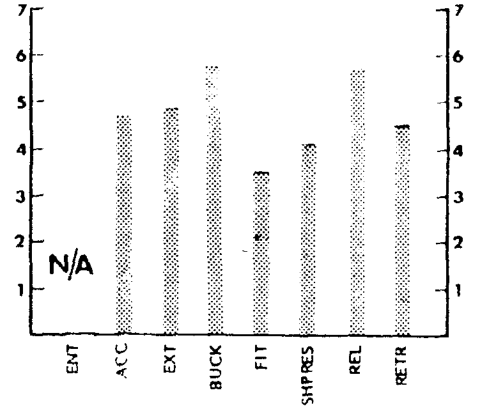
BUICK (GMC) REGAL

SIZE:	FULL SIZE	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	YES, AUTOMATIC RELEASE
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	YES

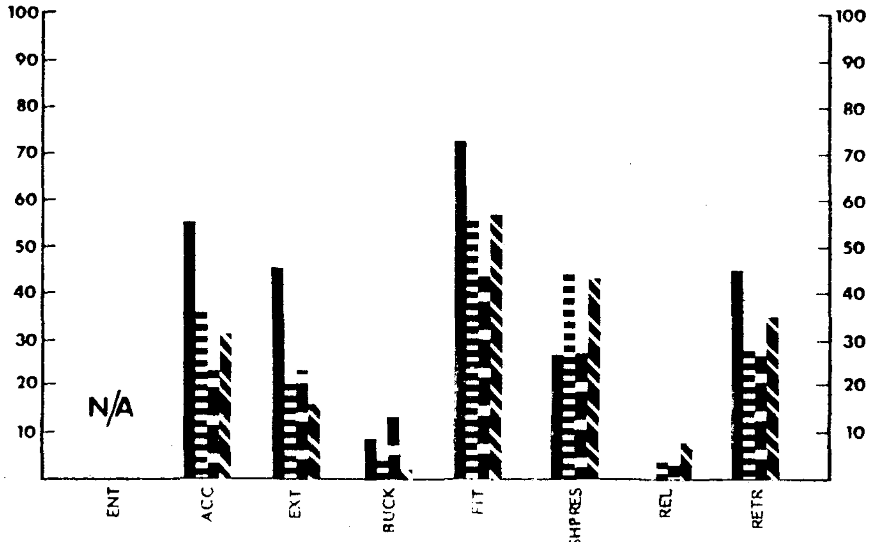
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



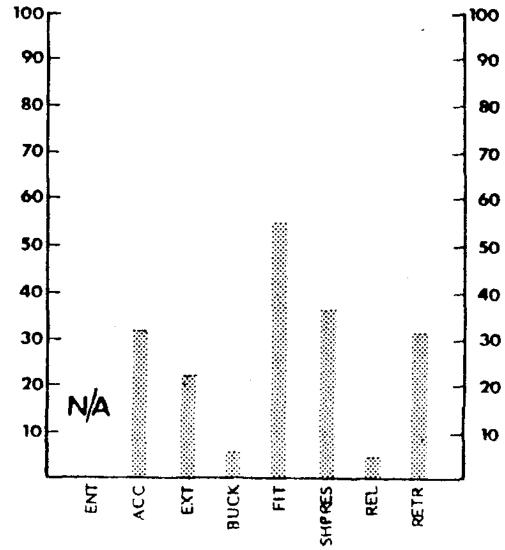
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



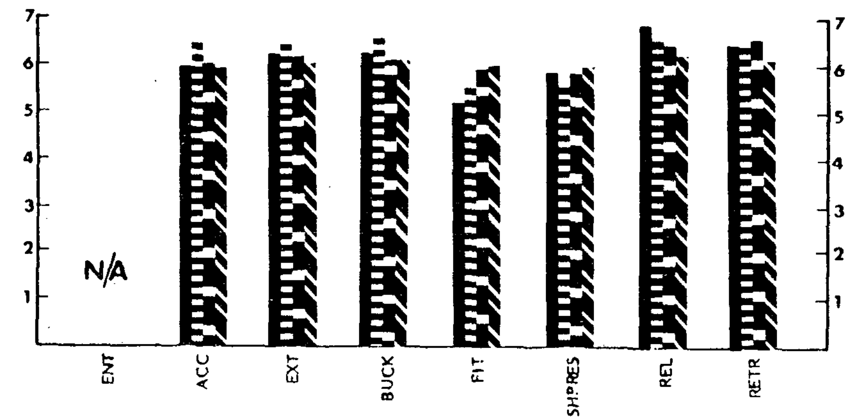
KEY
- Short/Overweight
- Short/Not Overweight
- Average/Overweight
- Average/Not Overweight

PERCENT Twisted 15.9 Slack 11.6
Not Fully Retracted 33.3

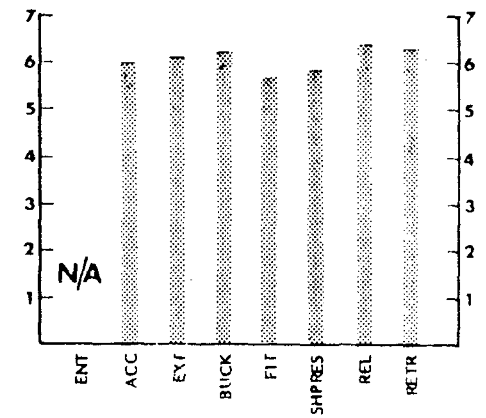
CADILLAC (GMC) SEDAN DEVILLE

SIZE:	FULL SIZE	SAFETY BELT TYPE:	MANUAL, DUAL RETRACTOR
DOORS:	4	WINDOW SHADE DEVICE:	YES, AUTOMATIC RELEASE
SEAT:	SPLIT BENCH	LATCHPLATE LOCKING DEVICE:	

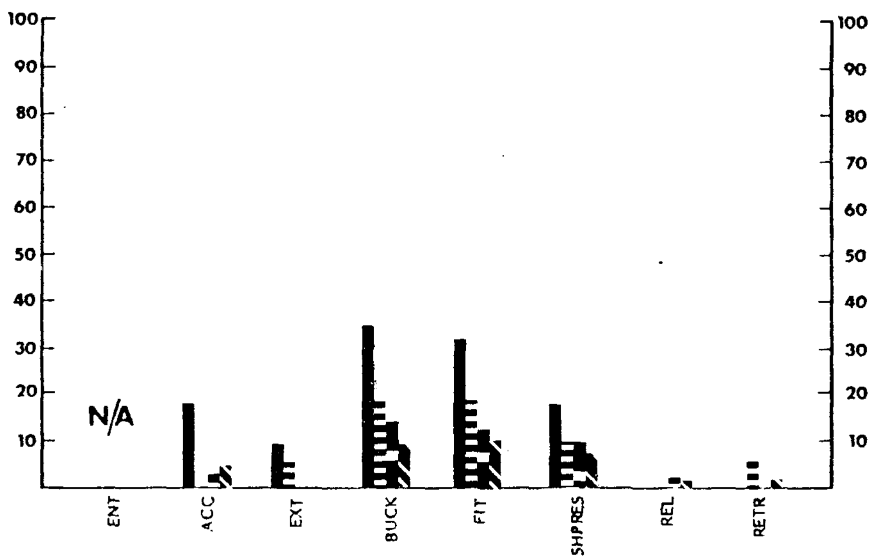
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



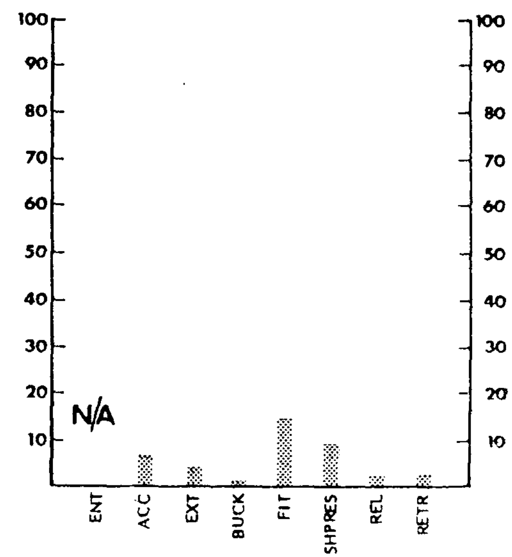
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY
- Short/Overweight
- Short/Not Overweight
- Average/Overweight
- Average/Not Overweight

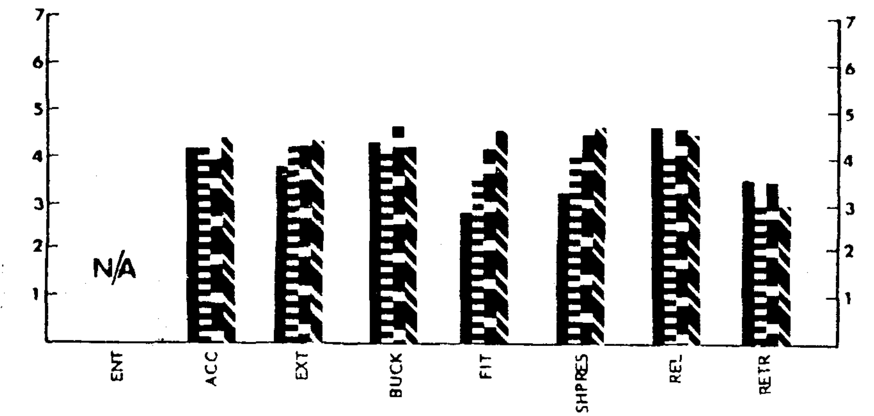
PERCENT Twisted 2.6 Slack 32.1
Not Fully Retracted 92.2

CHEVROLET (GMC) CAMARO

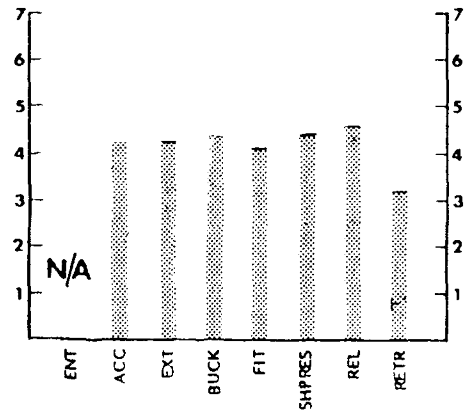
SIZE: SUBCOMPACT
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: YES
LATCHPLATE LOCKING DEVICE:

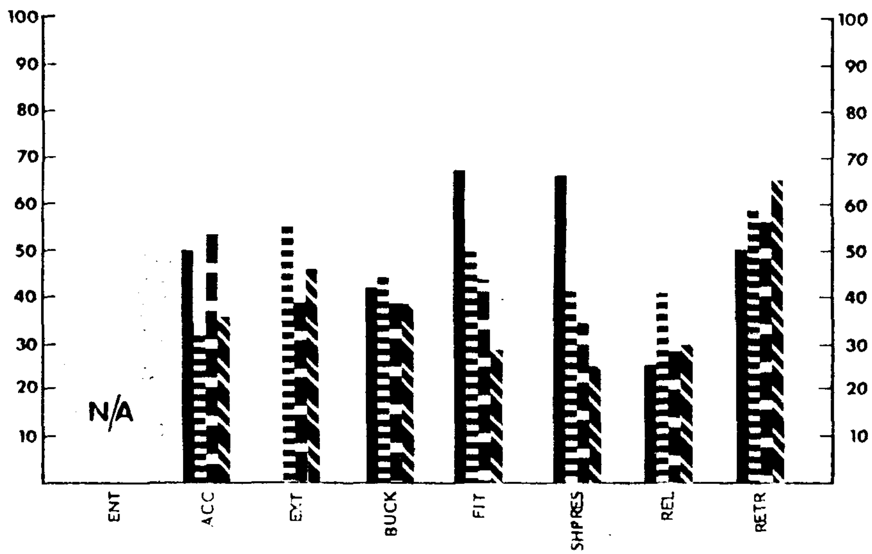
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



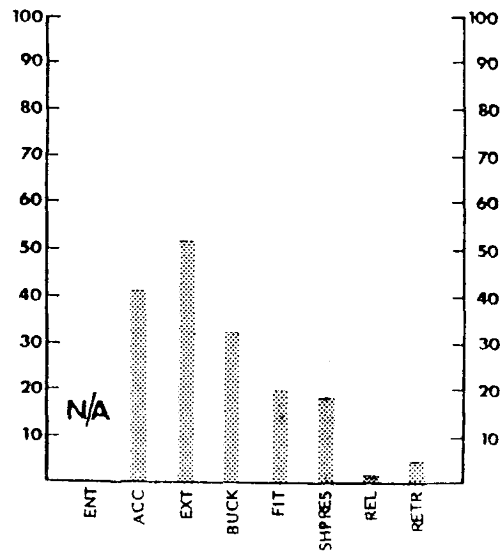
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



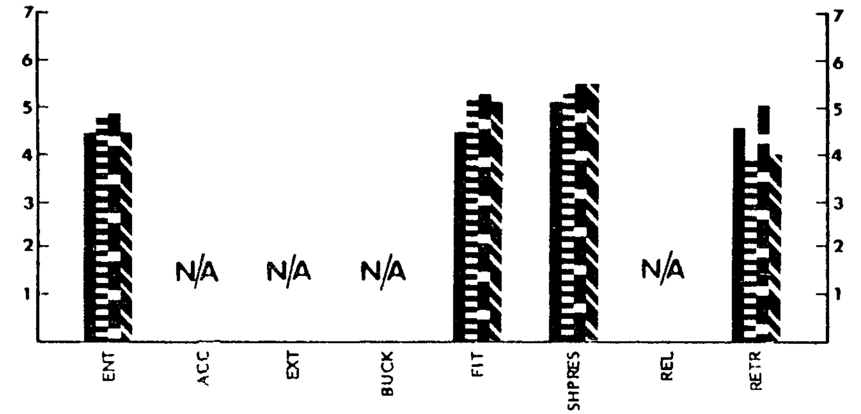
KEY
- Short/Overweight
- Short/Not Overweight
- Average/Overweight
- Average/Not Overweight

PERCENT Twisted 15.8 Slack 52.6
Not Fully Retracted 41.4

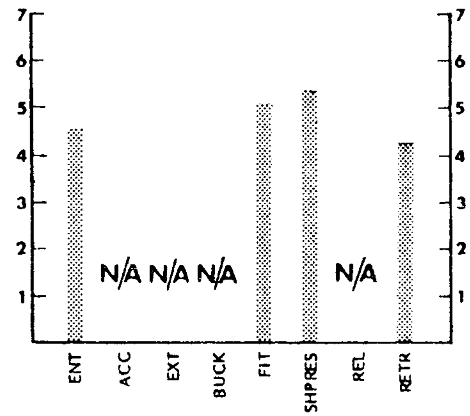
CHEVROLET (GMC) CHEVETTE

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	AUTOMATIC, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	YES, AUTOMATIC RELEASE
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	N/A

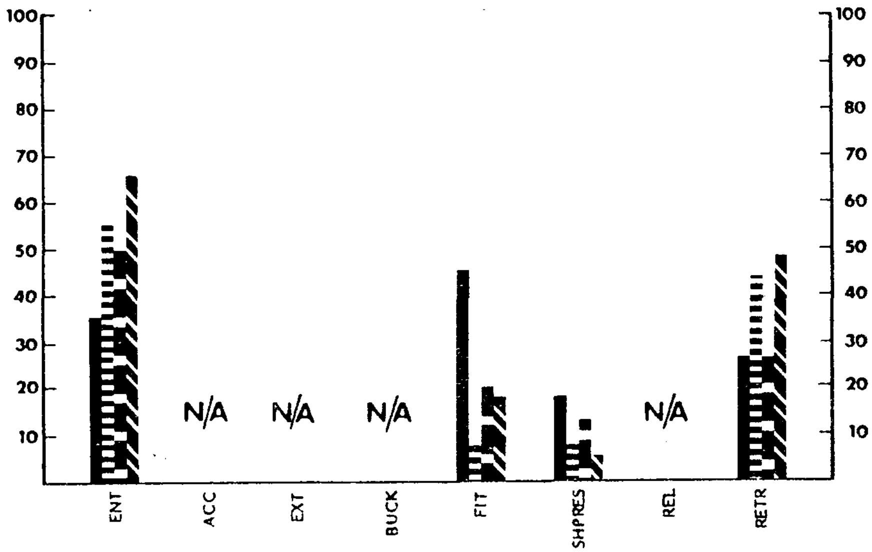
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



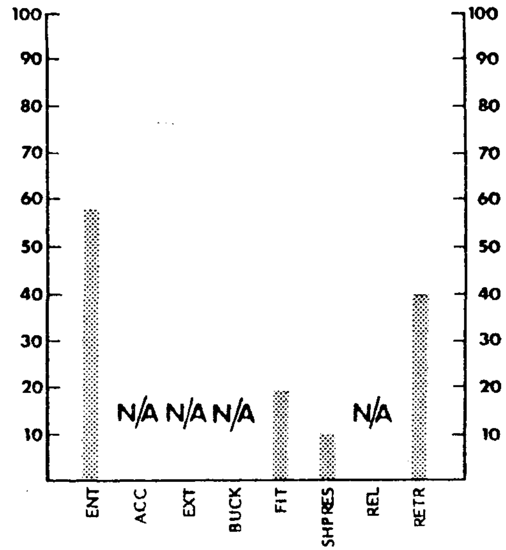
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



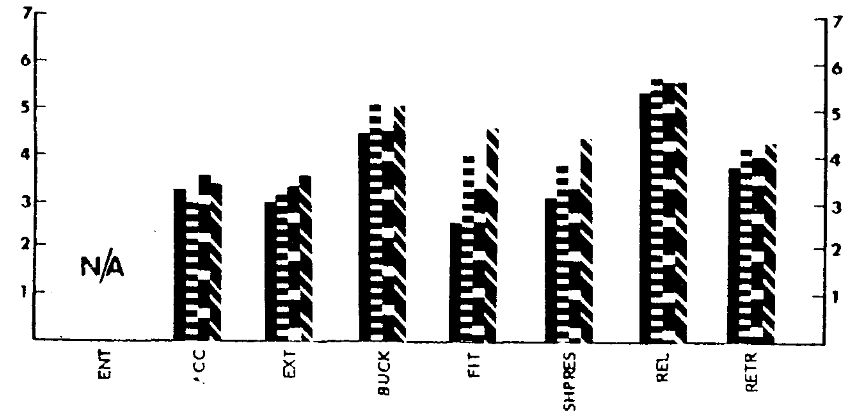
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 19.5 Slack N/A
Not Fully Retracted 46.9

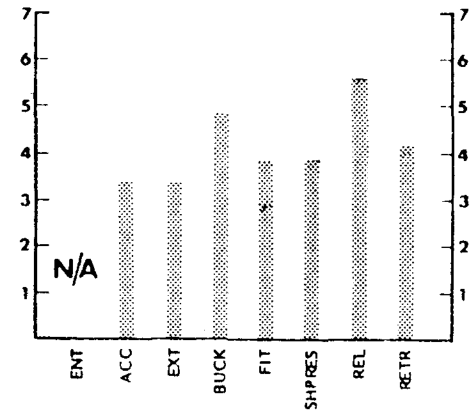
CHEVROLET (GMC) CHEVETTE

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	YES, AUTOMATIC RELEASE
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	YES

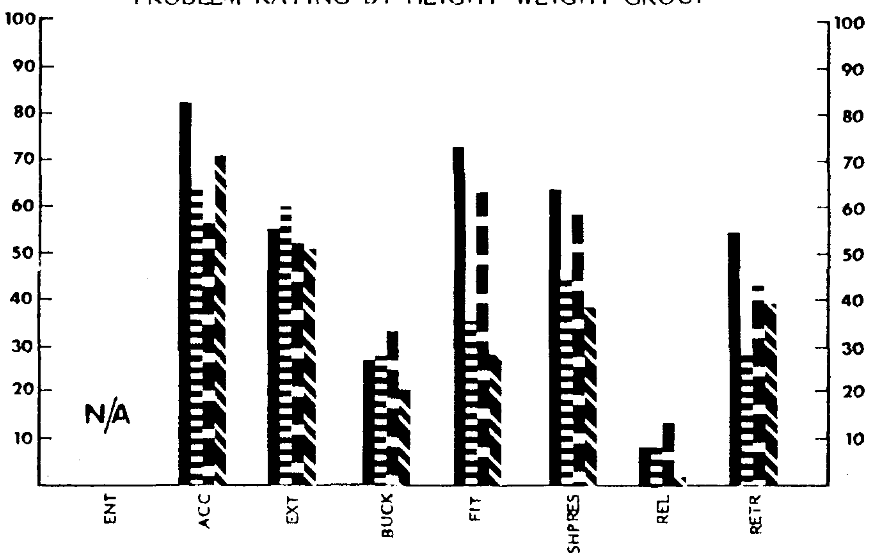
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



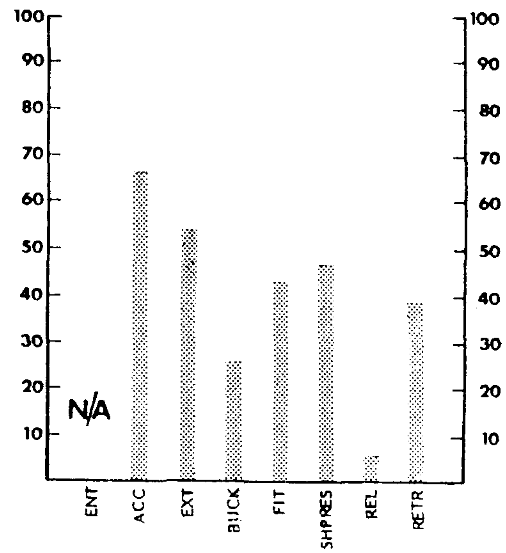
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY
- Short/Overweight
- Short/Not Overweight
- Average/Overweight
- Average/Not Overweight

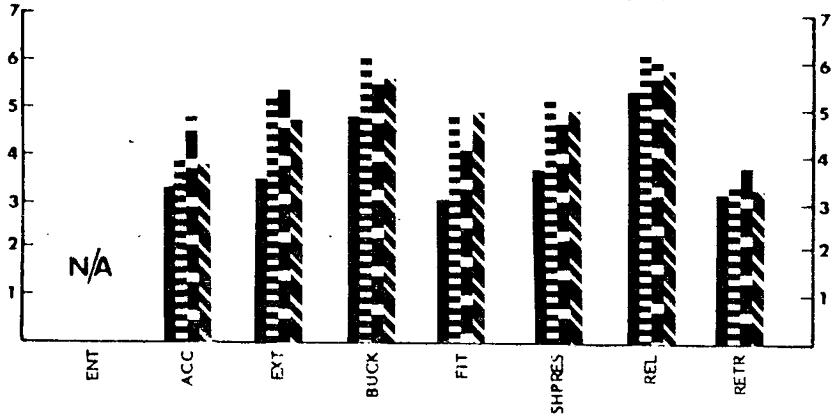
PERCENT Twisted 19.5 Slack 10.2
Not Fully Retracted 49.1

CHEVROLET (GMC) CITATION

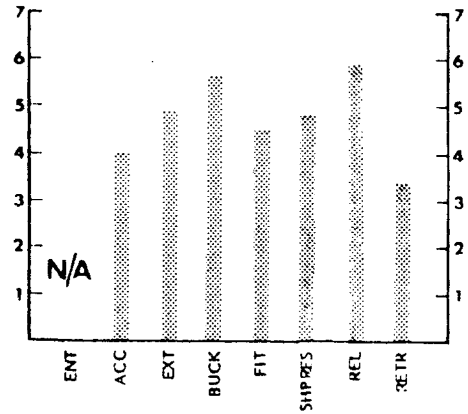
SIZE: COMPACT
DOORS: 2
SEAT: BENCH

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: YES, AUTOMATIC RELEASE
LATCHPLATE LOCKING DEVICE: YES

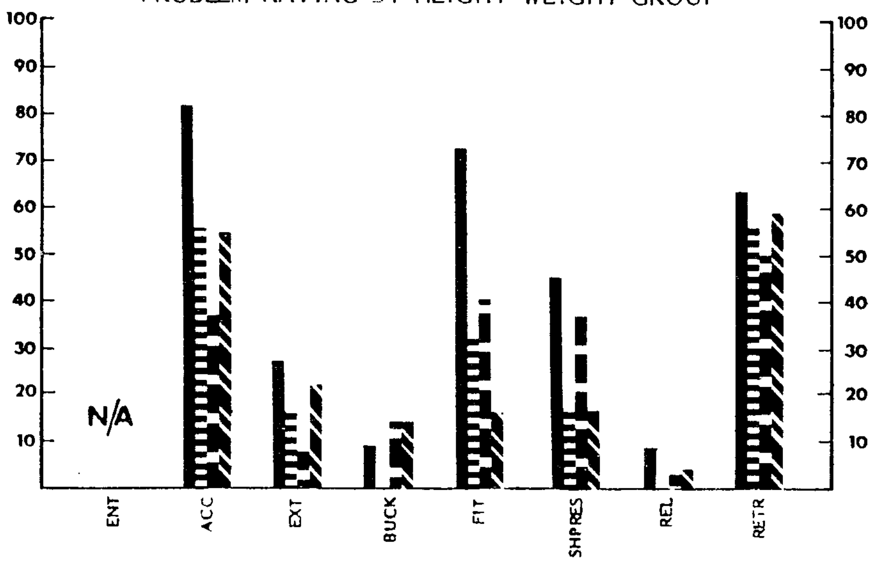
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



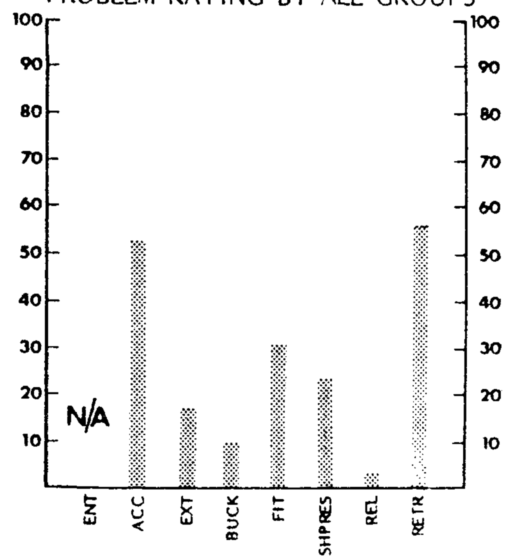
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

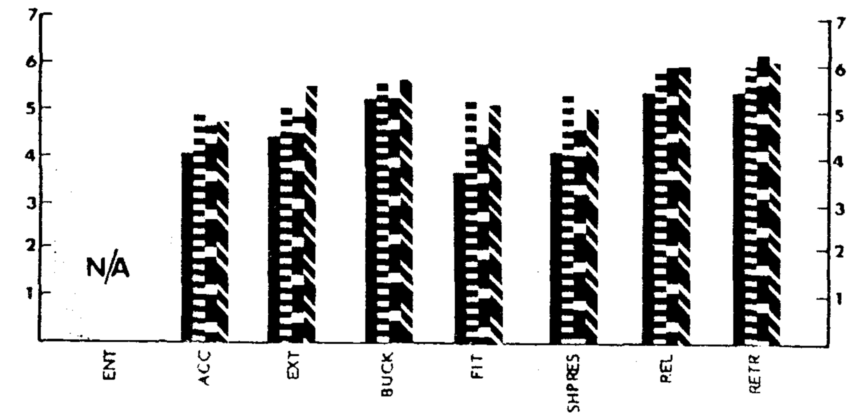
PERCENT Twisted 2.6 Slack 11.7 Not Fully Retracted 63.5

CHEVROLET (GMC) PICKUP

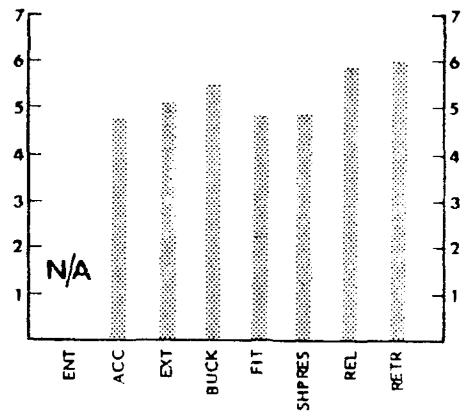
SIZE: TRUCK
DOORS: 2
SEAT: BENCH

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE: NO

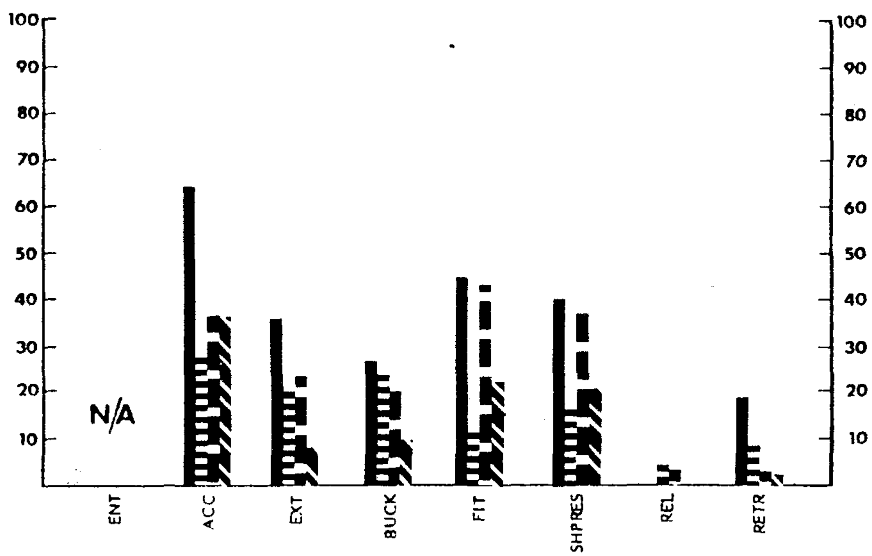
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



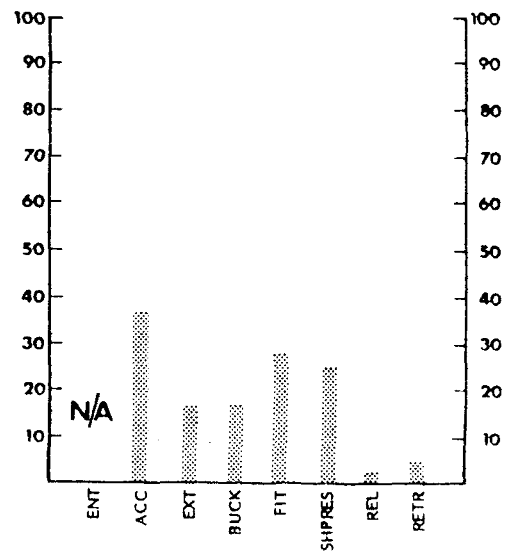
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

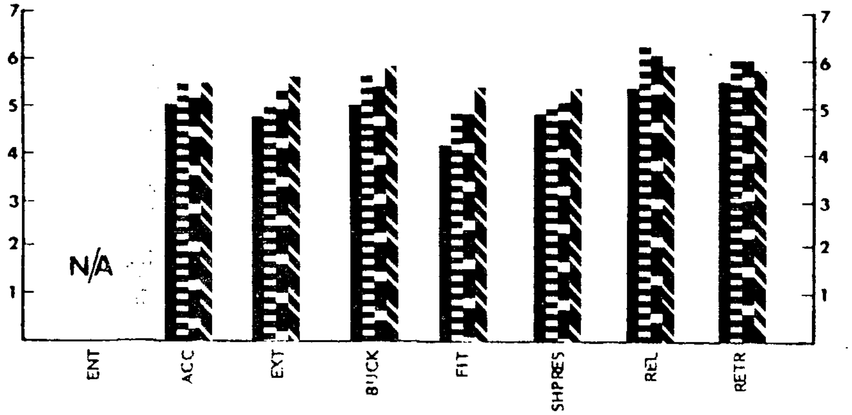
PERCENT Twisted 6.3 Slack N/A
Not Fully Retracted 10.5

CHEVROLET (GMC) VAN

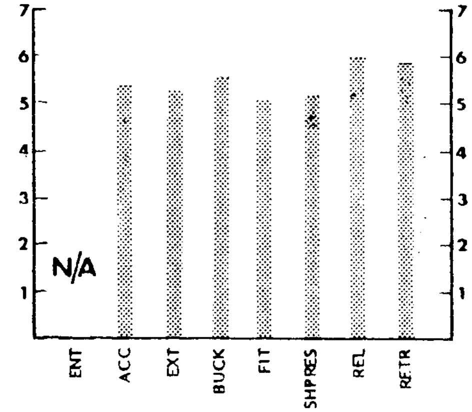
SIZE: VAN
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE: NO

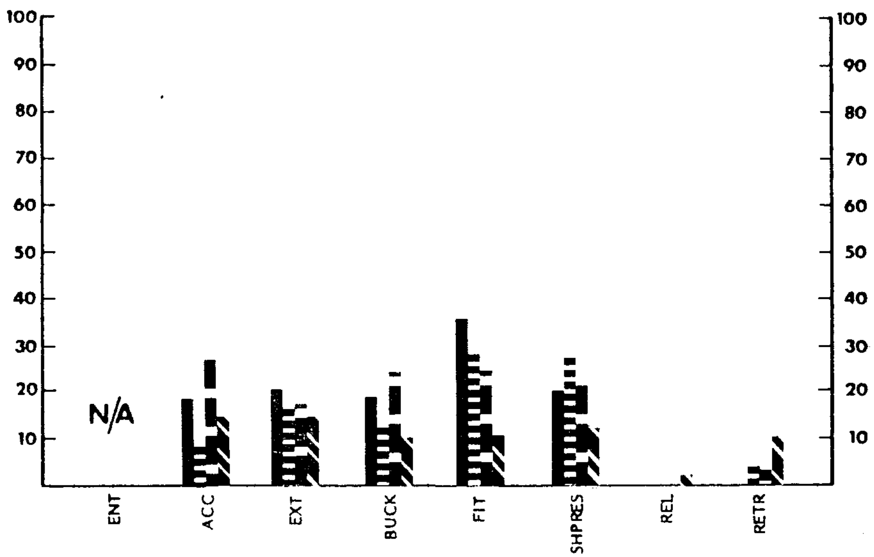
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



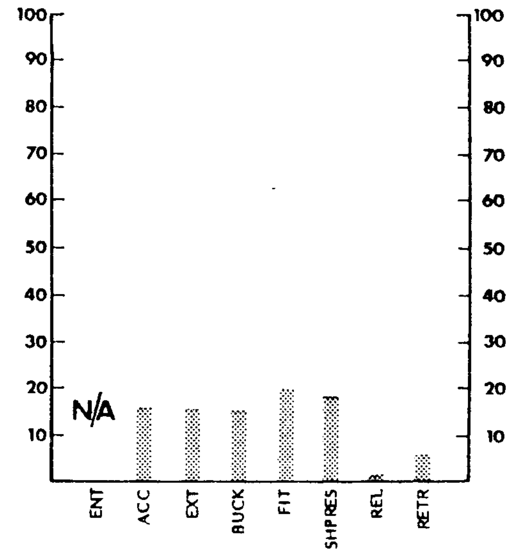
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



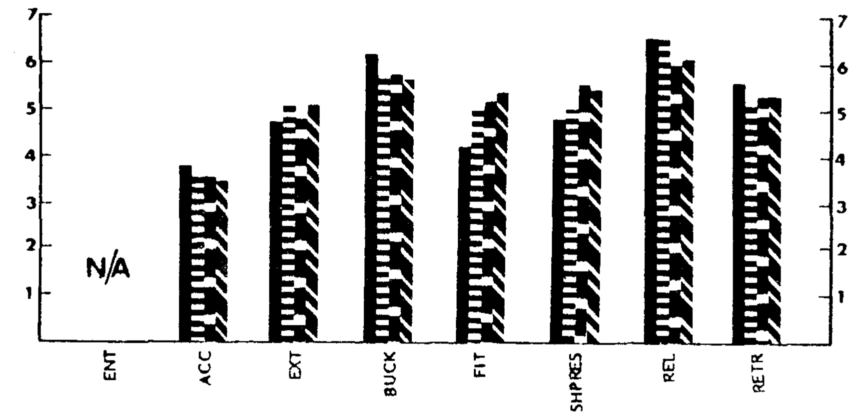
KEY
Short/Overweight
Short/Not Overweight
Average/Overweight
Average/Not Overweight

PERCENT Twisted 6.1 Slack N/A
Not Fully Retracted 22.6

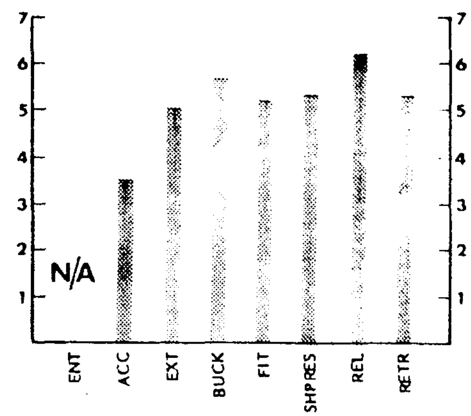
CHRYSLER CHAMP

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	

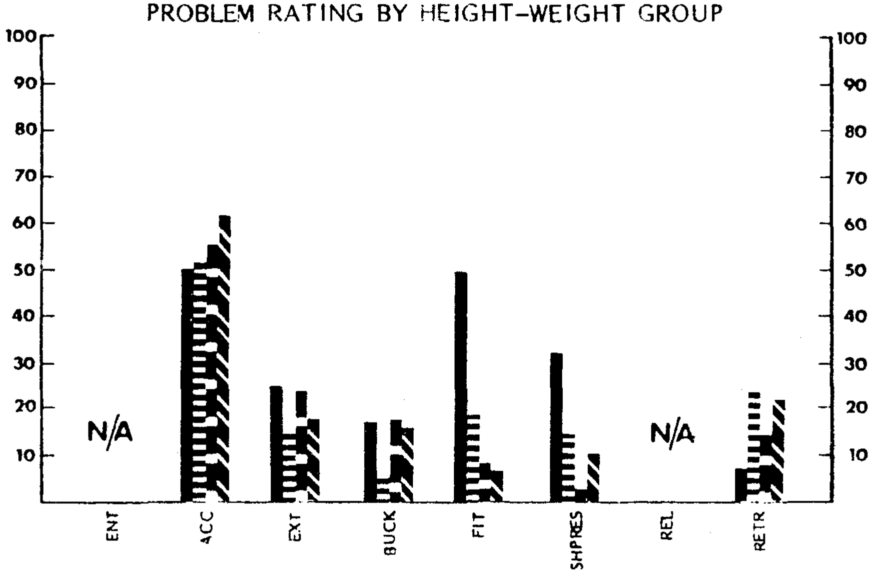
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



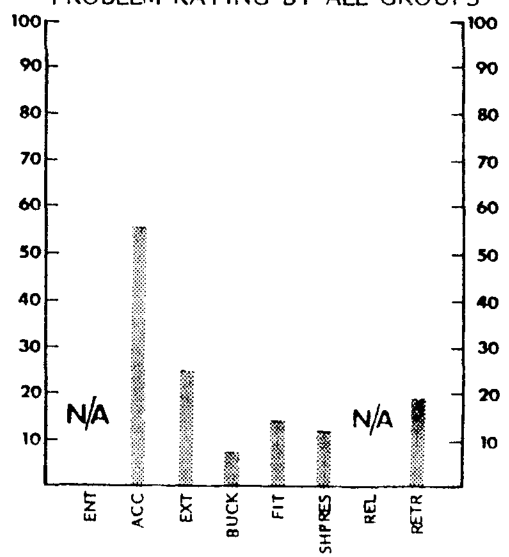
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

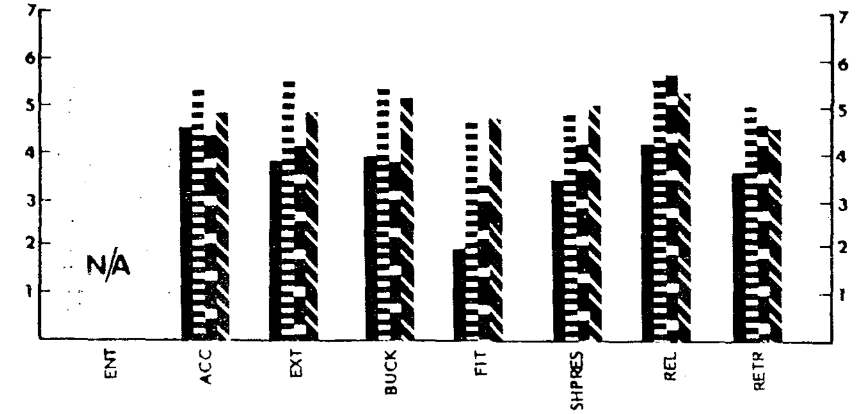
PERCENT Twisted 14.2 Slack N/A
Not Fully Retracted 87.2

CHRYSLER CORDOBA

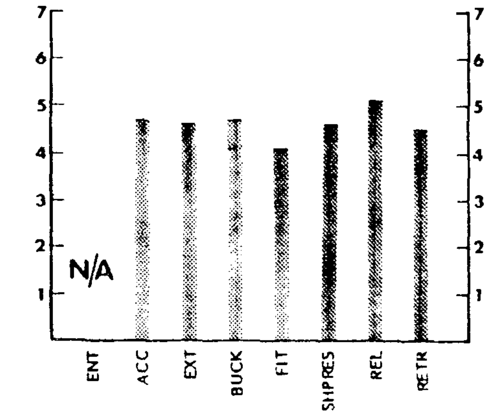
SIZE: FULL SIZE
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: YES, AUTOMATIC RELEASE
LATCHPLATE LOCKING DEVICE: YES

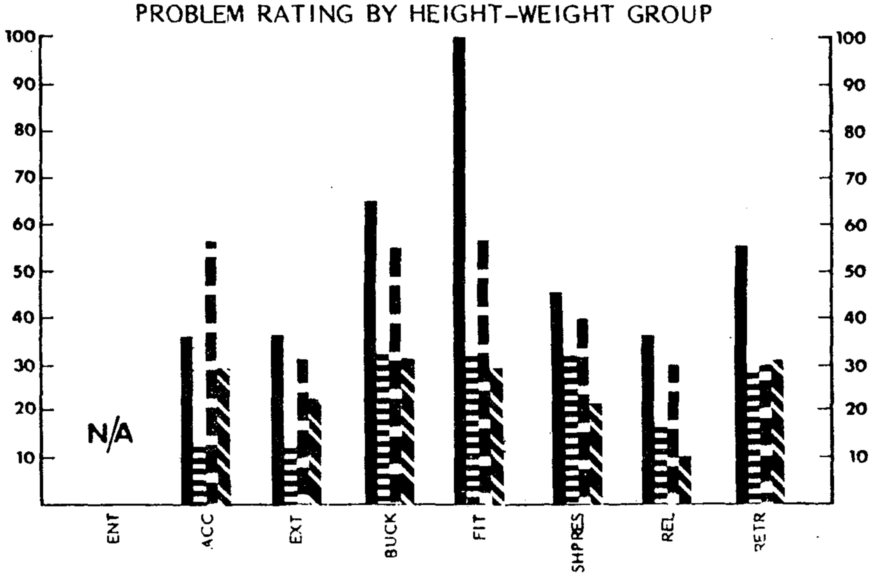
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



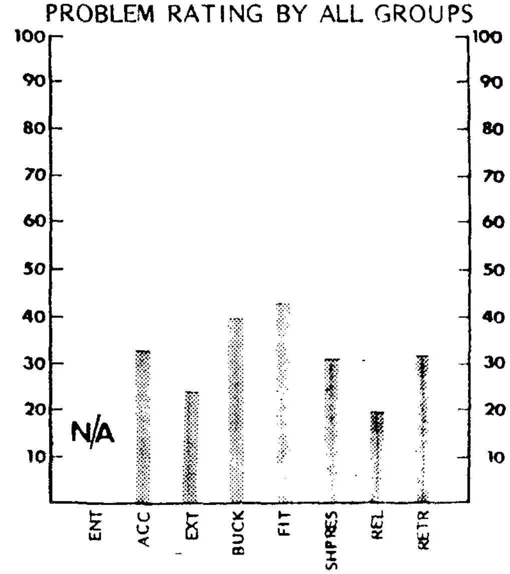
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



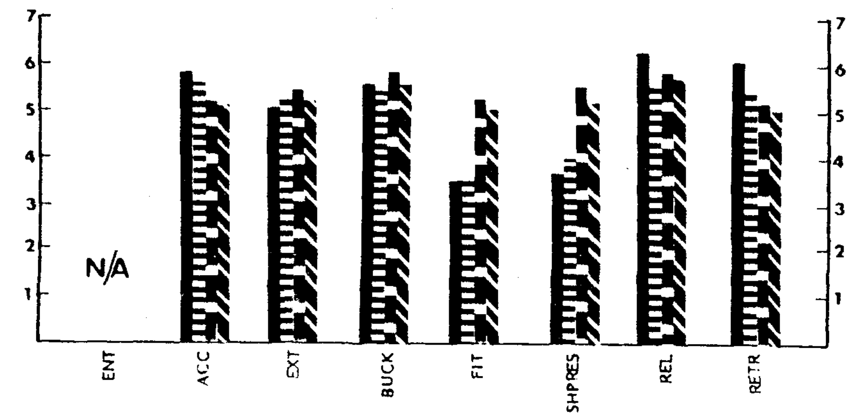
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 14.8 Slack 10.0
Not Fully Retracted 39.8

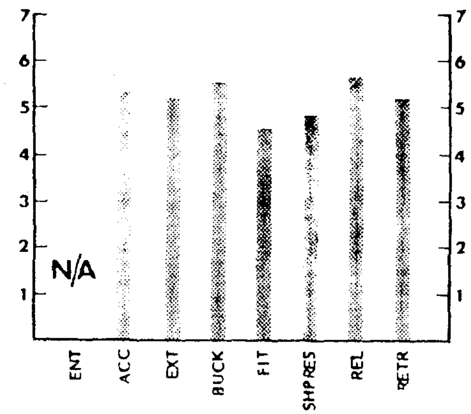
CHRYSLER LEBARON

SIZE:	MIDSIZE	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	4	WINDOW SHADE DEVICE:	YES, AUTOMATIC RELEASE
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	

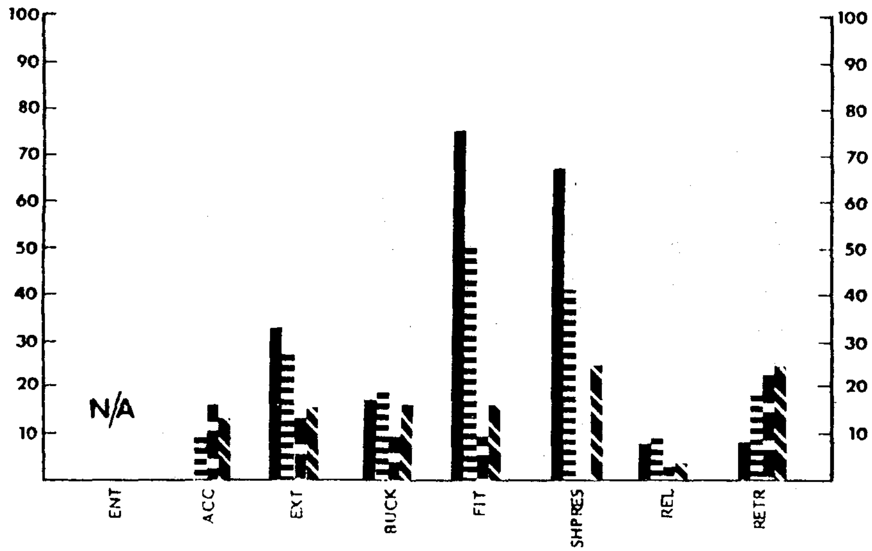
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



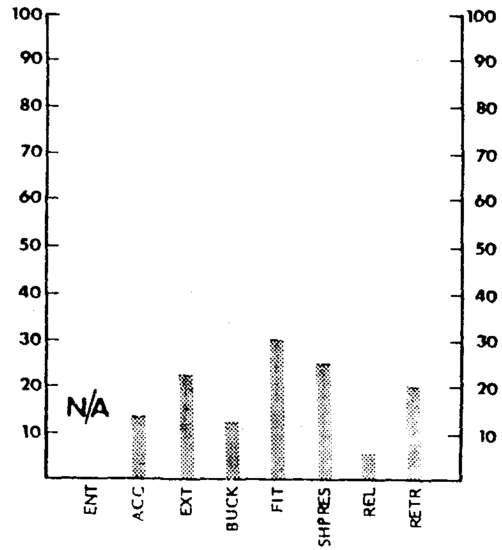
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



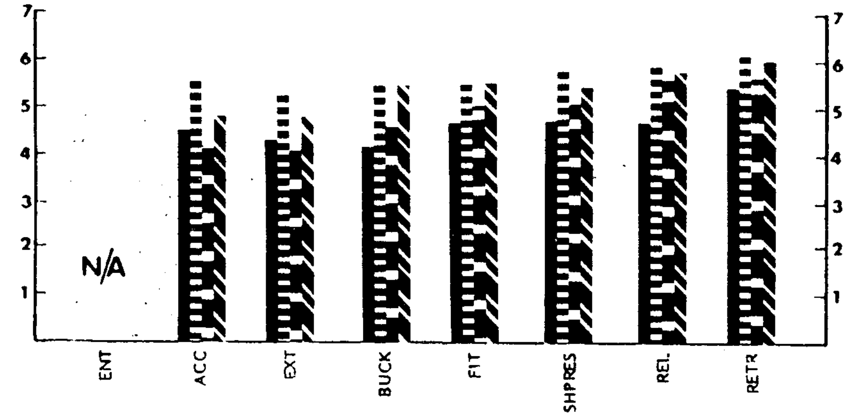
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 6.9 Slack 19.6
Not Fully Retracted 75.9

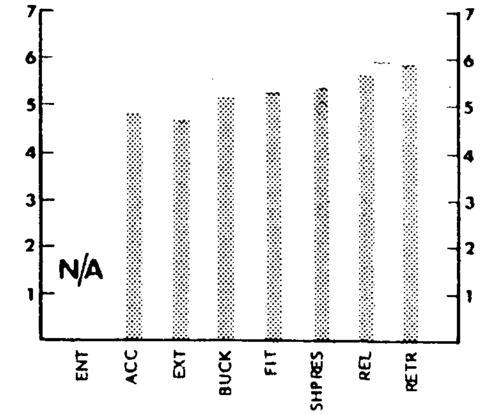
DATSUN PICKUP

SIZE:	TRUCK	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BENCH	LATCHPLATE LOCKING DEVICE:	YES

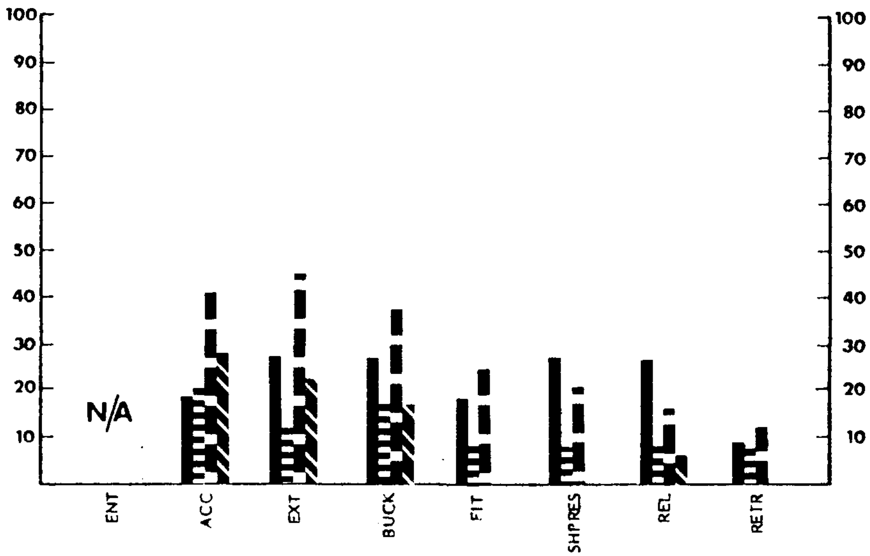
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



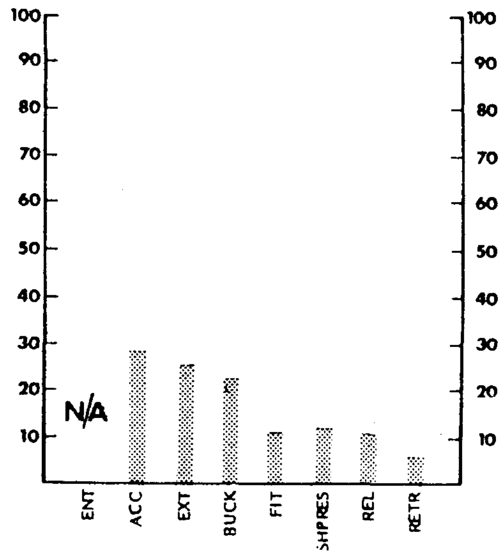
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

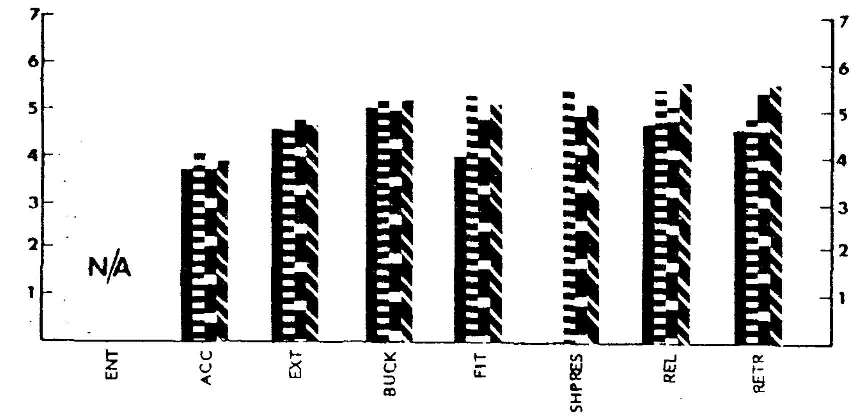
PERCENT Twisted 10.1 Slack N/A
Not Fully Retracted 21.1

DATSUN 210

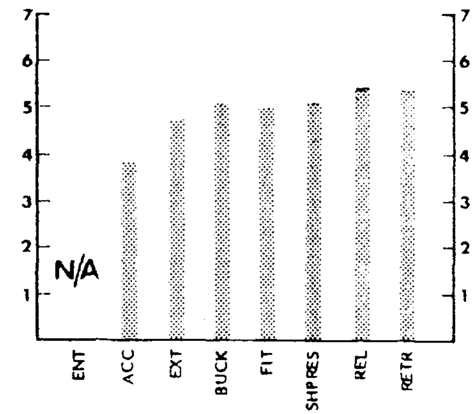
SIZE: SUBCOMPACT
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE: NO

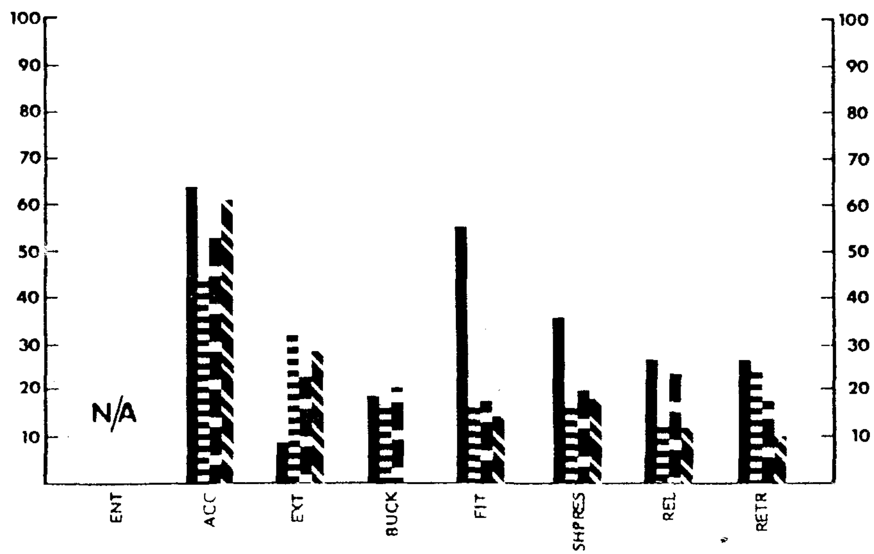
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



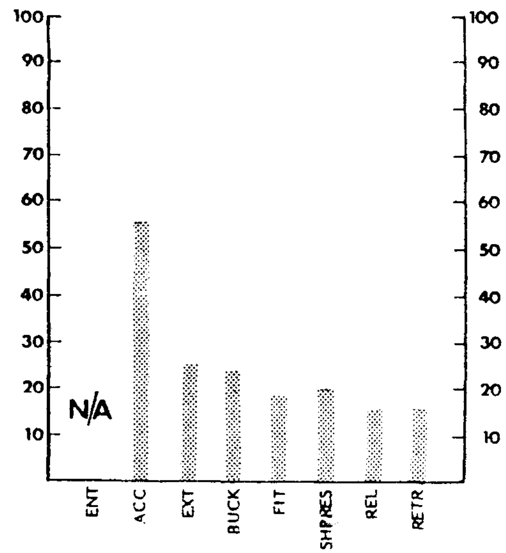
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY
- Short/Overweight
- Short/Not Overweight
- Average/Overweight
- Average/Not Overweight

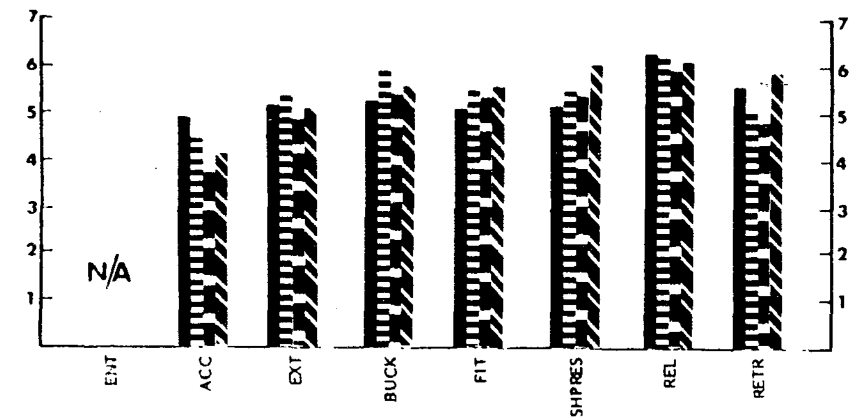
PERCENT Twisted 15.9 Slack N/A
Not Fully Retracted 32.1

DATSUN 280ZX

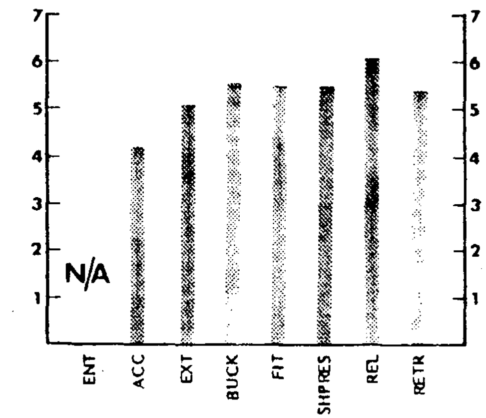
SIZE: TWO-SEATER
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE:

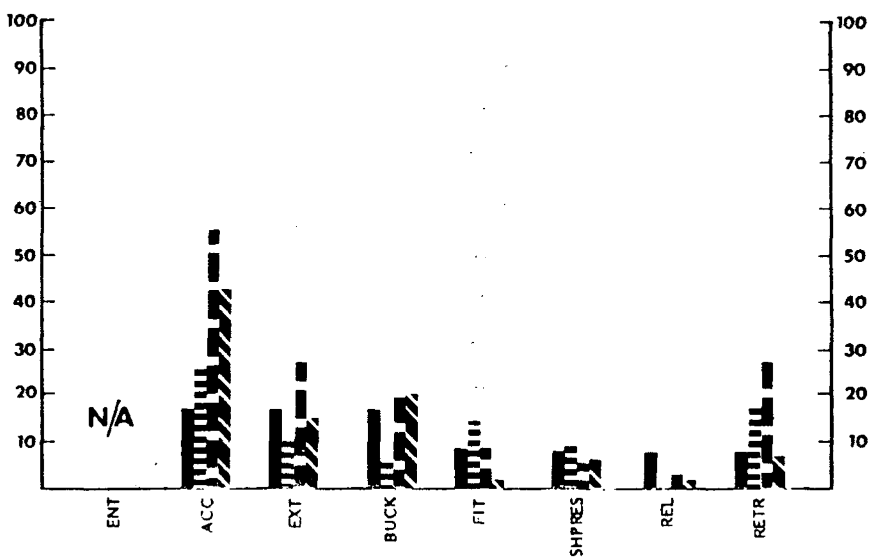
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



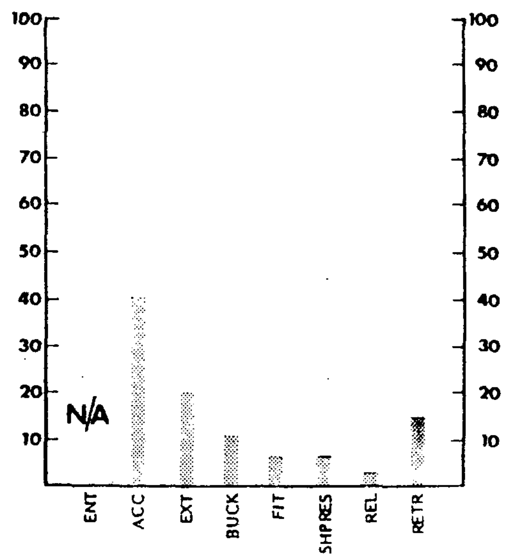
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



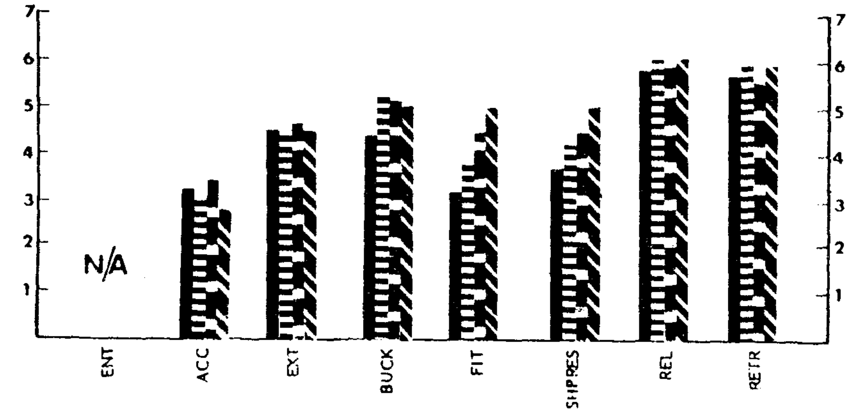
KEY
- Short/Overweight
- Short/Not Overweight
- Average/Overweight
- Average/Not Overweight

PERCENT
Twisted 17.4
Not Fully Retracted 82.3

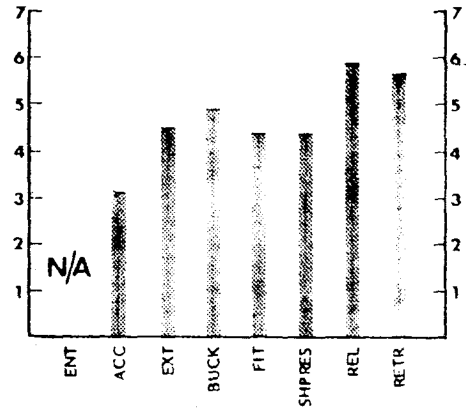
DATSUN 310

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	

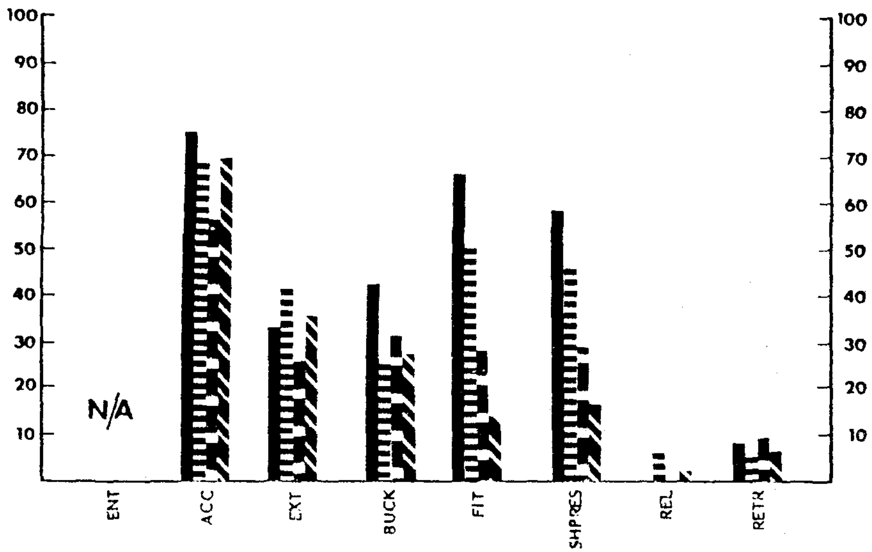
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



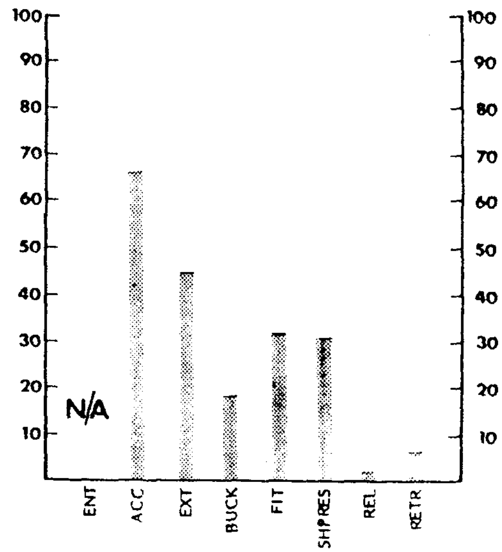
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



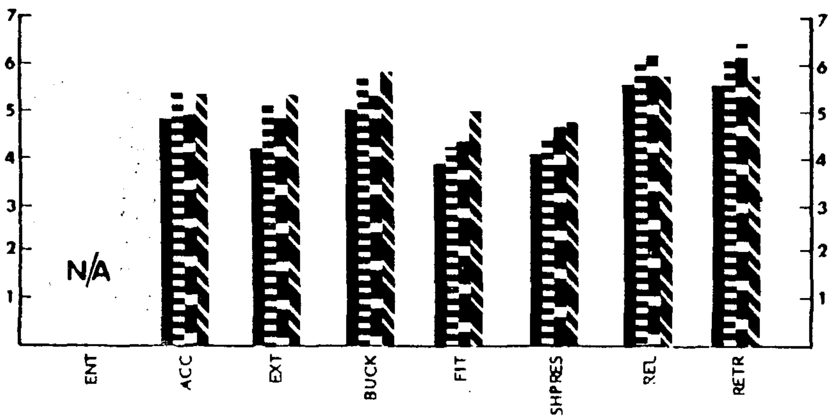
KEY Short/Overweight — Short/Not Overweight — Average/Overweight — Average/Not Overweight

PERCENT Twisted 18.8 Slack N/A
Not Fully Retracted 89.7

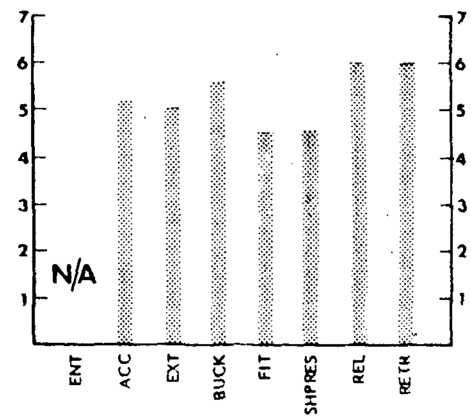
DODGE (CHRYSLER) ASPEN

SIZE:	COMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	4	WINDOW SHADE DEVICE:	NO
SEAT:	BENCH	LATCHPLATE LOCKING DEVICE:	NO

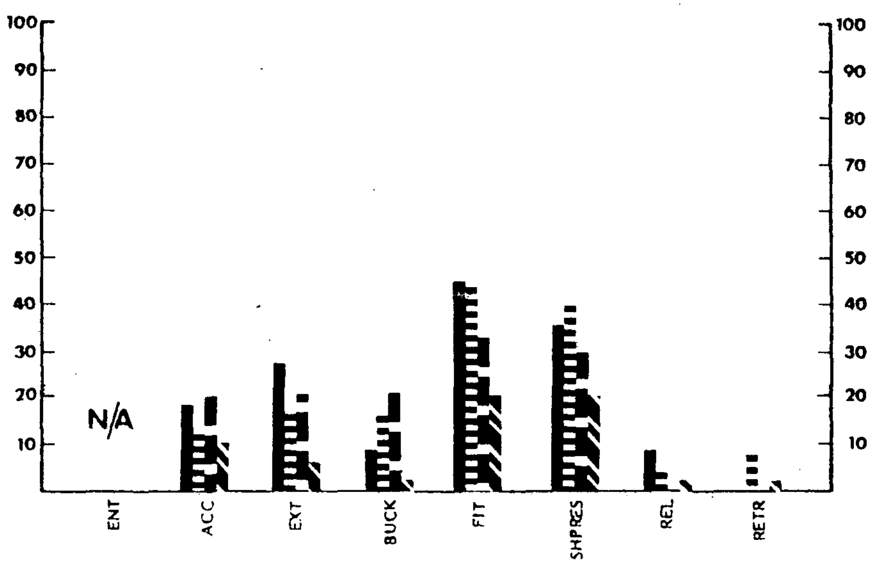
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



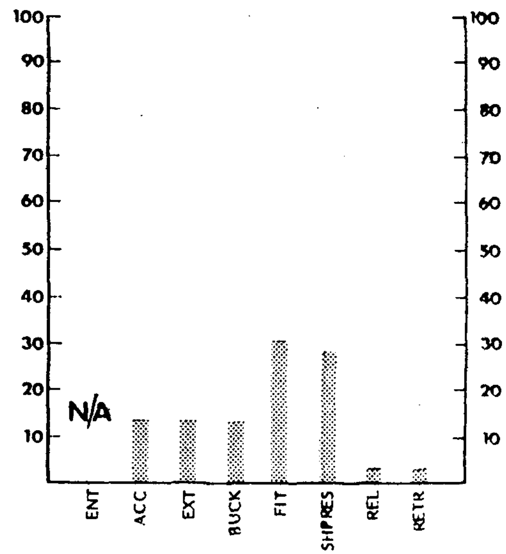
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

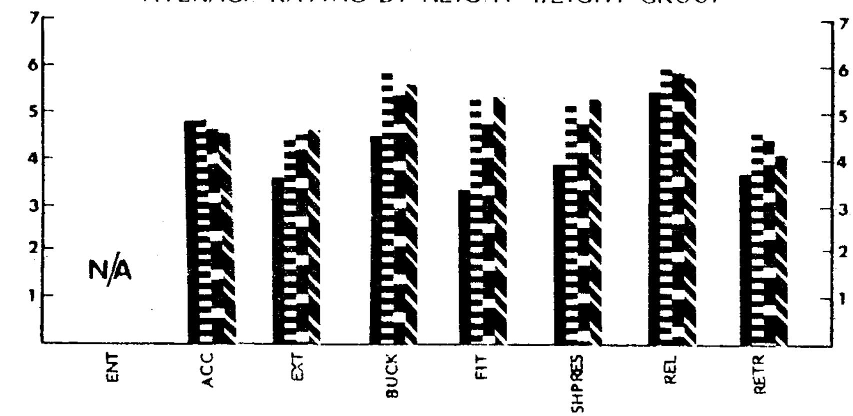
PERCENT Twisted 11.4 Slack N/A
Not Fully Retracted 5.2

DODGE (CHRYSLER) PICKUP

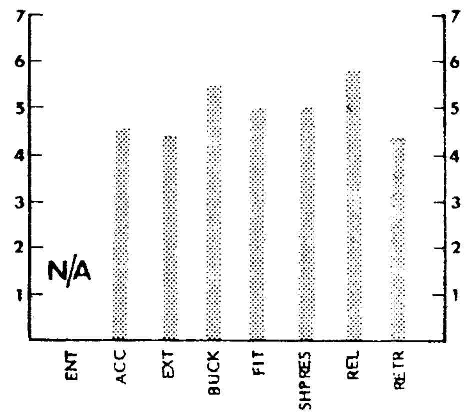
SIZE: TRUCK
DOORS: 2
SEAT: BENCH

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: YES
LATCHPLATE LOCKING DEVICE: YES

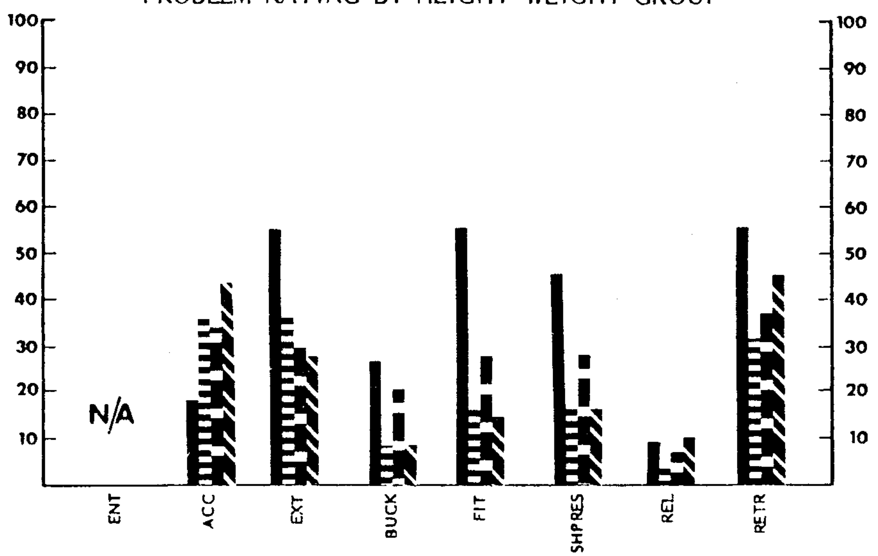
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



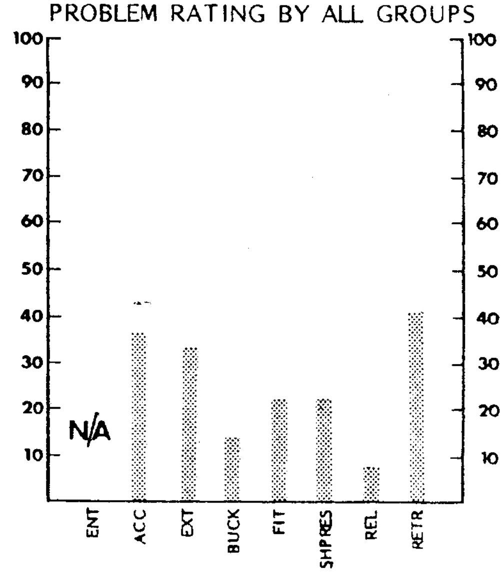
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



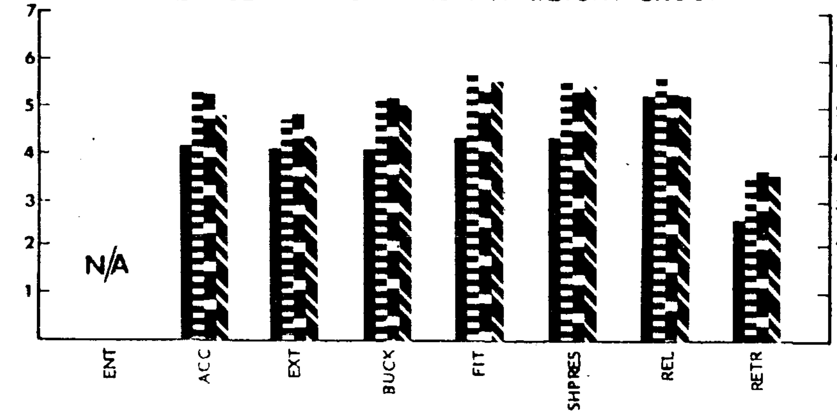
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 12.3 Slack 8.3
Not Fully Retracted 48.7

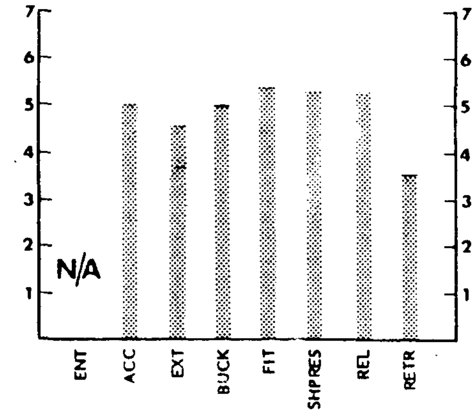
DODGE (CHRYSLER) VAN

SIZE:	VAN	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	YES
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	YES

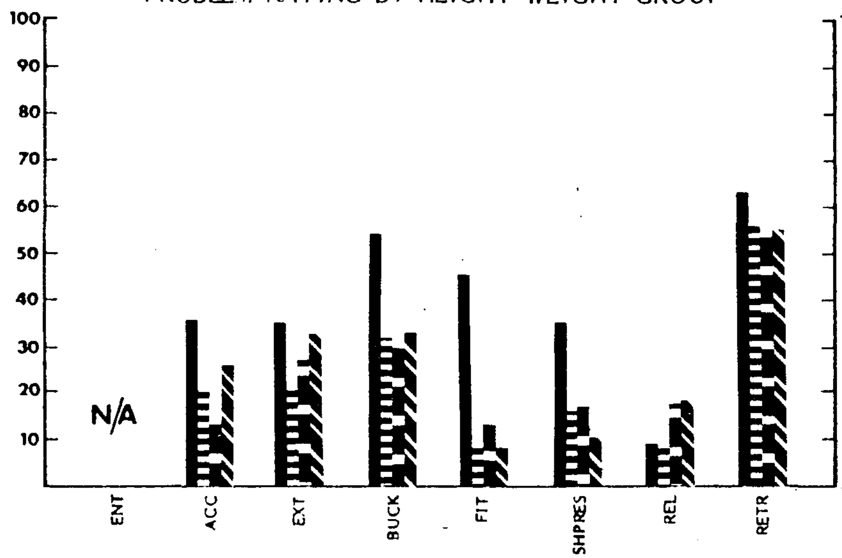
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



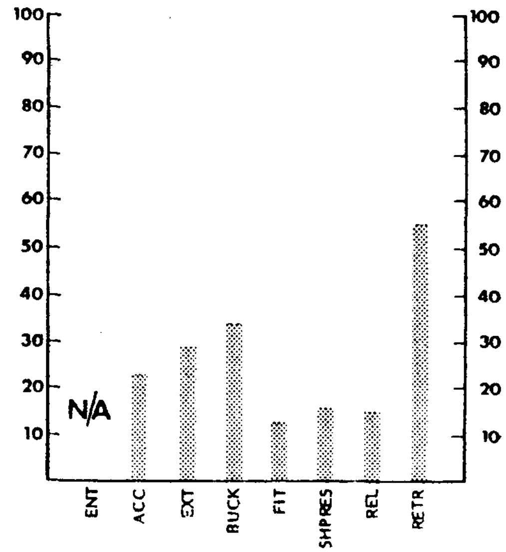
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY
- Short/Overweight
- Short/Not Overweight
- Average/Overweight
- Average/Not Overweight

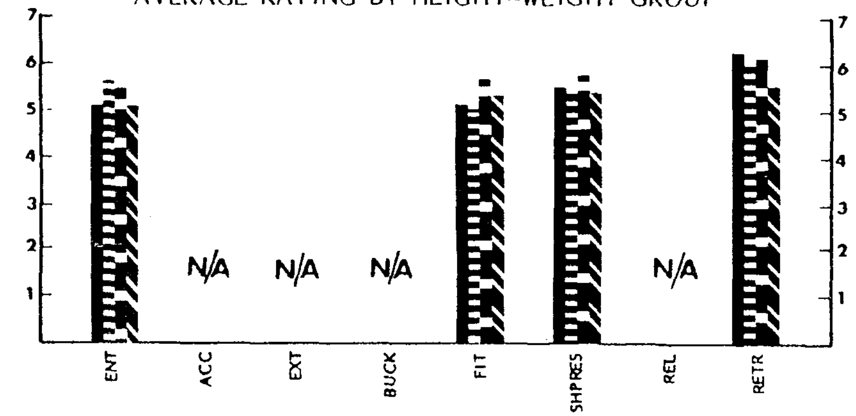
PERCENT Twisted 23.2 Slack 7.1
Not Fully Retracted 65.5

DOT EXPERIMENTAL
AUTOMATIC BELT SYSTEM

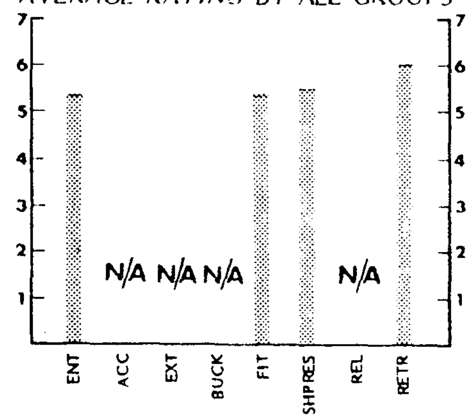
SIZE: SUBCOMPACT
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: AUTOMATIC, CONTINUOUS LOOP
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE: N/A

AVERAGE RATING BY HEIGHT-WEIGHT GROUP

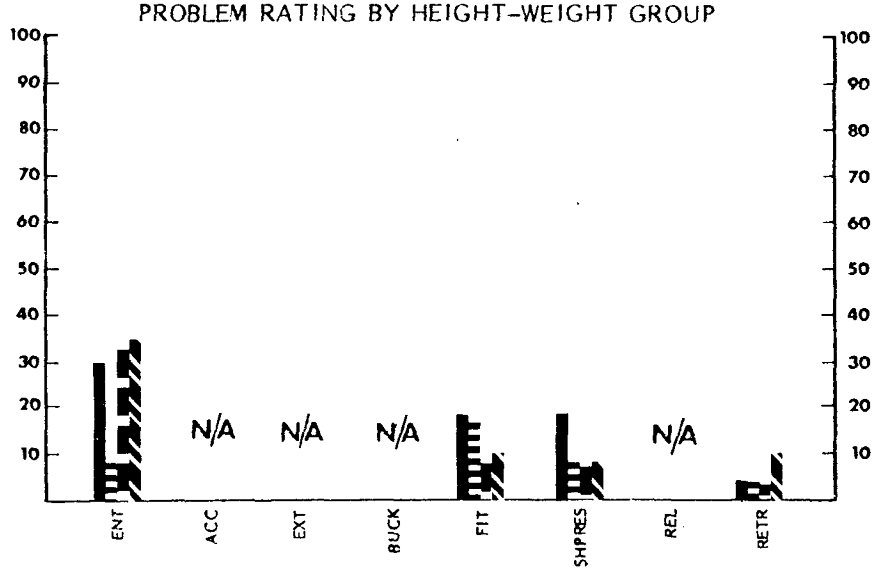


AVERAGE RATING BY ALL GROUPS

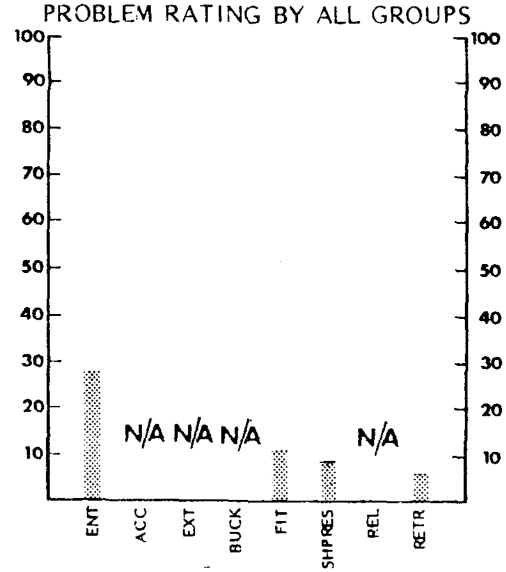


143

PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



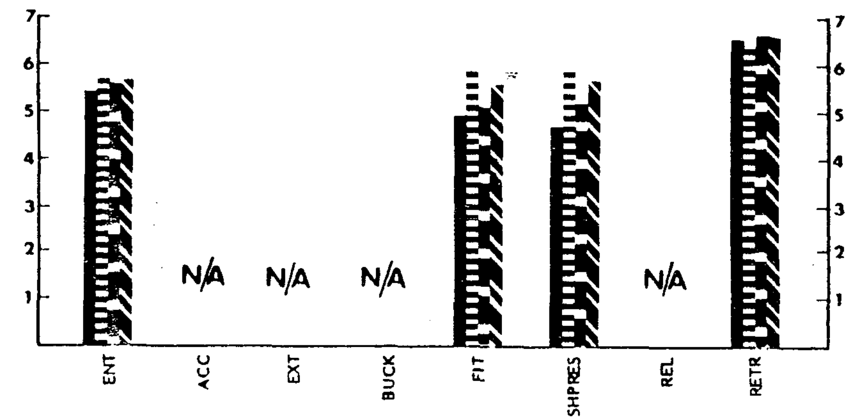
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 8.8 Slack N/A
Not Fully Retracted 8.7

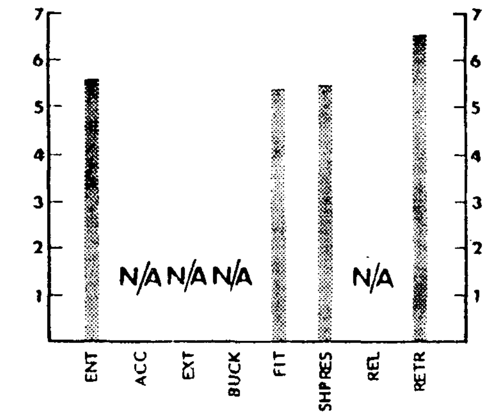
DOT EXPERIMENTAL
MOTORIZED BELT SYSTEM

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	MOTORIZED, SINGLE RETRACTOR
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	N/A

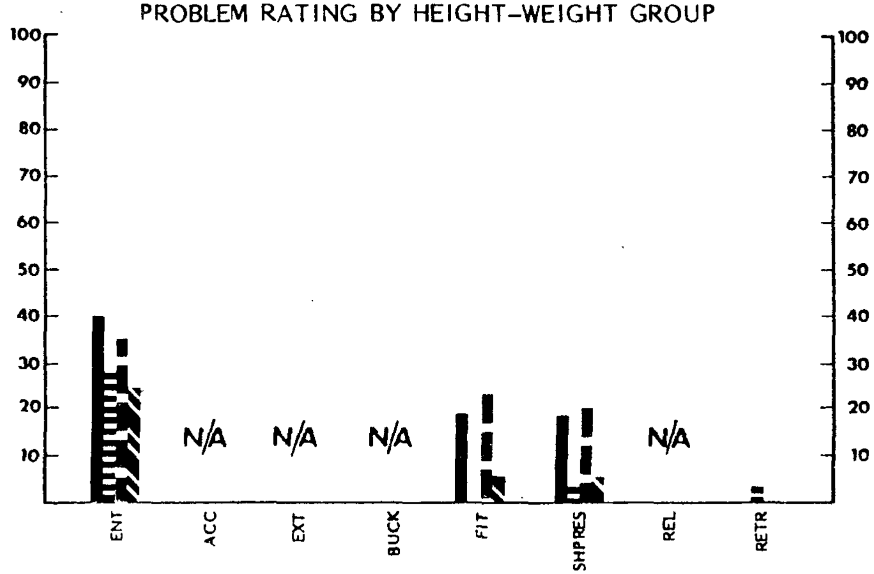
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



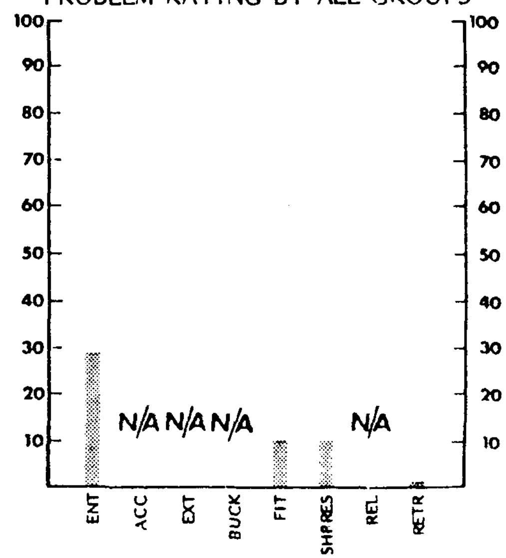
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



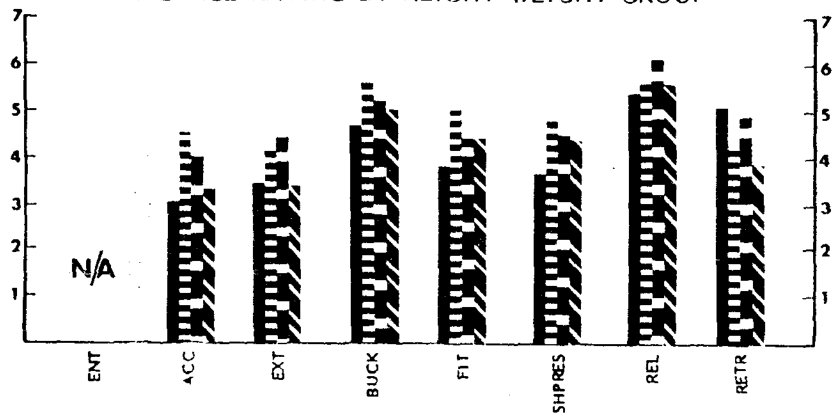
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 10.4 Slack N/A
Not Fully Retracted 4.4

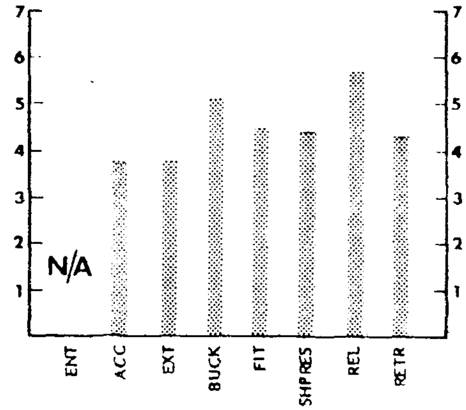
FIAT STRADA

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	NO

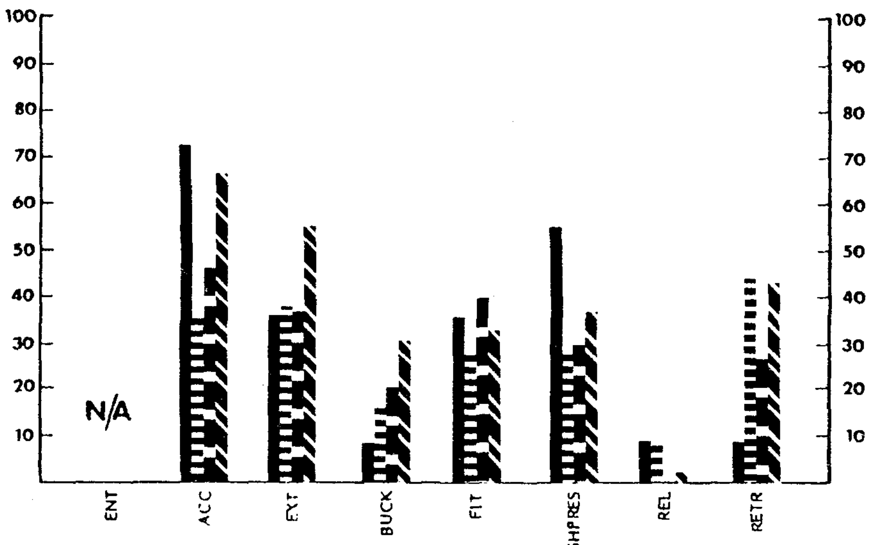
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



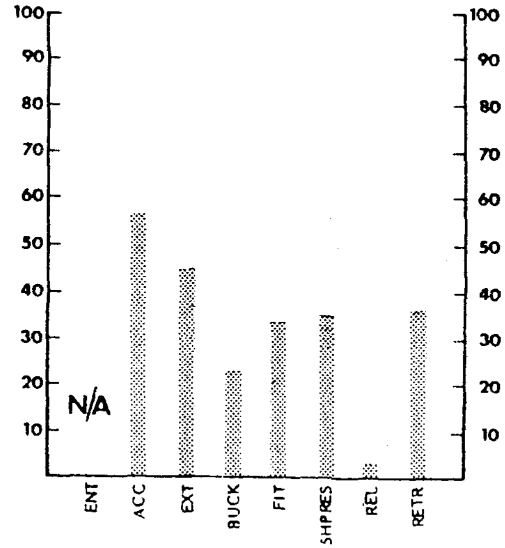
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

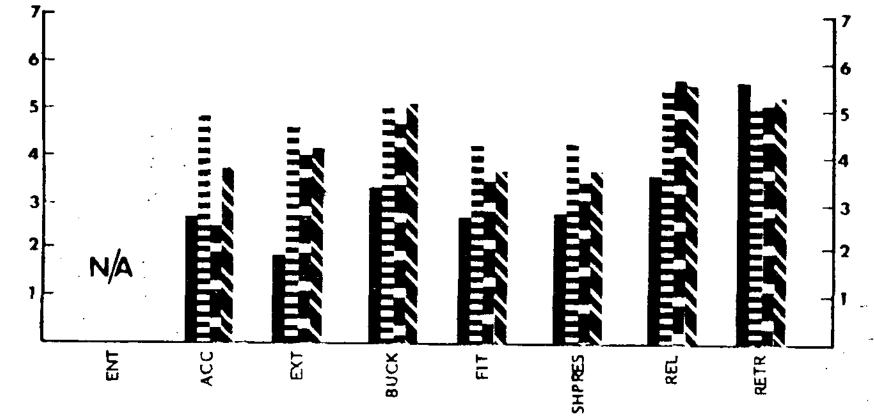
PERCENT Twisted 17.7 Slack N/A
Not Fully Retracted 64.6

FIAT 2000

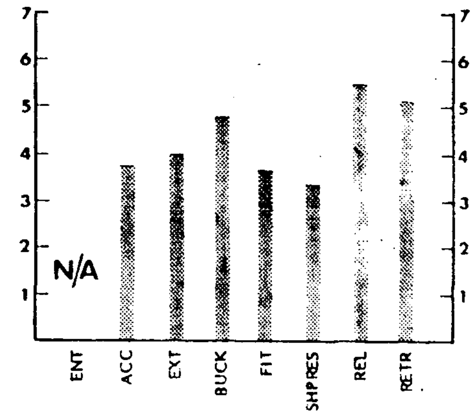
SIZE: TWO-SEATER
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE:

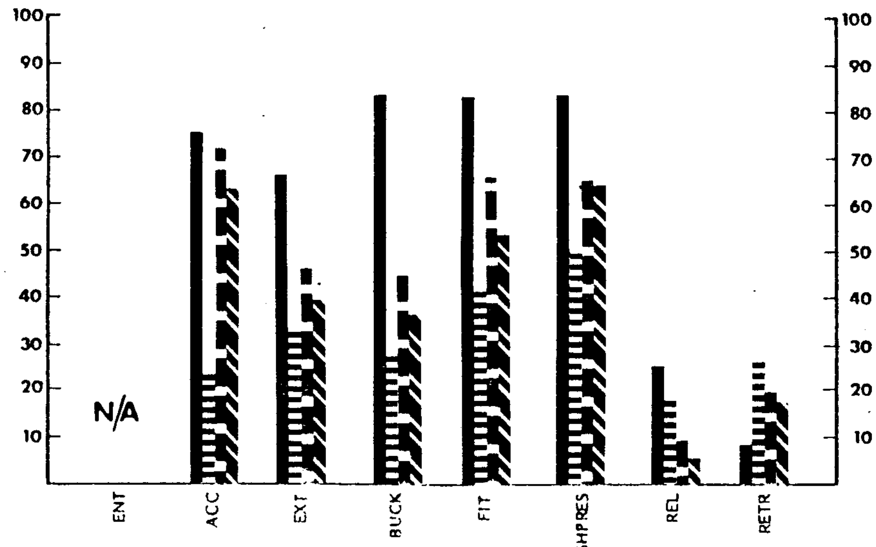
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



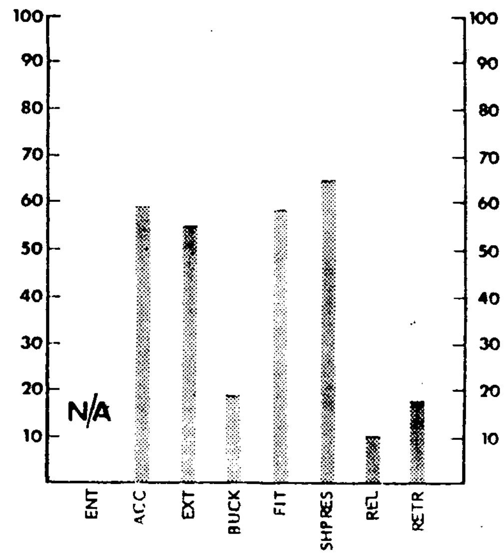
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



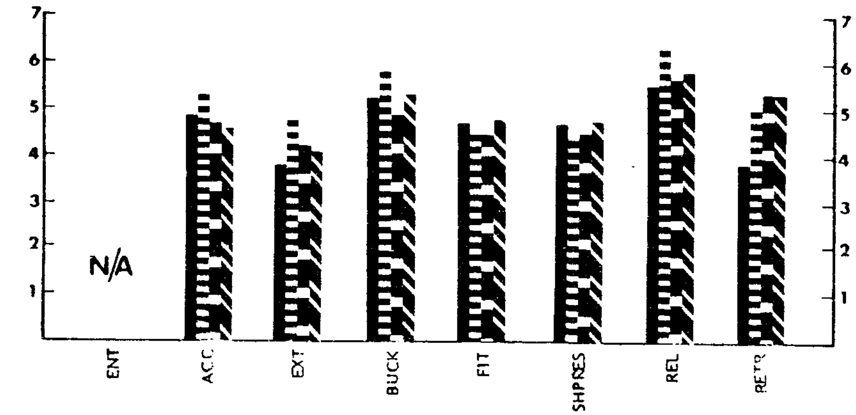
KEY Short/Overweight · Short/Not Overweight · Average/Overweight · Average/Not Overweight

PERCENT Twisted 7.8 Slack N/A
Not Fully Retracted 73.0

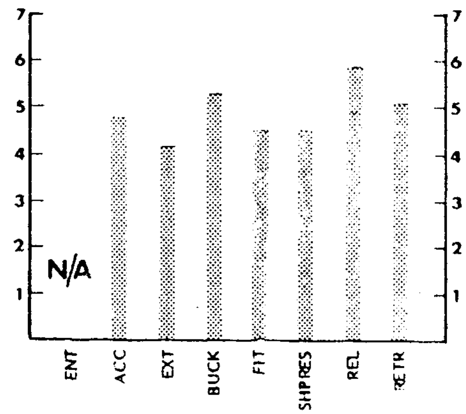
FORD FAIRMONT

SIZE:	COMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	4	WINDOW SHADE DEVICE:	YES, AUTOMATIC RELEASE
SEAT:	BENCH	LATCHPLATE LOCKING DEVICE:	YES

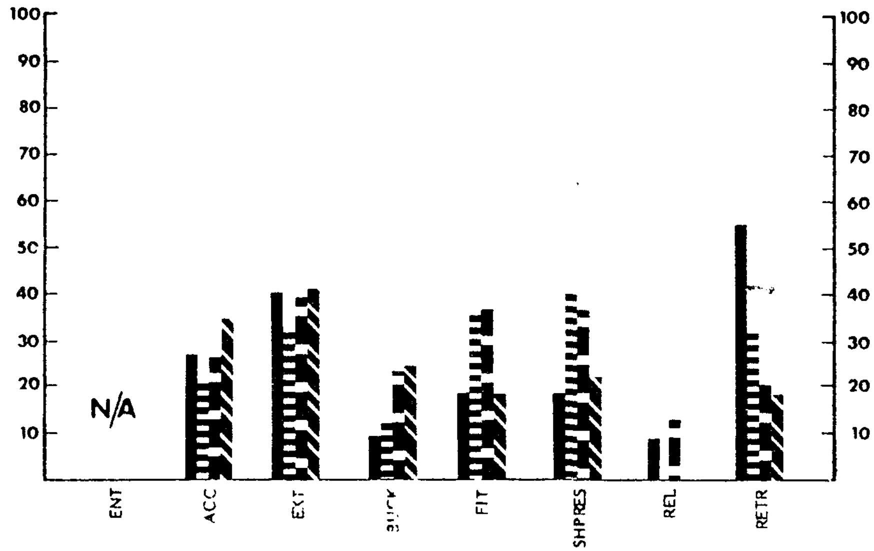
AVERAGE RATING BY HEIGHT–WEIGHT GROUP



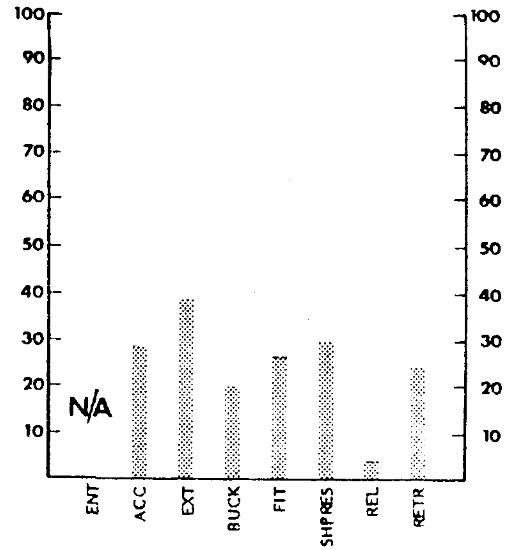
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT–WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



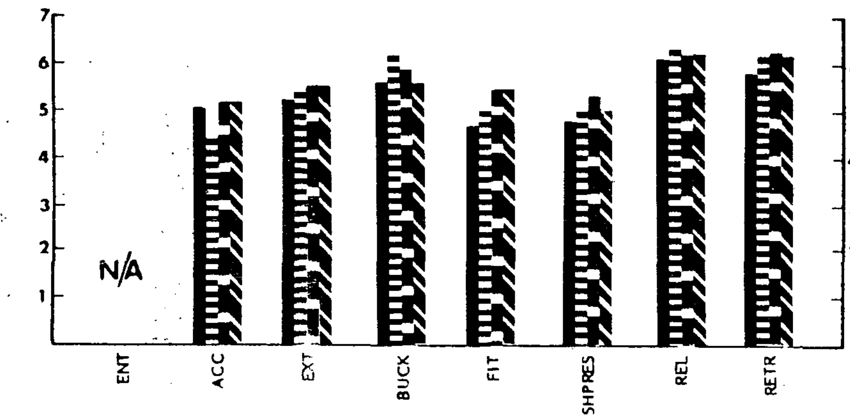
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 7.1 Slack 12.7
Not Fully Retracted 25.0

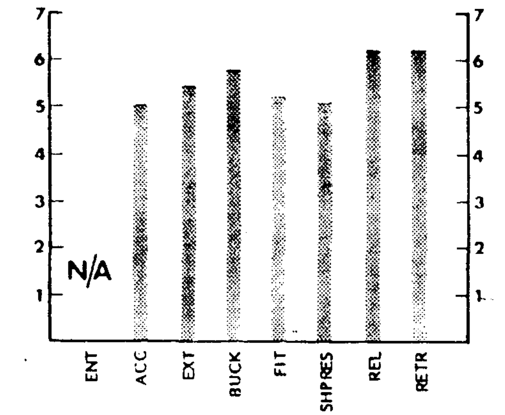
FORD FAIRMONT

SIZE:	MIDSIZE	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	4	WINDOW SHADE DEVICE:	NO
SEAT:	BENCH	LATCHPLATE LOCKING DEVICE:	

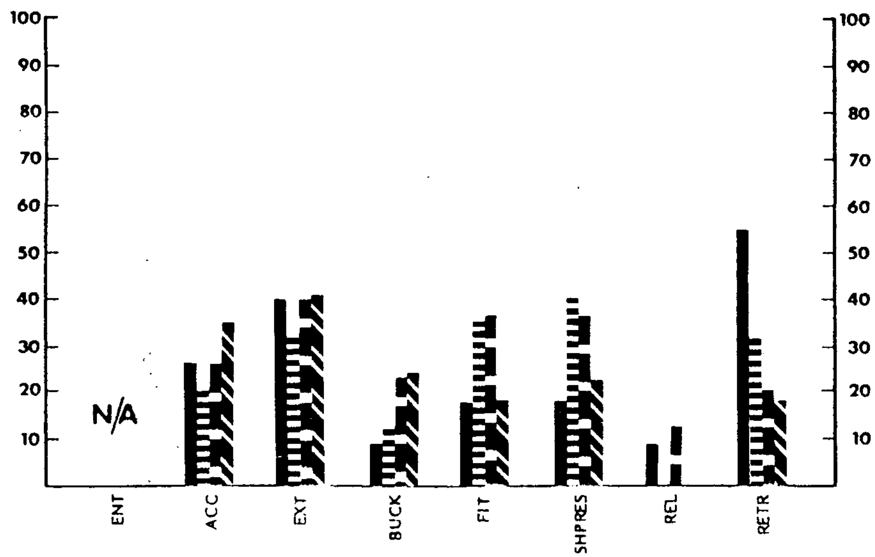
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



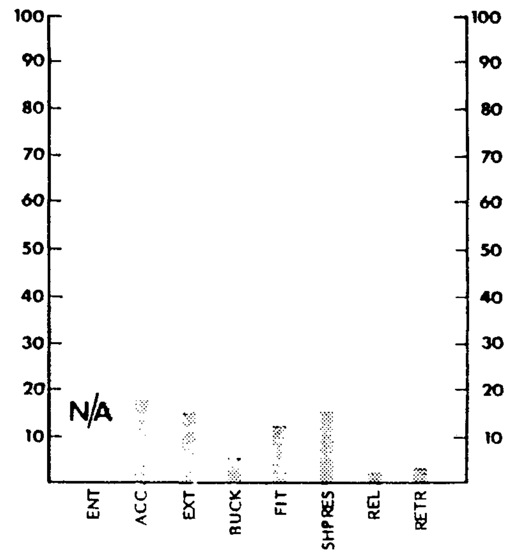
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



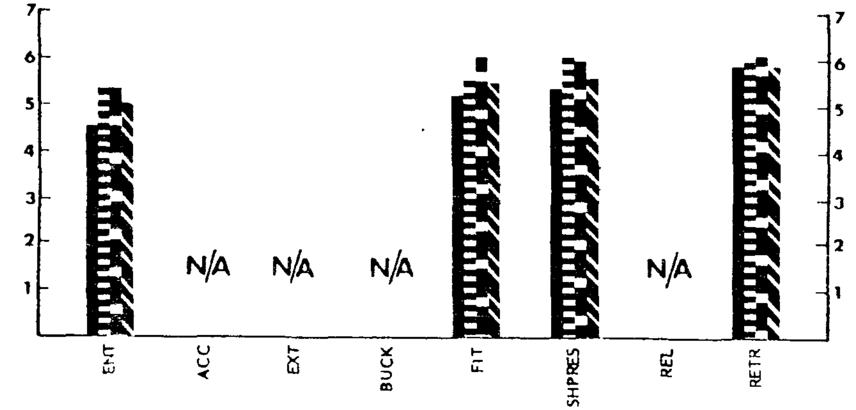
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 11.5 Slack N/A
Not Fully Retracted 98.2

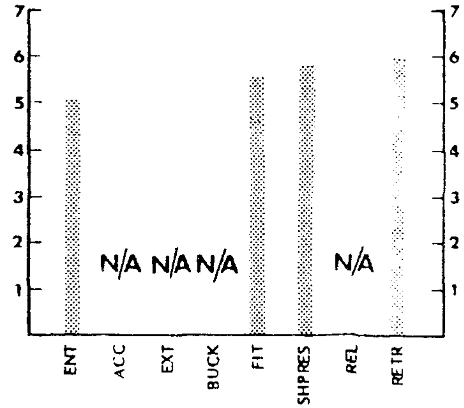
FORD LTD

SIZE:	FULL SIZE	SAFETY BELT TYPE:	AUTOMATIC, CONTINUOUS LOOP
DOORS:	4	WINDOW SHADE DEVICE:	NO
SEAT:	BENCH	LATCHPLATE LOCKING DEVICE:	N/A

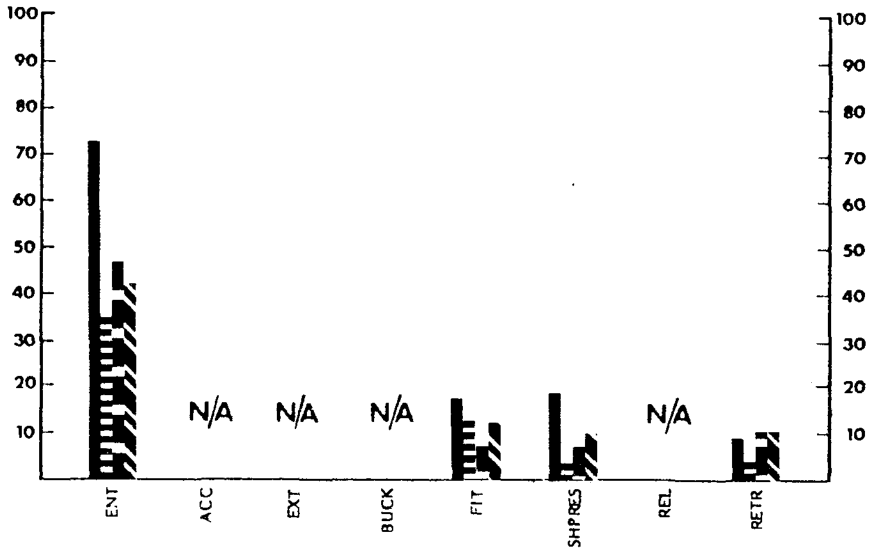
AVERAGE RATING BY HEIGHT–WEIGHT GROUP



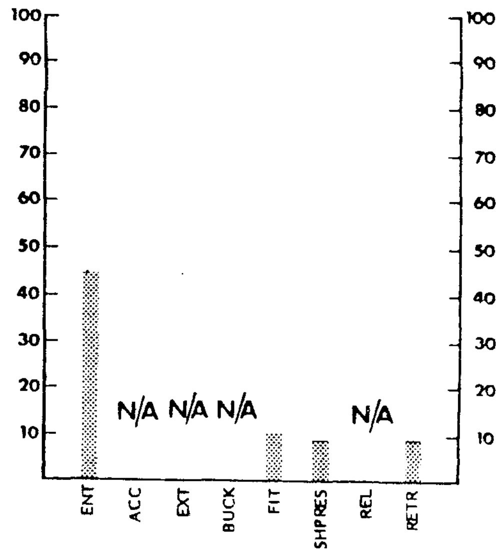
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT–WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



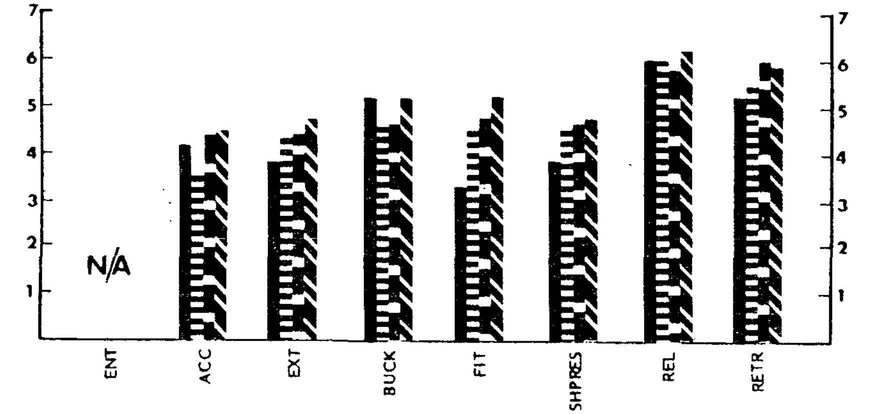
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 15.8 Slack N/A
Not Fully Retracted 4.4

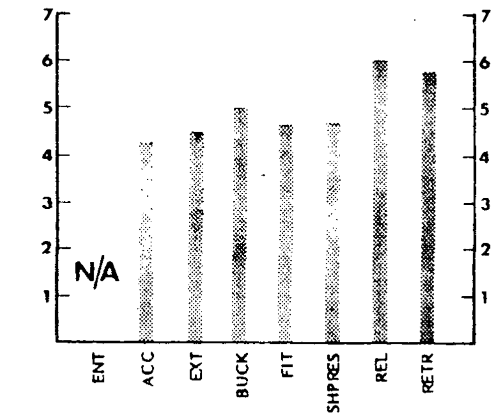
FORD LTD

SIZE:	FULL SIZE	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	4	WINDOW SHADE DEVICE:	NO
SEAT:	BENCH	LATCHPLATE LOCKING DEVICE:	

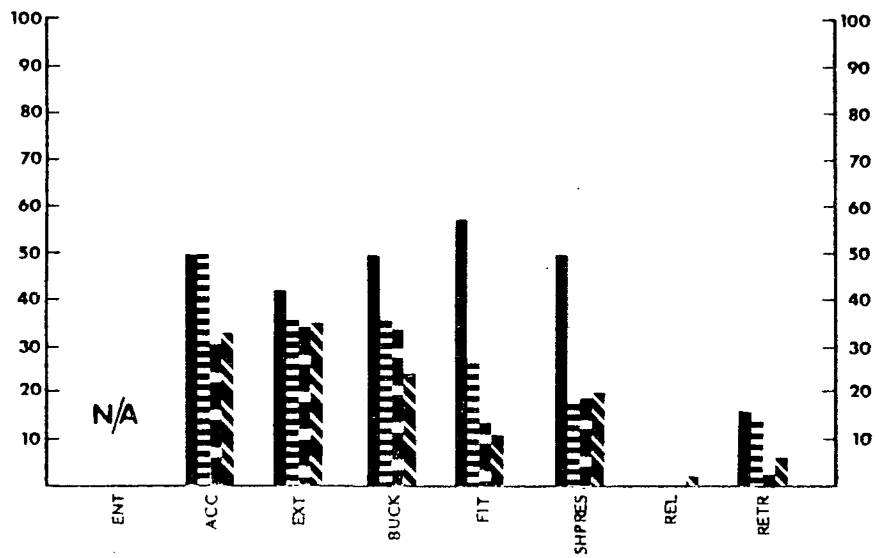
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



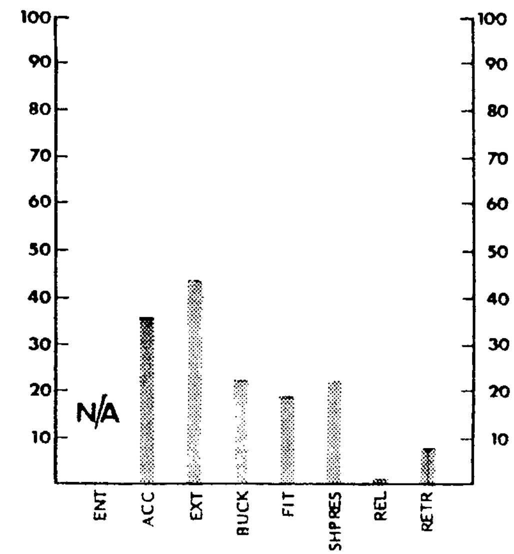
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



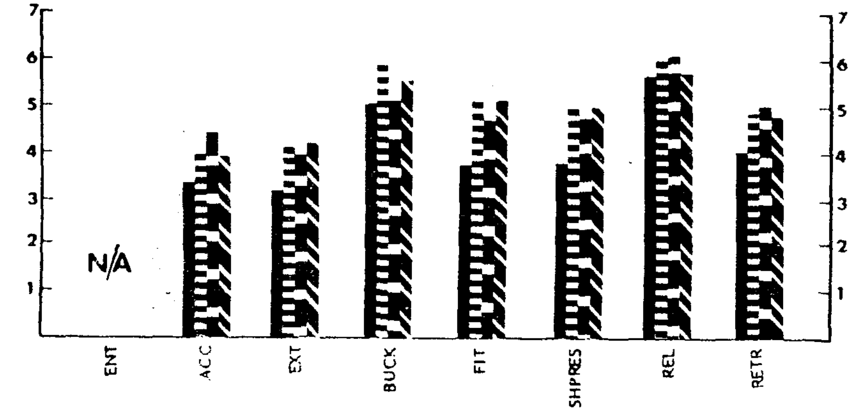
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 16.5 Slack N/A
Not Fully Retracted 95.7

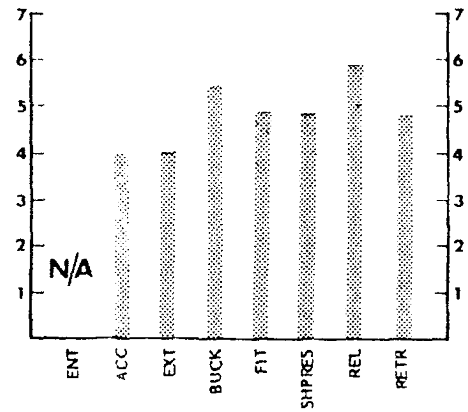
FORD MUSTANG

SIZE:	COMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	YES, AUTOMATIC RELEASE
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	YES

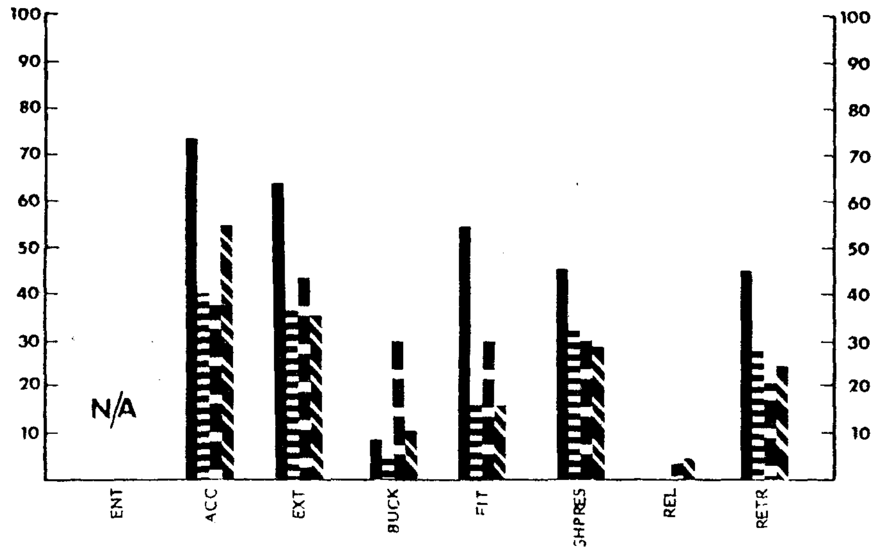
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



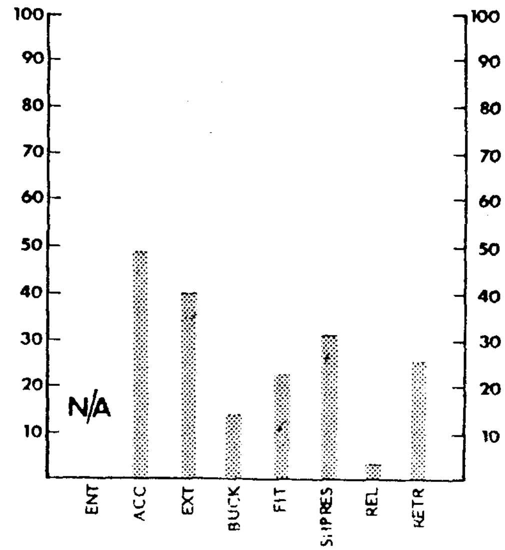
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

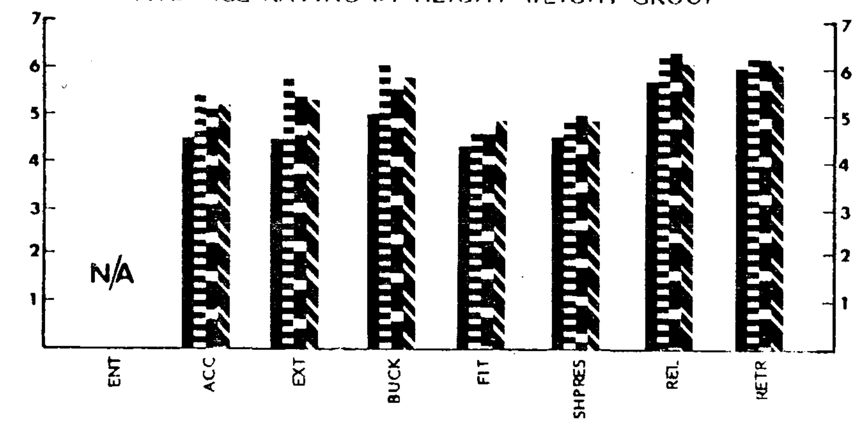
PERCENT Twisted 10.4 Slack 11.4
Not Fully Retracted 35.1

FORD PICKUP

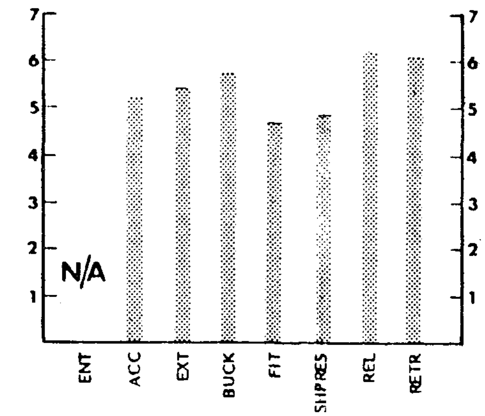
SIZE: TRUCK
DOORS: 2
SEAT: BENCH

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE: NO

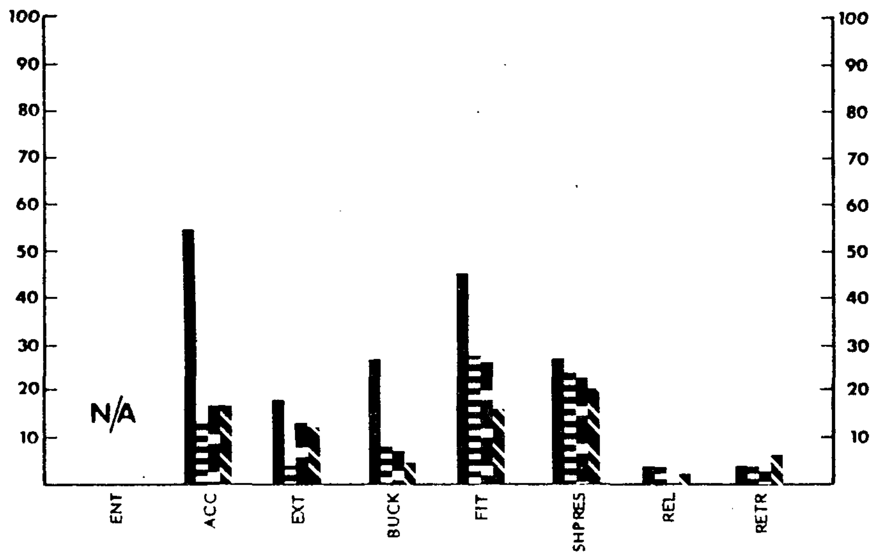
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



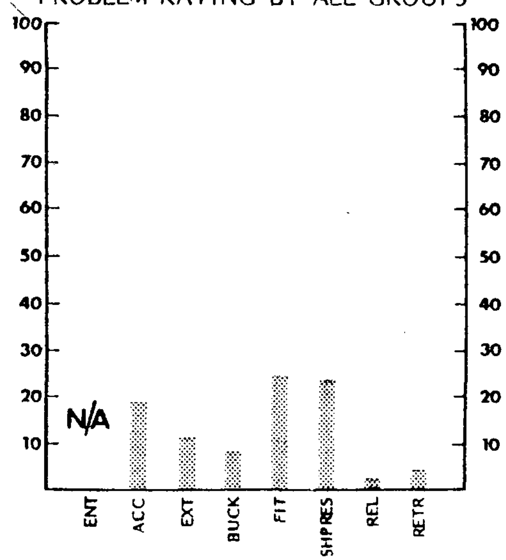
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



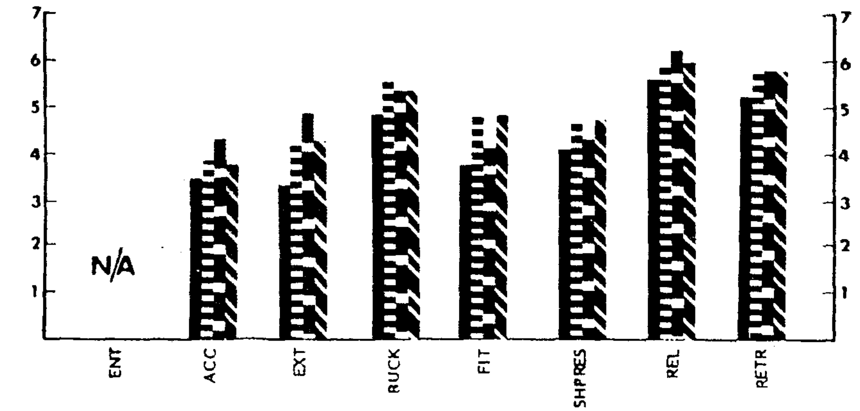
KEY
- Short/Overweight
- Short/Not Overweight
- Average/Overweight
- Average/Not Overweight

PERCENT Twisted 14.2 Slack N/A
Not Fully Retracted 16.1

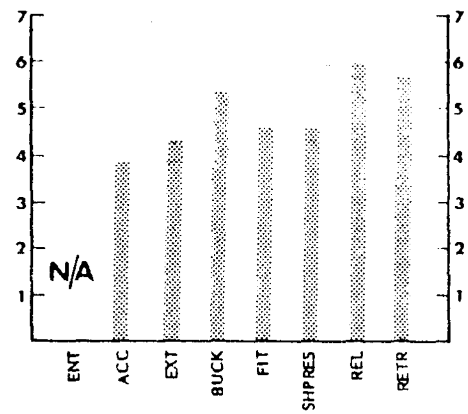
FORD PINTO

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	NO

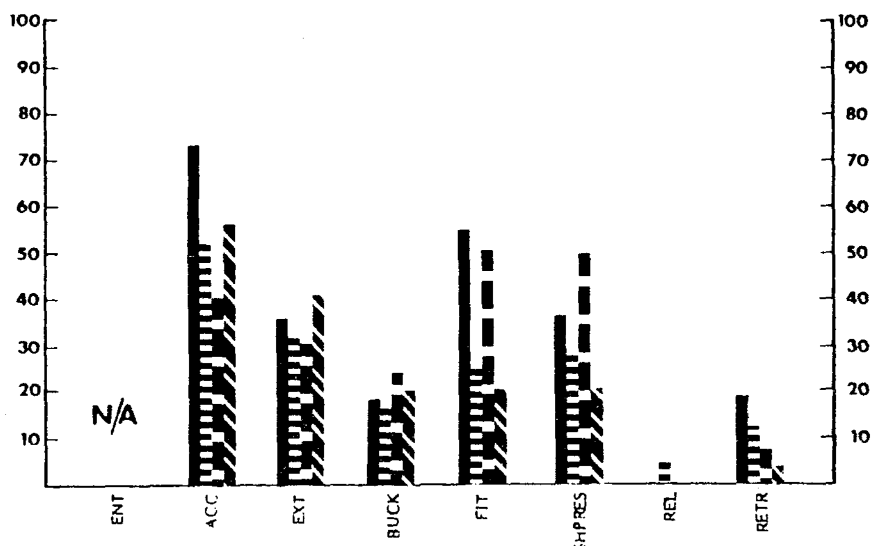
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



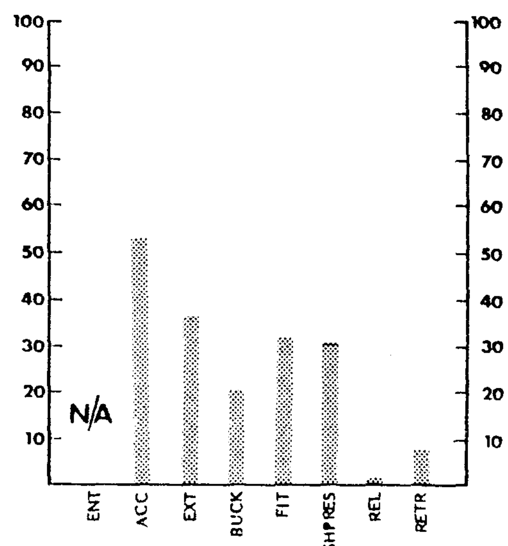
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



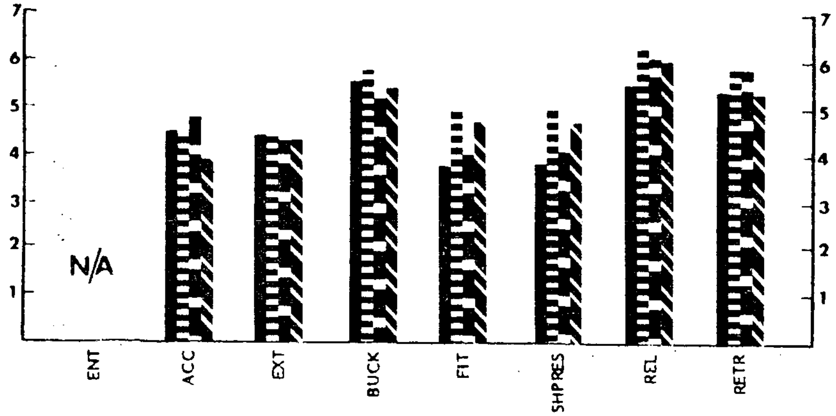
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 36.3 Slack N/A
Not Fully Retracted 27.8

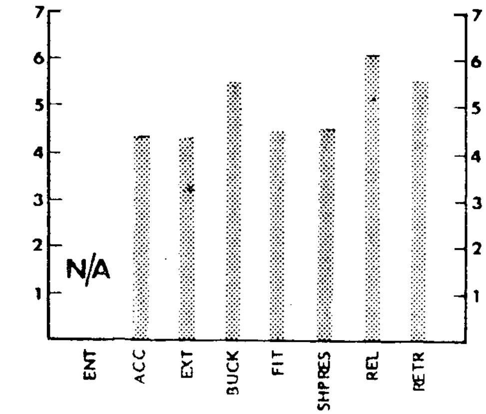
FORD THUNDERBIRD

SIZE:	FULL SIZE	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	YES, AUTOMATIC RELEASE
SEAT:	BENCH	LATCHPLATE LOCKING DEVICE:	YES

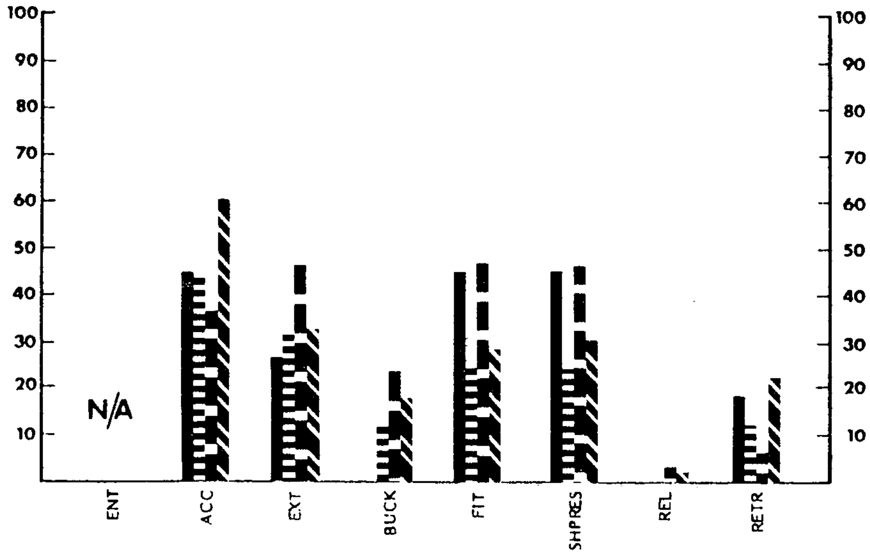
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



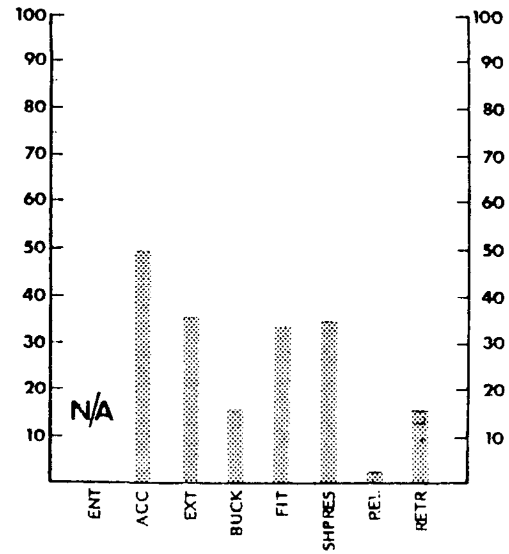
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



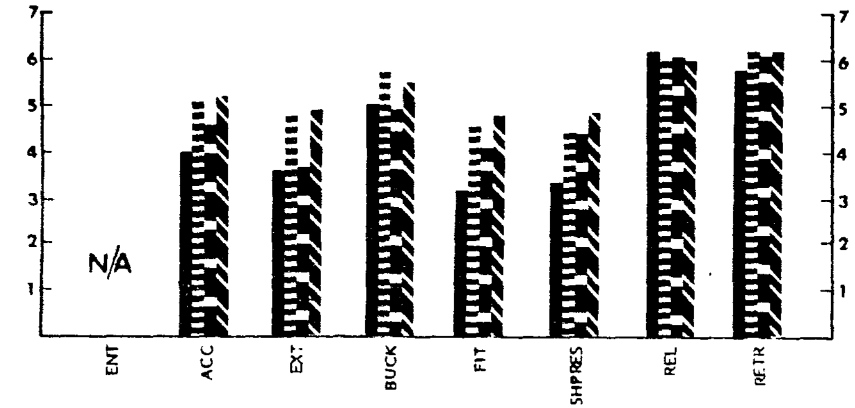
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 13.2 Slack 9.1
Not Fully Retracted 13.2

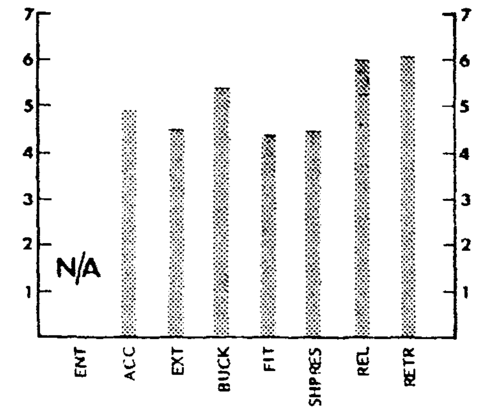
FORD VAN

SIZE:	VAN	SAFETY BELT TYPE:	MANUAL, DUAL RETRACTORS
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	NO

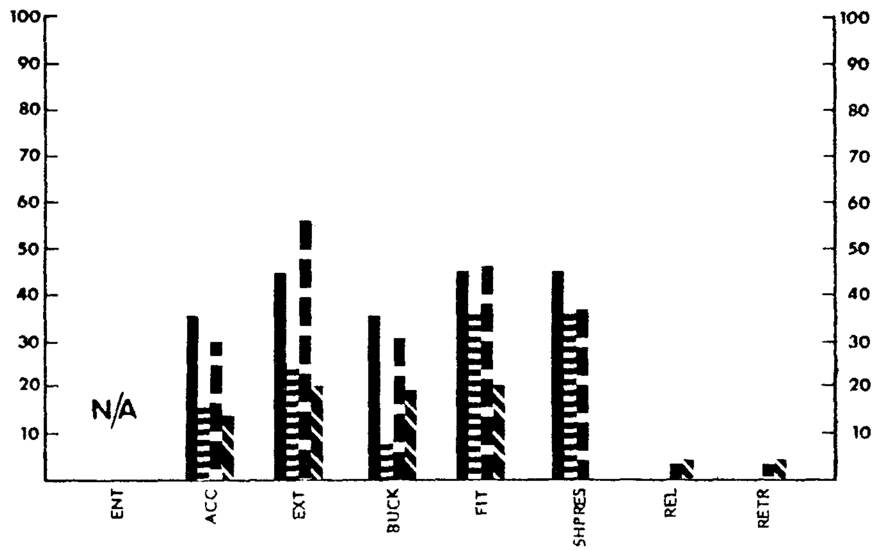
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



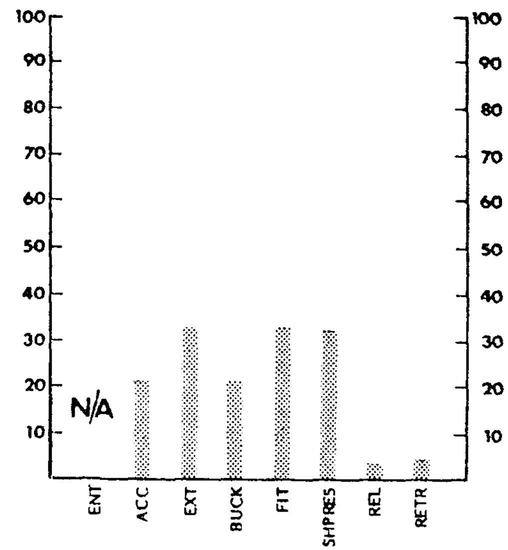
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



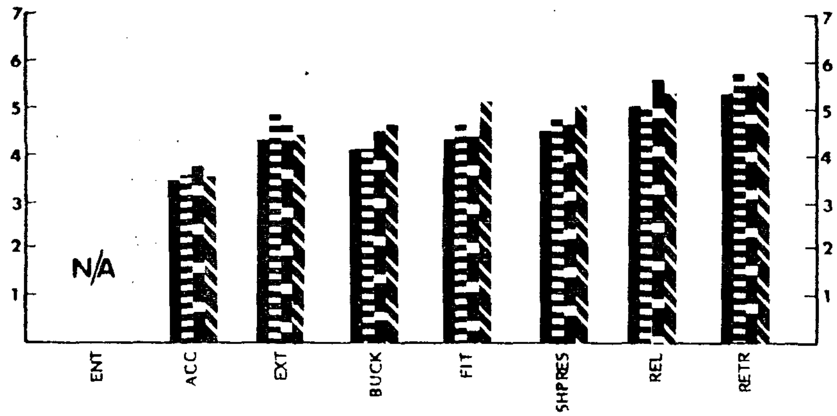
KEY
- Short/Overweight
- Short/Not Overweight
- Average/Overweight
- Average/Not Overweight

PERCENT Twisted 12.3 Slack N/A
Not Fully Retracted 7.8

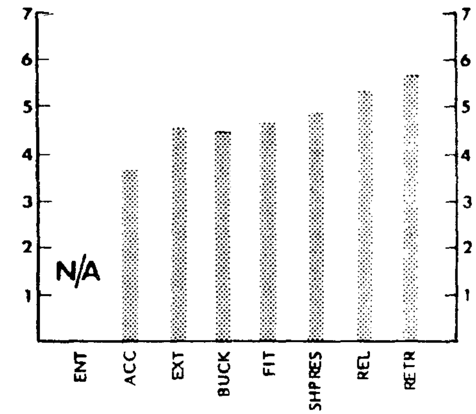
HONDA CIVIC 13

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	NO

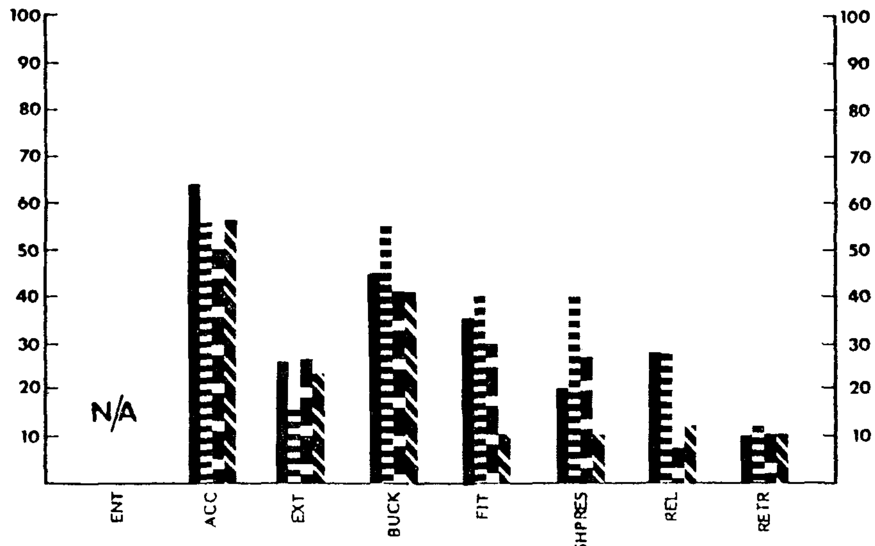
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



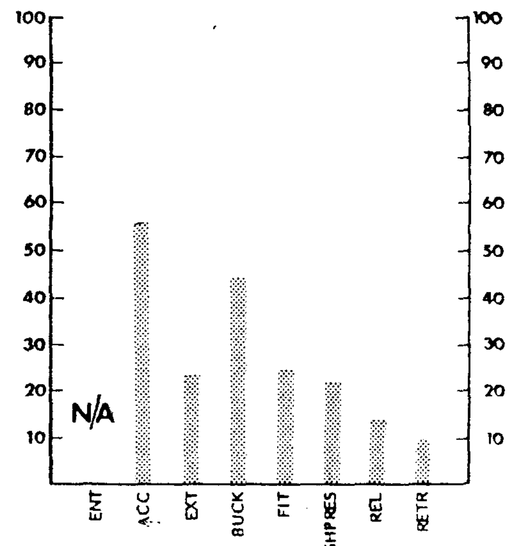
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



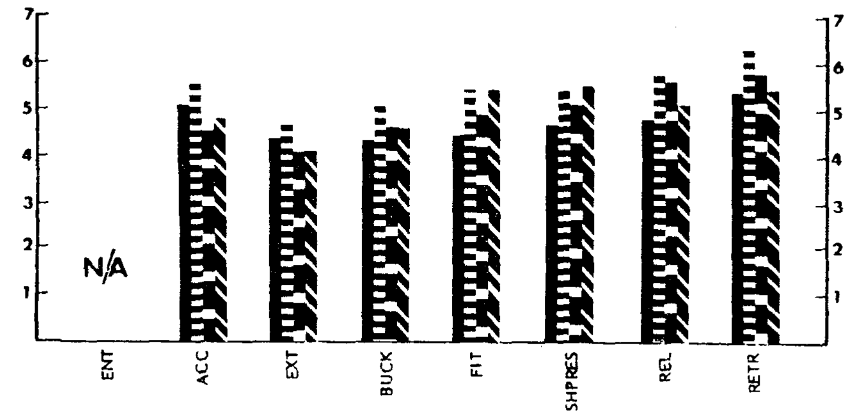
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 20.4 Slack N/A
Not Fully Retracted 10.4

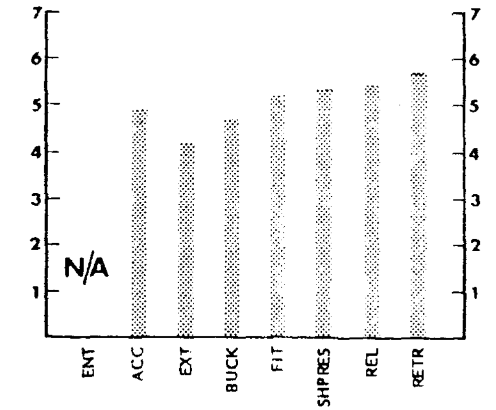
JEEP (AMC) PICKUP

SIZE:	TRUCK	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BENCH	LATCHPLATE LOCKING DEVICE:	YES

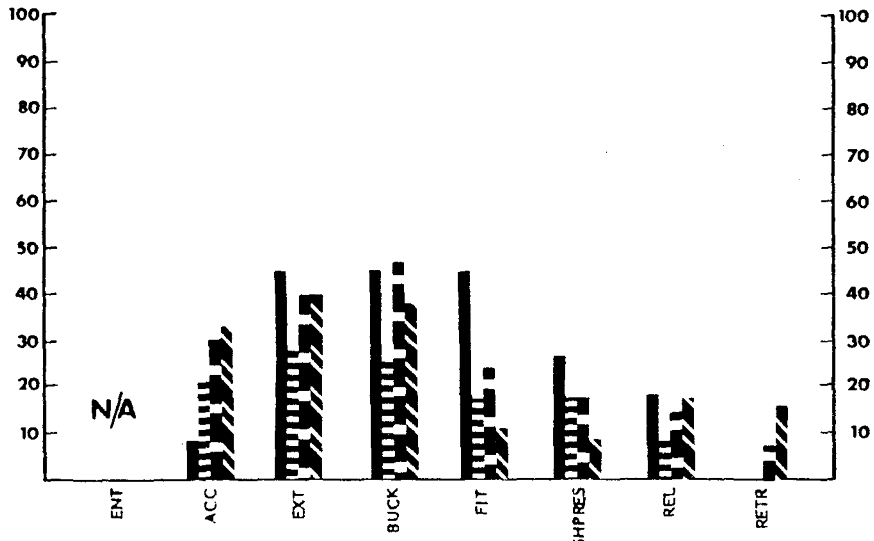
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



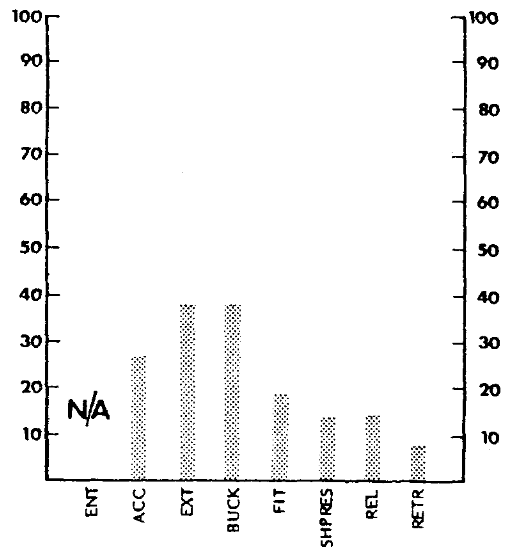
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

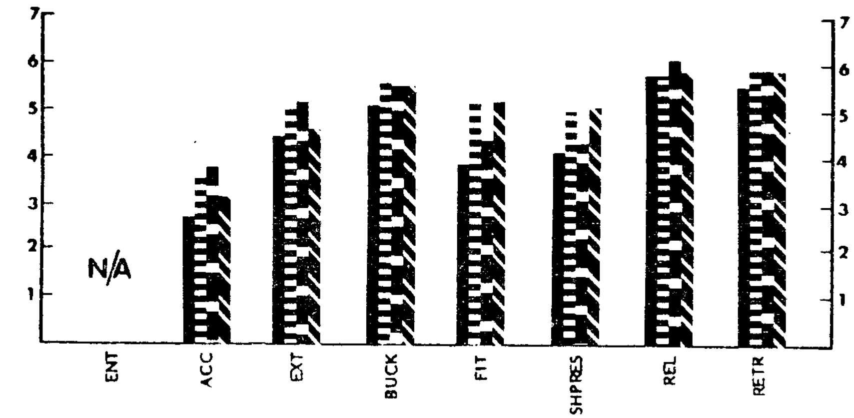
PERCENT Twisted 8.0 Slack N/A
Not Fully Retracted 23.9

MAZDA GLC

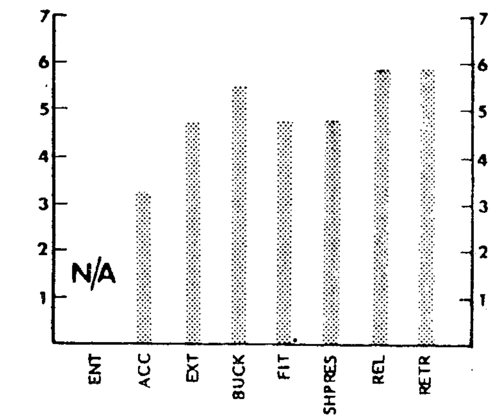
SIZE: SUBCOMPACT
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE: NO

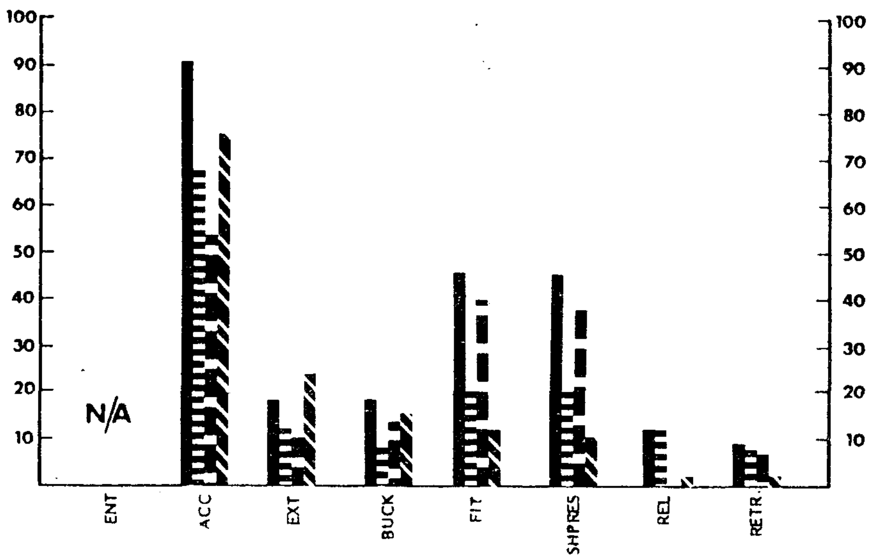
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



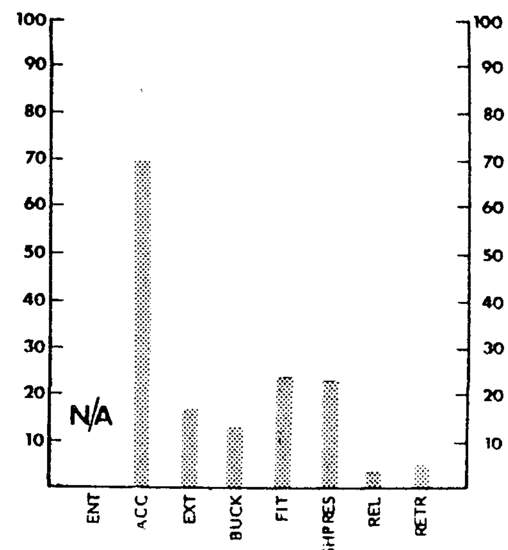
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

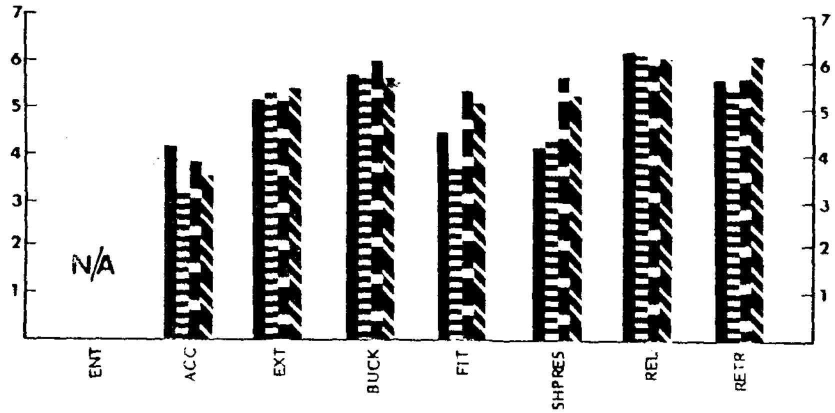
PERCENT Twisted 15.0 Slack N/A
Not Fully Retracted 11.3

MAZDA 626

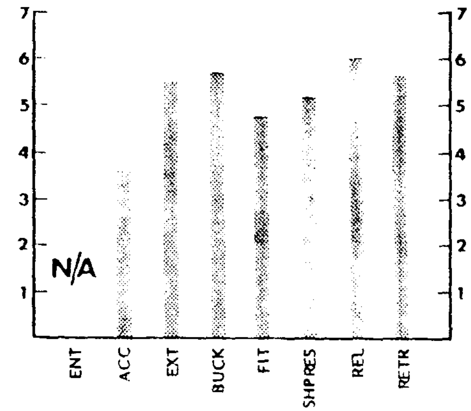
SIZE: SUBCOMPACT
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE:

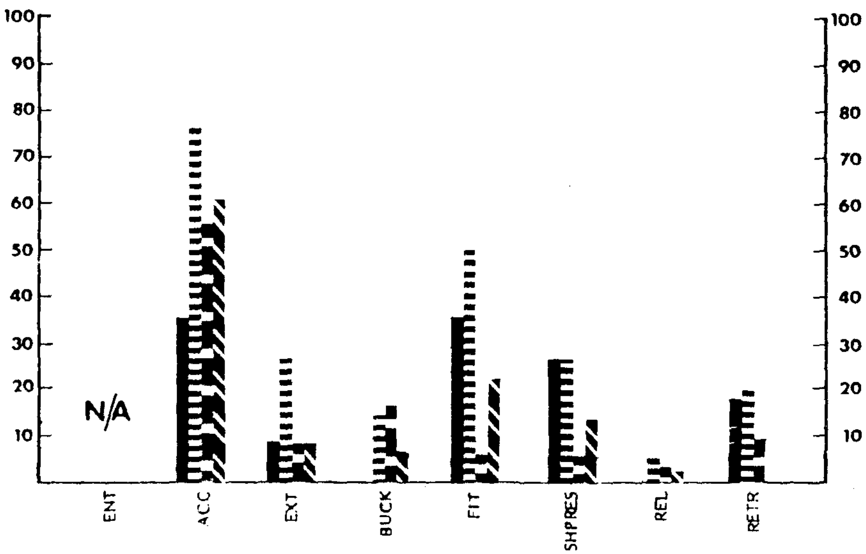
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



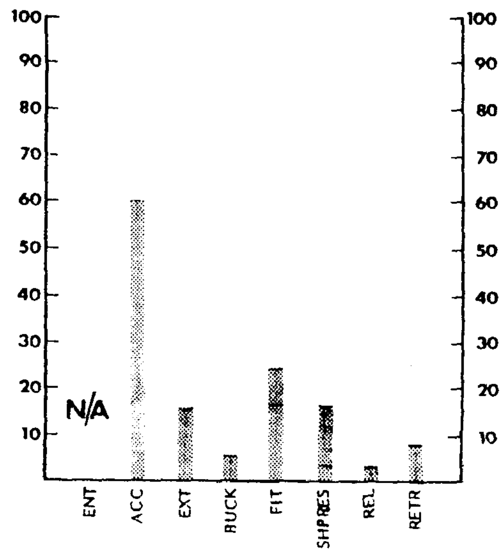
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight — Short/Not Overweight — Average/Overweight — Average/Not Overweight

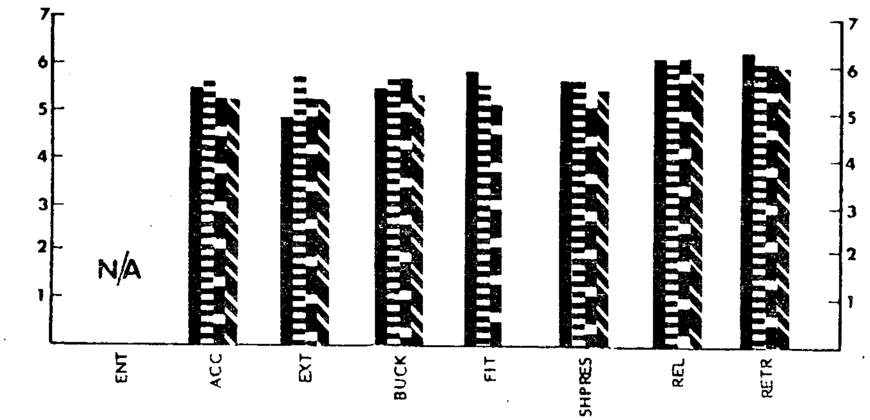
PERCENT Twisted 1.8 Slack N/A
Not Fully Retracted 94.0

MERCEDES 3000

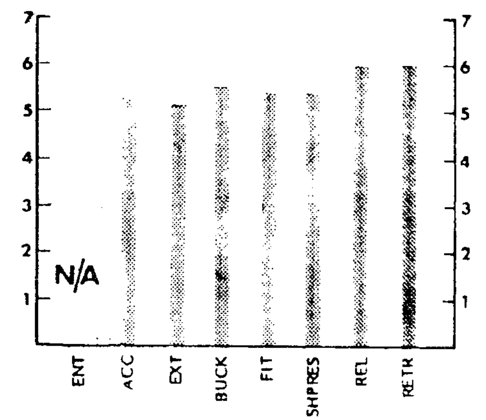
SIZE: COMPACT
DOORS: 4
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE:

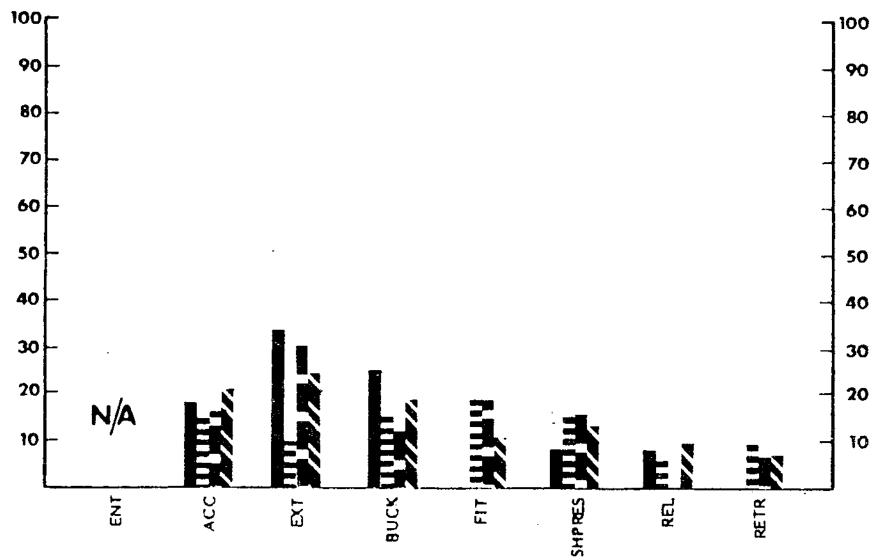
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



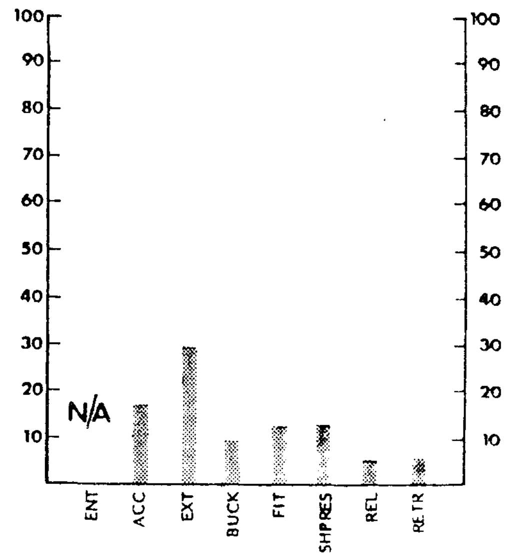
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



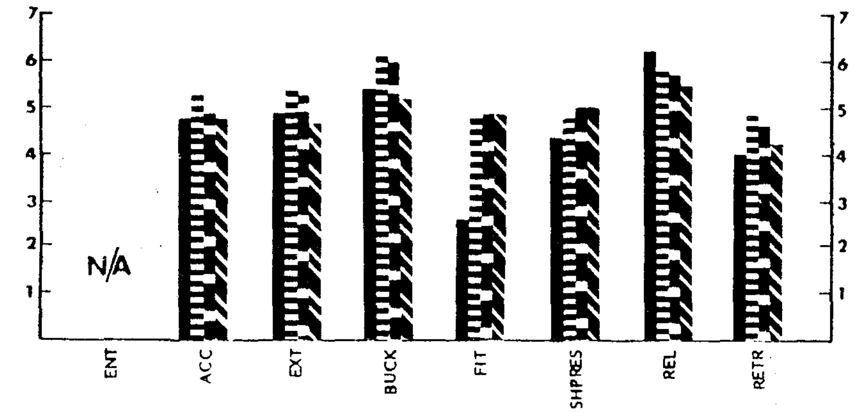
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 7.9 Slack N/A
Not Fully Retracted 88.8

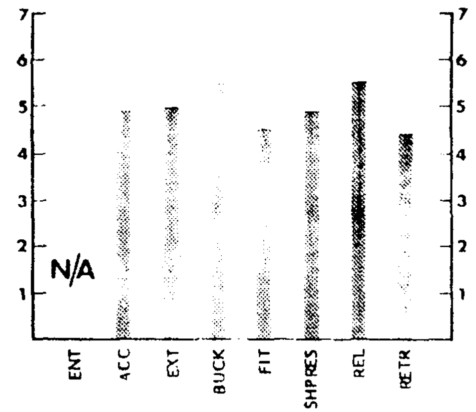
OLDSMOBILE (GMC) CUTLASS–WAGON

SIZE:	MIDSIZE	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	4	WINDOW SHADE DEVICE:	YES, AUTOMATIC RELEASE
SEAT:	BENCH	LATCHPLATE LOCKING DEVICE:	

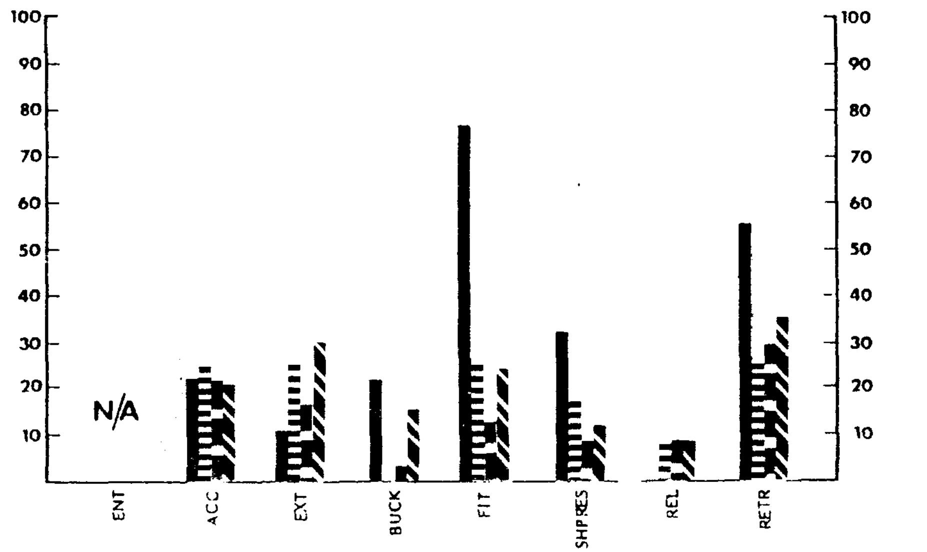
AVERAGE RATING BY HEIGHT–WEIGHT GROUP



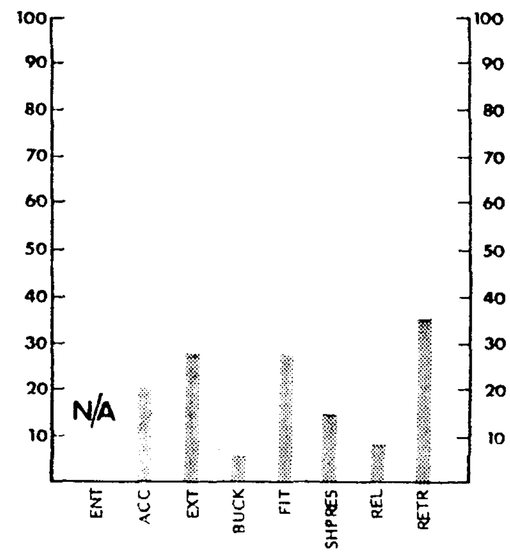
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT–WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



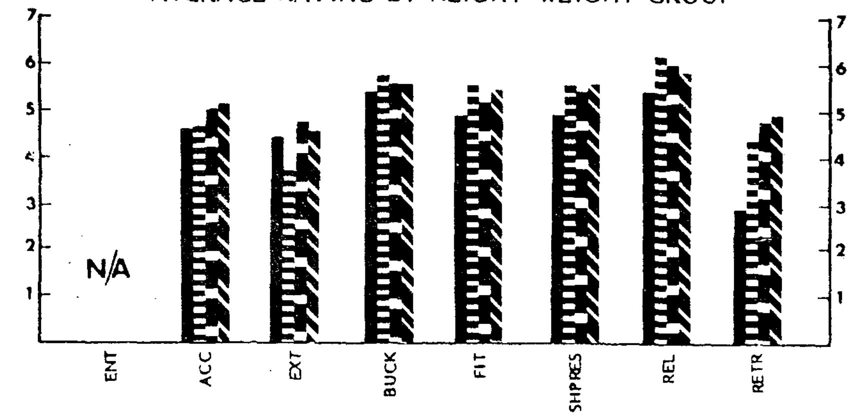
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 17.9 Slack 13.3
Not Fully Retracted 65.8

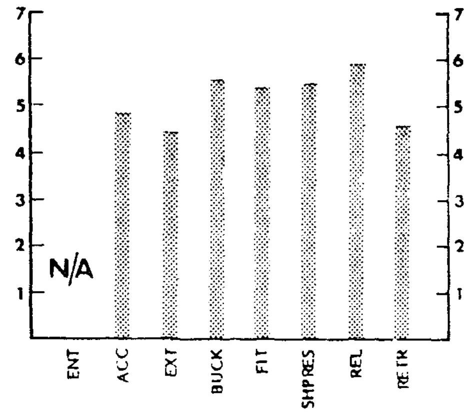
OLDSMOBILE (GMC) DELTA 88

SIZE:	FULL SIZE	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	4	WINDOW SHADE DEVICE:	YES, AUTOMATIC RELEASE
SEAT:	BENCH	LATCHPLATE LOCKING DEVICE:	YES

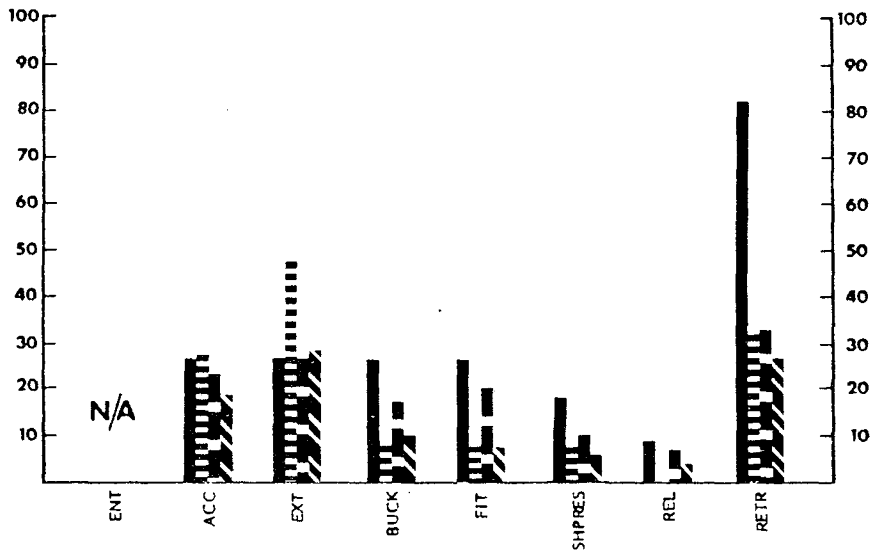
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



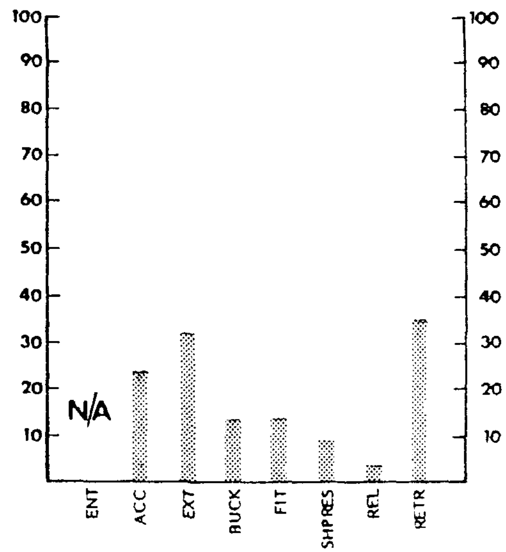
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

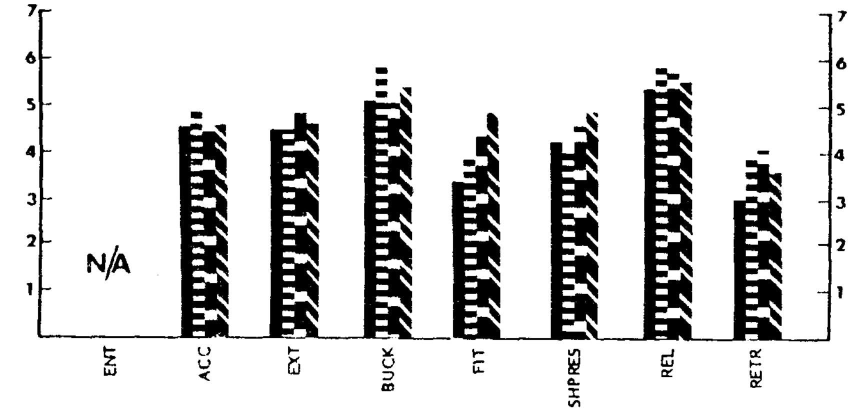
PERCENT Twisted 13.9 Slack 15.2
Not Fully Retracted 38.3

PLYMOUTH (CHRYSLER) HORIZON

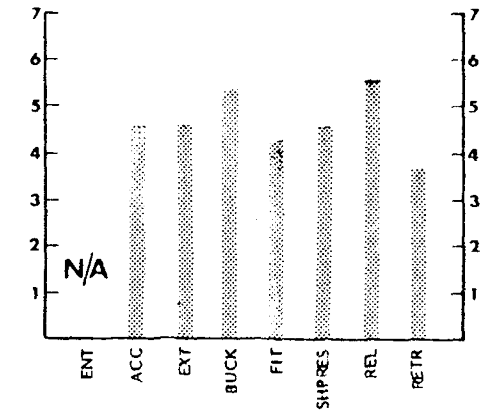
SIZE: SUBCOMPACT
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: YES
LATCHPLATE LOCKING DEVICE: YES

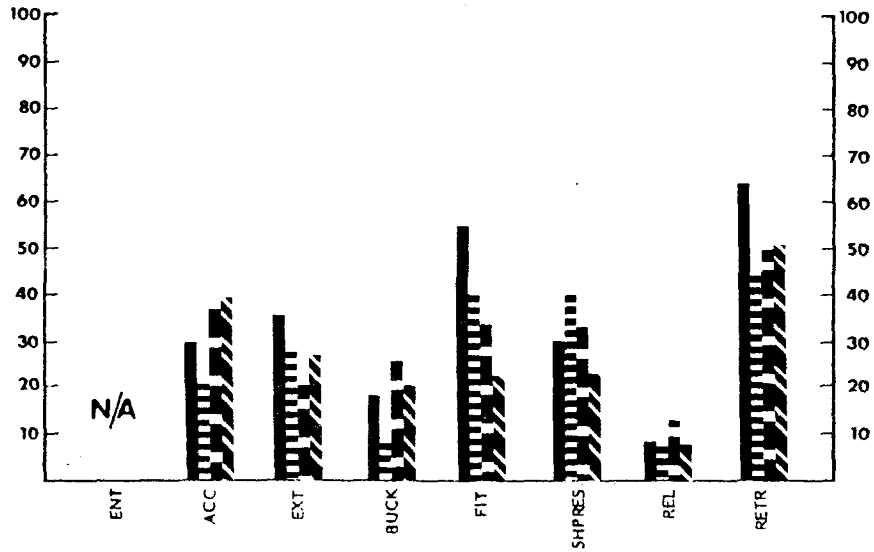
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



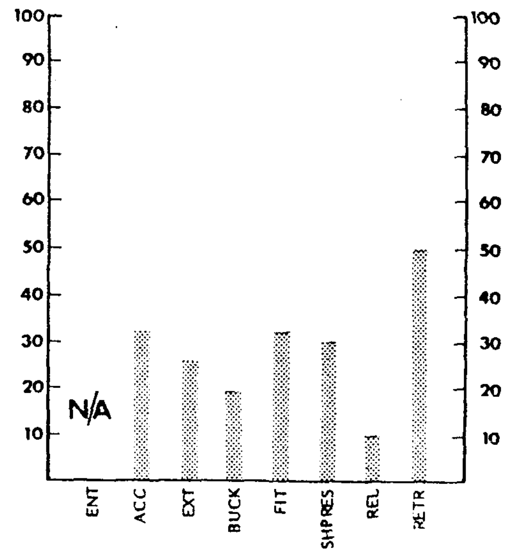
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



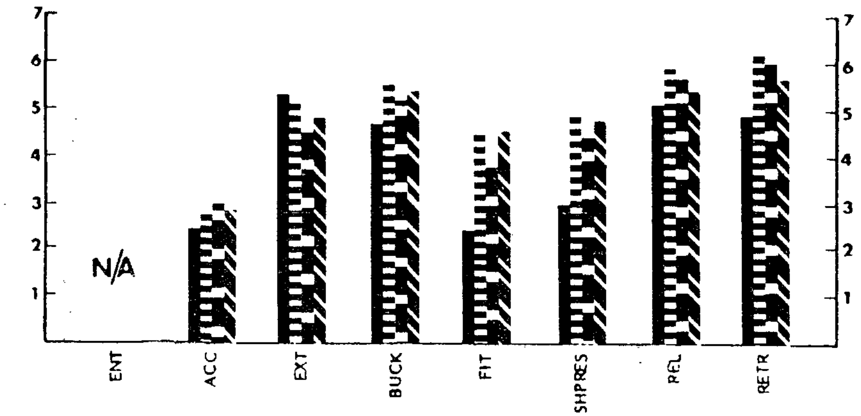
KEY
- Short/Overweight
- Short/Not Overweight
- Average/Overweight
- Average/Not Overweight

PERCENT Twisted 23.7 Slack 18.2
Not Fully Retracted 71.1

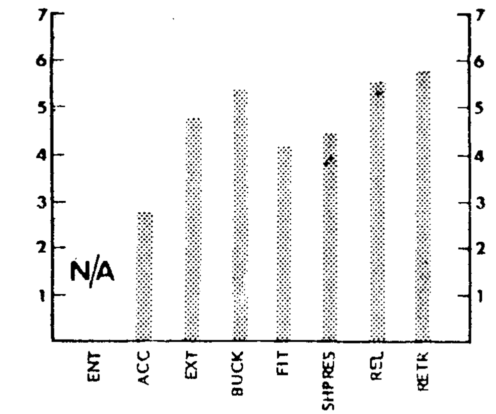
SUBARU 1800 GLF

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	NO

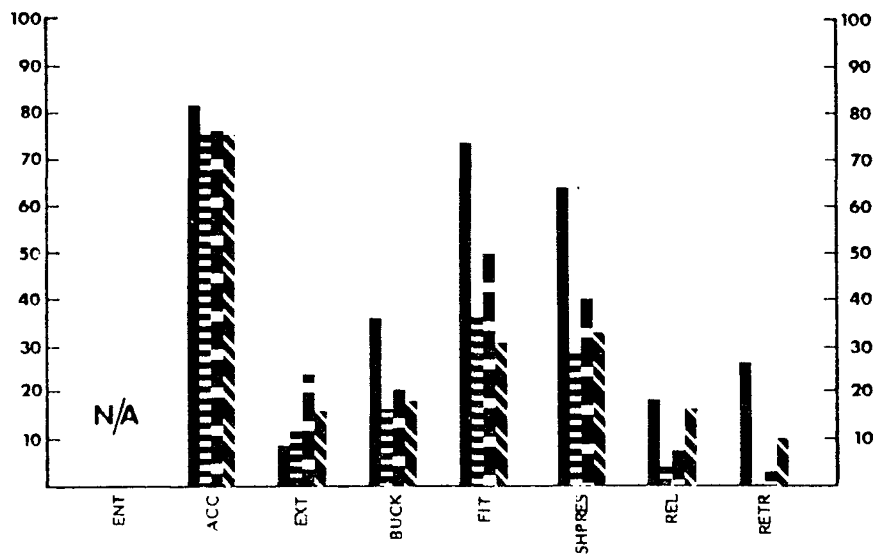
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



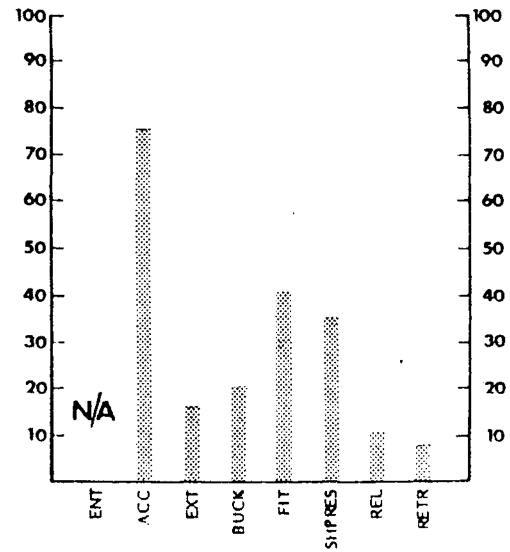
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

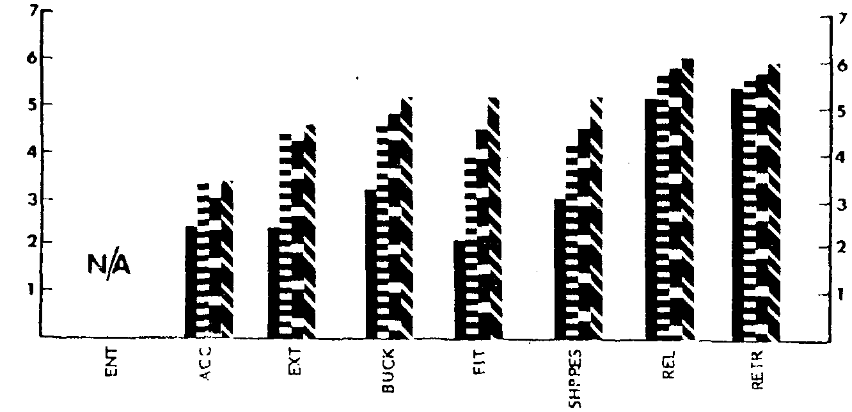
PERCENT Twisted 13.3 Slack N/A
Not Fully Retracted 35.1

TOYOTA CELICA

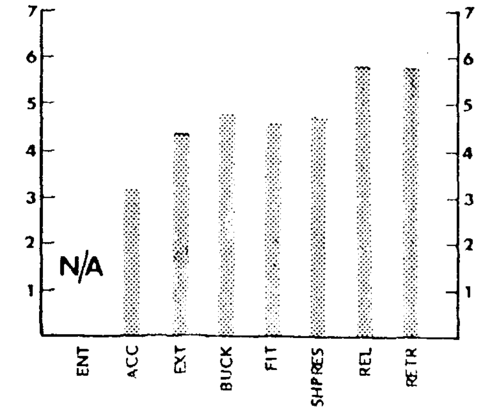
SIZE: SUBCOMPACT
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL, DUAL RETRACTOR
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE:

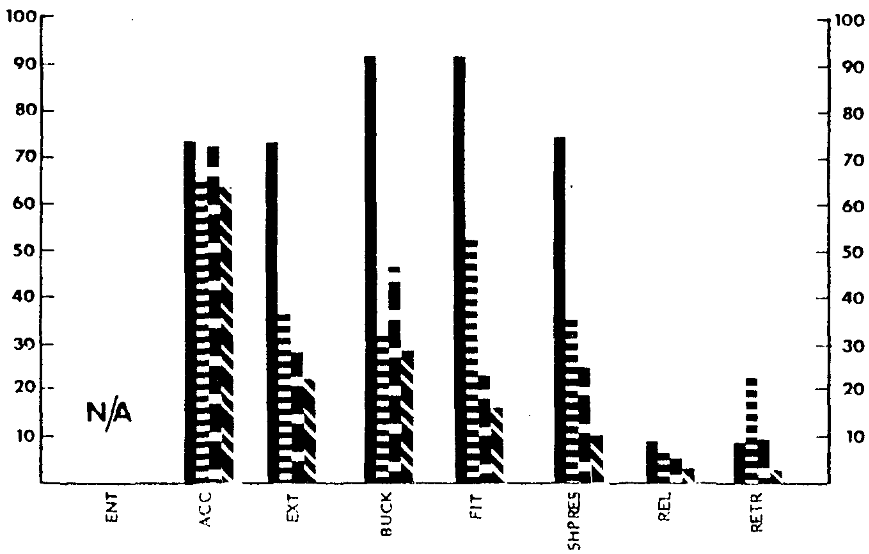
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



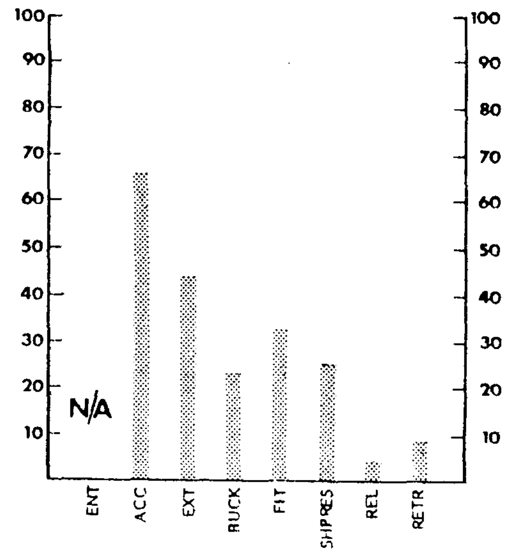
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

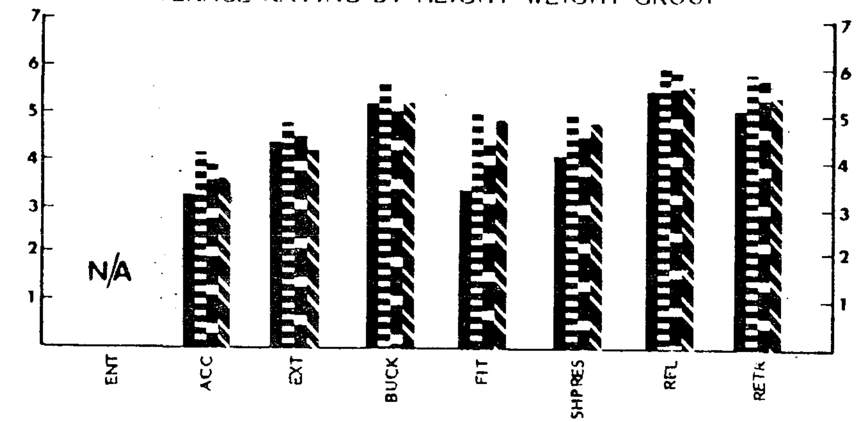
PERCENT Twisted; Slack; Not Fully Retracted

TOYOTA COROLLA

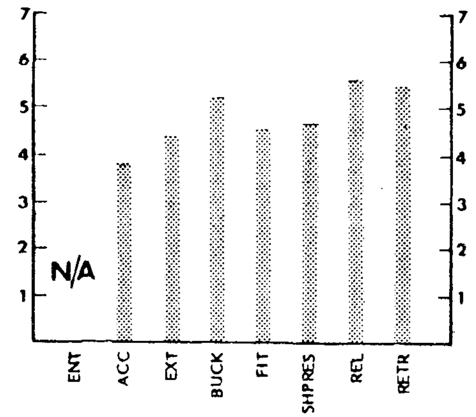
SIZE: SUBCOMPACT
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE: NO

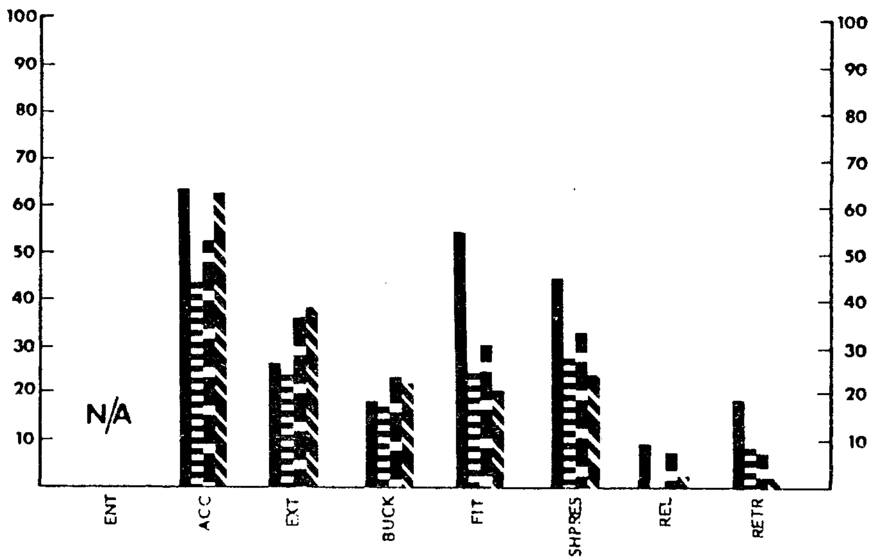
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



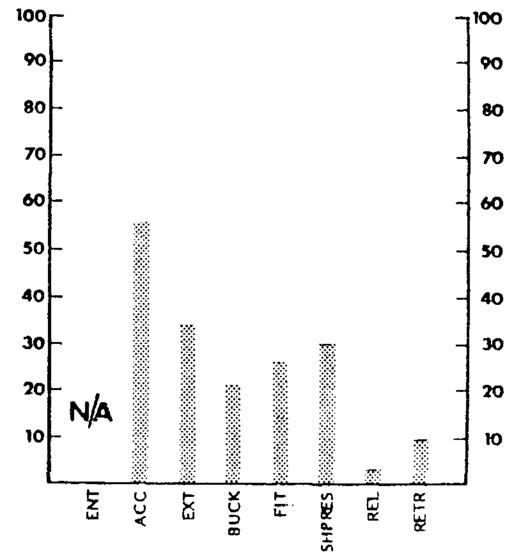
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

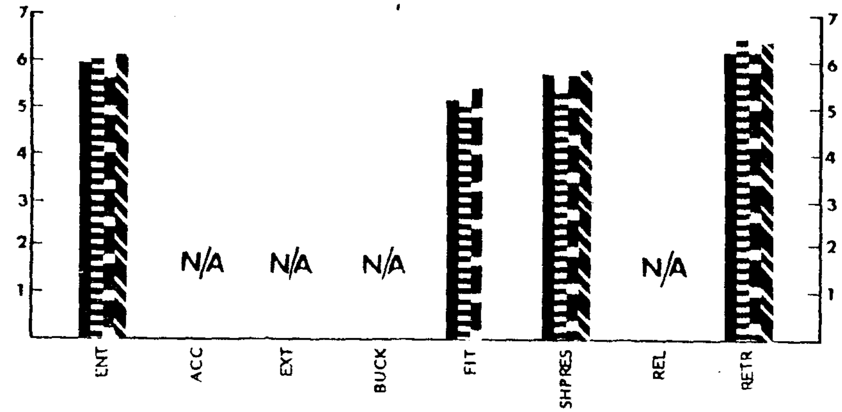
PERCENT Twisted 5.1 Slack N/A
Not Fully Retracted 16.5

TOYOTA CORONA

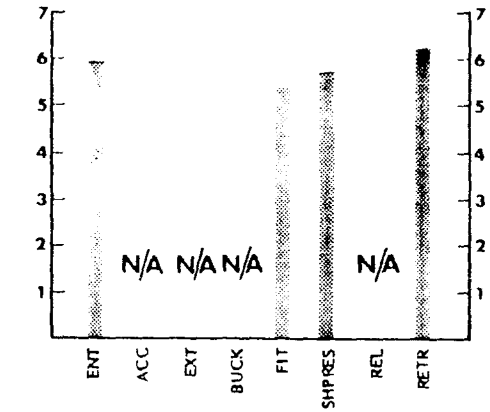
SIZE: SUBCOMPACT
DOORS: 4
SEAT: BUCKET

SAFETY BELT TYPE: AUTOMATIC, 2-POINT*
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE: N/A

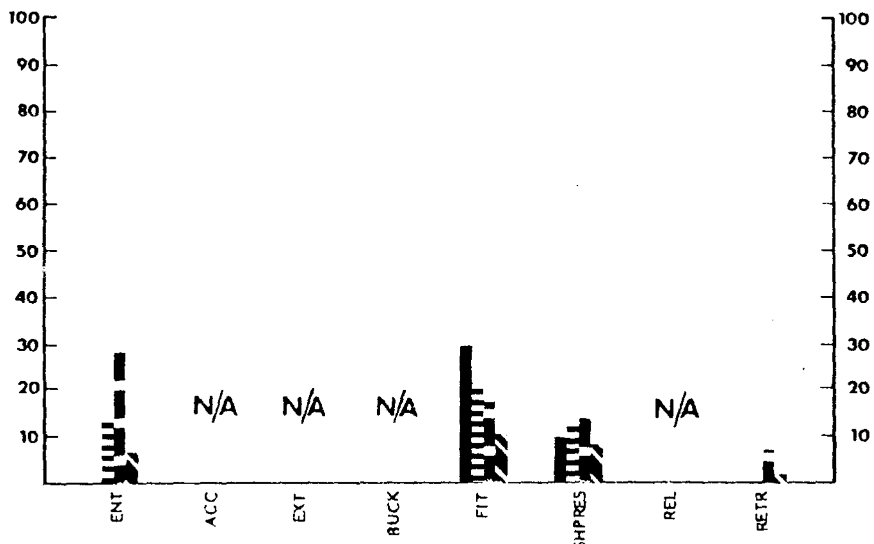
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



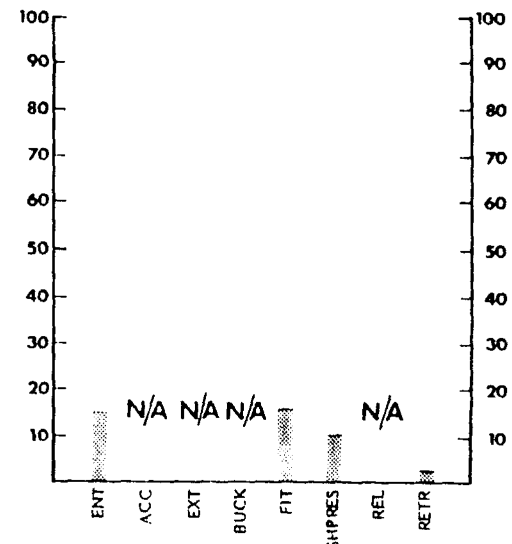
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

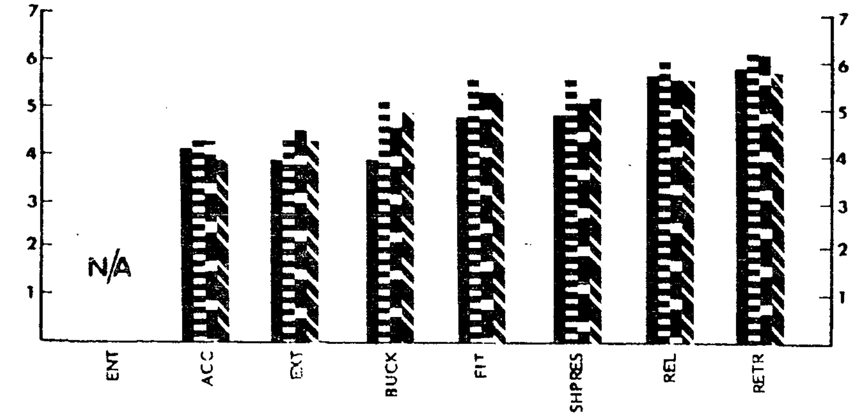
PERCENT Twisted 4.5 Slack N/A
Not Fully Retracted 5.5

*With optional lap belt.

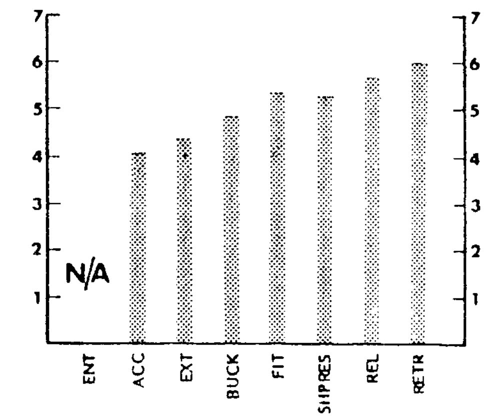
TOYOTA PICKUP

SIZE:	TRUCK	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BENCH	LATCHPLATE LOCKING DEVICE:	NO

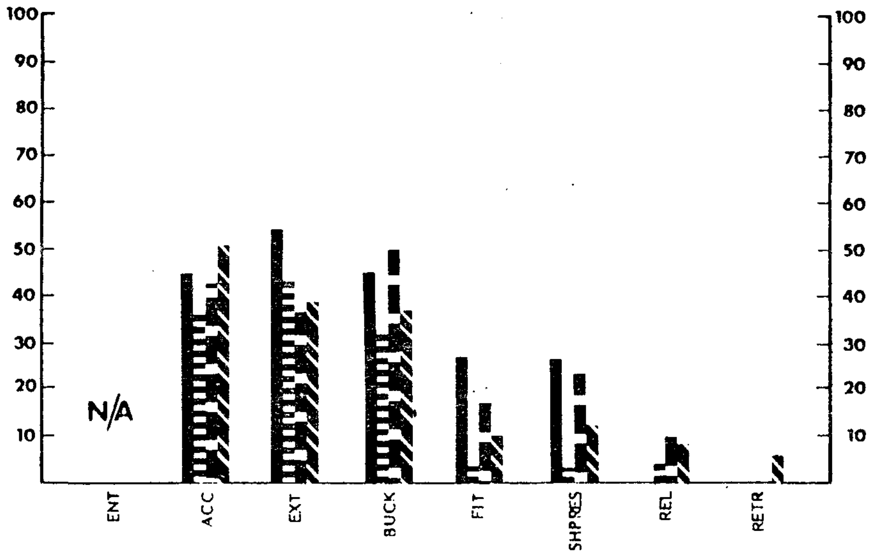
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



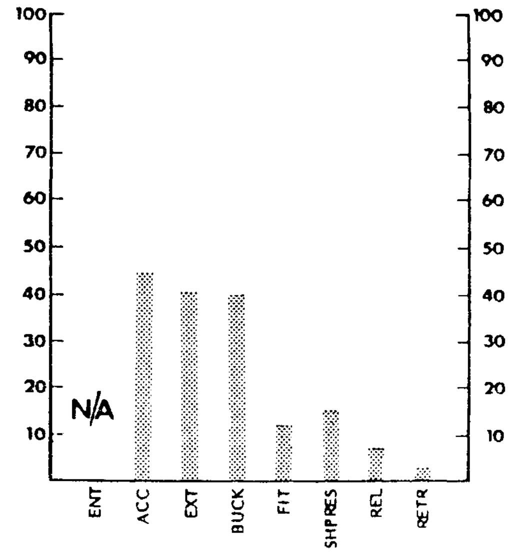
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



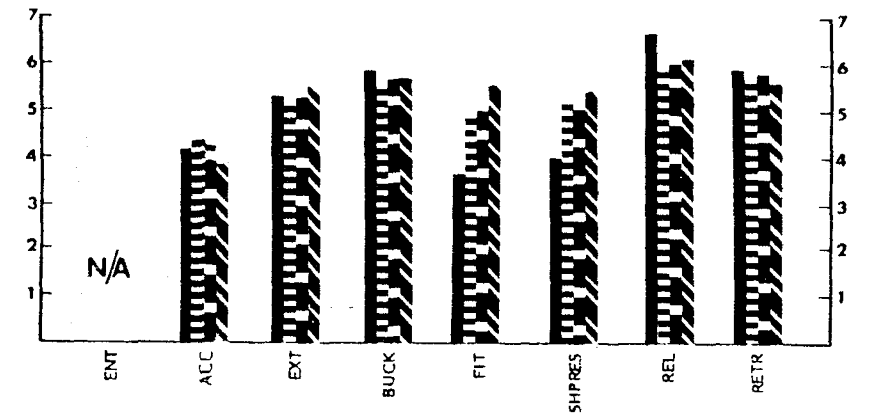
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 8.8 Slack N/A
Not Fully Retracted 4.3

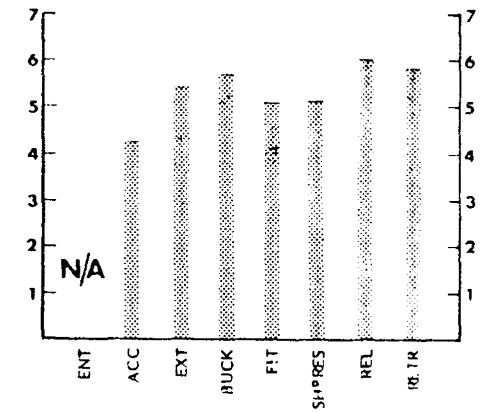
TOYOTA TERCEL

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	MANUAL, COMFORT ZONE
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	

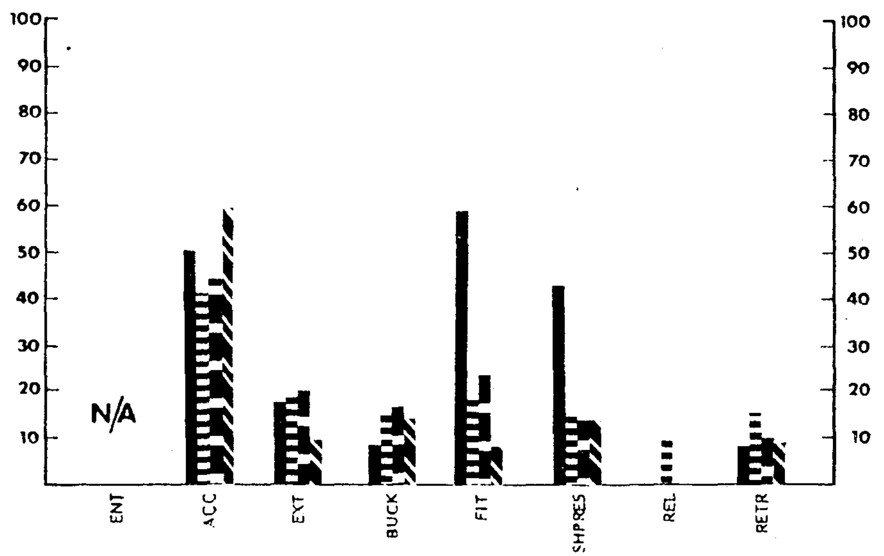
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



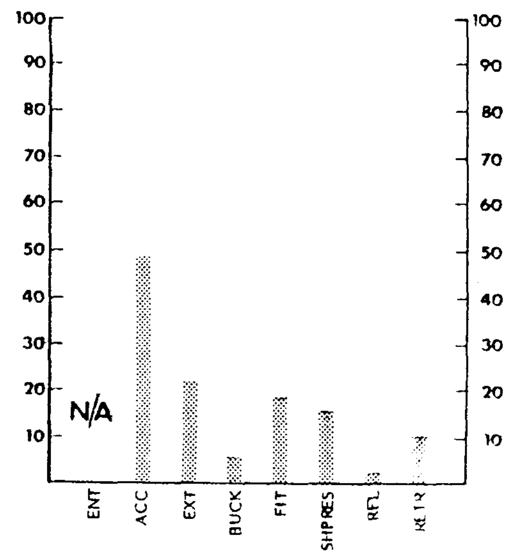
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



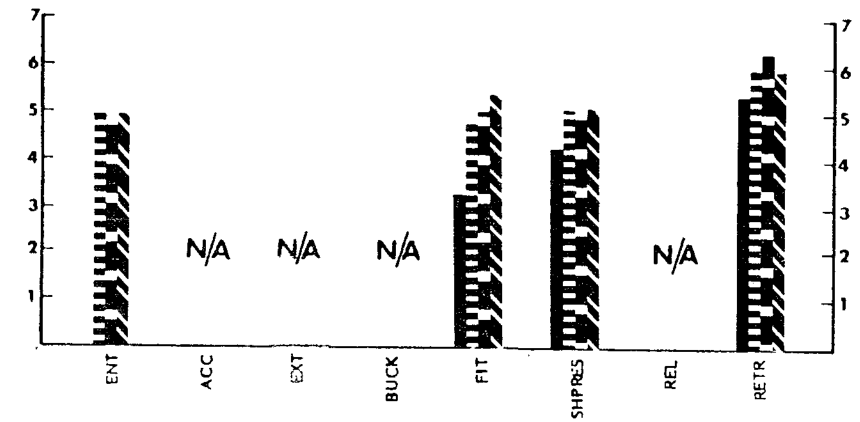
KEY Short/Overweight · Short/Not Overweight · Average/Overweight · Average/Not Overweight

PERCENT Twisted 4.3 Slack N/A
Not Fully Retracted 93.1

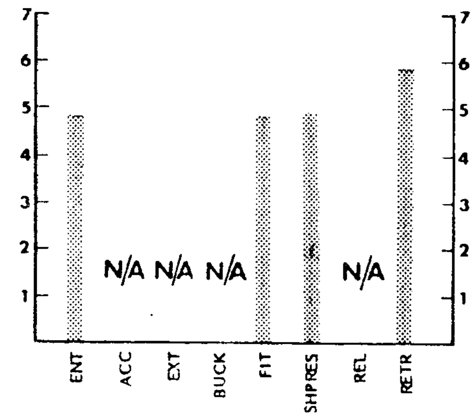
VOLKSWAGEN JETTA

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	AUTOMATIC, 2-POINT
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	

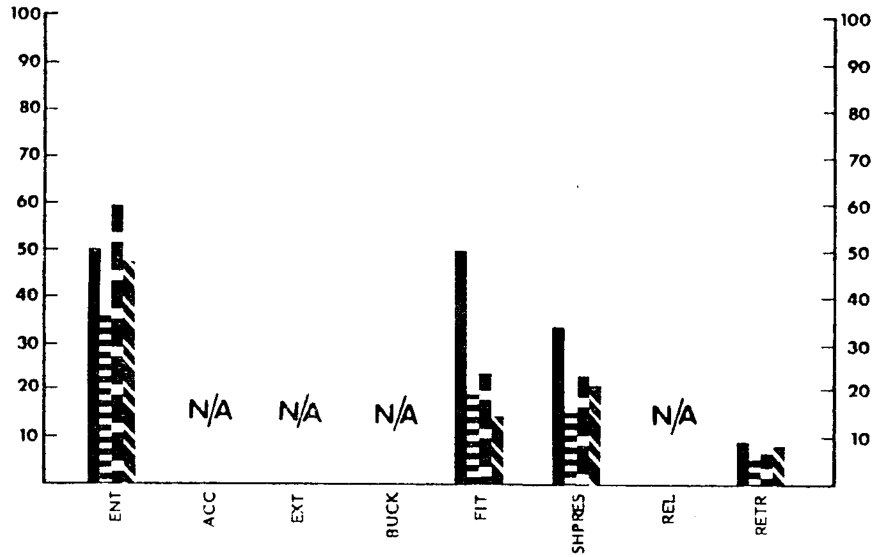
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



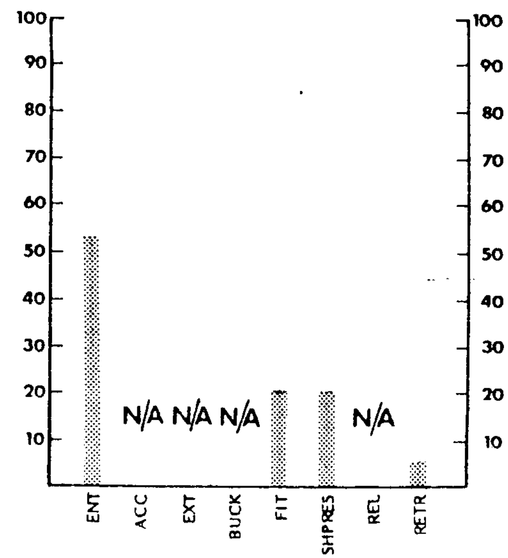
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



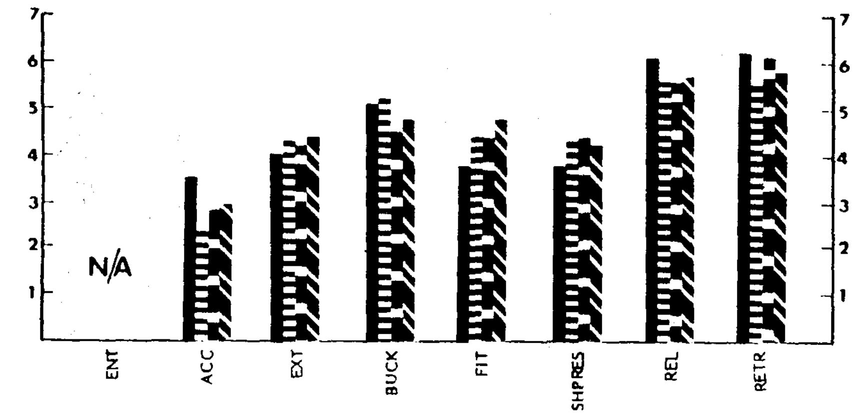
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 6.8 Slack N/A
Not Fully Retracted 82.1

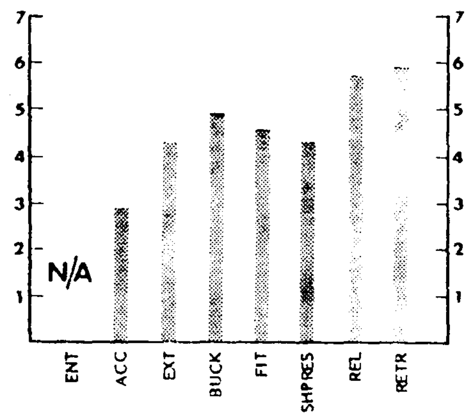
VOLKSWAGEN JETTA

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	

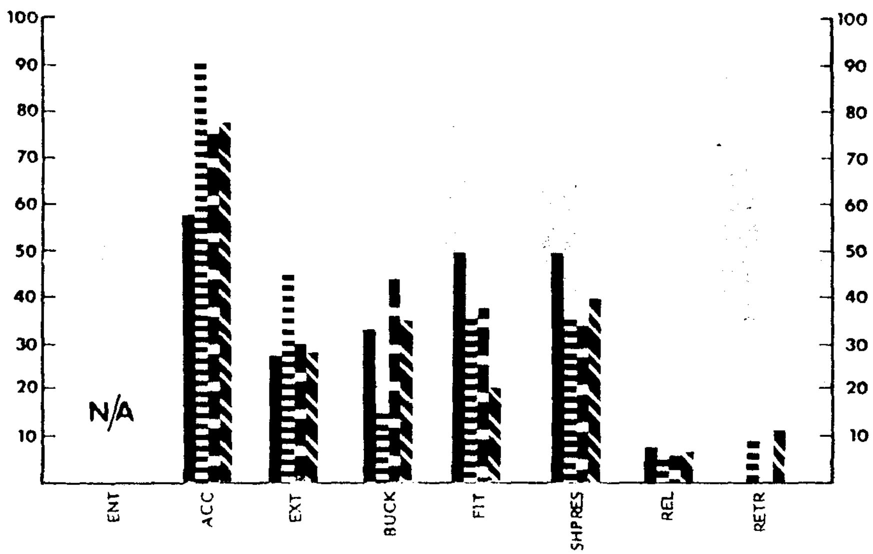
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



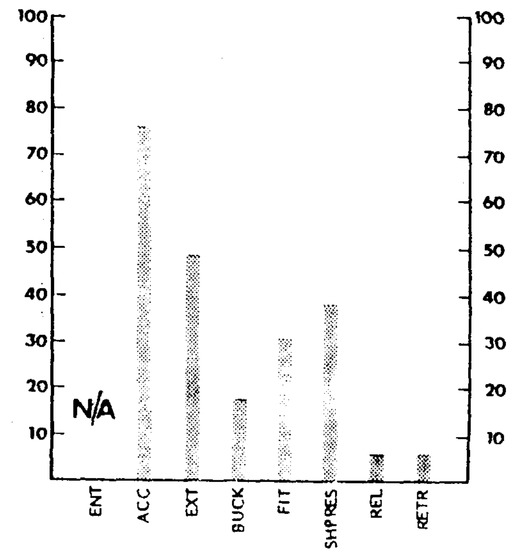
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

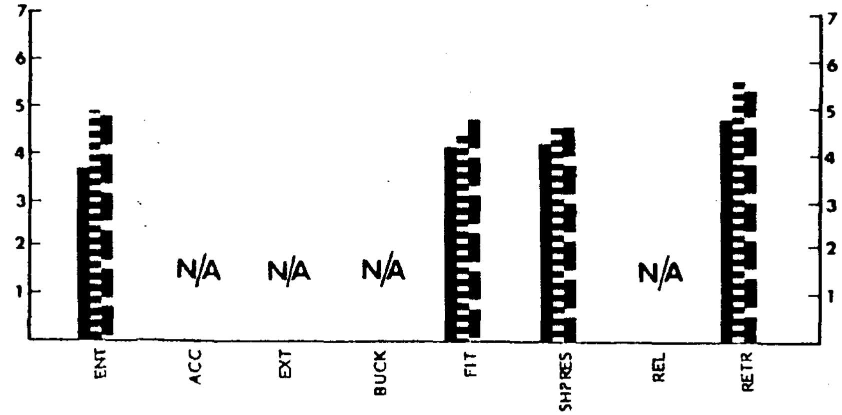
PERCENT Twisted 10.4 Slack N/A
Not Fully Retracted 93.1

VOLKSWAGEN RABBIT

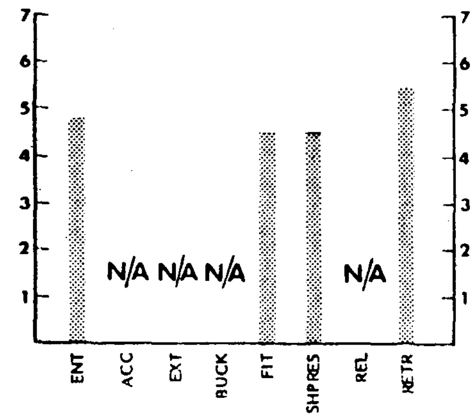
SIZE: SUBCOMPACT
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: AUTOMATIC
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE: N/A

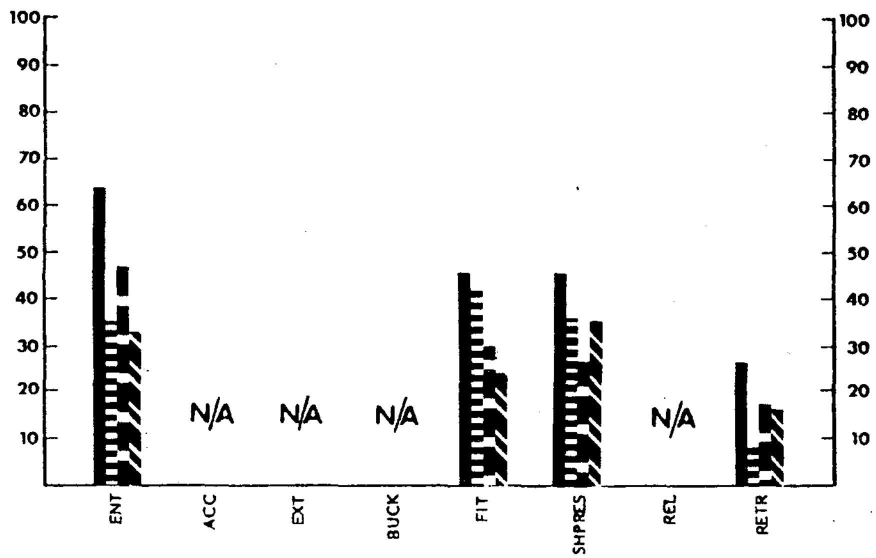
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



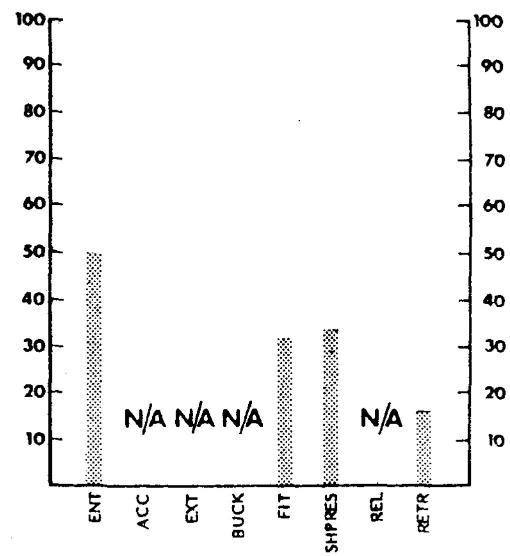
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



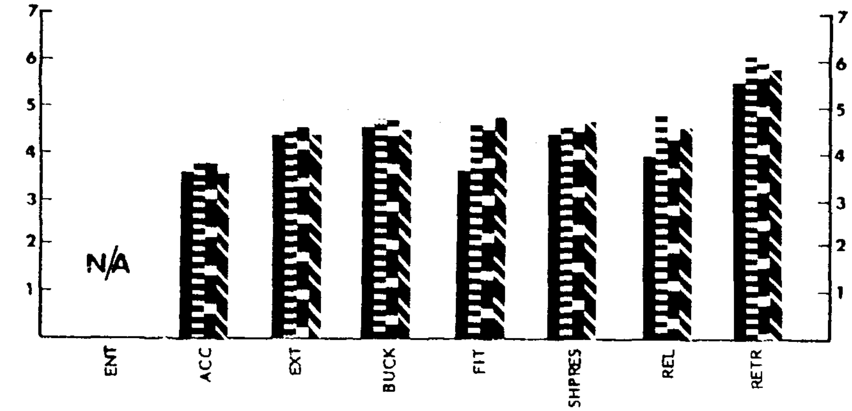
KEY Short/Overweight — Average/Overweight — Short/Not Overweight — Average/Not Overweight

PERCENT Twisted 13.9 Slack N/A
Not Fully Retracted 6.1

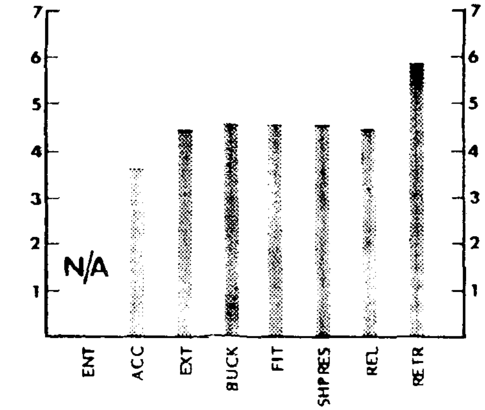
VOLKSWAGEN RABBIT

SIZE:	SUBCOMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	2	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	NO

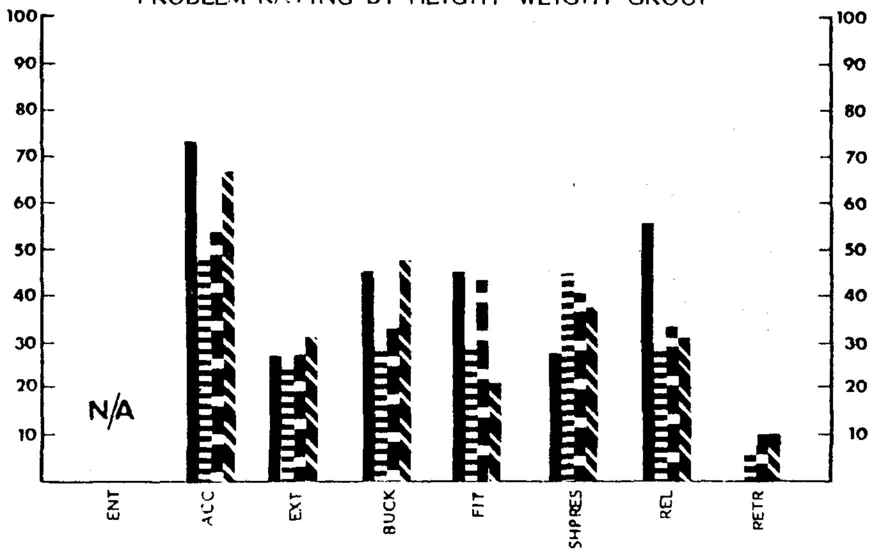
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



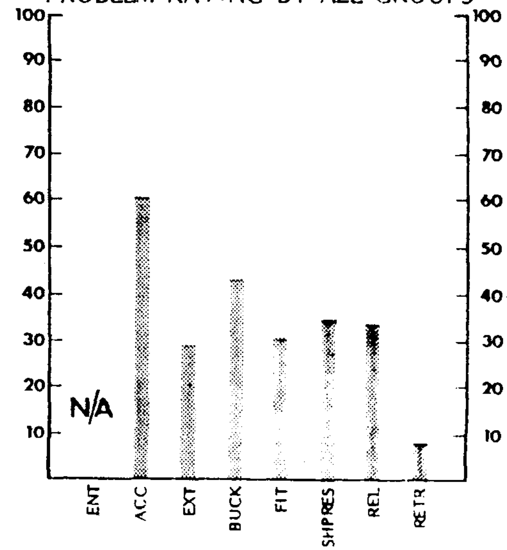
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

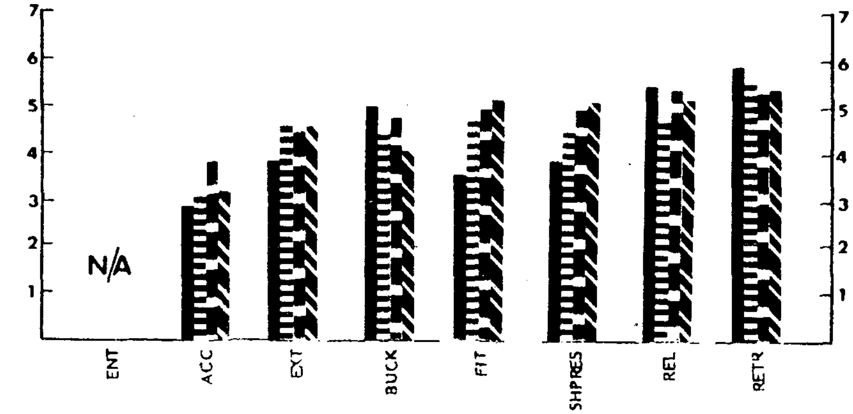
PERCENT Twisted 9.1 Slack N/A
Not Fully Retracted 7.8

VOLKSWAGEN RABBIT

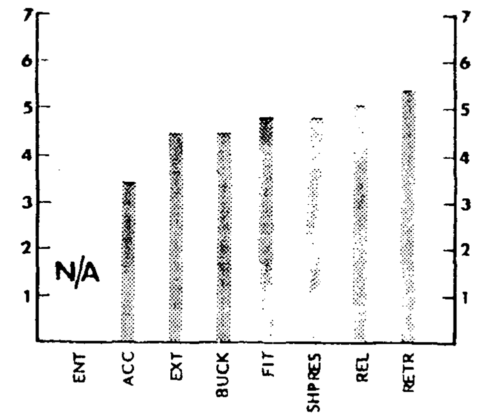
SIZE: SUBCOMPACT
DOORS: 2
SEAT: BUCKET

SAFETY BELT TYPE: MANUAL, CONTINUOUS LOOP
WINDOW SHADE DEVICE: NO
LATCHPLATE LOCKING DEVICE:

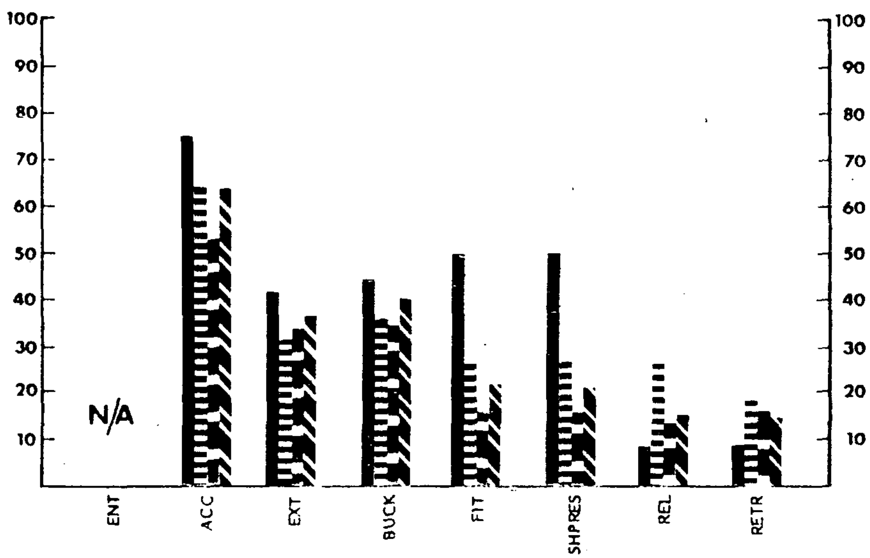
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



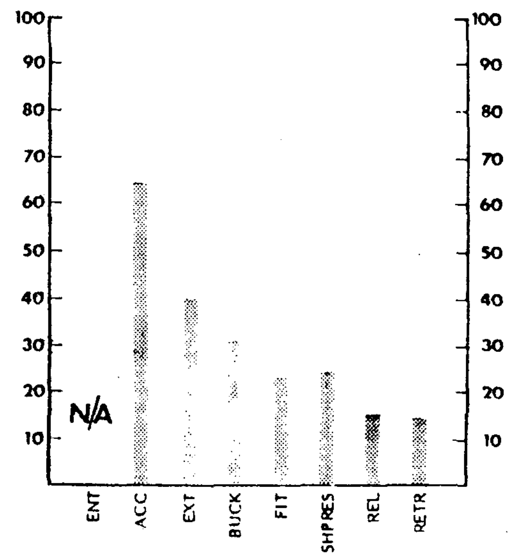
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



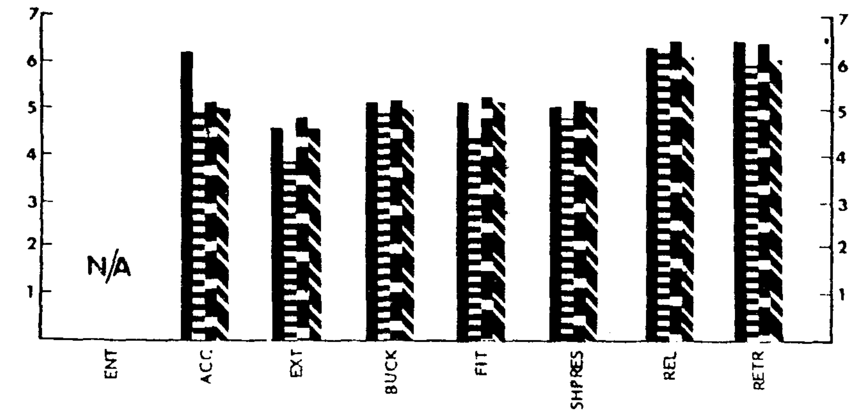
KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 4.3 Slack N/A
Not Fully Retracted 92.3

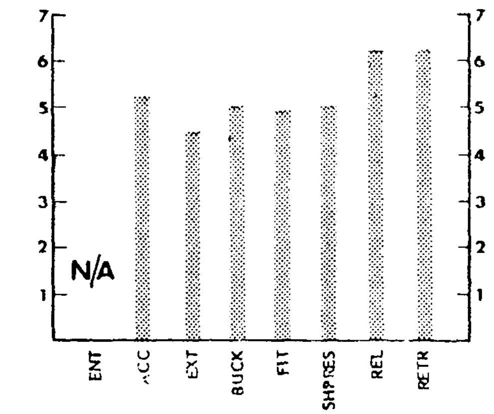
VOLVO 244

SIZE:	COMPACT	SAFETY BELT TYPE:	MANUAL, CONTINUOUS LOOP
DOORS:	4	WINDOW SHADE DEVICE:	NO
SEAT:	BUCKET	LATCHPLATE LOCKING DEVICE:	

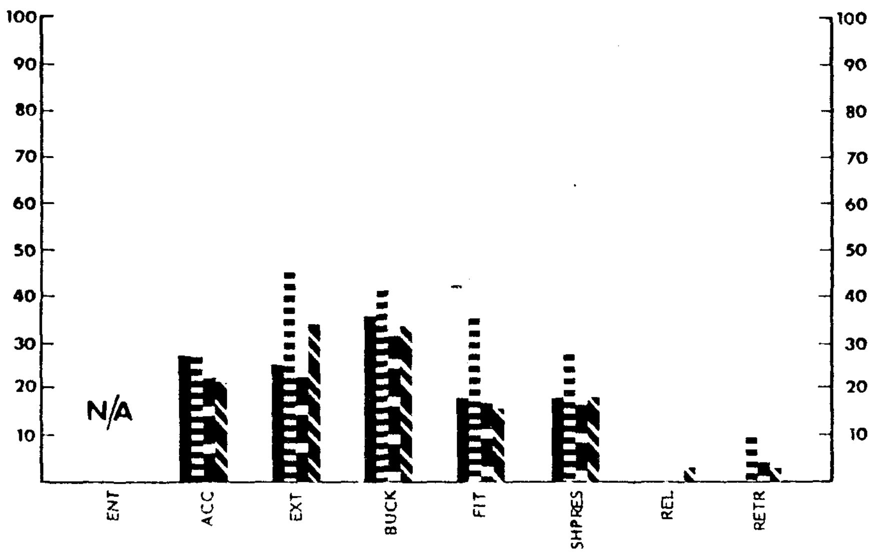
AVERAGE RATING BY HEIGHT-WEIGHT GROUP



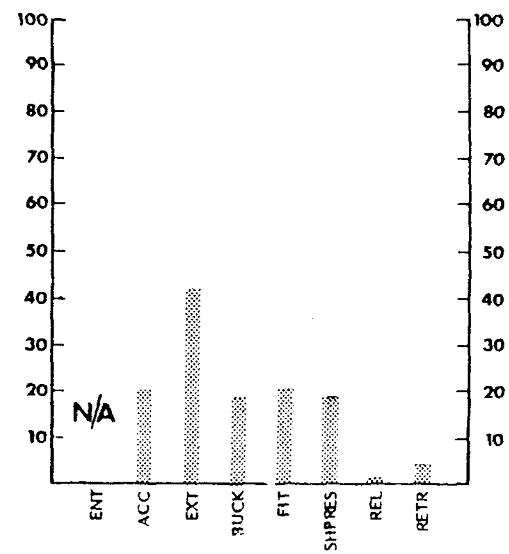
AVERAGE RATING BY ALL GROUPS



PROBLEM RATING BY HEIGHT-WEIGHT GROUP



PROBLEM RATING BY ALL GROUPS



KEY Short/Overweight; Short/Not Overweight; Average/Overweight; Average/Not Overweight

PERCENT Twisted 6.9 Slack N/A
Not Fully Retracted 87.9

Appendix D

COMPUTER OUTPUT
FOR STATISTICAL ANALYSIS

Presented in this appendix are copies of the computer output used in the analysis of variance and Chi-square analysis used to determine which user and safety belt system characteristics had significant impacts on comfort and convenience.

Exhibit D1-1

Analysis of The Relationship Between Height of Participant And Accessibility

Crosstabulation

ACC13 by HGROUP (cells: COUNT / ROW PCT / COL PCT / TOT PCT)

ACC13		LE 59 IN 1	60-62 IN 2	63-66 IN 3	67-69 IN 4	GE 70 IN 5	ROW TOTAL
0	COUNT	43	127	208	91	64	533
	ROW PCT	8.1	23.8	39.0	17.1	12.0	60.1
	COL PCT	66.2	61.4	60.6	54.8	60.4	
	TOT PCT	4.8	14.3	23.4	10.3	7.2	
1	COUNT	22	80	135	75	42	354
	ROW PCT	6.2	22.6	38.1	21.2	11.9	39.9
	COL PCT	33.8	38.6	39.4	45.2	39.6	
	TOT PCT	2.5	9.0	15.2	8.5	4.7	
COLUMN TOTAL		65	207	343	166	106	887
		7.3	23.3	38.7	18.7	12.0	100.0

RAW CHI SQUARE = 3.10429 WITH 4 DEGREES OF FREEDOM. SIGNIFICANCE = 0.5405

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	4	0.7444	0.1861	0.774	0.543
WITHIN GROUPS	882	211.9749	0.2403		
TOTAL	886	212.7193			

Exhibit D1-2

Analysis Of The Relationship Between Height of Participant And Extending

Crosstabulation

EXT13 / HGROUP		ILE 59 IN 1	60-62 IN 2	63-66 IN 3	67-69 IN 4	GE 70 IN 5	ROW TOTAL
0	COUNT	329	818	1492	759	398	3796
	ROW PCT	8.7	21.5	39.3	20.0	10.5	71.7
	COL PCT	71.8	69.5	74.0	73.8	64.4	
	TOT PCT	6.2	15.4	28.2	14.3	7.5	
1	COUNT	129	359	523	269	220	1500
	ROW PCT	8.6	23.9	34.9	17.9	14.7	28.3
	COL PCT	28.2	30.5	26.0	26.2	35.6	
	TOT PCT	2.4	6.8	9.9	5.1	4.2	
COLUMN TOTAL		458	1177	2015	1028	618	5296
		8.6	22.2	38.0	19.4	11.7	100.0

RAW CHI SQUARE = 26.78818 WITH 4 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB
BETWEEN GROUPS	4	5.4382	1.3596	6.725	C.000
WITHIN GROUPS	5291	1069.7131	0.2022		
TOTAL	5295	1075.1514			

Exhibit D1-3

Analysis of The Relationship Between Height of Participant and Buckling

Crosstabulation

BUCK13	HGROUP: COUNT / ROW PCT / COL PCT / TOT PCT	LE 59 IN 1	60-62 IN 2	63-66 IN 3	67-69 IN 4	GE 70 IN 5	ROW TOTAL
0	COUNT	344	911	1535	801	433	4024
	ROW PCT	8.5	22.6	38.1	19.9	10.8	76.3
	COL PCT	75.3	77.7	76.4	78.5	70.4	
	TOT PCT	6.5	17.3	29.1	15.2	8.2	
1	COUNT	113	262	474	220	182	1251
	ROW PCT	9.0	20.9	37.9	17.6	14.5	23.7
	COL PCT	24.7	22.3	23.6	21.5	29.6	
	TOT PCT	2.1	5.0	9.0	4.2	3.5	
COLUMN TOTAL		457	1173	2009	1021	615	5275
		8.7	22.2	38.1	19.4	11.7	100.0

RAW CHI SQUARE = 15.90654 WITH 4 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0031

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB
BETWEEN GROUPS	4	2.8774	0.7194	3.985	0.004
WITHIN GROUPS	5270	951.4399	0.1805		
TOTAL	5274	954.3174			

Exhibit D1-4

Analysis of the Relationship Between Height of Participant and Fit Crosstabulation

FIT13	HGROUP: COUNT / ROW PCT / COL PCT / TOT PCT	LE 59 IN 1	60-62 IN 2	63-66 IN 3	67-69 IN 4	GE 70 IN 5	ROW TOTAL
0	COUNT	322	967	1903	917	542	4651
	ROW PCT	6.9	20.8	40.9	19.7	11.7	74.9
	COL PCT	60.9	69.4	80.4	76.8	74.8	
	TOT PCT	5.2	15.6	30.7	14.8	8.7	
1	COUNT	207	426	463	277	183	1556
	ROW PCT	13.3	27.4	29.8	17.8	11.8	25.1
	COL PCT	39.1	30.6	19.6	23.2	25.2	
	TOT PCT	3.3	6.9	7.5	4.5	2.9	
COLUMN TOTAL		529	1393	2366	1194	725	6207
		8.5	22.4	38.1	19.2	11.7	100.0

RAW CHI SQUARE = 118.55457 WITH 4 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	4	22.2693	5.5673	30.191	0.000
WITHIN GROUPS	6202	1143.6655	0.1844		
TOTAL	6206	1165.9348			

Exhibit D1-5

Analysis of the Relationship Between Height of Participant and Pressure

Crosstabulation

HGROUP

SHPR13	COUNT / ROW PCT / COL PCT / TOT PCT	LE 59 IN (1)	60-62 IN (2)	63-66 IN (3)	67-69 IN (4)	GE 70 IN (5)	ROW TOTAL
0	COUNT	352	1017	1909	930	526	4734
	ROW PCT	7.4	21.5	40.3	19.6	11.1	76.4
	COL PCT	66.7	73.2	80.7	78.2	72.7	
	TOT PCT	5.7	16.4	30.8	15.0	8.5	
1	COUNT	176	373	457	259	198	1463
	ROW PCT	12.0	25.5	31.2	17.7	13.5	23.6
	COL PCT	33.3	26.8	19.3	21.8	27.3	
	TOT PCT	2.8	6.0	7.4	4.2	3.2	
COLUMN TOTAL		528	1390	2366	1189	724	6197
		8.5	22.4	38.2	19.2	11.7	100.0

RAW CHI SQUARE = 67.70061 WITH 4 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	4	12.2095	3.0524	17.098	0.000
WITHIN GROUPS	6192	1105.4028	0.1785		
TOTAL	6196	1117.6123			

Exhibit D1-6
Analysis of the Relationship Between Height of Participant and Releasing
Crosstabulation

REL13	HGROUP COUNT ROW PCT COL PCT TOT PCT	LE 59 IN 1	60-62 IN 2	63-66 IN 3	67-69 IN 4	GE 70 IN 5	ROW TOTAL
	0	424	1086	1886	965	561	4922
		8.6	22.1	38.3	19.6	11.4	92.8
		92.2	92.0	93.4	93.9	90.9	
		8.0	20.5	35.6	18.2	10.6	
	1	36	94	134	63	56	383
		9.4	24.5	35.0	16.4	14.6	7.2
		7.8	8.0	6.6	6.1	9.1	
		0.7	1.8	2.5	1.2	1.1	
	COLUMN TOTAL	460	1180	2020	1028	617	5305
		8.7	22.2	38.1	19.4	11.6	100.0

RAW CHI SQUARE = 7.27199 WITH 4 DEGREES OF FREEDOM. SIGNIFICANCE = 0.1222

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	4	0.4871	0.1218	1.819	0.121
WITHIN GROUPS	5300	354.8618	0.0670		
TOTAL	5304	355.3489			

Exhibit D1-7
Analysis of the Relationship Between Height of Participant and Retraction
Crosstabulation

HGROUP

RETR13	COUNT / ROW PCT / COL PCT / TOT PCT	LE 59 IN 1	60-62 IN 2	63-66 IN 3	67-69 IN 4	GE 70 IN 5	ROW TOTAL
0	COUNT	422	1129	1998	978	573	5100
	ROW PCT	8.3	22.1	39.2	19.2	11.2	82.1
	COL PCT	79.8	81.0	84.4	81.6	78.9	
	TOT PCT	6.8	18.2	32.1	15.7	9.2	
1	COUNT	107	264	370	221	153	1115
	ROW PCT	9.6	23.7	33.2	19.8	13.7	17.9
	COL PCT	20.2	19.0	15.6	18.4	21.1	
	TOT PCT	1.7	4.2	6.0	3.6	2.5	
COLUMN TOTAL		529	1393	2368	1199	726	6215
		8.5	22.4	38.1	19.3	11.7	100.0

RAW CHI SQUARE = 16.51022 WITH 4 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0024

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	4	2.4306	0.6077	4.135	0.003
WITHIN GROUPS	6210	912.5332	0.1469		
TOTAL	6214	914.9639			

Exhibit D2-1

Analysis of the Relationship Between Safety Belt Usage Rates and Accessibility

Crosstabulation

ACC13	COUNT / ROW PCT / COL PCT / TOT PCT	USEAGE: LE 20 (1)	GT20LT70 (2)	GE 70 (3)	ROW TOTAL
0	COUNT	2334	376	323	3033
	ROW PCT	77.0	12.4	10.6	57.8
	COL PCT	57.9	65.8	50.0	
	TOT PCT	44.4	7.2	6.2	
1	COUNT	1700	195	323	2218
	ROW PCT	76.6	8.8	14.6	42.2
	COL PCT	42.1	34.2	50.0	
	TOT PCT	32.4	3.7	6.2	
COLUMN TOTAL		4034	571	646	5251
		76.8	10.9	12.3	100.0

RAW CHI SQUARE = 31.27534 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	7.6304	3.8152	15.722	0.000
WITHIN GROUPS	5248	1273.4961	0.2427		
TOTAL	5250	1281.1265			

Exhibit D2-2

Analysis of the Relationship Between Safety Belt Useage Rates and Extending

Crosstabulation

USEAGE

EXT13	COUNT / ROW PCT / COL PCT / TOT PCT	ILE 20 1	GT20LT70 2	GE 70 3	ROW TOTAL
0	COUNT	2864	432	463	3759
	ROW PCT	76.2	11.5	12.3	71.7
	COL PCT	71.1	75.7	71.9	
	TOT PCT	54.6	8.2	8.8	
1	COUNT	1163	139	181	1483
	ROW PCT	78.4	9.4	12.2	28.3
	COL PCT	28.9	24.3	28.1	
	TOT PCT	22.2	2.7	3.5	
COLUMN TOTAL		4027	571	644	5242
		76.8	10.9	12.3	100.0

RAW CHI SQUARE = 5.08617 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0786

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	1.0317	0.5159	2.544	0.077
WITHIN GROUPS	5239	1062.4170	0.2028		
TOTAL	5241	1063.4487			

Exhibit D2-3
Analysis of the Relationship Between Safety Belt Useage Rates and Buckling
Crosstabulation

USEAGE

BUCK13	COUNT / ROW PCT / COL PCT / TOT PCT	LE 20 (1)	GT20LT70 (2)	GE 70 (3)	ROW TOTAL
0	COUNT	3062	442	478	3982
	ROW PCT	76.9	11.1	12.0	76.3
	COL PCT	76.4	78.0	74.2	
	TOT PCT	58.6	8.5	9.2	
1	COUNT	948	125	166	1239
	ROW PCT	76.5	10.1	13.4	23.7
	COL PCT	23.6	22.0	25.8	
	TOT PCT	18.2	2.4	3.2	
COLUMN TOTAL		4010	567	644	5221
		76.8	10.9	12.3	100.0

RAW CHI SQUARE = 2.39617 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.3018

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	0.4336	0.2168	1.198	0.302
WITHIN GROUPS	5218	944.5383	0.1810		
TOTAL	5220	944.9719			

Exhibit D2-4
Analysis of the Relationship Between Safety Belt Useage Rates and Fit
Crosstabulation

USEAGE

FIT13	COUNT / ROW PCT / COL PCT / TOT PCT	ILE 20 (1)	GT20LT70 (2)	GE 70 (3)	ROW TOTAL
0	COUNT	3521	551	532	4604
	ROW PCT	76.5	12.0	11.6	74.9
	COL PCT	74.3	84.3	70.0	
	TOT PCT	57.3	9.0	8.7	
1	COUNT	1215	103	228	1546
	ROW PCT	78.6	6.7	14.7	25.1
	COL PCT	25.7	15.7	30.0	
	TOT PCT	19.8	1.7	3.7	
COLUMN TOTAL		4736	654	760	6150
		77.0	10.6	12.4	100.0

RAW CHI SQUARE = 40.85187 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	7.6877	3.8439	20.552	0.000
WITHIN GROUPS	6147	1149.6755	0.1870		
TOTAL	6149	1157.3633			

Exhibit D2-5
Analysis of the Relationship Between Safety Belt Useage Rates and Pressure
Crosstabulation

SHPR13	COUNT / ROW PCT / COL PCT / TOT PCT	USEAGE: LE 20 (1)	GT20LT70 (2)	GE 70 (3)	ROW TOTAL
0	COUNT	3572	553	566	4691
	ROW PCT	76.1	11.8	12.1	76.4
	COL PCT	75.6	84.2	74.5	
	TOT PCT	58.2	9.0	9.2	
1	COUNT	1153	104	194	1451
	ROW PCT	79.5	7.2	13.4	23.6
	COL PCT	24.4	15.8	25.5	
	TOT PCT	18.8	1.7	3.2	
COLUMN TOTAL		4725	657	760	6142
		76.9	10.7	12.4	100.0

RAW CHI SQUARE = 25.23181 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	4.5525	2.2762	12.661	0.000
WITHIN GROUPS	6139	1103.6602	0.1798		
TOTAL	6141	1108.2126			

Exhibit D2-6

Analysis of the Relationship Between Safety Belt Useage Rates and Releasing

Crosstabulation

USEAGE

REL13	COUNT / ROW PCT / COL PCT / TOT PCT	ILE 20 (1)	GT20LT70 (2)	GE 70 (3)	ROW TOTAL
	0	3747	534	589	4870
		76.9	11.0	12.1	92.7
		92.9	93.4	91.2	
		71.4	10.2	11.2	
	1	286	38	57	381
		75.1	10.0	15.0	7.3
		7.1	6.6	8.8	
		5.4	0.7	1.1	
	COLUMN TOTAL	4033	572	646	5251
		76.8	10.9	12.3	100.0

RAW CHI SQUARE = 2.84004 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.2417

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	0.1911	0.0956	1.420	0.240
WITHIN GROUPS	5248	353.1643	0.0673		
TOTAL	5250	353.3555			

Exhibit D2-7

Analysis of the Relationship Between Safety Belt Useage Rates and Retraction

Crosstabulation

RETR13	COUNT / ROW PCT / COL PCT / TOT PCT	USEAGE: ILE 20 (1)	GT20LT70 (2)	GE 70 (3)	ROW TOTAL
0	COUNT	3881	570	601	5052
	ROW PCT	76.8	11.3	11.9	82.0
	COL PCT	81.9	86.8	78.9	
	TOT PCT	63.0	9.3	9.8	
1	COUNT	858	87	161	1106
	ROW PCT	77.6	7.9	14.6	18.0
	COL PCT	18.1	13.2	21.1	
	TOT PCT	13.9	1.4	2.6	
COLUMN TOTAL		4739	657	762	6158
		77.0	10.7	12.4	100.0

RAW CHI SQUARE = 15.18514 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0005

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	2.2375	1.1187	7.608	0.001
WITHIN GROUPS	6155	905.1206	0.1471		
TOTAL	6157	907.3582			

Exhibit D3-1
Analysis of the Relationship Between Type of Safety Belt System and Accessibility
Crosstabulation

ACC13	NEWSB: COUNT / ROW PCT / COL PCT / TOT PCT	CONTLOOP 1	DUALRETR 2	ROW TOTAL
0	COUNT	2664	329	2993
	ROW PCT	89.0	11.0	57.6
	COL PCT	56.2	72.6	
	TOT PCT	51.3	6.3	
1	COUNT	2076	124	2200
	ROW PCT	94.4	5.6	42.4
	COL PCT	43.8	27.4	
	TOT PCT	40.0	2.4	
COLUMN TOTAL		4740	453	5193
		91.3	8.7	100.0

CORRECTED CHI SQUARE = 45.01172 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	11.1538	11.1538	46.068	0.000
WITHIN GROUPS	5191	1256.8225	0.2421		
TOTAL	5192	1267.9763			

Exhibit D3-2

Analysis of the Relationship Between Type of Safety Belt System and Extending

Crosstabulation

EXT13	COUNT / ROW PCT / COL PCT / TOT PCT	NEWSB: CONTLOOP 1	DUALRETR 2	ROW TOTAL
0	COUNT	3341	359	3700
	ROW PCT	90.3	9.7	71.4
	COL PCT	70.6	79.4	
	TOT PCT	64.4	6.9	
1	COUNT	1391	93	1484
	ROW PCT	93.7	6.3	28.6
	COL PCT	29.4	20.6	
	TOT PCT	26.8	1.8	
COLUMN TOTAL		4732	452	5184
		91.3	8.7	100.0

CORRECTED CHI SQUARE = 15.28166 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0001

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	3.2100	3.2100	15.752	0.000
WITHIN GROUPS	5182	1055.9724	0.2038		
TOTAL	5183	1059.1824			

Exhibit D3-3
Analysis of the Relationship Between Type of Safety Belt System and Buckling
Crosstabulation

BUCK13 by NEWSB COUNT ROW PCT COL PCT TOT PCT	CONTLOOP 1	DUALRETR 2	ROW TOTAL
0	3566 90.8 75.6 69.1	362 9.2 80.8 7.0	3928 76.1
1	1150 93.0 24.4 22.3	86 7.0 19.2 1.7	1236 23.9
COLUMN TOTAL	4716 91.3	448 8.7	5164 100.0

CORRECTED CHI SQUARE = 5.76836 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0163

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	1.1013	1.1013	6.054	0.013
WITHIN GROUPS	5162	939.0630	0.1819		
TOTAL	5163	940.1643			

Exhibit D3-4
Analysis of the Relationship Between Type of Safety Belt System and Fit
Crosstabulation

FIT13	NEWSB: COUNT / ROW PCT / COL PCT / TOT PCT	CONTLOOP 1	DUALRETR 2	ROW TOTAL
0	COUNT	3756	338	4094
	ROW PCT	91.7	8.3	74.1
	COL PCT	74.0	75.1	
	TOT PCT	68.0	6.1	
1	COUNT	1321	112	1433
	ROW PCT	92.2	7.8	25.9
	COL PCT	26.0	24.9	
	TOT PCT	23.9	2.0	
COLUMN TOTAL		5077	450	5527
		91.9	8.1	100.0

CORRECTED CHI SQUARE = 0.21933 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.6396

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.0527	0.0527	0.275	0.601
WITHIN GROUPS	5525	1061.4097	0.1921		
TOTAL	5526	1061.4624			

Exhibit D3-5

Analysis of the Relationship Between Type of Safety Belt System and Pressure

Crosstabulation

SHPR13	COUNT / ROW PCT / COL PCT / TOT PCT	NEWSB: CONTLOOP 1	DUALRETR 2	ROW TOTAL
0	COUNT	3814	355	4169
	ROW PCT	91.5	8.5	75.6
	COL PCT	75.3	78.9	
	TOT PCT	69.1	6.4	
1	COUNT	1254	95	1349
	ROW PCT	93.0	7.0	24.4
	COL PCT	24.7	21.1	
	TOT PCT	22.7	1.7	
COLUMN TOTAL		5068	450	5518
		91.8	8.2	100.0

CORRECTED CHI SQUARE = 2.75897 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0967

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.5452	0.5452	2.952	0.082
WITHIN GROUPS	5516	1018.6614	0.1847		
TOTAL	5517	1019.2065			

Exhibit D3-6
Analysis of the Relationship Between Type of Safety Belt System and Releasing
Crosstabulation

NEWSB

REL13	COUNT / ROW PCT / COL PCT / TOT PCT	CONTLOOP 1	DUALRETR 2	ROW TOTAL
0	COUNT	4370	443	4813
	ROW PCT	90.8	9.2	92.7
	COL PCT	92.2	97.8	
	TOT PCT	84.1	8.5	
1	COUNT	371	10	381
	ROW PCT	97.4	2.6	7.3
	COL PCT	7.8	2.2	
	TOT PCT	7.1	0.2	
COLUMN TOTAL		4741	453	5194
		91.3	8.7	100.0

CORRECTED CHI SQUARE = 18.38098 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	1.3050	1.3050	19.262	0.000
WITHIN GROUPS	5192	351.7471	0.0677		
TOTAL	5193	353.0520			

Exhibit D3-7
Analysis of the Relationship Between Type of Safety Belt System and Retraction
Crosstabulation

RETR13 by NEWSB (COUNT / ROW PCT / COL PCT / TOT PCT)

RETR13		CONTLOOP 1	DUALRETR 2	ROW TOTAL
0	COUNT	4036	429	4465
	ROW PCT	90.4	9.6	80.7
	COL PCT	79.4	94.9	
	TOT PCT	72.9	7.8	
1	COUNT	1045	23	1068
	ROW PCT	97.8	2.2	19.3
	COL PCT	20.6	5.1	
	TOT PCT	18.9	0.4	
COLUMN TOTAL		5081	452	5533
		91.8	8.2	100.0

CORRECTED CHI SQUARE = 62.85167 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	9.9444	9.9444	64.564	0.000
WITHIN GROUPS	5531	851.9062	0.1540		
TOTAL	5532	861.8506			

Exhibit D4-1

Analysis of the Relationship Between Vehicle Size and Accessibility

Crosstabulation

ACC13	MODEL: COUNT / ROW PCT / COL PCT / TOT PCT	SUBCMPCT 1	COMPACT 2	MIDSIZE 3	FULLSIZE 4	TRUCK 5	VAN 6	2-SEATER 7	ROW TOTAL
0	COUNT	911	561	251	477	461	276	112	3049
	ROW PCT	29.9	18.4	8.2	15.6	15.1	9.1	3.7	57.5
	COL PCT	40.1	70.2	83.7	69.7	67.4	80.0	50.0	
	TOT PCT	17.2	10.6	4.7	9.0	8.7	5.2	2.1	
1	COUNT	1358	238	49	207	223	69	112	2256
	ROW PCT	60.2	10.5	2.2	9.2	9.9	3.1	5.0	42.5
	COL PCT	59.9	29.8	16.3	30.3	32.6	20.0	50.0	
	TOT PCT	25.6	4.5	0.9	3.9	4.2	1.3	2.1	
COLUMN TOTAL		2269	799	300	684	684	345	224	5305
		42.8	15.1	5.7	12.9	12.9	6.5	4.2	100.0

RAW CHI SQUARE = 562.26392 WITH 6 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	6	137.4246	22.9041	104.682	0.000
WITHIN GROUPS	5298	1159.1909	0.2188		
TOTAL	5304	1296.6155			

Exhibit D4-2
Analysis of the Relationship Between Vehicle Size and Extending
Crosstabulation

MODEL

EXT13	COUNT / ROW PCT / COL PCT / TOT PCT	SUBCMPCT 1	COMPACT 2	MIDSIZE 3	FULLSIZE 4	TRUCK 5	VAN 6	2-SEATER 7	ROW TOTAL
0	COUNT	1558	576	246	511	495	255	155	3796
	ROW PCT	41.0	15.2	6.5	13.5	13.0	6.7	4.1	71.7
	COL PCT	68.8	72.3	82.3	74.8	72.2	74.1	69.5	
	TOT PCT	29.4	10.9	4.6	9.6	9.3	4.8	2.9	
1	COUNT	706	221	53	172	191	89	68	1500
	ROW PCT	47.1	14.7	3.5	11.5	12.7	5.9	4.5	28.3
	COL PCT	31.2	27.7	17.7	25.2	27.8	25.9	30.5	
	TOT PCT	13.3	4.2	1.0	3.2	3.6	1.7	1.3	
COLUMN TOTAL		2264	797	299	683	686	344	223	5296
		42.7	15.0	5.6	12.9	13.0	6.5	4.2	100.0

RAW CHI SQUARE = 30.73552 WITH 6 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	6	6.2395	1.0399	5.146	0.000
WITHIN GROUPS	5289	1068.9119	0.2021		
TOTAL	5295	1075.1514			

Exhibit D4-3
Analysis of the Relationship Between Vehicle Size and Buckling
Crosstabulation

BUCK13	COUNT / ROW PCT / COL PCT / TOT PCT	MODEL: SUBCMPCT 1	COMPACT 2	MIDSIZE 3	FULLSIZE 4	TRUCK 5	VAN 6	2-SEATER 7	ROW TOTAL
0	COUNT	1614	645	266	556	523	261	159	4024
	ROW PCT	40.1	16.0	6.6	13.8	13.0	6.5	4.0	76.3
	COL PCT	71.6	81.1	89.3	81.5	76.8	76.5	71.0	
	TOT PCT	30.6	12.2	5.0	10.5	9.9	4.9	3.0	
1	COUNT	640	150	32	126	158	80	65	1251
	ROW PCT	51.2	12.0	2.6	10.1	12.6	6.4	5.2	23.7
	COL PCT	28.4	18.9	10.7	18.5	23.2	23.5	29.0	
	TOT PCT	12.1	2.8	0.6	2.4	3.0	1.5	1.2	
COLUMN TOTAL		2254	795	298	682	681	341	224	5275
		42.7	15.1	5.6	12.9	12.9	6.5	4.2	100.0

RAW CHI SQUARE = 79.28244 WITH 6 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	6	14.3430	2.3905	13.397	0.000
WITHIN GROUPS	5268	939.9744	0.1784		
TOTAL	5274	954.3174			

Exhibit D4-4

Analysis of the Relationship Between Vehicle Size and Fit Crosstabulation

FIT13	COUNT / ROW PCT / COL PCT / TOT PCT	MODEL: SUBCMPCT 1	COMPACT 2	MIDSIZE 3	FULLSIZE 4	TRUCK 5	VAN 6	2-SEATER 7	ROW TOTAL
0	COUNT	2159	709	233	581	550	268	151	4651
	ROW PCT	46.4	15.2	5.0	12.5	11.8	5.8	3.2	74.9
	COL PCT	73.3	77.7	77.7	72.7	80.6	77.9	67.7	
	TOT PCT	34.8	11.4	3.8	9.4	8.9	4.3	2.4	
1	COUNT	788	203	67	218	132	76	72	1556
	ROW PCT	50.6	13.0	4.3	14.0	8.5	4.9	4.6	25.1
	COL PCT	26.7	22.3	22.3	27.3	19.4	22.1	32.3	
	TOT PCT	12.7	3.3	1.1	3.5	2.1	1.2	1.2	
COLUMN TOTAL		2947	912	300	799	682	344	223	6207
		47.5	14.7	4.8	12.9	11.0	5.5	3.6	100.0

RAW CHI SQUARE = 31.15417 WITH 6 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	6	5.8518	0.9753	5.212	0.000
WITHIN GROUPS	6200	1160.0830	0.1871		
TOTAL	6206	1165.9348			

Exhibit D4-5

Analysis of the Relationship Between Vehicle Size and Pressure

Crosstabulation

SHPR13	MODEL: COUNT / ROW PCT / COL PCT / TOT PCT	SUBCMPCT 1	COMPACT 2	MIDSIZE 3	FULLSIZE 4	TRUCK 5	VAN 6	2-SEATER 7	ROW TOTAL
0	COUNT	2195	708	242	624	554	267	144	4734
	ROW PCT	46.4	15.0	5.1	13.2	11.7	5.6	3.0	76.4
	COL PCT	74.6	77.6	80.9	78.3	81.5	78.1	64.3	
	TOT PCT	35.4	11.4	3.9	10.1	8.9	4.3	2.3	
1	COUNT	748	204	57	173	126	75	80	1463
	ROW PCT	51.1	13.9	3.9	11.8	8.6	5.1	5.5	23.6
	COL PCT	25.4	22.4	19.1	21.7	18.5	21.9	35.7	
	TOT PCT	12.1	3.3	0.9	2.8	2.0	1.2	1.3	
COLUMN TOTAL		2943	912	299	797	680	342	224	6197
		47.5	14.7	4.8	12.9	11.0	5.5	3.6	100.0

RAW CHI SQUARE = 39.59744 WITH 6 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	6	7.1409	1.1901	6.634	0.000
WITHIN GROUPS	6190	1110.4714	0.1794		
TOTAL	6196	1117.6123			

Exhibit D4-6
Analysis of the Relationship Between Vehicle Size and Releasing
Crosstabulation

REL13	COUNT / ROW PCT / COL PCT / TOT PCT	MODEL: SUBCMPCT 1	COMPACT 2	MIDSIZE 3	FULLSIZE 4	TRUCK 5	VAN 6	2-SEATER 7	ROW TOTAL
0	COUNT	2051	772	286	646	634	324	209	4922
	ROW PCT	41.7	15.7	5.8	13.1	12.9	6.6	4.2	92.8
	COL PCT	90.4	96.6	95.3	94.4	92.8	93.9	93.3	
	TOT PCT	38.7	14.6	5.4	12.2	12.0	6.1	3.9	
1	COUNT	219	27	14	38	49	21	15	383
	ROW PCT	57.2	7.0	3.7	9.9	12.8	5.5	3.9	7.2
	COL PCT	9.6	3.4	4.7	5.6	7.2	6.1	6.7	
	TOT PCT	4.1	0.5	0.3	0.7	0.9	0.4	0.3	
COLUMN TOTAL		2270	799	300	684	683	345	224	5305
		42.8	15.1	5.7	12.9	12.9	6.5	4.2	100.0

RAW CHI SQUARE = 44.07095 WITH 6 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	6	2.9520	0.4920	9.807	0.000
WITHIN GROUPS	5298	352.3967	0.0665		
TOTAL	5304	355.3489			

Exhibit D4-7
Analysis of the Relationship Between Vehicle Size and Retraction
Crosstabulation

RETR13 (COUNT / ROW PCT / COL PCT / TOT PCT)	MODEL: SUBCMPCT 1	COMPACT 2	MIDSIZE 3	FULLSIZE 4	TRUCK 5	VAN 6	2-SEATER 7	ROW TOTAL
0	2439	709	247	644	606	269	186	5100
	47.8	13.9	4.8	12.6	11.9	5.3	3.6	82.1
	82.6	77.7	82.3	80.8	88.7	78.2	83.0	
	39.2	11.4	4.0	10.4	9.8	4.3	3.0	
1	515	204	53	153	77	75	38	1115
	46.2	18.3	4.8	13.7	6.9	6.7	3.4	17.9
	17.4	22.3	17.7	19.2	11.3	21.8	17.0	
	8.3	3.3	0.9	2.5	1.2	1.2	0.6	
COLUMN TOTAL	2954	913	300	797	683	344	224	6215
	47.5	14.7	4.8	12.8	11.0	5.5	3.6	100.0

RAW CHI SQUARE = 37.65924 WITH 6 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	6	5.5441	0.9240	6.308	0.000
WITHIN GROUPS	6208	909.4197	0.1465		
TOTAL	6214	914.9639			

Exhibit D5-1
Analysis of the Relationship Between Seat Type and Accessibility
Crosstabulation

ACC13 (COUNT / ROW PCT / COL PCT / TOT PCT)	SEAT: BENCH 1	SEAT: BUCKET 2	ROW TOTAL
0	1065	1984	3049
	34.9	65.1	57.5
	68.3	53.0	
	20.1	37.4	
1	494	1762	2256
	21.9	78.1	42.5
	31.7	47.0	
	9.3	33.2	
COLUMN TOTAL	1559	3746	5305
	29.4	70.6	100.0

CORRECTED CHI SQUARE = 105.49632 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	25.9380	25.9380	108.249	0.000
WITHIN GROUPS	5303	1270.6775	0.2396		
TOTAL	5304	1296.6155			

Exhibit D5-2
Analysis of the Relationship Between Seat Type and Extending
Crosstabulation

EXT13	COUNT / ROW PCT / COL PCT / TOT PCT	SEAT: BENCH 1	SEAT: BUCKET 2	ROW TOTAL
0	COUNT	1138	2658	3796
	ROW PCT	30.0	70.0	71.7
	COL PCT	73.0	71.1	
	TOT PCT	21.5	50.2	
1	COUNT	421	1079	1500
	ROW PCT	28.1	71.9	28.3
	COL PCT	27.0	28.9	
	TOT PCT	7.9	20.4	
COLUMN TOTAL		1559	3737	5296
		29.4	70.6	100.0

CORRECTED CHI SQUARE = 1.80179 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.1795

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.3843	0.3843	1.893	0.165
WITHIN GROUPS	5294	1074.7671	0.2030		
TOTAL	5295	1075.1514			

Exhibit D5-3
Analysis of the Relationship Between Seat Type and Buckling
Crosstabulation

```
                      SEAT
             COUNT   I
           ROW PCT   IBENCH      BUCKET       ROW
           COL PCT   I                        TOTAL
           TOT PCT   I       1   I       2   I
BUCK13     --------I---------I---------I
                 0   I   1259    I   2765    I   4024
                     I   31.3    I   68.7    I   76.3
                     I   81.0    I   74.3    I
                     I   23.9    I   52.4    I
                    -I---------I---------I
                 1   I    295    I    956    I   1251
                     I   23.6    I   76.4    I   23.7
                     I   19.0    I   25.7    I
                     I    5.6    I   18.1    I
                    -I---------I---------I
            COLUMN       1554        3721        5275
             TOTAL       29.5        70.5       100.0
```

CORRECTED CHI SQUARE =   26.90140 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F EBCB.
BETWEEN GROUPS	1	4.9336	4.9336	27.402	0.000
WITHIN GROUPS	5273	949.3838	0.1800		
TOTAL	5274	954.3174			

Exhibit D5-4
Analysis of the Relationship Between Seat Type and Fit
Crosstabulation

FIT13	COUNT / ROW PCT / COL PCT / TOT PCT	SEAT: BENCH 1	SEAT: BUCKET 2	ROW TOTAL
0	COUNT	1314	3337	4651
	ROW PCT	28.3	71.7	74.9
	COL PCT	78.6	73.6	
	TOT PCT	21.2	53.8	
1	COUNT	358	1198	1556
	ROW PCT	23.0	77.0	25.1
	COL PCT	21.4	26.4	
	TOT PCT	5.8	19.3	
COLUMN TOTAL		1672	4535	6207
		26.9	73.1	100.0

CORRECTED CHI SQUARE = 16.02739 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0001

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	3.0605	3.0605	16.331	0.000
WITHIN GROUPS	6205	1162.8743	0.1874		
TOTAL	6206	1165.9348			

Exhibit D5-5
Analysis of the Relationship Between Seat Type and Pressure
Crosstabulation

SHPR13	SEAT COUNT ROW PCT COL PCT TOT PCT	BENCH 1	BUCKET 2	ROW TOTAL
0		1334 28.2 79.9 21.5	3400 71.8 75.1 54.9	4734 76.4
1		335 22.9 20.1 5.4	1128 77.1 24.9 18.2	1463 23.6
	COLUMN TOTAL	1669 26.9	4528 73.1	6197 100.0

CORRECTED CHI SQUARE = 15.57146 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0001

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	2.8564	2.8564	15.874	0.000
WITHIN GROUPS	6195	1114.7559	0.1799		
TOTAL	6196	1117.6123			

Exhibit D5-6

Analysis of the Relationship Between Seat Type and Releasing

Crosstabulation

REL13	COUNT / ROW PCT / COL PCT / TOT PCT	SEAT: BENCH 1	SEAT: BUCKET 2	ROW TOTAL
0	COUNT	1481	3441	4922
	ROW PCT	30.1	69.9	92.8
	COL PCT	95.1	91.8	
	TOT PCT	27.9	64.9	
1	COUNT	77	306	383
	ROW PCT	20.1	79.9	7.2
	COL PCT	4.9	8.2	
	TOT PCT	1.5	5.8	
COLUMN TOTAL		1558	3747	5305
		29.4	70.6	100.0

CORRECTED CHI SQUARE = 16.60120 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	1.1440	1.1440	17.128	0.000
WITHIN GROUPS	5303	354.2048	0.0668		
TOTAL	5304	355.3489			

Exhibit D5-7
Analysis of the Relationship Between Seat Type and Retraction
Crosstabulation

RETR13	SEAT COUNT ROW PCT COL PCT TOT PCT	BENCH 1	BUCKET 2	ROW TOTAL
0	COUNT	1391	3709	5100
	ROW PCT	27.3	72.7	82.1
	COL PCT	83.2	81.6	
	TOT PCT	22.4	59.7	
1	COUNT	281	834	1115
	ROW PCT	25.2	74.8	17.9
	COL PCT	16.8	18.4	
	TOT PCT	4.5	13.4	
COLUMN TOTAL		1672	4543	6215
		26.9	73.1	100.0

CORRECTED CHI SQUARE = 1.89487 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.1687

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.2943	0.2943	1.999	0.154
WITHIN GROUPS	6213	914.6694	0.1472		
TOTAL	6214	914.9639			

Exhibit D6-1

Analysis of the Relationship Between Number of Car Doors and Accessibility

Crosstabulation

ACC13	DOORS COUNT ROW PCT COL PCT TOT PCT	TWO 1	FOUR 2	ROW TOTAL
	0	2086 68.4 50.9 39.3	963 31.6 79.7 18.2	3049 57.5
	1	2011 89.1 49.1 37.9	245 10.9 20.3 4.6	2256 42.5
	COLUMN TOTAL	4097 77.2	1208 22.8	5305 100.0

CORRECTED CHI SQUARE = 315.49023 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	77.3979	77.3979	336.643	0.000
WITHIN GROUPS	5303	1219.2175	0.2299		
TOTAL	5304	1296.6155			

Exhibit D6-2

Analysis of the Relationship Between Number of Car Doors and Extending

Crosstabulation

EXT13	COUNT / ROW PCT / COL PCT / TOT PCT	DOORS: TWO 1	FOUR 2	ROW TOTAL
0	COUNT	2877	919	3796
	ROW PCT	75.8	24.2	71.7
	COL PCT	70.3	76.2	
	TOT PCT	54.3	17.4	
1	COUNT	1213	287	1500
	ROW PCT	80.9	19.1	28.3
	COL PCT	29.7	23.8	
	TOT PCT	22.9	5.4	
COLUMN TOTAL		4090	1206	5296
		77.2	22.8	100.0

CORRECTED CHI SQUARE = 15.46698 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0001

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	3.1985	3.1985	15.796	0.000
WITHIN GROUPS	5294	1071.9529	0.2025		
TOTAL	5295	1075.1514			

Exhibit D6-3

Analysis of the Relationship Between Number of Car Doors and Buckling

Crosstabulation

BUCK13	COUNT / ROW PCT / COL PCT / TOT PCT	DOORS: TWO 1	FOUR 2	ROW TOTAL
0	COUNT	3030	994	4024
	ROW PCT	75.3	24.7	76.3
	COL PCT	74.4	82.7	
	TOT PCT	57.4	18.8	
1	COUNT	1043	208	1251
	ROW PCT	83.4	16.6	23.7
	COL PCT	25.6	17.3	
	TOT PCT	19.8	3.9	
COLUMN TOTAL		4073	1202	5275
		77.2	22.8	100.0

CORRECTED CHI SQUARE = 34.91077 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	6.3982	6.3982	35.591	0.000
WITHIN GROUPS	5273	947.9192	0.1798		
TOTAL	5274	954.3174			

Exhibit D6-4
Analysis of the Relationship Between Number of Car Doors and Fit
Crosstabulation

FIT13	COUNT / ROW PCT / COL PCT / TOT PCT	DOORS: TWO 1	FOUR 2	ROW TOTAL
0	COUNT	3489	1162	4651
	ROW PCT	75.0	25.0	74.9
	COL PCT	73.1	81.0	
	TOT PCT	56.2	18.7	
1	COUNT	1283	273	1556
	ROW PCT	82.5	17.5	25.1
	COL PCT	26.9	19.0	
	TOT PCT	20.7	4.4	
COLUMN TOTAL		4772	1435	6207
		76.9	23.1	100.0

CORRECTED CHI SQUARE = 35.88222 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	6.8186	6.8186	36.501	0.000
WITHIN GROUPS	6205	1159.1162	0.1868		
TOTAL	6206	1165.9348			

Exhibit D6-5

Analysis of the Relationship Between Number of Car Doors and Pressure

Crosstabulation

SHPR13	DOORS COUNT ROW PCT COL PCT TOT PCT	TWO 1	FOUR 2	ROW TOTAL
	0	3544 74.9 74.4 57.2	1190 25.1 83.0 19.2	4734 76.4
	1	1220 83.4 25.6 19.7	243 16.6 17.0 3.9	1463 23.6
	COLUMN TOTAL	4764 76.9	1433 23.1	6197 100.0

CORRECTED CHI SQUARE = 45.23978 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	8.2451	8.2451	46.043	0.000
WITHIN GROUPS	6195	1109.3672	0.1791		
TOTAL	6196	1117.6123			

Exhibit D6-6
Analysis of the Relationship Between Number of Car Doors and Releasing
Crosstabulation

REL13	DOORS: COUNT / ROW PCT / COL PCT / TOT PCT	TWO 1	FOUR 2	ROW TOTAL
0	COUNT	3756	1166	4922
	ROW PCT	76.3	23.7	92.8
	COL PCT	91.7	96.5	
	TOT PCT	70.8	22.0	
1	COUNT	341	42	383
	ROW PCT	89.0	11.0	7.2
	COL PCT	8.3	3.5	
	TOT PCT	6.4	0.8	
COLUMN TOTAL		4097	1208	5305
		77.2	22.8	100.0

CORRECTED CHI SQUARE = 31.99239 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	2.1912	2.1912	32.902	0.000
WITHIN GROUPS	5303	353.1577	0.0666		
TOTAL	5304	355.3489			

Exhibit D6-7
Analysis of the Relationship Between Number of Car Doors and Retraction
Crosstabulation

DOORS

RETR13	COUNT / ROW PCT / COL PCT / TOT PCT	TWO 1	FOUR 2	ROW TOTAL
0	COUNT	3869	1231	5100
	ROW PCT	75.9	24.1	82.1
	COL PCT	81.0	85.7	
	TOT PCT	62.3	19.8	
1	COUNT	909	206	1115
	ROW PCT	81.5	18.5	17.9
	COL PCT	19.0	14.3	
	TOT PCT	14.6	3.3	
COLUMN TOTAL		4778	1437	6215
		76.9	23.1	100.0

CORRECTED CHI SQUARE = 16.18401 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0001

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	2.4293	2.4293	16.540	0.000
WITHIN GROUPS	6213	912.5344	0.1469		
TOTAL	6214	914.9639			

Exhibit D7-1
Analysis of the Relationship Between Weight-Height Groupings and Accessibility
Crosstabulation

ACC13	PTSIZE COUNT ROW PCT COL PCT TOT PCT	SHRTOVER 1	SHRTNOT 2	AVGOVER 3	AVGNOT 4	ROW TOTAL
0		280	690	849	1230	3049
		9.2	22.6	27.8	40.3	57.5
		52.8	62.3	59.0	55.2	
		5.3	13.0	16.0	23.2	
1		250	418	589	999	2256
		11.1	18.5	26.1	44.3	42.5
		47.2	37.7	41.0	44.8	
		4.7	7.9	11.1	18.8	
	COLUMN	530	1108	1438	2229	5305
	TOTAL	10.0	20.9	27.1	42.0	100.0

RAW CHI SQUARE = 21.35812 WITH 3 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0001

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	5.2197	1.7399	7.142	0.000
WITHIN GROUPS	5301	1291.3958	0.2436		
TOTAL	5304	1296.6155			

Exhibit D7-2
Analysis of the Relationship Between Weight-Height Groupings and Extending
Crosstabulation

EXT13	PTSIZE COUNT ROW PCT COL PCT TOT PCT	SHRTOVER 1	SHRTNOT 2	AVGOVER 3	AVGNOT 4	ROW TOTAL
0		345	802	1031	1618	3796
		9.1	21.1	27.2	42.6	71.7
		65.3	72.4	71.8	72.7	
		6.5	15.1	19.5	30.6	
1		183	305	404	608	1500
		12.2	20.3	26.9	40.5	28.3
		34.7	27.6	28.2	27.3	
		3.5	5.8	7.6	11.5	
	COLUMN TOTAL	528	1107	1435	2226	5296
		10.0	20.9	27.1	42.0	100.0

RAW CHI SQUARE = 11.90312 WITH 3 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0077

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	2.4165	0.8055	3.974	0.008
WITHIN GROUPS	5292	1072.7349	0.2027		
TOTAL	5295	1075.1514			

Exhibit D7-3
Analysis of the Relationship Between Weight-Height Groupings and Buckling
Crosstabulation

PTSIZE

BUCK13	COUNT / ROW PCT / COL PCT / TOT PCT	SHRTOVER 1	SHRTNOT 2	AVGOVER 3	AVGNOT 4	ROW TOTAL
0	COUNT	370	885	1052	1717	4024
	ROW PCT	9.2	22.0	26.1	42.7	76.3
	COL PCT	70.1	80.3	73.8	77.3	
	TOT PCT	7.0	16.8	19.9	32.5	
1	COUNT	158	217	373	503	1251
	ROW PCT	12.6	17.3	29.8	40.2	23.7
	COL PCT	29.9	19.7	26.2	22.7	
	TOT PCT	3.0	4.1	7.1	9.5	
COLUMN TOTAL		528	1102	1425	2220	5275
		10.0	20.9	27.0	42.1	100.0

RAW CHI SQUARE = 27.25356 WITH 3 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	4.9304	1.6435	9.125	0.000
WITHIN GROUPS	5271	949.3870	0.1801		
TOTAL	5274	954.3174			

Exhibit D7-4
Analysis of the Relationship Between Weight-Height Groupings and Fit
Crosstabulation

PTSIZE (columns); FIT13 (rows). Cell entries: COUNT / ROW PCT / COL PCT / TOT PCT

FIT13		SHRTOVER 1	SHRTNOT 2	AVGOVER 3	AVGNOT 4	ROW TOTAL
0	COUNT	329	960	1208	2154	4651
	ROW PCT	7.1	20.6	26.0	46.3	74.9
	COL PCT	53.2	73.7	72.3	82.4	
	TOT PCT	5.3	15.5	19.5	34.7	
1	COUNT	290	343	462	461	1556
	ROW PCT	18.6	22.0	29.7	29.6	25.1
	COL PCT	46.8	26.3	27.7	17.6	
	TOT PCT	4.7	5.5	7.4	7.4	
COLUMN TOTAL		619	1303	1670	2615	6207
		10.0	21.0	26.9	42.1	100.0

RAW CHI SQUARE = 240.47066 WITH 3 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	45.1704	15.0568	83.334	0.000
WITHIN GROUPS	6203	1120.7644	0.1807		
TOTAL	6206	1165.9348			

Exhibit D7-5

Analysis of the Relationship Between Weight-Height Groupings and Pressure

Crosstabulation

PTSIZE

SHPR13	COUNT / ROW PCT / COL PCT / TOT PCT	SHRTOVER 1	SHRTNOT 2	AVGOVER 3	AVGNOT 4	ROW TOTAL
0	COUNT	384	985	1252	2113	4734
	ROW PCT	8.1	20.8	26.4	44.6	76.4
	COL PCT	62.4	75.6	75.1	80.9	
	TOT PCT	6.2	15.9	20.2	34.1	
1	COUNT	231	318	415	499	1463
	ROW PCT	15.8	21.7	28.4	34.1	23.6
	COL PCT	37.6	24.4	24.9	19.1	
	TOT PCT	3.7	5.1	6.7	8.1	
COLUMN TOTAL		615	1303	1667	2612	6197
		9.9	21.0	26.9	42.1	100.0

RAW CHI SQUARE = 97.75847 WITH 3 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	17.6306	5.8769	33.087	0.000
WITHIN GROUPS	6193	1099.9817	0.1776		
TOTAL	6196	1117.6123			

Exhibit D7-6

Analysis of the Relationship Between Weight-Height Groupings and Releasing Crosstabulation

PTSIZE

REL13	COUNT / ROW PCT / COL PCT / TOT PCT	SHRTOVER 1	SHRTNOT 2	AVGOVER 3	AVGNOT 4	ROW TOTAL
0		481	1029	1330	2082	4922
		9.8	20.9	27.0	42.3	92.8
		90.6	92.8	92.8	93.3	
		9.1	19.4	25.1	39.2	
1		50	80	103	150	383
		13.1	20.9	26.9	39.2	7.2
		9.4	7.2	7.2	6.7	
		0.9	1.5	1.9	2.8	
	COLUMN TOTAL	531	1109	1433	2232	5305
		10.0	20.9	27.0	42.1	100.0

RAW CHI SQUARE = 4.65745 WITH 3 DEGREES OF FREEDOM. SIGNIFICANCE = 0.1987

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	0.3120	0.1040	1.553	0.197
WITHIN GROUPS	5301	355.0369	0.0670		
TOTAL	5304	355.3489			

Exhibit D7-7

Analysis of the Relationship Between Weight-Height Groupings and Retraction

Crosstabulation

RETR13	PTSIZE COUNT ROW PCT COL PCT TOT PCT	SHRTOVER 1	SHRTNOT 2	AVGOVER 3	AVGNOT 4	ROW TOTAL
0		493	1058	1400	2149	5100
		9.7	20.7	27.5	42.1	82.1
		79.6	81.2	83.7	82.0	
		7.9	17.0	22.5	34.6	
1		126	245	273	471	1115
		11.3	22.0	24.5	42.2	17.9
		20.4	18.8	16.3	18.0	
		2.0	3.9	4.4	7.6	
	COLUMN TOTAL	619	1303	1673	2620	6215
		10.0	21.0	26.9	42.2	100.0

RAW CHI SQUARE = 6.10408 WITH 3 DEGREES OF FREEDOM. SIGNIFICANCE = 0.1067

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	0.8986	0.2995	2.035	0.105
WITHIN GROUPS	6211	914.0652	0.1472		
TOTAL	6214	914.9639			

Exhibit D8-1
Analysis of the Relationship Between Sex of Participant and Accessibility
Crosstabulation

ACC13	SEX: COUNT / ROW PCT / COL PCT / TOT PCT	MALE 1	FEMALE 2	ROW TOTAL
0	COUNT	1391	1658	3049
	ROW PCT	45.6	54.4	57.5
	COL PCT	54.2	60.5	
	TOT PCT	26.2	31.3	
1	COUNT	1175	1081	2256
	ROW PCT	52.1	47.9	42.5
	COL PCT	45.8	39.5	
	TOT PCT	22.1	20.4	
COLUMN TOTAL		2566	2739	5305
		48.4	51.6	100.0

CORRECTED CHI SQUARE = 21.42117 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	5.2986	5.2986	21.759	0.000
WITHIN GROUPS	5303	1291.3169	0.2435		
TOTAL	5304	1296.6155			

Exhibit D8-2

Analysis of the Relationship Between Sex of Participant and Extending

Crosstabulation

EXT13	SEX: COUNT / ROW PCT / COL PCT / TOT PCT	MALE 1	FEMALE 2	ROW TOTAL
0	COUNT	1824	1972	3796
	ROW PCT	48.1	51.9	71.7
	COL PCT	71.1	72.2	
	TOT PCT	34.4	37.2	
1	COUNT	740	760	1500
	ROW PCT	49.3	50.7	28.3
	COL PCT	28.9	27.8	
	TOT PCT	14.0	14.4	
COLUMN TOTAL		2564	2732	5296
		48.4	51.6	100.0

CORRECTED CHI SQUARE = 0.65793 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.4173

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.1440	0.1440	0.709	0.404
WITHIN GROUPS	5294	1075.0073	0.2031		
TOTAL	5295	1075.1514			

Exhibit D8-3

Analysis of the Relationship Between Sex of Participant and Buckling

Crosstabulation

BUCK13	COUNT / ROW PCT / COL PCT / TOT PCT	SEX: MALE 1	FEMALE 2	ROW TOTAL
0	COUNT	1943	2081	4024
	ROW PCT	48.3	51.7	76.3
	COL PCT	76.3	76.3	
	TOT PCT	36.8	39.5	
1	COUNT	604	647	1251
	ROW PCT	48.3	51.7	23.7
	COL PCT	23.7	23.7	
	TOT PCT	11.5	12.3	
COLUMN TOTAL		2547	2728	5275
		48.3	51.7	100.0

CORRECTED CHI SQUARE = 0.00090 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.9761

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.4439	0.4439	3.536	0.057
WITHIN GROUPS	5302	665.5559	0.1255		
TOTAL	5303	665.9998			

Exhibit D8-4
Analysis of the Relationship Between Sex of Participant and Fit
Crosstabulation

FIT13	COUNT / ROW PCT / COL PCT / TOT PCT	SEX: MALE 1	FEMALE 2	ROW TOTAL
0	COUNT	2361	2290	4651
	ROW PCT	50.8	49.2	74.9
	COL PCT	78.8	71.3	
	TOT PCT	38.0	36.9	
1	COUNT	634	922	1556
	ROW PCT	40.7	59.3	25.1
	COL PCT	21.2	28.7	
	TOT PCT	10.2	14.9	
COLUMN TOTAL		2995	3212	6207
		48.3	51.7	100.0

CORRECTED CHI SQUARE = 46.46021 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	8.8025	8.8025	47.202	0.000
WITHIN GROUPS	6205	1157.1323	0.1865		
TOTAL	6206	1165.9348			

Exhibit D8-5

Analysis of the Relationship Between Sex of Participant and Pressure

Crosstabulation

SHPR13	COUNT / ROW PCT / COL PCT / TOT PCT	SEX: MALE 1	FEMALE 2	ROW TOTAL
0	COUNT	2361	2373	4734
	ROW PCT	49.9	50.1	76.4
	COL PCT	78.9	74.1	
	TOT PCT	38.1	38.3	
1	COUNT	633	830	1463
	ROW PCT	43.3	56.7	23.6
	COL PCT	21.1	25.9	
	TOT PCT	10.2	13.4	
COLUMN TOTAL		2994	3203	6197
		48.3	51.7	100.0

CORRECTED CHI SQUARE = 19.26724 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	3.5225	3.5225	19.587	0.000
WITHIN GROUPS	6195	1114.0898	0.1798		
TOTAL	6196	1117.6123			

Exhibit D8-6

Analysis of the Relationship Between Sex of Participant and Releasing

Crosstabulation

SEX

REL13	COUNT / ROW PCT / COL PCT / TOT PCT	MALE 1	FEMALE 2	ROW TOTAL
0	COUNT	2384	2538	4922
	ROW PCT	48.4	51.6	92.8
	COL PCT	93.1	92.5	
	TOT PCT	44.9	47.8	
1	COUNT	178	205	383
	ROW PCT	46.5	53.5	7.2
	COL PCT	6.9	7.5	
	TOT PCT	3.4	3.9	
COLUMN TOTAL		2562	2743	5305
		48.3	51.7	100.0

CORRECTED CHI SQUARE = 0.47121 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.4924

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.0366	0.0366	0.547	0.466
WITHIN GROUPS	5303	355.3123	0.0670		
TOTAL	5304	355.3489			

Exhibit D8-7

Analysis of the Relationship Between Sex of Participant and Retraction

Crosstabulation

RETR13	SEX: COUNT / ROW PCT / COL PCT / TOT PCT	MALE 1	FEMALE 2	ROW TOTAL
0	COUNT	2463	2637	5100
	ROW PCT	48.3	51.7	82.1
	COL PCT	82.1	82.0	
	TOT PCT	39.6	42.4	
1	COUNT	537	578	1115
	ROW PCT	48.2	51.8	17.9
	COL PCT	17.9	18.0	
	TOT PCT	8.6	9.3	
COLUMN TOTAL		3000	3215	6215
		48.3	51.7	100.0

CORRECTED CHI SQUARE = 0.00223 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.9623

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.0009	0.0009	0.006	0.537
WITHIN GROUPS	6213	914.9629	0.1473		
TOTAL	6214	914.9639			

Exhibit D9-1

Analysis of the Relationship Between Weight of Participant and Accessibility

Crosstabulation

ACC13	OVERWT COUNT ROW PCT COL PCT TOT PCT	NOT OVER WEIGHT 0	OVERWEIGHT 1	ROW TOTAL
0		1920 63.0 57.5 36.2	1129 37.0 57.4 21.3	3049 57.5
1		1417 62.8 42.5 26.7	839 37.2 42.6 15.8	2256 42.5
COLUMN TOTAL		3337 62.9	1968 37.1	5305 100.0

CORRECTED CHI SQUARE = 0.00835 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.9272

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.0034	0.0034	0.014	0.595
WITHIN GROUPS	5303	1296.6121	0.2445		
TOTAL	5304	1296.6155			

Exhibit D9-2

Analysis of the Relationship Between Weight of Participant and Extending

Crosstabulation

EXT13 (COUNT / ROW PCT / COL PCT / TOT PCT)	OVERWT: NOT OVER WEIGHT 0	OVERWT: OVERWEIGHT 1	ROW TOTAL
0	2420	1376	3796
	63.8	36.2	71.7
	72.6	70.1	
	45.7	26.0	
1	913	587	1500
	60.9	39.1	28.3
	27.4	29.9	
	17.2	11.1	
COLUMN TOTAL	3333	1963	5296
	62.9	37.1	100.0

CORRECTED CHI SQUARE = 3.71260 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0540

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.7788	0.7788	3.838	0.047
WITHIN GROUPS	5294	1074.3726	0.2029		
TOTAL	5295	1075.1514			

Exhibit D9-3
Analysis of the Relationship Between Weight of Participant and Buckling
Crosstabulation

BUCK13	COUNT / ROW PCT / COL PCT / TOT PCT	OVERWT: NOT OVER WEIGHT 0	OVERWT: OVERWEIGHT 1	ROW TOTAL
0	COUNT	2602	1422	4024
	ROW PCT	64.7	35.3	76.3
	COL PCT	78.3	72.8	
	TOT PCT	49.3	27.0	
1	COUNT	720	531	1251
	ROW PCT	57.6	42.4	23.7
	COL PCT	21.7	27.2	
	TOT PCT	13.6	10.1	
COLUMN TOTAL		3322	1953	5275
		63.0	37.0	100.0

CORRECTED CHI SQUARE = 20.37572 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	3.7410	3.7410	20.752	0.000
WITHIN GROUPS	5273	950.5764	0.1803		
TOTAL	5274	954.3174			

Exhibit D9-4

Analysis of the Relationship Between Weight of Participant and Fit

Crosstabulation

FIT13	OVERWT	NOT OVER WEIGHT 0	OVERWEIGHT 1	ROW TOTAL
0	COUNT	3114	1537	4651
	ROW PCT	67.0	33.0	74.9
	COL PCT	79.5	67.1	
	TOT PCT	50.2	24.8	
1	COUNT	804	752	1556
	ROW PCT	51.7	48.3	25.1
	COL PCT	20.5	32.9	
	TOT PCT	13.0	12.1	
COLUMN TOTAL		3918	2289	6207
		63.1	36.9	100.0

CORRECTED CHI SQUARE = 116.32379 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	21.9736	21.9736	119.188	0.000
WITHIN GROUPS	6205	1143.9612	0.1844		
TOTAL	6206	1165.9348			

Exhibit D9-5

Analysis of the Relationship Between Weight of Participant and Pressure

Crosstabulation

SHPR13	COUNT / ROW PCT / COL PCT / TOT PCT	OVERWT: NOT OVER WEIGHT 0	OVERWT: OVERWEIGHT 1	ROW TOTAL
0		3098	1636	4734
		65.4	34.6	76.4
		79.1	71.7	
		50.0	26.4	
1		817	646	1463
		55.8	44.2	23.6
		20.9	28.3	
		13.2	10.4	
COLUMN TOTAL		3915	2282	6197
		63.2	36.8	100.0

CORRECTED CHI SQUARE = 43.83780 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	7.9802	7.9802	44.553	0.000
WITHIN GROUPS	6195	1109.6321	0.1791		
TOTAL	6196	1117.6123			

Exhibit D9-6

Analysis of the Relationship Between Weight of Participant and Releasing

Crosstabulation

```
                      OVERWT
             COUNT   I
             ROW PCT INOT OVER OVERWEIG   ROW
             COL PCT IWEIGHT    HT        TOTAL
             TOT PCT I     0   I     1   I
REL13        --------I---------I---------I
                   0 I  3111   I  1811   I  4922
                     I  63.2   I  36.8   I  92.8
                     I  93.1   I  92.2   I
                     I  58.6   I  34.1   I
                    -I---------I---------I
                   1 I   230   I   153   I   383
                     I  60.1   I  39.9   I   7.2
                     I   6.9   I   7.8   I
                     I   4.3   I   2.9   I
                    -I---------I---------I
             COLUMN     3341      1964      5305
              TOTAL     63.0      37.0     100.0
```

CORRECTED CHI SQUARE = 1.38367 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.2395

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.1015	0.1015	1.516	0.216
WITHIN GROUPS	5303	355.2473	0.0670		
TOTAL	5304	355.3489			

Exhibit D9-7

Analysis of the Relationship Between Weight of Participant and Retraction
Crosstabulation

RETR13	COUNT / ROW PCT / COL PCT / TOT PCT	OVERWT: NOT OVER WEIGHT 0	OVERWEIGHT 1	ROW TOTAL
	0	3207	1893	5100
		62.9	37.1	82.1
		81.7	82.6	
		51.6	30.5	
	1	716	399	1115
		64.2	35.8	17.9
		18.3	17.4	
		11.5	6.4	
	COLUMN TOTAL	3923	2292	6215
		63.1	36.9	100.0

CORRECTED CHI SQUARE = 0.64222 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.4229

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.1028	0.1028	0.698	0.40E
WITHIN GROUPS	6213	914.8608	0.1472		
TOTAL	6214	914.9639			

Exhibit D10-1

Analysis of the Relationship Between Type of Windowshade Device and Accessibility

Crosstabulation

ACC13 (rows) / NEWWS (columns)	COUNT / ROW PCT / COL PCT / TOT PCT	NO WS 1	WS-NO-REL 2	WS-W-REL 3	ROW TOTAL
0	COUNT	1624	431	799	2854
	ROW PCT	56.9	15.1	28.0	57.5
	COL PCT	53.1	63.0	65.5	
	TOT PCT	32.7	8.7	16.1	
1	COUNT	1434	253	421	2108
	ROW PCT	68.0	12.0	20.0	42.5
	COL PCT	46.9	37.0	34.5	
	TOT PCT	28.9	5.1	8.5	
COLUMN TOTAL		3058	684	1220	4962
		61.6	13.8	24.6	100.0

RAW CHI SQUARE = 64.54810 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	15.7722	7.8861	32.680	0.000
WITHIN GROUPS	4959	1196.6892	0.2413		
TOTAL	4961	1212.4614			

Exhibit D10-2
Analysis of the Relationship Between Type of Windowshade Device and Extending
Crosstabulation

EXT13		NEWWS NO WS 1	WS-NO-REL 2	WS-W-REL 3	ROW TOTAL
0	COUNT	2268	441	873	3582
	ROW PCT	63.3	12.3	24.4	72.3
	COL PCT	74.3	64.3	71.9	
	TOT PCT	45.8	8.9	17.6	
1	COUNT	784	245	342	1371
	ROW PCT	57.2	17.9	24.9	27.7
	COL PCT	25.7	35.7	28.1	
	TOT PCT	15.8	4.9	6.9	
COLUMN TOTAL		3052	686	1215	4953
		61.6	13.9	24.5	100.0

RAW CHI SQUARE = 28.30263 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	5.6655	2.8328	14.224	0.000
WITHIN GROUPS	4950	985.8391	0.1992		
TOTAL	4952	991.5046			

Exhibit D10-3
Analysis of the Relationship Between Type of Windowshade and Buckling
Crosstabulation

BUCK13	NEWWS COUNT / ROW PCT / COL PCT / TOT PCT	NO WS 1	WS-NO-REL 2	WS-W-REL 3	ROW TOTAL
0	COUNT	2320	455	1021	3796
	ROW PCT	61.1	12.0	26.9	76.9
	COL PCT	76.4	66.8	84.0	
	TOT PCT	47.0	9.2	20.7	
1	COUNT	717	226	195	1138
	ROW PCT	63.0	19.9	17.1	23.1
	COL PCT	23.6	33.2	16.0	
	TOT PCT	14.5	4.6	4.0	
	COLUMN TOTAL	3037	681	1216	4934
		61.6	13.8	24.6	100.0

RAW CHI SQUARE = 73.67708 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	13.0737	6.5369	37.374	0.000
WITHIN GROUPS	4931	862.4529	0.1749		
TOTAL	4933	875.5266			

Exhibit D10-4
Analysis of the Relationship Between Type of Windowshade and Fit
Crosstabulation

FIT13	NEWWS: COUNT / ROW PCT / COL PCT / TOT PCT	NO WS 1	WS-NO-REL 2	WS-W-REL 3	ROW TOTAL
0	COUNT	2941	503	932	4376
	ROW PCT	67.2	11.5	21.3	74.6
	COL PCT	76.5	73.4	69.8	
	TOT PCT	50.1	8.6	15.9	
1	COUNT	905	182	403	1490
	ROW PCT	60.7	12.2	27.0	25.4
	COL PCT	23.5	26.6	30.2	
	TOT PCT	15.4	3.1	6.9	
COLUMN TOTAL		3846	685	1335	5866
		65.6	11.7	22.8	100.0

RAW CHI SQUARE = 23.73120 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	4.4966	2.2483	11.907	0.000
WITHIN GROUPS	5863	1107.0344	0.1888		
TOTAL	5865	1111.5310			

Exhibit D10-5
Analysis of the Relationship Between Type of Windowshade Device and Pressure
Crosstabulation

SHPR13	COUNT / ROW PCT / COL PCT / TOT PCT	NEWWS: NO WS 1	WS-NO-REL 2	WS-W-REL 3	ROW TOTAL
0	COUNT	2955	512	992	4459
	ROW PCT	66.3	11.5	22.2	76.2
	COL PCT	77.0	75.0	74.5	
	TOT PCT	50.5	8.7	16.9	
1	COUNT	885	171	340	1396
	ROW PCT	63.4	12.2	24.4	23.8
	COL PCT	23.0	25.0	25.5	
	TOT PCT	15.1	2.9	5.8	
COLUMN TOTAL		3840	683	1332	5855
		65.6	11.7	22.7	100.0

RAW CHI SQUARE = 3.95289 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.1386

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	0.7178	0.3589	1.977	0.136
WITHIN GROUPS	5852	1062.4360	0.1816		
TOTAL	5854	1063.1538			

Exhibit D10-6
Analysis of the Relationship Between Type of Windowshade Device and Releasing
Crosstabulation

NEWWS (column variable) by REL13 (row variable)

REL13	COUNT / ROW PCT / COL PCT / TOT PCT	NO WS 1	WS-NO-REL 2	WS-W-REL 3	ROW TOTAL
0	COUNT	2876	580	1152	4608
	ROW PCT	62.4	12.6	25.0	92.8
	COL PCT	94.1	84.5	94.4	
	TOT PCT	57.9	11.7	23.2	
1	COUNT	181	106	68	355
	ROW PCT	51.0	29.9	19.2	7.2
	COL PCT	5.9	15.5	5.6	
	TOT PCT	3.6	2.1	1.4	
COLUMN TOTAL		3057	686	1220	4963
		61.6	13.8	24.6	100.0

RAW CHI SQUARE = 82.70953 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	5.4930	2.7465	42.030	0.000
WITHIN GROUPS	4960	324.1140	0.0653		
TOTAL	4962	329.6069			

Exhibit D10-7

Analysis of the Relationship Between Type of Windowshade Device and Retraction

Crosstabulation

RETR13	NEWWS COUNT ROW PCT COL PCT TOT PCT	NO WS 1	WS-NO-REL 2	WS-W-REL 3	ROW TOTAL
0	COUNT	3489	358	935	4782
	ROW PCT	73.0	7.5	19.6	81.4
	COL PCT	90.6	52.2	70.1	
	TOT PCT	59.4	6.1	15.9	
1	COUNT	364	328	399	1091
	ROW PCT	33.4	30.1	36.6	18.6
	COL PCT	9.4	47.8	29.9	
	TOT PCT	6.2	5.6	6.8	
COLUMN TOTAL		3853	686	1334	5873
		65.6	11.7	22.7	100.0

RAW CHI SQUARE = 713.26978 WITH 2 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	107.8867	53.9433	405.728	0.000
WITHIN GROUPS	5870	780.4434	0.1330		
TOTAL	5872	888.3298			

Exhibit D11-1

Analysis of the Relationship Between Fit Compliance Test Results and Accessibility

Crosstabulation

ACC13	COUNT / ROW PCT / COL PCT / TOT PCT	SB16 YES 1	NO 2	ROW TOTAL
PROBLEM	0	59 4.2 25.8 1.7	1351 95.8 42.1 39.3	1410 41.0
NO PROBLEM	1	170 8.4 74.2 4.9	1858 91.6 57.9 54.0	2028 59.0
	COLUMN TOTAL	229 6.7	3209 93.3	3438 100.0

CORRECTED CHI SQUARE = 22.90842 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

NUMBER OF MISSING OBSERVATIONS = 700

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	66.1406	66.1406	22.053	0.000
WITHIN GROUPS	3370	10107.3086	2.9992		
TOTAL	3371	10173.4492			

Exhibit D11-2

Analysis of the Relationship Between Fit Compliance Test Results and Extending

Crosstabulation

EXT13	SB16 COUNT / ROW PCT / COL PCT / TOT PCT	YES 1	NO 2	ROW TOTAL
PROBLEM	0	67	917	984
		6.8	93.2	28.7
		29.3	28.6	
		2.0	26.7	
NO PROBLEM	1	162	2287	2449
		6.6	93.4	71.3
		70.7	71.4	
		4.7	66.6	
COLUMN TOTAL		229	3204	3433
		6.7	93.3	100.0

CORRECTED CHI SQUARE = 0.01699 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.8963

NUMBER OF MISSING OBSERVATIONS = 705

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	2.1250	2.1250	0.677	0.416
WITHIN GROUPS	3370	10577.5625	3.1387		
TOTAL	3371	10579.6875			

Exhibit D11-3

Analysis of the Relationship Between Fit Compliance Test Results and Buckling

Crosstabulation

BUCK13 (COUNT / ROW PCT / COL PCT / TOT PCT)	SB16: YES 1	NO 2	ROW TOTAL
0 PROBLEM	40 5.0 17.8 1.2	766 95.0 24.0 22.4	806 23.6
1 NO PROBLEM	185 7.1 82.2 5.4	2429 92.9 76.0 71.0	2614 76.4
COLUMN TOTAL	225 6.6	3195 93.4	3420 100.0

CORRECTED CHI SQUARE = 4.14410 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0418

NUMBER OF MISSING OBSERVATIONS = 718

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	15.5625	15.5625	7.160	0.007
WITHIN GROUPS	3370	7324.8750	2.1736		
TOTAL	3371	7340.4375			

Exhibit D11-4

Analysis of the Reltionship Between Fit Compliance Test Results and Fit Crosstabulation

SB16 (columns) by FIT13 (rows)

FIT13	COUNT / ROW PCT / COL PCT / TOT PCT	YES 1	NO 2	ROW TOTAL
PROBLEM	0	88	963	1051
		8.4	91.6	25.5
		15.5	27.1	
		2.1	23.4	
NO PROBLEM	1	481	2592	3073
		15.7	84.3	74.5
		84.5	72.9	
		11.7	62.9	
COLUMN TOTAL		569	3555	4124
		13.8	86.2	100.0

CORRECTED CHI SQUARE = 34.28316 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

NUMBER OF MISSING OBSERVATIONS = 14

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	90.7500	90.7500	27.899	0.000
WITHIN GROUPS	3370	10962.0000	3.2528		
TOTAL	3371	11052.7500			

Exhibit D11-5

Analysis of the Relationship Between Fit Compliance Test Results and Pressure

Crosstabulation

PRES13	COUNT / ROW PCT / COL PCT / TOT PCT	SB16 YES 1	NO 2	ROW TOTAL
PROBLEM	0	44 4.4 13.1 1.2	965 95.6 29.2 26.5	1009 27.7
NO PROBLEM	1	293 11.1 86.9 8.1	2337 88.9 70.8 64.2	2630 72.3
COLUMN TOTAL		337 9.3	3302 90.7	3639 100.0

CORRECTED CHI SQUARE = 39.08798 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

NUMBER OF MISSING OBSERVATIONS = 499

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	37.0625	37.0625	19.203	0.000
WITHIN GROUPS	3370	6504.3750	1.9301		
TOTAL	3371	6541.4375			

Exhibit D11-6

Analysis of the Relationship Between Fit Compliance Test Results and Releasing
Crosstabulation

REL13	SB16 COUNT / ROW PCT / COL PCT / TOT PCT	YES 1	NO 2	ROW TOTAL
PROBLEM	0	17 6.1 7.5 0.5	263 93.9 8.2 7.6	280 8.1
NO PROBLEM	1	209 6.6 92.5 6.1	2950 93.4 91.8 85.8	3159 91.9
	COLUMN TOTAL	226 6.6	3213 93.4	3439 100.0

CORRECTED CHI SQUARE = 0.05137 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.8207

NUMBER OF MISSING OBSERVATIONS = 699

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	3.1250	3.1250	1.669	0.193
WITHIN GROUPS	3370	6308.1875	1.8719		
TOTAL	3371	6311.3125			

Exhibit D11-7
Analysis of the Relationship Between Fit Compliance Test Results and Retraction
Crosstabulation

RETR13	COUNT / ROW PCT / COL PCT / TOT PCT	SB16 YES 1	NO 2	ROW TOTAL
0 PROBLEM	COUNT	76	752	828
	ROW PCT	9.2	90.8	20.1
	COL PCT	13.4	21.1	
	TOT PCT	1.8	18.2	
1 NO PROBLEM	COUNT	493	2805	3298
	ROW PCT	14.9	85.1	79.9
	COL PCT	86.6	78.9	
	TOT PCT	11.9	68.0	
COLUMN TOTAL		569	3557	4126
		13.8	86.2	100.0

CORRECTED CHI SQUARE = 18.04984 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

NUMBER OF MISSING OBSERVATIONS = 12

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	1.8125	1.8125	0.499	0.487
WITHIN GROUPS	3370	12239.7500	3.6320		
TOTAL	3371	12241.5625			

Exhibit D12-1

Analysis of the Relationship Between Pressure Compliance Test Results and Accessibility

Crosstabulation

ACC13	COUNT / ROW PCT / COL PCT / TOT PCT	PRESS: PASS 1	FAIL 2	ROW TOTAL
PROBLEM	0	375	1035	1410
		26.6	73.4	41.0
		46.7	39.3	
		10.9	30.1	
NO PROBLEM	1	428	1600	2028
		21.1	78.9	59.0
		53.3	60.7	
		12.4	46.5	
	COLUMN TOTAL	803	2635	3438
		23.4	76.6	100.0

CORRECTED CHI SQUARE = 13.70474 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0002

NUMBER OF MISSING OBSERVATIONS = 700

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	37.8242	37.8242	12.576	0.001
WITHIN GROUPS	3370	10135.6250	3.0076		
TOTAL	3371	10173.4492			

Exhibit D12-2
Analysis of the Relationship Between Pressure Compliance Test Results and Extending
Crosstabulation

EXT13	COUNT / ROW PCT / COL PCT / TOT PCT	PRESS: PASS 1	PRESS: FAIL 2	ROW TOTAL
PROBLEM	0	223	761	984
		22.7	77.3	28.7
		27.8	28.9	
		6.5	22.2	
NO PROBLEM	1	579	1870	2449
		23.6	76.4	71.3
		72.2	71.1	
		16.9	54.5	
COLUMN TOTAL		802	2631	3433
		23.4	76.6	100.0

CORRECTED CHI SQUARE = 0.32358 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.5695

NUMBER OF MISSING OBSERVATIONS = 705

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	6.2500	6.2500	1.992	0.154
WITHIN GROUPS	3370	10573.4375	3.1375		
TOTAL	3371	10579.6875			

Exhibit D12-3
Analysis of the Relationship Between Pressure Compliance Test Results and Buckling
Crosstabulation

BUCK13	COUNT / ROW PCT / COL PCT / TOT PCT	PRESS: PASS 1	FAIL 2	ROW TOTAL
PROBLEM	0	223	583	806
		27.7	72.3	23.6
		28.0	22.2	
		6.5	17.0	
NO PROBLEM	1	574	2040	2614
		22.0	78.0	76.4
		72.0	77.8	
		16.8	59.6	
COLUMN TOTAL		797	2623	3420
		23.3	76.7	100.0

CORRECTED CHI SQUARE = 10.91600 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0010

NUMBER OF MISSING OBSERVATIONS = 718

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	14.2500	14.2500	6.555	0.010
WITHIN GROUPS	3370	7326.1875	2.1739		
TOTAL	3371	7340.4375			

EXHIBIT D12

Analysis of the Relationship Between Pressure Compliance Test Results and Fit

Crosstabulation

FIT13	PRESS: COUNT / ROW PCT / COL PCT / TOT PCT	PASS 1	FAIL 2	ROW TOTAL
PROBLEM	0	223	828	1051
		21.2	78.8	25.5
		17.7	28.9	
		5.4	20.1	
NO PROBLEM	1	1036	2037	3073
		33.7	66.3	74.5
		82.3	71.1	
		25.1	49.4	
COLUMN TOTAL		1259	2865	4124
		30.5	69.5	100.0

CORRECTED CHI SQUARE = 57.06409 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

NUMBER OF MISSING OBSERVATIONS = 14

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	75.8125	75.8125	23.275	0.000
WITHIN GROUPS	3370	10976.9375	3.2573		
TOTAL	3371	11052.7500			

Exhibit D12-5

Analysis of the Relationship Between Pressure Compliance Test Results and Pressure

Crosstabulation

PRESS

COUNT / ROW PCT / COL PCT / TOT PCT

PRES13		PASS 1	FAIL 2	ROW TOTAL
PROBLEM	0	188	821	1009
		18.6	81.4	27.7
		20.7	30.1	
		5.2	22.6	
NO PROBLEM	1	721	1909	2630
		27.4	72.6	72.3
		79.3	69.9	
		19.8	52.5	
COLUMN TOTAL		909	2730	3639
		25.0	75.0	100.0

CORRECTED CHI SQUARE = 29.54572 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

NUMBER OF MISSING OBSERVATIONS = 499

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	28.8750	28.8750	14.942	0.000
WITHIN GROUPS	3370	6512.5625	1.9325		
TOTAL	3371	6541.4375			

Exhibit D12-6

Analysis of the Relationship Between Pressure Compliance Test Results and Releasing
Crosstabulation

REL13 (COUNT / ROW PCT / COL PCT / TOT PCT)	PRESS: PASS 1	FAIL 2	ROW TOTAL
0 PROBLEM	67	213	280
	23.9	76.1	8.1
	8.4	8.1	
	1.9	6.2	
1 NO PROBLEM	735	2424	3159
	23.3	76.7	91.9
	91.6	91.9	
	21.4	70.5	
COLUMN TOTAL	802	2637	3439
	23.3	76.7	100.0

CORRECTED CHI SQUARE = 0.03141 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.8593

NUMBER OF MISSING OBSERVATIONS = 699

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	2.0625	2.0625	1.102	0.294
WITHIN GROUPS	3370	6309.2500	1.8722		
TOTAL	3371	6311.3125			

Exhibit D12-7
Analysis of the Relationship Between Pressure Compliance Test Results and Retraction
Crosstabulation

RETR13	PRESS (COUNT / ROW PCT / COL PCT / TOT PCT)	PASS 1	FAIL 2	ROW TOTAL
PROBLEM	0	106	722	828
		12.8	87.2	20.1
		8.4	25.2	
		2.6	17.5	
NO PROBLEM	1	1153	2145	3298
		35.0	65.0	79.9
		91.6	74.8	
		27.9	52.0	
	COLUMN TOTAL	1259	2867	4126
		30.5	69.5	100.0

CORRECTED CHI SQUARE = 152.22176 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0

NUMBER OF MISSING OBSERVATIONS = 12

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	324.3125	324.3125	91.710	0.000
WITHIN GROUPS	3370	11917.2500	3.5363		
TOTAL	3371	12241.5625			

Exhibit D13-1

Analysis of the Relationship Between Retraction Compliance Test Results and Accessibility

Crosstabulation

SB21

ACC13	COUNT / ROW PCT / COL PCT / TOT PCT	PROPER 1	IMPROPER 2	ROW TOTAL
PROBLEM	0	947	384	1331
		71.1	28.9	41.4
		37.5	55.7	
		29.5	12.0	
NO PROBLEM	1	1577	305	1882
		83.8	16.2	58.6
		62.5	44.3	
		49.1	9.5	
	COLUMN TOTAL	2524	689	3213
		78.6	21.4	100.0

CORRECTED CHI SQUARE = 73.24432 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0000

NUMBER OF MISSING OBSERVATIONS = 925

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	247.2461	247.2461	84.209	0.000
WITHIN GROUPS	3151	9251.6758	2.9361		
TOTAL	3152	9498.9219			

Exhibit D13-2

Analysis of the Relationship Between Retraction Compliance Test Results and Extending

Crosstabulation

SB21

EXT13	COUNT / ROW PCT / COL PCT / TOT PCT	PROPER 1	IMPROPER 2	ROW TOTAL
PROBLEM	0	712	218	930
		76.6	23.4	29.0
		28.2	31.7	
		22.2	6.8	
NO PROBLEM	1	1809	470	2279
		79.4	20.6	71.0
		71.8	68.3	
		56.4	14.6	
COLUMN TOTAL		2521	688	3209
		78.6	21.4	100.0

CORRECTED CHI SQUARE = 2.94846 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0860

NUMBER OF MISSING OBSERVATIONS = 929

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	10.6563	10.6563	3.429	0.061
WITHIN GROUPS	3151	9791.6875	3.1075		
TOTAL	3152	9802.3437			

Exhibit D13-3

Analysis of the Relationship Between Retraction Compliance Test Results and Buckling

Crosstabulation

BUCK13		COUNT / ROW PCT / COL PCT / TOT PCT	SB21: PROPER 1	IMPROPER 2	ROW TOTAL
PROBLEM	0	COUNT	634	138	772
		ROW PCT	82.1	17.9	24.2
		COL PCT	25.3	20.1	
		TOT PCT	19.8	4.3	
NO PROBLEM	1	COUNT	1874	549	2423
		ROW PCT	77.3	22.7	75.8
		COL PCT	74.7	79.9	
		TOT PCT	58.7	17.2	
COLUMN TOTAL			2508	687	3195
			78.5	21.5	100.0

CORRECTED CHI SQUARE = 7.65179 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.0057

NUMBER OF MISSING OBSERVATIONS = 943

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	6.8125	6.8125	3.109	0.074
WITHIN GROUPS	3151	6904.1250	2.1911		
TOTAL	3152	6910.9375			

Exhibit D13-4

Analysis of the Relationship Between Retraction Compliance Test Results and Fit

Crosstabulation

FIT13	COUNT / ROW PCT / COL PCT / TOT PCT	SB21: PROPER 1	IMPROPER 2	ROW TOTAL
PROBLEM	0	691	201	892
		77.5	22.5	27.8
		27.4	29.2	
		21.5	6.3	
NO PROBLEM	1	1828	488	2316
		78.9	21.1	72.2
		72.6	70.8	
		57.0	15.2	
COLUMN TOTAL		2519	689	3208
		78.5	21.5	100.0

CORRECTED CHI SQUARE = 0.73266 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.3920

NUMBER OF MISSING OBSERVATIONS = 930

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	3.0625	3.0625	0.930	0.337
WITHIN GROUPS	3151	10378.2500	3.2936		
TOTAL	3152	10381.3125			

Exhibit D13-5
Analysis of the Relationship Between Retraction Compliance Test Results and Pressure
Crosstabulation

PRES13	SB21 COUNT / ROW PCT / COL PCT / TOT PCT	PROPER 1	IMPROPER 2	ROW TOTAL
PROBLEM	0	724	208	932
		77.7	22.3	29.2
		28.9	30.3	
		22.7	6.5	
NO PROBLEM	1	1780	479	2259
		78.8	21.2	70.8
		71.1	69.7	
		55.8	15.0	
	COLUMN TOTAL	2504	687	3191
		78.5	21.5	100.0

CORRECTED CHI SQUARE = 0.42058 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.5166

NUMBER OF MISSING OBSERVATIONS = 947

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.0	0.0	0.0	0.305
WITHIN GROUPS	3151	6170.8125	1.9584		
TOTAL	3152	6170.8125			

Exhibit D13-6

Analysis of the Relationship Between Retraction Compliance Test Results and Releasing

Crosstabulation

REL13	COUNT / ROW PCT / COL PCT / TOT PCT	SB21 PROPER 1	IMPROPER 2	ROW TOTAL
PROBLEM	0	217	50	267
		81.3	18.7	8.3
		8.6	7.2	
		6.8	1.6	
NO PROBLEM	1	2305	640	2945
		78.3	21.7	91.7
		91.4	92.8	
		71.8	19.9	
COLUMN TOTAL		2522	690	3212
		78.5	21.5	100.0

CORRECTED CHI SQUARE = 1.13861 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.2859

NUMBER OF MISSING OBSERVATIONS = 926

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.6875	0.6875	0.364	0.552
WITHIN GROUPS	3151	5944.0000	1.8864		
TOTAL	3152	5944.6875			

Exhibit D13-7

Analysis of the Relationship Between Retraction Compliance Test Results and Retraction

Crosstabulation

SB21: COUNT / ROW PCT / COL PCT / TOT PCT

RETR13		IPROPER 1	IMPROPER 2	ROW TOTAL
PROBLEM	0	556	137	693
		80.2	19.8	21.6
		22.1	19.9	
		17.3	4.3	
NO PROBLEM	1	1963	553	2516
		78.0	22.0	78.4
		77.9	80.1	
		61.2	17.2	
COLUMN TOTAL		2519	690	3209
		78.5	21.5	100.0

CORRECTED CHI SQUARE = 1.44433 WITH 1 DEGREE OF FREEDOM. SIGNIFICANCE = 0.2294

NUMBER OF MISSING OBSERVATIONS = 929

Analysis of Variance

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	1	0.5625	0.5625	0.153	0.667
WITHIN GROUPS	3151	11565.0000	3.6703		
TOTAL	3152	11565.5625			

Appendix E

DETAILED RESULTS BY CHILD RESTRAINT DEVICE

The table presented in this appendix shows how well each of the child restraint devices included in this study are accommodated by the individual test vehicles. The results presented are the forwardmost position of the front passenger seat able to accommodate the CRD.

Exhibit E-1

CHILD RESTRAINT DEVICE/VEHICLE COMPATIBILITY FOR FRONT PASSENGER SEATS

Automobile	Questor		GM	Strolee		Collier		Ford	Century	
	Infant	Child	Infant	Infant	Child	Infant	Child	Child	Infant	Child
AMC Eagle	–	–	–	–	–	–	–	–	–	–
AMC Spirit	–	–	–	M	–	–	–	M	–	–
BMW 320i (A)	–	–	–	M	–	–	–	–	–	–
Buick Regal	–	–	–	–	–	–	–	–	–	–
Chevy Chevette (A)	–	–	–	–	–	–	–	–	–	–
Chevy Chevette (M)	–	–	–	M	–	–	–	M	–	–
Chevy Citation	–	–	–	M	–	–	–	M	–	–
Chevy Pickup	–	–	–	M	–	–	–	–	–	–
Chevy Van	–	–	–	–	–	–	–	–	–	–
Chrysler Cordoba	–	–	–	–	–	–	–	–	–	–
Datsun Pickup	–	–	–	M	–	–	–	M	–	–
Datsun 210	M	–	–	M	–	–	–	B	–	–
Dodge Aspen	–	–	–	M	–	–	–	M	–	–
Dodge Pickup	–	–	–	–	–	–	–	–	–	–
Dodge Van	–	–	–	–	–	–	–	–	–	–
Fiat Strada	M	M	M	N	M	B	B	N	M	B
Ford Fairmont	–	–	–	–	–	–	–	M	–	–
Ford LTD(A)	–	–	–	–	–	–	–	–	–	–
Ford Mustang	–	–	–	–	–	–	–	M	–	–
Ford Pickup	–	–	–	M	–	–	–	M	–	–
Ford Pinto	–	–	–	–	–	–	–	–	–	–
Ford T-bird	–	–	–	–	–	–	–	–	–	–
Ford Van	–	–	–	B	–	–	–	B	–	–
Honda Civic	–	–	–	M	–	M	–	M	–	–
Jeep Pickup	–	–	–	–	–	–	–	–	–	–
Mazda GLC	–	–	–	M	–	–	–	M	–	–
Olds Delta 88	–	–	–	–	–	–	–	–	–	–
Plymouth Horizon	–	–	–	M	–	–	–	M	–	–
Subaru 1800 GLF	–	–	–	–	–	–	–	–	–	–
Toyota Corolla	–	–	–	–	–	–	–	M	–	–
Toyota Corona (A)	–	–	–	–	–	–	–	–	–	–
Toyota Pickup	–	–	–	–	–	–	–	–	–	–
VW Rabbit (A)	–	–	–	–	–	–	–	–	–	–
VW Rabbit (M)	–	–	–	–	–	–	–	–	–	–

Key:

(A) Automatic belt system
(M) Manual belt system
– Fowardmost position
M Middle position
B Back position
N No position

APPENDIX F

VEHICLE RANKINGS BY USER SIZE GROUPS

This appendix presents the relative ranking of all safety belt systems for each of the seven aspects of comfort and convenience and for an overall index. These rankings were determined for both the average and problem indices and were based on the average responses of test participants grouped into four size categories:

- Short/not overweight,
- Short/overweight,
- Average height/not overweight, and
- Average height/overweight.

Note that in cases of ties, the ranks represented by the tied vehicles were averaged, and the result was assigned to each of those involved in ties. For example, three vehicles tied for the tenth rank would hold the tenth, eleventh, and twelfth positions in the ranking. The average of these positions, eleven, is assigned to each of these three vehicles.

Exhibit F-1

RANKINGS BY ACCESSIBILITY INDICES FOR HEIGHT/WEIGHT GROUPS

	Average Index				Problem Index			
	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight
AMC Eagle	5	6	10.5	16	14	8.5	15	14
AMC Spirit	46	32	43	44	45.5	24	43	43.5
BMW 320i (A)	—	—	—	—	—	—	—	—
BMW 320i (M)	42	47	42	43	43	45	44	45
Buick Regal	30	20.5	10.5	17	28.5	24	10.5	16
Cadillac Sedan Deville	2	1	1	1	5.5	1	1	1
Chevy Camaro	20.5	28	31	24	25.5	21	31.5	21
Chevy Chevette (A)	—	—	—	—	—	—	—	—
Chevy Chevette (M)	38	45	40	41	45.5	42	41.5	43.5
Chevy Citation	38	34	15	31	45.5	38.5	21	27.5
Chevy Pick-up	27	16	16	12	32.5	19.5	21	22
Chevy Van	8	7	4	2	9.5	2	12.5	4.5
Chrysler Champ	28	38	41	37	25.5	37	37	35
Chrysler Cordoba	18	13	27	18	19	4.5	41.5	14
Chrysler Lebaron	3	2.5	3	9	1.5	3	5	3
Datsun Pick-up	15.5	5	29	15	9.5	11.5	25	14
Datsun 210	29	31	38	27	32.5	32	34.5	33.5
Datsun 280 ZX	9	23	34.5	25	5.5	17.5	39	25
Datsun 310	40	44	44	48	41	43	39	41
Dodge Aspen	12.5	9	13	3	9.5	4.5	7	2
Dodge Pick-up	12.5	18	18	25	9.5	24	18	24
Dodge Van	22	10	2	13	19	11.5	3	12
DOT Automatic	—	—	—	—	—	—	—	—
DOT Motorized	—	—	—	—	—	—	—	—
Fiat Strada	41	22	30	39	37	24	28	39.5
Fiat 2000	45	19	45	33	41	15	45.5	36.5
Ford Fairmont (December)	10	11	17	21	14	11.5	12.5	19
Ford Fairmont (July)	6	24	5	6	5.5	28	2	6
Ford LTD (A)	—	—	—	—	—	—	—	—
Ford LTD (M)	23	37	21	23	24.5	35	17	17
Ford Mustang	36	33	22.5	27	37	29	21	27.5
Ford Pick-up	15.5	8	7	5	28.5	6	6	7
Ford Pinto	34	35	24	32	37	36	24	29.5
Ford T-bird	18	26	14	29	21.5	32	21	33.5
Ford Van	26	14	19	7	19	8.5	15	4.5
Honda Civic	34	39	36	34	32.5	38.5	30	29.5
Jeep Pick-up	7	4	20	19	3	14	15	19
Mazda GLC	44	40	33	45	48	43	33.5	46.5
Mazda 626	20.5	42	37	38	17	47	39	31
Mercedes 300D	4	2.5	6	4	5.5	7	4	10
Olds Cutlass (Wagon)	11	12	12	11	12	16	8	9
Olds Delta 88	14	20.5	9	8	14	19.5	10.5	29.5
Plymouth Horizon	18	15	22.5	20	16	11.5	21	23
Subaru 1800 GLF	47.5	46	47	47	45.5	46	48	46.5
Toyota Celica	47.5	41	46	40	37	40.5	45.5	36.5
Toyota Corolla	38	30	32	35	32.5	31	33.5	38
Toyota Corona	11.5	16	10	17	16	8	10	12
Toyota Pick-up	25	27	25	27	21.5	24	26	26
Toyota Tercel	24	28	28	30	25.5	29	27	31
Volvo	1	17	8	10	1.5	17.5	9	11
VW Jetta (A)	—	—	—	—	—	—	—	—
VW Jetta (M)	31	48	48	46	30	48	47	48
VW Rabbit (A)	—	—	—	—	—	—	—	—
VW Rabbit (M-December)	34	36	39	36	37	34	33.5	39.5
VW Rabbit (M-July)	43	43	34.5	42	41	40.5	32	42

Exhibit F-2

RANKINGS BY EXTENDING INDICES FOR HEIGHT/WEIGHT GROUPS

	Average Index				Problem Index			
	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight
AMC Eagle	27.5	15	17	30	30	26.5	12	32
AMC Spirit	47	47	47	47	44.5	47	44.5	46
BMW 320i (A)	—	—	—	—	—	—	—	—
BMW 320i (M)	39	43	42	41.5	43	40.5	41	34.5
Buick Regal	33.5	22	10	9	38	19	16.5	12.5
Cadillac Sedan Deville	1	1	1	1	1	2	1	1
Chevy Camaro	43	45	43	44	46.5	46	38	45
Chevy Chevette (A)	—	—	—	—	—	—	—	—
Chevy Chevette (M)	45	48	48	46	41	48	47	47
Chevy Citation	40.5	6	2.5	17	19	12.5	3	18.5
Chevy Pick-up	20.5	10.5	20.5	3	30	18	16.5	4
Chevy Van	8	10.5	4	2	11	12.5	8	9
Chrysler Champ	13	25	23	16	13.5	10	20	14
Chrysler Cordoba	33.5	3	39.5	15.5	30	7.5	30.5	18.5
Chrysler Lebaron	16.5	20	9	10	25	24.5	6	10.5
Datsun Pick-up	24.5	6	39.5	13	19	7.5	43	18.5
Datsun 210	12	28	19	18	2.5	32.5	16.5	26
Datsun 280 ZX	6	12.5	25	12	6.5	4	26.5	10.5
Datsun 310	16.5	46	26	43	25	40.5	21	37
Dodge Aspen	27.5	8.5	17	4	19	12.5	12	2
Dodge Pick-up	37.5	31.5	29	22.5	41	35.5	28	26
Dodge Van	29	23	17	27	30	18	23.5	32
DOT Automatic	—	—	—	—	—	—	—	—
DOT Motorized	—	—	—	—	—	—	—	—
Fiat Strada	40.5	35	32	48	30	39	36	48
Fiat 2000	46	34	45	45	46.5	29.5	46	41
Ford Fairmont (December)	35	21	35	40	34	32.5	39.5	43.5
Ford Fairmont (July)	3	17	5	7	6.5	15.5	2	8
Ford LTD (A)	—	—	—	—	—	—	—	—
Ford LTD (M)	36	39.5	36	38	35.5	37.5	33.5	34.5
Ford Mustang	44	37	44	35	44.5	35.5	42	36
Ford Pick-up	14.5	2	2.5	5	9.5	1	7	7
Ford Pinto	42	34	[illegible]	32	30	32.5	30.5	43.5
Ford T-bird	18	31.5	33	28	19	32.5	44.5	32
Ford Van	37.5	22.5	46	11	38	21	48	15
Honda Civic	24.5	16	24	26	19	12.5	23.5	18.5
Jeep Pick-up	24.5	26.5	41	39	38	28	39.5	42
Mazda GLC	20.5	11.5	6	19.5	9.5	7.5	5	21
Mazda 626	4.5	16	7	8	6.5	24.5	4	4.5
Mercedes 300D	9.5	4	15	21	25	3	29	20
Olds Cutlass (Wagon)	4.5	25.5	11	37	4	23	9	28
Olds Delta 88	14.5	40	20.5	19.5	19	45	23.5	25
Plymouth Horizon	20.5	29	14	22.5	30	26.5	12	22
Subaru 1800 GLF	2	7.5	29.5	15.5	2.5	6.5	16.5	11.5
Toyota Celica	48	37	37.5	25	48	37.5	26.5	15
Toyota Corolla	20.5	18	29	34	19	21	36	38.5
Toyota Corona	10	4	5	6	4	4	4	5
Toyota Pick-up	31	32	31	30	41	42	36	38.5
Toyota Tercel	7	13	8	6	6.5	15.5	10	4.5
Volvo	9.5	42	13	36	13.5	43.5	14	29
VW Jetta (A)	—	—	—	—	—	—	—	—
VW Jetta (M)	30	42	37.5	33	19	43.5	32	23
VW Rabbit (A)	—	—	—	—	—	—	—	—
VW Rabbit (M-December)	24.5	28	27	30	19	21	23.5	27
VW Rabbit (M-July)	32	38.5	34	41.5	35.5	29.5	33.5	37

Exhibit F-3

RANKINGS BY BUCKLING INDICES FOR HEIGHT/WEIGHT GROUPS

	Average Index				Problem Index			
	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight
AMC Eagle	18	13	15	35	31.5	17.5	19	33
AMC Spirit	48	48	48	48	47	48	48	48
BMW 320i (A)	—	—	—	—	—	—	—	—
BMW 320i (M)	39	32	40.5	31	36	32.5	33	30
Buick Regal	20.5	4.5	9	6	7.5	4.5	7.5	1
Cadillac Sedan Deville	1	1	1	1	2	2	2	3
Chevy Camaro	38	45	40.5	46	36	46	40.5	43
Chevy Chevette (A)	—	—	—	—	—	—	—	—
Chevy Chevette (M)	33.5	35	38	34	25.5	37	35.5	26
Chevy Citation	27.5	2	11.5	12	7.5	2	9	14
Chevy Pick-up	11	22	22	5	25.5	34	19	10
Chevy Van	24	18	16	2	17.5	17.5	26.5	10
Chrysler Champ	5.5	23	10	11	12.5	7.5	14	16.5
Chrysler Cordoba	44	31	47	33	45	40	47	35.5
Chrysler Lebaron	5.5	26	3	21	12.5	31	5	16.5
Datsun Pick-up	41	29	39	18.5	25.5	29.5	39	19
Datsun 210	18	33	28.5	29	17.5	26	19	37
Datsun 280 ZX	7	10	13	16	12.5	6	15	24
Datsun 310	37	34	33	32	35	32.5	33	32
Dodge Aspen	20.5	20	17	4	7.5	26	19	10
Dodge Pick-up	33.5	7	40	9.5	25.5	11	19	6
Dodge Van	42.5	39	25	36	43	40	29.5	38
DOT Automatic	—	—	—	—	—	—	—	—
DOT Motorized	—	—	—	—	—	—	—	—
Fiat Strada	29.5	27.5	23.5	38	7.5	26	19	35.5
Fiat 2000	46	37	45	42	45	36	43.5	42
Ford Fairmont (December)	11	8.5	31	26	7.5	17.5	24	31
Ford Fairmont (July)	8	6	2	7	12.5	7.5	1	7
Ford LTD (A)	—	—	—	—	—	—	—	—
Ford LTD (M)	31	43	36	25	4	42.5	37	29
Ford Mustang	18	11	26	20	7.5	4.5	29.5	10
Ford Pick-up	24	4.5	6	3	25.5	11	4	2
Ford Pinto	26	25	19	27	17.5	26	26.5	26
Ford T-bird	3	8.5	21	22	2	17.5	24	21.5
Ford Van	24	12	32	18.5	32.5	14	31	23
Honda Civic	42.5	47	44	41	40	47	42	45
Jeep Pick-up	40	36	42	43	40	35	45	44
Mazda GLC	15.5	26.5	11.5	15	17.5	11	7.5	15
Mazda 626	4	19	5	8	20	23	10.5	5
Mercedes 300D	14	15	8	13	22	21	6	20
Olds Cutlass (Wagon)	13	3	4	28	21	2	3	18
Olds Delta 88	9	16	7	9.5	25.5	11	13	10
Plymouth Horizon	15.5	17	27	24	17.5	11	28	26
Subaru 1800 GLF	29.5	21	23.5	23	32.5	26	19	21.5
Toyota Celica	47	42	43	37	48	38	40.5	33
Toyota Corolla	11	23	28.5	30	17.5	29.5	24	28
Toyota Corona	10	26	27	5	27	15	12	4
Toyota Pick-up	45	37	37	39	40	40	46	41
Toyota Tercel	2	30	14	14	4	21	10.5	13
Volvo	27.5	46	30	40	32.5	44	33	39
VW Jetta (A)	—	—	—	—	—	—	—	—
VW Jetta (M)	32	40	46	44	30	21	43.5	40
VW Rabbit (A)	—	—	—	—	—	—	—	—
VW Rabbit (M-December)	35	44	35	47	40	45	35.5	47
VW Rabbit (M-July)	36	41	34	45	40	42.5	38	46

Exhibit F-4

RANKINGS BY FIT INDICES FOR HEIGHT/WEIGHT GROUPS

	Average Index				Problem Index			
	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight
AMC Eagle	5.5	2	17.5	19	17	2.5	26	20
AMC Spirit	53	31	45	48	52	39	45	45.5
BMW 320i (A)	19.5	14	9	20.5	17	15.5	19	7
BMW 320i (M)	22	47	27	47	20	43	22.5	33.5
Buick Regal	48	55	50	55	47.5	55	47	55
Cadillac Sedan Deville	3	7	2	1	13.5	18.5	8.5	9.5
Chevy Camaro	47	53.5	46	51	44.5	51.5	44	48
Chevy Chevette (A)	15	17	10.5	26	26	5.5	19	31.5
Chevy Chevette (M)	51	48	54.5	52	47.5	39	54	50
Chevy Citation	46	27	49	35	47.5	35.5	42	29
Chevy Pick-up	33.5	15.5	42.5	28.5	26	8.5	47	43.5
Chevy Van	23	26	22	12	17	32.5	29	13
Chrysler Champ	24	21.5	13	13	33.5	21	5	5
Chrysler Cordoba	55	36	54.5	44	55	35.5	53	50
Chrysler Lebaron	38	53.5	15	33	50	51.5	6.5	41.5
Datsun Pick-up	12.5	8	19	9	7	5.5	28	2
Datsun 210	26	12.5	26	26	38.5	12.5	14.5	24.5
Datsun 280 ZX	7.5	9.5	6.5	3	2	10	6.5	1
Datsun 310	45	51	38	32	44.5	51.5	32	22.5
Dodge Aspen	27.5	45	42.5	34	26	49	37	38
Dodge Pick-up	42.5	12.5	29	15.5	38.5	12.5	30.5	24.5
Dodge Van	19.5	3	8	6.5	26	5.5	11	7
DOT Automatic	5.5	24.5	3	15.5	7	12.5	3.5	13
DOT Motorized	9.5	1	17.5	4	7	1	26	3
Fiat Strada	30	24.5	40	53	17	32.5	42	53
Fiat 2000	49.5	46	53	54	53	47	55	54
Ford Fairmont (December)	12.5	40.5	34	42	7	39	39	31.5
Ford Fairmont (July)	14	19	5	14	3.5	24	1.5	9.5
Ford LTD (A)	2	5.5	1	6.5	7	8.5	3.5	20
Ford LTD (M)	41	39	28	23	42.5	29.5	8.5	17
Ford Mustang	33.5	18	31	26	38.5	12.5	34	29
Ford Pick-up	19.5	38	32	39	26	32.5	30.5	29
Ford Pinto	30	30	47.5	37.5	38.5	26	51.5	38
Ford T-bird	30	21.5	51	45.5	26	26	49.5	50
Ford Van	44	36	47.5	43	26	39	49.5	38
Honda Civic	19.5	34	40	28.5	17	45.5	34	13
Jeep Pick-up	17	11	25	10	26	15.5	26	16
Mazda GLC	27.5	15.5	40	20.5	26	22	42	20
Mazda 626	16	52	6.5	30.5	13.5	51.5	1.5	41.5
Mercedes 300D	1	9.5	16	8	1	18.5	17	18
Olds Cutlass (Wagon)	49.5	28	24	40	51	28	10	47
Olds Delta 88	9.5	5.5	12	5	10.5	5.5	19	7
Plymouth Horizon	39.5	49	37	36	38.5	45.5	38	43.5
Subaru 1800 GLF	52	40.5	52	49	47.5	39	51.5	52
Toyota Celica	54	50	33	18	54	54	22.5	27
Toyota Corolla	39.5	21.5	44	37.5	38.5	2.5	36	38
Toyota Corona	4	21.5	10	12	12	22	12	13
Toyota Pick-up	11	4	10.5	17	10.5	2.5	14.5	13
Toyota Tercel	36.5	29	20	11	42.5	18.5	22.5	4
Volvo	7.5	44	14	30.5	3.5	43	13	26
VW Jetta (A)	43	32.5	21	22	33.5	18.5	22.5	22.5
VW Jetta (M)	32	43	35	41	33.5	43	40	35
VW Rabbit (A)	25	42	30	50	26	48	34	45.5
VW Rabbit (M-December)	33	36	36	45.5	26	32.5	47	38
VW Rabbit (M-July)	36.5	32.5	23	24	33.5	29.5	12	33.5

Exhibit F-5

RANKINGS BY SHOULDER BELT PRESSURE INDICES FOR HEIGHT/WEIGHT GROUPS

	Average Index				Problem Index			
	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight
AMC Eagle	8.5	2	13	18	28.5	2.5	21.5	19.5
AMC Spirit	55	36	42	46.5	50	40	39	45.5
BMW 320i (A)	23	10	15	22.5	28.5	12	36.5	13
BMW 320i (M)	30	47	41	48	44.5	43	28.5	36
Buick Regal	22	52	26.5	54	17.5	52	31	54
Cadillac Sedan Deville	1	8.5	3	1	5	9.5	8.5	5.5
Chevy Camaro	50	51	49	45	53	49.5	42.5	42.5
Chevy Chevette (A)	7	17	6	8	9.5	6.5	12	2.5
Chevy Chevette (M)	51.5	55	54	50.5	50	52	54	52
Chevy Citation	44.5	19	34	29.5	38	19	45.5	26.5
Chevy Pick-up	31	12	37.5	26	32	19	45.5	33.5
Chevy Van	11	22.5	20	12.5	13.5	34	24	17.5
Chrysler Champ	12	21	7	14	23.5	16	2	16
Chrysler Cordoba	48	31	52	31	38	37.5	50	37
Chrysler Lebaron	47	53	10	25	53	49.5	1	42.5
Datsun Pick-up	17	4	17	9	17.5	6.5	21.5	13
Datsun 210	17	14.5	26.5	24	28.5	19	21.5	29
Datsun 280 ZX	6	8.5	8	6	1.5	9.5	3.5	5.5
Datsun 310	46	49	48	35	48	54	34	25
Dodge Aspen	33.5	45	31	39.5	28.5	46.5	36.5	33.5
Dodge Pick-up	39	18	29	15	38	19	33	26.5
Dodge Van	25.5	11	12	12.5	28.5	19	17	2.5
DOT Automatic	4	14.5	2	10	9.5	6.5	5.5	7.5
DOT Motorized	17	3	14	3	9.5	2.5	21.5	2.5
Fiat Strada	44.5	33	39.5	52	47	34	36.5	51
Fiat 2000	54	54	55	55	55	55	55	55
Ford Fairmont (December)	17	43	39.5	43.5	9.5	46.5	45	39.5
Ford Fairmont (July)	14	28	11	28	5	26	8.5	28
Ford LTD (A)	5	1	1	4	9.5	2.5	5.5	13
Ford LTD (M)	37.5	37	32	41	44.5	24	19	30.5
Ford Mustang	41.5	26.5	30	29.5	38	37.5	36.5	47
Ford Pick-up	20	29.5	23	36	17.5	27.5	26.5	33.5
Ford Pinto	33.5	35	51	39.5	28.5	34	53	33.5
Ford T-bird	41.5	24.5	53	46.5	38	27.5	52	48
Ford Van	49	41	46.5	38	38	40	45.5	41
Honda Civic	21	34	33	22.5	13.5	46.5	31	13
Jeep Pick-up	17	13	18	7	17.5	22.5	18	9
Mazda GLC	33.5	22.5	50	21	38	25	48	13
Mazda 626	27	46	5	17	23.5	30	3.5	21.5
Mercedes 300D	3	7	19	11	15	13.5	14	23
Olds Cutlass (Wagon)	24	32	24	27	23.5	22.5	7	19.5
Olds Delta 88	10	6	9	5	9.5	6.5	10	2.5
Plymouth Horizon	28	50	37.5	37	21	46.5	40.5	39.5
Subaru 1800 GLF	53	29.5	44	42	50	34	50	49
Toyota Celica	51.5	48	36	19	53	43	28.5	10
Toyota Corolla	33.5	26.5	43	43.5	38	34	40.5	44
Toyota Corona	2	16	4	2	3	11	13	7.5
Toyota Pick-up	13	5	21	20	17.5	2.5	26.5	17.5
Toyota Tercel	37.5	20	22	16	33	13.5	11	21.5
Volvo	8.5	38	16	32	5	30	15.5	24
VW Jetta (A)	36	24.5	28	33	23.5	15	25	30.5
VW Jetta (M)	43	44	45	53	44.5	43	42.5	53
VW Rabbit (A)	29	39	35	50.5	38	40	31	50
VW Rabbit (M-December)	25.5	42	46.5	49	17.5	52	50	45.5
VW Rabbit (M-July)	40	40	25	34	44.5	30	15.5	38

Exhibit F-6

RANKINGS BY RELEASING INDICES FOR HEIGHT/WEIGHT GROUPS

	Average Index				Problem Index			
	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight
AMC Eagle	26	26.5	17.5	25.5	39	8	23	25
AMC Spirit	47	44	45	46	47.5	43	44	46
BMWi (A)	—	—	—	—	—	—	—	—
BMWi (M)	17	14	26	14	25.5	26.5	7	18.5
Buick Regal	19.5	12	19	36	10.5	19.5	23	34
Cadillac Sedan Deville	1	1	1	2	10.5	8	16	18.5
Chevy Camaro	44	48	47	48	41.5	47	46	47
Chevy Chevette (A)	—	—	—	—	—	—	—	—
Chevy Chevette (M)	31.5	35.5	38.5	31	10.5	32	39	10.5
Chevy Citation	31.5	12	17.5	25.5	33.5	8	23	25
Chevy Pick-up	31.5	26.5	15.5	12	10.5	19.5	23	3.5
Chevy Van	31.5	6	7	18	10.5	8	7	10.5
Chrysler Champ	3	2	14	5	10.5	8	7	3.5
Chrysler Cordoba	46	40	46	41	46	41	47	38.5
Chrysler Lebaron	9	41	30	30	25.5	37.5	16	29.5
Datsun Pick-up	42.5	26.5	36	27	44.5	32	42	31
Datsun 210	42.5	42	44	33	44.5	39.5	45	40.5
Datsun 280 ZX	4.5	8.5	21	6	25.5	8	16	18.5
Datsun 310	14	24	22.5	15.5	10.5	26.5	7	18.5
Dodge Aspen	22.5	18.5	5	19.5	33.5	19.5	7	10.5
Dodge Pick-up	26	22	20	24	33.5	19.5	31	38.5
Dodge Van	37.5	38	43	43	33.5	32	43	45
DOT Automatic	—	—	—	—	—	—	—	—
DOT Motorized	—	—	—	—	—	—	—	—
Fiat Strada	31.5	35.5	8.5	35	33.5	32	7	10.5
Fiat 2000	45	43	39	38	42.5	42	35	29.5
Ford Fairmont (December)	26	3.5	32.5	19.5	33.5	8	39	3.5
Ford Fairmont (July)	11	5	6	1	10.5	8	27.5	3.5
Ford LTD (A)	—	—	—	—	—	—	—	—
Ford LTD (M)	13	16.5	28	3	10.5	8	7	18.5
Ford Mustang	19.5	22	11	29	10.5	8	23	25
Ford Pick-up	19.5	7	3	4	10.5	19.5	7	10.5
Ford Pinto	22.5	29	4	13	10.5	19.5	7	3.5
Ford T-bird	26	3.5	8.5	11	10.5	8	23	10.5
Ford Van	8	18.5	11	11	10.5	8	23	25
Honda Civic	39.5	45	38.5	42	10.5	45.5	31	40.5
Jeep Pick-up	41	30	41	44	40	35.5	41	44
Mazda GLC	16	31	11	18	10.5	39.5	7	10.5
Mazda 626	6	15	22.5	15.5	10.5	26.5	16	18.5
Mercedes 300D	11	16.5	13	21	25.5	26.5	7	36
Olds Cutlass (Wagon)	7	34	34	40	10.5	35.5	34	37
Olds Delta 88	36	12	15.5	22	33.5	8	31	25
Plymouth Horizon	31.5	33	31	37	33.5	32	39	33
Subaru 1800 GLF	39.5	26.5	32.5	39	40	19.5	39	43
Toyota Celica	37.5	37	29	8	33.5	26.5	16	18.5
Toyota Corolla	26	22	25	34	33.5	8	31	10.5
Toyota Corona	15	10	27	23	11	8	18	25
Toyota Pick-up	19.5	20	37	32	10.5	19.5	36	34
Toyota Tercel	2	32	24	9	10.5	37.5	7	3.5
Volvo	4.5	8.5	2	7	10.5	8	7	18.5
VW Jetta (A)	—	—	—	—	—	—	—	—
VW Jetta (M)	11	39	35	28	25.5	26.5	27.5	32
VW Rabbit (A)	—	—	—	—	—	—	—	—
VW Rabbit (M-December)	48	46	48	47	47.5	45.5	48	48
VW Rabbit (M-July)	35	47	42	45	25.5	44	37	42

Exhibit F-7

RANKINGS BY RETRACTING INDICES FOR HEIGHT/WEIGHT GROUPS

	Average Index				Problem Index			
	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight	Short/ Overweight	Short/Not Overweight	Average/ Overweight	Average/Not Overweight
AMC Eagle	8.5	2	13	18	28.5	2.5	21.5	19.5
AMC Spirit	55	36	42	46.5	50	40	39	45.5
BMW 320i (A)	36	34	33	34	35	36.5	35.5	32
BMW 320i (M)	30	47	41	48	44.5	43	28.5	36
Buick Regal	22	52	26.5	54	17.5	52	31	54
Cadillac Sedan Deville	1	8.5	3	1	5	9.5	8.5	5.5
Chevy Camaro	50	51	49	45	53	49.5	42.5	42.5
Chevy Chevette (A)	40.5	51	39	50	39.5	50	42	51
Chevy Chevette (M)	46.5	48.5	52	45.5	48.5	41.5	51	47
Chevy Citation	44.5	19	34	29.5	38	19	45.5	26.5
Chevy Pick-up	31	12	37.5	26	32	19	45.5	33.5
Chevy Van	23	16	15	22.5	7.5	8	11.5	25
Chrysler Champ	12	21	7	14	23.5	16	2	16
Chrysler Cordoba	48	31	52	31	38	37.5	50	37
Chrysler Lebaron	47	53	10	25	53	49.5	1	42.5
Datsun Pick-up	17	4	17	9	17.5	6.5	21.5	13
Datsun 210	40.5	40	34	29	39.5	36.5	34	25
Datsun 280 ZX	6	8.5	8	6	1.5	9.5	3.5	5.5
Datsun 310	46	49	48	35	48	54	34	25
Dodge Aspen	33.5	45	31	39.5	28.5	46.5	36.5	33.5
Dodge Pick-up	39	18	29	15	38	19	33	26.5
Dodge Van	25.5	11	12	12.5	28.5	19	17	2.5
DOT Automatic	4	14.5	2	10	9.5	6.5	5.5	7.5
DOT Motorized	1	3	1.5	1	7.5	8	3.5	2
Fiat Strada	44.5	33	39.5	52	47	34	36.5	51
Fiat 2000	54	54	55	55	55	55	55	55
Ford Fairmont (December)	46.5	36	36	37	48.5	46	38.5	37
Ford Fairmont (July)	14	28	11	28	5	26	8.5	28
Ford LTD (A)	5	1	1.5	4	9.5	2.5	5.5	13
Ford LTD (M)	37.5	37	32	41	44.5	24	19	30.5
Ford Mustang	41.5	26.5	30	29.5	38	37.5	36.5	47
Ford Pick-up	8.5	5	7	6.5	7.5	8	11.5	14.5
Ford Pinto	33	24	24	24	35	26	19	12.5
Ford T-bird	27	19	20.5	35	35	26	19	39
Ford Van	15	7.5	12.5	3	26.5	3	11.5	12.5
Honda Civic	21	34	33	22.5	13.5	46.5	31	13
Jeep Pick-up	17	13	18	7	17.5	22.5	18	9
Mazda GLC	33.5	22.5	50	21	38	25	48	13
Mazda 626	27	46	5	17	23.5	30	3.5	21.5
Mercedes 300D	3	7	19	11	1.5	13.5	14	23
Olds Cutlass (Wagon)	24	32	24	27	23.5	22.5	7	19.5
Olds Delta 88	54	46	44	41	55	46.5	47	42
Plymouth Horizon	28	50	37.5	37	21	46.5	40.5	39.5
Subaru 1800 GLF	38	7.5	18	26	39.5	3	11.5	25
Toyota Celica	51.5	48	36	19	53	43	28.5	10
Toyota Corolla	33.5	26.5	43	43.5	38	34	40.5	44
Toyota Corona	2	16	4	2	3	11	13	7.5
Toyota Pick-up	10.5	7.5	5.5	22.5	7.5	3	3.5	14.5
Toyota Tercel	37.5	20	22	16	33	13.5	11	21.5
Volvo	8.5	38	16	32	5	30	15.5	24
VW Jetta (A)	36	24.5	28	33	23.5	15	25	30.5
VW Jetta (M)	43	44	45	53	44.5	43	42.5	53
VW Rabbit (A)	29	39	35	50.5	38	40	31	50
VW Rabbit (M-December)	25.5	42	46.5	49	17.5	52	50	45.5
VW Rabbit (M-July)	40	40	25	34	44.5	30	15.5	38