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FACTORS AFFECTING CONSUMER USAGE  
AND ACCEPTANCE OF CHILD RESTRAINTS

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16. Abstract  <p>This study was designed to focus on two factors with potential relevance to the child restraint device (CRD) usage problem: CRD design and directions for use; problems of initial users and repeated users were targeted for consideration. Ultimate objectives were to develop recommendations for educational programming designed to improve proper CRD usage, for improving manufacturers' instructions for CRD use, and for improving CRD design.</p> <p>Observational and self-report measures were used to collect data for the study. Both quantitative and qualitative analyses of data were conducted. A wide range of success rates for CRD installation were noted, both in relation to type of CRD and CRD component. In general, lowest success rates for CRD installation were found for CRDs with tether straps and those with more complex designs. Little systematic variation was noted in relation to type of instructions. Many positive and negative comments about CRD design were noted.</p> <p>Two panels of professionals were organized to review study results and make recommendations. One panel, composed of engineers, was focussed on improving CRD design for facilitating consumer acceptance and usage. The other panel, composed of educators, was focussed on improving instructions and other means of providing usage information to consumers.</p>					
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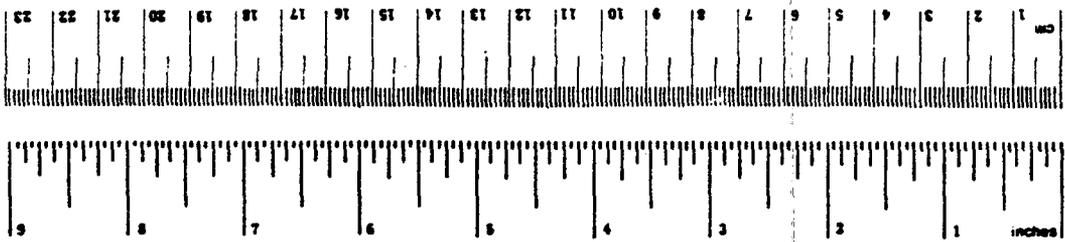
# METRIC CONVERSION FACTORS

## Approximate Conversions to Metric Measures

Symbol	What You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
<b>AREA</b>				
in <sup>2</sup>	square inches	6.5	square centimeters	cm <sup>2</sup>
ft <sup>2</sup>	square feet	0.09	square meters	m <sup>2</sup>
yd <sup>2</sup>	square yards	0.8	square meters	m <sup>2</sup>
mi <sup>2</sup>	square miles	2.6	square kilometers	km <sup>2</sup>
	acres	0.4	hectares	ha
<b>MASS (weight)</b>				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
<b>VOLUME</b>				
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 <sup>3</sup>	cubic feet	0.03	cubic meters	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.76	cubic meters	m <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

## Approximate Conversions from Metric Measures

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



\* 1 in = 2.54 (exact). For other exact conversions, and more detailed tables, see NBS Mon., Publ. 756, Units of Weights and Measures, Price \$7.25, SO Catalog No. C13.10:756.

## ABSTRACT

This study was designed to focus on two factors with potential relevance to the child restraint device (CRD) usage problem: CRD design and directions for use. Problems of both initial users and repeated users were targeted for consideration. Ultimate objectives were to develop recommendations for educational programming designed to improve proper CRD usage, for improving manufacturers' instructions for CRD use, and for improving CRD design.

The design for the initial use project component contained three controlled sources of variation: CRD type (6 levels); type of instructions (3 levels); and regional site/observer (4 levels--Iowa, New York, Tennessee, and Utah). Three components were held constant: parent's gender (mothers only), CRD experience (none), and vehicle type (mid-size four-door sedan). There were three counterbalanced sources of variation: parents' socioeconomic status (SES) (low, middle, and high); child's age (1-, 2-, and 3-year-olds); and child's gender (females and males). The design for the repeated use--longitudinal sample component of the study contained two controlled sources of variation: CRD type (5 levels) and time periods (5 contacts over the first 2 months of use of a loaned CRD). Four components were held constant: parent's gender (mothers only), CRD experience (none), site (Knoxville only), and type of instructions (manufacturer's). There were three counterbalanced sources of variation: parents' SES (low/middle and middle/high); child's age (1-, 2-, and 3-year-olds); and child's gender (females and males). The design for the repeated use--cross-sectional sample component of the study contained four sources of variation: site/observer (Iowa and Tennessee); child's age (1-, 2-, and 3-year-olds); child's gender (females and males); and parent's gender (fathers and mothers). The variable of CRD experience was held constant; all subjects were experienced users. For all project components, variables included beliefs/behaviors relevant to CRD use (success in CRD installation, ease of installing the CRD, ease of placing child in the CRD, acceptance of the CRD, perceived cost to children, perceived cost to parents, satisfaction with CRD, extent of CRD use) and descriptive characteristics (parental socio-demographic characteristics, CRD features, and vehicle features).

Observational and self-report measures were used to collect data for the study. Both quantitative and qualitative analyses of data were conducted.

A wide range of success rates for CRD installation were noted, both in relation to type of CRD and CRD component. In general, lowest success rates for CRD installation were found for CRDs with tether straps and those with more complex designs. Little systematic variation was noted in relation to type of instructions. Many positive and negative comments of CRD design were reported.

Two panels of professionals were organized to review study results and make recommendations. One panel, composed of engineers, was focused on improving CRD design for facilitating consumer acceptance and usage. The other panel, composed of educators, was focused on improving instructions and other means of providing usage information to consumers.

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## I. INTRODUCTION

Many believe that the United States is plagued with a new epidemic. Over 46,000 deaths and 1,800,000 injuries per year result from automobile accidents. It has been estimated that the United States spends \$38 billion to provide medical care for the injured ("Child Automobile Safety," 1979). Of children under 5 years old, 1,000 die and 60,000 are injured each year in automobile accidents. The head and face are involved in approximately 60% of the accidents, and brain damage occurs in 10% of the accidents of children under 5 years of age. Preventive measures are available for both adults and children but are not used widely ("Child Automobile Safety," 1979).

Because of anatomical differences between small children and adults, safety belts have been found to be ineffective with young children (Boughton, Lancashire, & Johnson, 1977). Since the Twelfth Stapp Car Crash Conference held in Detroit in 1968 by the Society of Automotive Engineers, the nation increasingly has become aware of the potential harm that can be done to children riding in automobiles. Siegel, Nahum, and Appleby (1968) studied various types of child restraint devices (CRDs) and provided convincing evidence for the effectiveness of CRDs in reducing the severity of injuries sustained by children in automobile accidents. The most comprehensive studies of the effectiveness of the use of CRDs have been done by Scherz in the state of Washington. He concluded that 91% of the fatalities and 67% of disabling injuries from automobile accidents might be avoided if children were restrained properly in CRDs (Scherz, 1978).

Despite the overwhelming evidence of the benefits of using CRDs, usage rates have been very low. In 1977, researchers from the Transportation Center at The University of Tennessee found that only 9.2% of parents observed in selected parking lots in various cities of Tennessee used CRDs with their children. After passage of a state law and a year of intense public information and education, only 13.4% of the parents were observed using CRDs (Philpot, Perry, Hughes, Wyrick, Culler, Lo, Trent, & Geiss, 1979). After approximately 3 more years of enforcement of the law and statewide implementation of public information and education programs, usage rates had more than doubled (Tennessee Department of Public Health, 1983), but these figures still are far from optimal in providing adequate protection for our youngest citizens.

The Tennessee results are consistent with other research findings. In a study in Maryland, Massachusetts, and Virginia, Williams (1976) found that only 7% of the children 10 years and under were restrained, only 11% of the passengers 20 years and older were restrained, and only 22% of the drivers were restrained. As more states have passed child restraint laws, usage rate statistics have paralleled those in Tennessee.

Although increased public attention to the importance of CRD use has been associated with definite increases in ownership of CRDs and moderate increases in use of CRDs, a serious problem still exists with respect to appropriateness of use. For example, Williams (1976) found that 15% of the CRDs observed were not used, and of those in use, 73% were not used correctly. Likewise, Hall and Council (1978) found that of the 26% of the children they observed riding in CRDs in North Carolina, only 5.9% were riding in seats that were secured

properly. Thus, effectiveness of protection to children riding in CRDs often is hampered significantly.

Many of the factors related to nonuse of CRDs appear to be related to those of misuse. Parents with higher educational levels are more likely than other parents to use CRDs (Philpot, Heathington, Perry, & Hughes, 1979), and parents who own but do not use CRDs regularly have reported that perceived lack of comfort and convenience and difficulty in following manufacturers' directions contribute to nonuse (Cunningham, Hughes, Philpot, & Pentz, 1981). Thus, even though a "cure for the disease" is available, means of facilitating usage must be identified before an end can be reached to the highway epidemic to which so many of the nation's children continue to fall victim.

The present study was designed to focus on two factors with potential relevance to the CRD usage problem: CRD design and directions for use; problems of both initial users and repeated users were targeted for consideration. Primary objectives were: (a) to determine the effect of CRD design on initial consumer acceptance and use (success in installation, perceived ease of installing the CRD, perceived ease of placing child in the CRD, acceptance of the CRD, perceived cost to children, perceived cost to parents, satisfaction with the CRD); (b) to determine the effect of readability of CRD instructions on initial consumer acceptance and use (success in installation, perceived ease of installing the CRD, perceived ease of placing child in the CRD, acceptance of the CRD, perceived cost to children, perceived cost to parents, satisfaction with the CRD); and (c) to determine the effect of CRD design on consumer acceptance and use over time (correctness of use, perceived ease of installing the CRD, perceived ease of placing child in the CRD, acceptance of the CRD, perceived cost to children, perceived cost to parents, satisfaction with the CRD, and extent of CRD use). Secondary objectives were: (a) to determine the impact on consumer acceptance and use of various CRD design features (tether, shield, shell, internal harness, elevated height, pivoting bar, permanent safety belt attachment); (b) to determine the relationship between consumer acceptance and use of various CRD design features and socio-demographic characteristics (socioeconomic group, child's age, child's gender, parent's gender); and (c) to determine the relationship between consumer acceptance and use of various CRD design features and vehicle characteristics (size of vehicle, style of vehicle, vehicle usage patterns). Ultimate objectives were to develop recommendations for educational programming designed to improve proper CRD usage, for improving manufacturers' instructions for CRD use, and for improving CRD design.

## II. REVIEW OF LITERATURE

Parents who buy child restraint devices (CRDs) to use with their children may do so under the threat of law in those states that have child restraint laws, because they wish to prevent misbehavior (Christophersen, 1977), and/or because they wish to protect their children from injury in an automobile accident. Unfortunately, studies with parents of infants have shown that even parents who choose to use CRDs for safety reasons occasionally may fail to use them or may misuse them. When misuse or disuse occurs, parents cite as reasons uncomfortable design and inconvenience of use because of design flaws, as well as failure of the manufacturer to inform the consumer adequately of the reasons for correct use (Weber, 1980). Weber and Allen (1982) suggested that the information provided to consumers does not allow them to make choices that will be acceptable over time.

If the safety-conscious parents of infants misuse or fail to use their CRDs because of perceived discomfort for the infants, parents of toddlers may not have to depend on their perceptions; their toddlers may be vocal about restraint in a CRD that is too confining or that is uncomfortable. Parents of children in Tennessee cited child discomfort and dislike of the CRD as the primary reasons they misused or failed to use their restraint devices (Cunningham et al., 1981). Researchers studying CRD use in Sweden and Australia also have pointed to dissatisfaction with child comfort as primary; parents in these studies cited some of the same concerns cited by American parents--e.g., the child's inability to see out of the moving automobile when restrained, difficulty in sleeping when restrained, and discomfort from heat (Arnberg, Arnberg, & Trinca, 1978; Trinca, Arnberg, & Arnberg, 1981).

Parents' perceptions of convenience of use also must be considered. Parents initially may choose to buy a CRD for safety reasons, but many discover that use of a CRD solves child misbehavior problems. Christophersen (1977) found that children who normally rode in CRDs behaved better than those who did not and that children who misbehaved when unrestrained improved dramatically when restrained. Almost 50% of parents of children under 5 years in Oklahoma reported the belief that most parents restrain their children in CRDs to enjoy improved behavior rather than to ensure the children's safety (Kielhorn & Westphal, 1980). This function cannot be fulfilled if children can unbuckle the harness or wiggle out of the CRD (Freedman & Lukin, 1977).

To avoid inconvenience of use, parents also may need to consider special limitations of their automobiles when choosing a CRD (Tom, Petersen, Robbins, & Peters, 1981). Parents with large families, small cars, or cars equipped with inertial safety belts may find that certain CRD designs and components are not appropriate for their needs.

Even parents who have the desire to use CRDs appropriately to protect their children's safety may be stymied by inability to interpret the instructions provided by the manufacturer. Hicks (1959) has noted that instructions should be clear, concise, and accurate. This is particularly important because the level of mechanical experience possessed by parents who attempt to use the instructions varies widely. Hicks also pointed out that in addition to telling users what to do, it is necessary to show them what to do. This requires clear and complete illustrations or photographs. Other suggestions

offered by Hicks are that the writer use short sentences and short paragraphs, begin a new paragraph for each new thought, avoid technical words that are singular to a given industry, avoid complicated phasing and unnecessary words, name each part and use the name when referring to it, divide the task with headings and subheadings, and integrate the illustrations and instructions so that they follow one another closely.

Short sentences are among the components of another important element in the usability of instructions--the reading level. A substantial minority of adults, particularly among the lower socioeconomic groups, may be considered functionally illiterate because they read below the 5th-grade reading level. Presentation of technical information such as that in instructions for CRDs can be made infinitely more difficult for the poor reader if the instructions are written at a 10th- or 11th-grade reading level (Heathington, 1980). Accuracy of initial installation and subsequent use may be affected by the subject's ability to interpret the directions.

In summary, although parents most often mention child discomfort and dislike of CRDs as reasons for misuse or disuse of their CRDs, parental perception of convenience of use also must be considered. Even if the parent is motivated to use the CRD, toddlers may short-circuit the safety of the CRD by unbuckling the seat or wiggling out of the seat. Special automobile features may make correct CRD use difficult, as may certain CRD features. Finally, parental ability to understand and follow the instructions for using the CRD correctly may depend on the parent's reading level, which in turn is likely to be related to socioeconomic level.

### III. METHODOLOGY

The study included three distinct components. These components were designed to answer questions about CRD use with toddlers and parents' attitudes toward CRDs at several points in the experience of CRD use. The initial use component of the study was focused on the initial parental contact with the CRD, including first-time CRD installation and child placement. The repeated use--longitudinal sample component of the study began with the initial parental contact with the CRD and then continued through the first 2 months of use of a loaned CRD. The repeated use--cross-sectional sample component of the study was focused on parents who identified themselves as consistent CRD users.

#### Materials

The CRDs included in the initial use and repeated use--longitudinal sample components were selected based on relevant design features. The six models selected were the Bobbie-Mac Champion, the Century Safe-T-Rider, the Cosco-Peterson Safe-T-Shield, the Ford Tot-Guard, the Kantwet-Questor One-Step, and the Takata Guardian (a Japanese seat not available in the U.S. and used only in the initial use component of the project). Features of the seats are summarized in Tables 1-3. Pictures of each seat are shown in Figures 1-6.

The instructions for CRD use were designed to vary in readability. Three sets of instructions were developed for each CRD tested in the initial use component: (a) instructions written at the normative reading level (10th grade) plus pictures, (b) instructions written at a reduced reading level (3rd grade) plus pictures, and (c) pictures only (with labels). These three sets of instructions for each of the six CRD types are given in Appendix A. Manufacturers' instructions were used for the repeated use--longitudinal sample component.

#### Design and Sample

A separate design was used for each project component. However, these designs were coordinated so some comparison across components was possible.

#### Initial Use Component

The design for the initial use project component contained three controlled sources of variation: CRD type (6 levels); type of instructions (3 levels); and regional site/observer (4 levels--Iowa, New York, Tennessee, and Utah). Three components were held constant: parent's gender (mothers only), CRD experience (none), and type vehicle (mid-size four-door sedan). There were three counterbalanced sources of variation: family's socioeconomic status (SES) (low, middle, and high); child's age (1-, 2-, and 3-year olds); and child's gender (females and males). Dependent variables were overall success in CRD installation, correctness of safety belt installation, correctness of tether installation (where applicable), correctness of internal harness installation (where applicable), correctness of shield installation (where applicable), perceived ease of installing the CRD, perceived ease of placing child in the CRD, acceptance of the CRD, perceived cost to children, perceived cost to parents, and satisfaction with the CRD.

Table 1  
Safety Features of Child Restraint Devices

Manufacturer/model	Safety features			
	Tether	Internal harness	Shield	Shell
Bobby-Mac Champion		X	X	X
Century Safe-T-Rider	(X) -----	(X)		
Cosco-Peterson Safe-T-Shield			X	X
Ford Tot-Guard			X	
Kantwet-Questor One-Step	X	(X) -----	(X)	X
Takata Guardian		(X) -----	(X)	X

Note. All seats must be used in conjunction with the adult lap belt.

Table 2  
Comfort Features of Child Restraint Devices

Manufacturer/model	Comfort features			
	Elevated height	Reclining capacity	Inertial harness	Sized for larger children
Bobby-Mac Champion		X		
Century Safe-T-Rider	X			X
Cosco-Peterson Safe-T-Shield	(X)	X		
Ford Tot-Guard	(X)			X
Kantwet-Questor One-Step	X	X		X
Takata Guardian	(X)	X	X	

Table 3

## Convenience Features of Child Restraint Devices

Manufacturer/model	Convenience features			
	Pivoting bar (shield)	One-step child placement	Permanent safety belt attachment	Convertible (infant/ toddler)
Bobby-Mac Champion				X
Century Safe-T-Rider				
Cosco-Peterson Safe-T-Shield	X	X	X	X
Ford Tot-Guard		X	X	
Kantwet-Questor One-Step	X	X	X	X
Takata Guardian	(X)	X	X	(X)

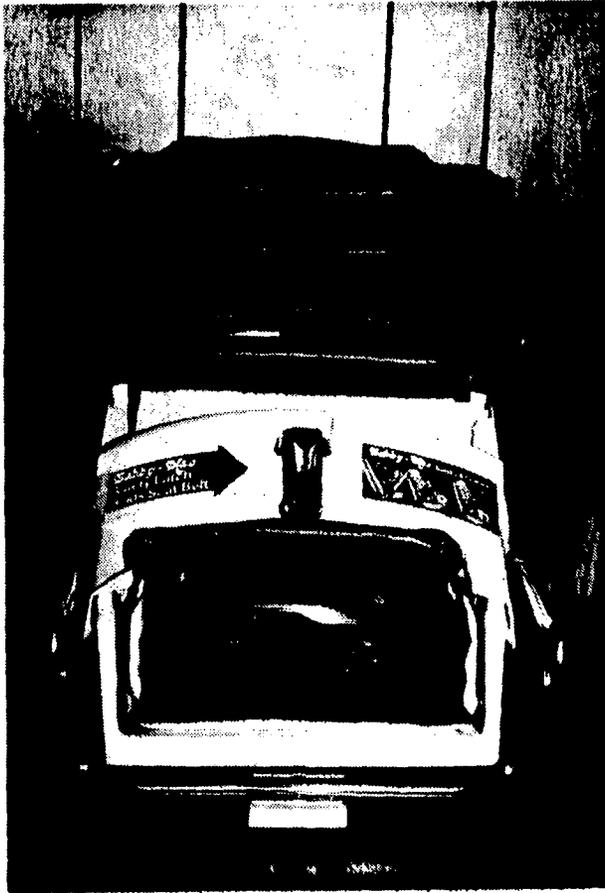


Figure 1. Bobby-Mac Champion



Figure 2. Century Safe-T-Rider

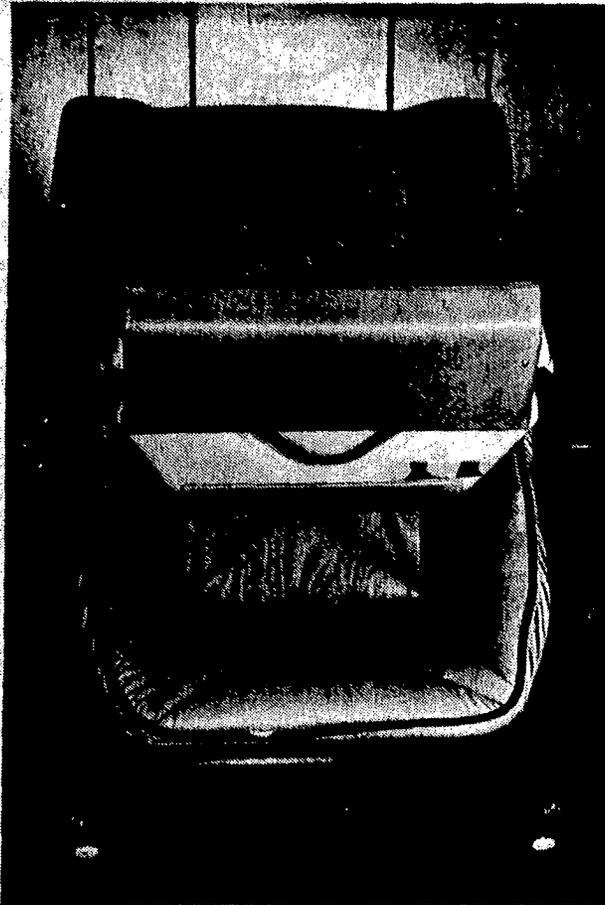


Figure 3. Cosco-Peterson Safe-T-Shield

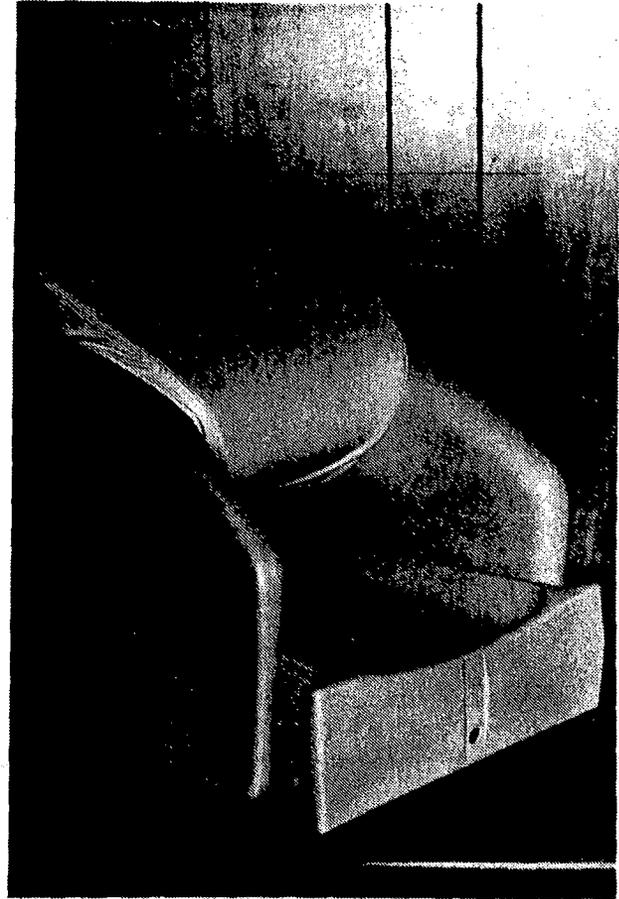


Figure 4. Ford Tot-Guard

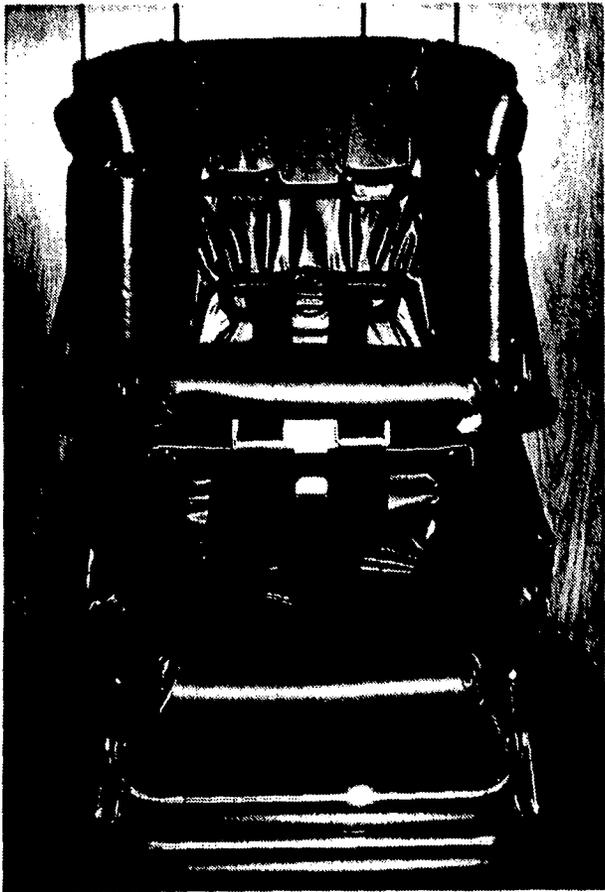


Figure 5. Kantwet-Questor One-Step



Figure 6. Takata Guardian

The sample for this component of the study was drawn from the population of mothers of 1-, 2-, and 3-year-old toddlers in the four sites. Mothers who used CRDs with their toddlers or had been consistent users of infant CRDs were excluded from the sample. Fathers were excluded from the sample to avoid any possible problem of differences in mechanical skills engendered by differential socialization. Names of potential subjects were obtained from day care centers, schools, churches, welfare and WIC (Women, Infants, and Children) offices, and personal contacts. The family's SES was determined by occupation on the basis of the Duncan Socioeconomic Index (Duncan, 1961). Ranks 1-3 were considered low SES, ranks 4-6 were considered middle SES, and ranks 7-10 were considered high SES. In two-parent households, the family's SES determination was made on the basis of the parent with the occupation of the highest rank. At each of the four sites, there were 54 subjects, for a total of 216 subjects (3 observations/cell).

#### Repeated Use--Longitudinal Sample Component

The design for the repeated use--longitudinal sample component contained two controlled sources of variation: CRD type (5 levels) and time periods (repeated measures across time, with 4 levels for some variables and 2 levels for others). Four components were held constant: parent's gender (mothers only), CRD experience (none), site (Knoxville only), and type of instructions (manufacturer's). There were three counterbalanced sources of variation: family's SES (low/middle and middle/high); child's age (1-, 2-, and 3-year-olds); and child's gender (females and males). Dependent variables were overall success in CRD installation, correctness of safety belt installation, correctness of tether installation, correctness of internal harness installation, correctness of shield installation, perceived ease of installing the CRD, perceived ease of placing child in the CRD, acceptance of the CRD, perceived cost to children, perceived cost to parents, and satisfaction with the CRD.

The sample for this component of the study was drawn from the population of Knoxville mothers of 1-, 2-, and 3-year-old toddlers. Only mothers who did not use a CRD with their toddlers and had not used a CRD consistently with the toddlers as infants were included in the sample. Names of potential subjects were obtained from day care centers, physicians, churches, social groups, and welfare and WIC offices, as well as through advertisements and articles on radio, on television, and in newspapers. Difficulty in securing subjects willing to devote the required time to the project over the 2-month period required the reduction of the sample from the planned 45 to 30.

#### Repeated Use--Cross-Sectional Sample Component

The design for the repeated use--cross-sectional sample component contained four sources of variation: site/observer (Iowa and Tennessee); child's age (1-, 2-, and 3-year-olds); child's gender (females and males); and parent's gender (fathers and mothers). The variable of CRD experience was held constant; all subjects were experienced users. Variables included beliefs/behaviors relevant to CRD use (overall success in CRD installation, ease of installing the CRD, ease of placing child in the CRD, acceptance of the CRD, perceived cost to children, perceived cost to parents, satisfaction with the CRD, and extent of CRD use) and descriptive characteristics (parental socio-demographic characteristics, CRD features, and vehicle features).

The sample for this component of the study was drawn from the population of parents (both mothers and fathers) of toddlers aged 1, 2, or 3 years. The parents selected for the study were consistent users of federally approved CRDs with the toddlers in question. Names of potential subjects were obtained through day care centers, churches, social groups, and personal contacts. There were 40 subjects at each site, for a total of 80 participants.

### Instruments

Several instruments were developed or adapted for this study. Content validity of all instruments was evaluated as satisfactory by professionals in child development, education, and transportation safety. Copies of all instruments are included in Appendix B.

The Observation of CRD Installation included quantitative data--child's gender and age; parent's gender, SES, and occupation; CRD type; make and model of vehicle; initial and final seat (front or back) and seating position (left, center, or right) choice for CRD installation; parental approach to the installation problem; time required for installation; and correctness of installation of CRD and child placement--and qualitative data (parental verbal and nonverbal behavior during installation). During pretesting of the instruments, 95% interobserver reliability was obtained.

The CRD Beliefs Questionnaire, a self-administered form, included some items used in previous investigations (scales for cost to parents, cost to children, and satisfaction with the CRD) plus items added for this study (scales for ease of installation and ease of child placement). Although pilot testing of the scales for ease of installation and ease of child placement resulted in high reliability, in actual field assessment parents tended to become confused, mentally reversing the comparison requested in the items; thus, data from these two scales were not used in the final analyses. Finally, two items were included on which the parent was asked to estimate the number of CRD uses on the last five long car trips and the last five short car trips. Scale reliabilities are summarized in Table 4.

The Sociodemographic Information Questionnaire, a self-administered form, was developed for this study but included items adapted from previous investigations. Scales were included for number of children; both parent's occupations; respondent parent's level of education, marital status, age, and ethnic group; family's income; and parent's experience in using a CRD.

The CRD Installation Interview was developed for this study. A shortened version, used with the initial use and repeated use--longitudinal sample components, included questions only about the CRD presented to the parent during the study. Additional questions added for the repeated use--cross-sectional sample component were used to solicit parents' opinions about CRDs they had used previously.

The CRD Use Interview was developed for use in the repeated use--longitudinal sample component of the study. It was used to solicit information about numbers of times parents used and failed to use the CRD, numbers of times other persons used and failed to use the CRD, situations that made the parent feel more positive or less positive toward CRD use, and things the parent liked or disliked about the CRD.

Table 4  
Reliability Coefficients for CRD Beliefs  
Scales for All Sample Groups

Subsample/scale	Number of items	<u>n</u>	Cronbach's alpha (standardized)
Initial use sample			
Iowa mothers			
Ease of installing CRD	3	49	-.67
Ease of placing child in CRD	3	49	.56
Acceptance of CRD	4	49	.86
Perceived cost to children	6	49	.10
Perceived cost to parents	6	49	-.35
Satisfaction with CRD	7	49	.74
Extent of use	2	49	.62
New York mothers			
Ease of installing CRD	3	53	.79
Ease of placing child in CRD	3	53	.66
Acceptance of CRD	4	53	.90
Perceived cost to children	6	53	-.14
Perceived cost to parents	6	53	-.32
Satisfaction with CRD	7	53	.77
Extent of use	2	53	.74
Tennessee mothers			
Ease of installing CRD	3	49	.72
Ease of placing child in CRD	3	49	.64
Acceptance of CRD	4	49	.92
Perceived cost to children	6	49	.19
Perceived cost to parents	6	49	-.08
Satisfaction with CRD	7	49	.57
Extent of use	2	49	.87
Utah mothers			
Ease of installing CRD	3	47	.62
Ease of placing child in CRD	3	47	.69
Acceptance of CRD	4	47	.92
Perceived cost to children	6	47	-.04
Perceived cost to parents	6	47	.02
Satisfaction with CRD	7	47	.66
Extent of use	2	47	.88

Table 4 (continued)

Subsample/scale	Number of items	<u>n</u>	Cronbach's alpha (standardized)
All initial use sample mothers			
Ease of installing CRD	3	198	.70
Ease of placing child in CRD	3	198	.64
Acceptance of CRD	4	198	.90
Perceived cost to children	6	198	.51
Perceived cost to parents	6	198	.57
Satisfaction with CRD	7	198	.71
Extent of use	2	198	.85
Repeated use--cross-sectional sample			
Iowa parents			
Ease of installing CRD	3	39	.78
Ease of placing child in CRD	3	39	.40
Acceptance of CRD	4	39	.82
Perceived cost to children	6	39	.47
Perceived cost to parents	6	39	.56
Satisfaction with CRD	7	39	.79
Extent of use	2	39	-.22
Tennessee parents			
Ease of installing CRD	3	40	.72
Ease of placing child in CRD	3	40	.29
Acceptance of CRD	4	40	.90
Perceived cost to children	6	40	.74
Perceived cost to parents	6	40	.51
Satisfaction with CRD	7	40	.59
Extent of use	2	40	.13
All repeated use--cross-sectional sample parents			
Ease of installing CRD	3	79	.75
Ease of placing child in CRD	3	79	.34
Acceptance of CRD	4	79	.87
Perceived cost to children	6	49	.62
Perceived cost to parents	6	49	.52
Satisfaction with CRD	7	49	.70
Extent of use	2	49	-.08

Table 4 (continued)

Subsample/scale	Number of items	<u>n</u>	Cronbach's alpha (standardized)
Repeated use--longitudinal sample			
Ease of installing CRD	3	26	.66
Ease of placing child in CRD	3	26	.77
Acceptance of CRD	4	26	.73
Perceived cost to children	6	26	.70
Perceived cost to parents	6	26	.65
Satisfaction with CRD	7	26	.73
Extent of use	2	26	.89
Entire sample			
Ease of installing CRD	3	303	.72
Ease of placing child in CRD	3	303	.63
Acceptance of CRD	4	303	.90
Perceived cost to children	6	303	.57
Perceived cost to parents	6	303	.57
Satisfaction with CRD	7	303	.71
Extent of use	2	303	.89

## Procedures

Different individuals were used to collect data at each site. All were white and in the 25- to 35-year age range; all but one (the one responsible for data collection from the repeated use--longitudinal sample) were female. All had both undergraduate and graduate work in child development and/or education, and all had previous experience as interviewers.

Procedures manuals were developed to train the individuals responsible for data collection. This information was supplemented by extensive telephone or personal follow-up training designed to check understanding of procedures.

### Initial Use Component

The collection of data was conducted at locations convenient for the parent (e.g., a day care center, a WIC office, her home). In each site, a mid-size four-door American-made sedan with a tether bolt installed in the rear panel was used for CRD installation. Before data collection began, each mother was given a brief description of the project, informed of her right to refuse to participate or withdraw from participation, and asked to sign a consent form (see Appendix C).

Each mother was presented with one CRD and one set of instructions (determined in advance by the factorial design) and asked to attempt to install that CRD and place the toddler in it. Although the data collector did not answer questions during installation, the mothers were encouraged to "think out loud" as they worked. Mothers were assured that any questions would be answered at the end of the contact. The period of attempted installation was timed and the time was recorded. If successful installation and child placement had not occurred at the end of 20 minutes, the installation was ended. Whether the mother stopped on her own or was stopped, the data collector then examined the CRD installation and child placement, noting both correct and incorrect points on the observation form. The data collector also observed the mother during installation, recording the initial and final auto seat choice (front or rear) and seat position choice (driver's side, middle, or passenger's side), as well as her approach to the problem (reading entire instructions before beginning, reading and installing simultaneously, or installing without reference to the instructions) and verbal and nonverbal behavior during installation.

At the completion of the installation procedure, the mother was asked to complete the CRD Beliefs Questionnaire and the Sociodemographic Information Questionnaire. Finally, the CRD Installation Interview was conducted.

At the end of the data collection period, the mother's questions were answered. Then she was presented with a copy of the informational pamphlet, A Matter of Love, and the children's book, For Pete's Sake.

### Repeated Use--Longitudinal Sample Component

The initial contact with the mother in this project component was identical to the initial contact in the initial use component except that (a) manufacturers' instructions were used in all cases; (b) the mother was "debriefed" at the end of the first installation session to assure that she could install

the seat properly; (c) installation was in the parent's vehicle; and (d) with tethered seats, the parent was given the name and address of a local agency that had agreed to install the tether bolt free of charge. The mother then began a "loaner" period using the CRD she had attempted to install.

In addition to the initial contact, three more "in-person" data collection occasions (at the end of the second, fifth, and eighth weeks) were used. On each of these occasions, the mother was asked to install the borrowed CRD in her own vehicle. The data collector completed the Observation of CRD Installation and the CRD Use Interview each time.

On the weeks not planned for in-person contacts, the mothers were contacted by telephone and administered the CRD Use Interview. After each contact, mothers were encouraged to clear up any questions they had about correct CRD use.

#### Repeated Use--Cross-Section Sample Component

Data collection was conducted at locations convenient for the parent (e.g., a day care center, the parent's home). Each parent first was given a brief description of the project, informed of his/her right to refuse to participate in the study or to withdraw at any time, and asked to sign a consent form (see Appendix C).

The parent then was asked to install the CRD s/he normally used with his/her toddler in the family's own vehicle and to place his/her toddler in the CRD. Parents were allowed to consult the instructions provided with the CRD if they chose. The parent was allowed 20 minutes for installation; if the installation was not completed by the end of that time period, the observation was terminated. The time required for installation was recorded. The data collector then investigated the installation and child placement and completed the Observation of CRD Installation form as with the initial use component.

At the end of the installation procedure, the parent was asked to complete the CRD Beliefs Questionnaire and the Sociodemographic Information Questionnaire. Finally, the CRD Installation Interview (including four questions not used in the initial use component) was administered.

At the end of the data collection period, parents' questions were answered. Each participant then was given a copy of A Matter of Love and For Pete's Sake.

#### Analysis

Both quantitative and qualitative analyses of data were conducted. To answer questions about success in installation of CRDs relative to type of CRD, form of instructions, site, parent's gender, and/or experience, cross tabulations/chi-square analyses were conducted. To determine differences in beliefs relative to these same independent variables, analyses of variance were conducted. To determine whether the belief/behavior variables could be used to form systematic clusters of individuals (i.e., groups of individuals with common beliefs and behaviors), cluster analysis was used. In all cases, the individual was the unit of analysis, and the criterion for significance was an alpha level of .05 for most analyses.

#### IV. RESULTS

Separate analyses were conducted for each project component. Both quantitative and qualitative analyses were completed for each.

##### Initial Use Component

Quantitative analyses were conducted to determine whether there were differences in installation success and beliefs in relation to type of CRD (six types), form of instructions (three forms), and/or site (four sites--confounded by observer). Qualitative analyses were focused on mothers' perceptions of CRD characteristics.

##### Quantitative Analyses

It was hypothesized that correctness of CRD use (including installation and correct child placement) would be related to CRD type. This hypothesis was tested in two ways.

First, relationships between correctness of installation and the six types of CRDs (each possessing at least two of the CRD components identified as typical of toddler CRDs) were examined. A chi-square analysis performed on these data did not yield evidence of such a difference.

From visual inspection of the data, it is evident that there was a wide range of success rates for CRD installation. For example, the complex Kantwet-Questor One-Step was installed correctly by only 17% of these first-time users, as compared with 53% for the Ford Tot-Guard and 58% for the Century Safe-T-Rider, the two least complex CRDs tested. Percentage of correct installation for each CRD (across all sites and instruction forms) is presented in Table 5.

The relationship of correctness of installation to CRD type also was examined by combining the correct usage of CRD components across all CRDs that included these components. Once again, none of the differences were significant.

Again, as shown in Table 6, visual analysis of these data reflects a wide range of success rates for the various components. As might be expected, the tether was used incorrectly most often (53% of the time). The auto safety belt, the one component common to all CRDs available in the U.S., was installed correctly less than two-thirds of the time (62%). Apparently, the components in combination make the CRD more difficult to use than its parts; overall, the CRDs were installed completely correctly only 41% of the time.

Correctness of CRD component use also was investigated by CRD brand/model. Differences among the specific brands/models tested on the usability of components are shown in Table 7.

It was hypothesized that a relationship would exist between parents' scores on the CRD Beliefs Questionnaire and (a) reading level of instructions, (b) CRD type, (c) family's SES, (d) child's gender, and (e) child's

Table 5  
Success of Initial Use Mothers in CRD Installation

CRD brand/model	Percent of installations correct
Bobby-Mac Champion	28
Century Safe-T-Rider	58
Cosco-Peterson Safe-T-Shield	44
Ford Tot-Guard	53
Kantwet-Questor One-Step	17
Takata Guardian	50

$\underline{n} = 36$  for each CRD type.

Table 6

Success of Initial Use Mothers in Installation  
Relative to Specific CRD Components

CRD component	Percent of installations correct
Booster seat (Century Safe-T-Rider, Ford Tot-Guard)	84
CRD reclining capacity (all except Century Safe-T-Rider and Ford Tot-Guard)	97
Internal harness (all except Ford Tot-Guard)	72
Shield (all except Century Safe-T-Rider)	78
Automobile safety belt (all CRDs)	62
Tether (Century Safe-T-Rider, Kantwet-Questor One-Step)	53
All components of CRD	41

$\underline{n}$  = 216 overall ( $\underline{n}$  = 36 for each CRD type).

Table 7

Success of Initial Use Mothers in Installation  
Relative to Specific CRD Components for  
Various Brands/Models

CRD brand model	Percent of installations correct				
	Automobile safety belt	Tether	Shield	Internal harness	Booster seat
Bobby-Mac Champion	47	-	42	81	-
Century Safe-T-Rider	75	67	-	78	97
Cosco-Peterson Safe-T-Shield	64	-	83	57	-
Ford Tot-Guard	78	-	97	-	71
Kantwet-Questor One-Step	44	39	72	53	-
Takata Guardian	61	-	97	89	-

Note. Not all components are applicable to all CRD types.

n = 36 for each CRD type.

age. Because the ease of installation and ease of child placement scales apparently were confusing to the mothers in the sample, they were excluded from the analyses.

A General Linear Model (GLM) procedure was used to test for interactions among the variables of site, CRD type, and instruction level. An interaction was found between CRD type and site on the satisfaction scale. Mothers in New York who tested the Century Safe-T-Rider had more positive scores on the satisfaction scale than did New York mothers who tested the Kantwet-Questor One-Step.

The GLM procedure also was used to determine whether differences existed between parents' scores on these scales and the variables of family's SES, child's gender, child's age, site, CRD type, and instruction level. Several differences were found:

1. Mothers (across all sites) who installed the Takata Guardian had more positive scores on acceptance of CRDs than did mothers who installed the Ford Tot-Guard.

2. Mothers (across all sites) who installed the Takata Guardian had more positive scores on satisfaction with CRDs than did mothers who installed the Ford Tot-Guard.

3. Mothers in Tennessee and New York, both of which had child restraint laws, scored more positively on acceptance of CRDs than did mothers in Iowa, which did not have child restraint legislation.

4. Mothers in Tennessee scored more positively on satisfaction with CRDs than did mothers in Iowa.

No differences were found on car seat beliefs by form of instructions. Scores on cost to parents and cost to children did not differ by CRD type or site.

### Qualitative Analyses

Qualitative data were collected in the initial use component through observation of mothers' verbal and nonverbal behavior during attempted installation and through the administration of the CRD Installation Interview. Initial users made few comments during installation. Those comments that were made usually fell into one of four categories: (a) comments reflecting on the mother's self-perception of mechanical prowess (e.g., "I can never do things like this so my husband always helps me." or "I'm not good at mechanical stuff."); (b) comments reflecting on physical characteristics of the CRD (e.g., "Boy, is this ugly!" or "This seat is too heavy." or "This vinyl wouldn't last."); (c) comments about the ease/difficulty of installation (e.g., "Gosh, this is tough!" or "You'd need a degree in engineering to put this together." or "That's not hard at all."); and (d) comments about the likelihood of the mother's toddler agreeing to ride in the CRD ("This looks comfy--I think she'd stay in it." or "This would be okay for short trips, but he'd never stay put in it for an hour." or "I could never get her to sit in a car seat because she needs her freedom.").

The most common comment overall involved the mother's disparaging her own mechanical skills and/or commenting about how helpless she felt when faced with such a task; 11 mothers made specific comments to that effect. The mothers' nonverbal behavior also suggested a great deal of frustration with the installation task. Based on verbal and nonverbal behavior during installation, correctly placing the tether strap on the Kantwet-Questor One-Step appeared to be the most troublesome task, but some mothers even tried to place the shield of the Ford Tot-Guard upside down and/or backwards.

The CRD Installation Interview was included to provide a more formalized opportunity for the mothers to comment. Specific topics included CRD size, ease of installation, durability, cleanability, appearance, safety, comfort, convenience, specific CRD components, and comments in relation to CRD use in the automobile. A summary of all comments is given in Appendix D.

CRD size. When the mothers were asked to comment on the size of the CRD they installed, the number of general positive comments (e.g., "I like the size." or "It's a good size.") ranged from 29 by mothers who installed the Takata to 13 by mothers who installed the Ford. Only the Century was mentioned (by 6 mothers) as being space-conserving in the automobile. The Takata and the Century were mentioned by 5 and 4 mothers respectively as being lightweight. Each of the other seats except the Ford received one positive comment about weight. The ease with which the CRD accommodated the child's size was mentioned by 7 mothers who installed the Kantwet-Questor, 3 mothers who installed the Takata, and 1 mother who installed the Cosco-Peterson.

On the other hand, the Bobby-Mac received 14 general negative comments about size (e.g., "I don't like it."), more than twice the number of such comments about any other seat. Specific negative comments about size included 13 comments about the Cosco-Peterson, 8 about the Bobby-Mac, 4 each about the Century and Kantwet-Questor, and 3 about the Takata suggesting that the CRD was too small inside for the child. Of mothers who tested the Ford and the Cosco-Peterson, 4 of each specifically mentioned that the shield did not leave enough room, whereas 3 mothers who tested the Century complained that the harness cross-piece came right at the child's neck. Too large a size was the complaint of 8 mothers who tested the Ford, 4 who tested the Century, and 1 each who tested the Kantwet-Questor and Takata (most of whom had 1- or 2-year old children). Bulkiness of the seat was perceived as a problem to 9 mothers who tested the Tot-Guard, 2 each who tested the Kantwet-Questor and the Cosco-Peterson, and 1 who tested the Bobby-Mac.

Ease of installation. The Ford was praised most frequently for ease of installation (34 comments), followed by the Cosco-Peterson (32 comments), the Takata and the Century (31 comments each), and the Bobby-Mac (29 comments). Considerably fewer mothers (18) thought the Kantwet-Questor was easy to install. In the same vein, 6 mothers thought the whole Kantwet-Questor installation process was too difficult, 5 thought the tether strap should have been installed on the CRD at the factory, and 3 thought the time required to hook the tether to the tether belt would be a time-waster. On the other hand, the Bobby-Mac and Cosco-Peterson CRDs each received only 2 general negative comments about ease of installation, and the Century, Ford, and Takata CRDs received only 1 negative comment each.

Durability. The Ford was considered durable by 35 mothers, followed by the Cosco-Peterson (31), the Century (29), the Takata and the Bobby-Mac (28), and the Kantwet-Questor (22). Only 3 mothers who tested the Cosco-Peterson and 1 mother who tested the Century considered the seat covering to be durable. The thin vinyl covering the seat was considered to be nondurable by 19 mothers who tested the Kantwet-Questor, 5 who tested the Bobby-Mac, 3 who tested the Takata, and 1 each for the other seats. There were 2 mothers who worried that the Bobby-Mac shield was flimsy, and 2 were concerned that the shield locking mechanism on the Cosco-Peterson would break.

Cleanability. The washability of the Ford was praised by 4 mothers, followed by 3 mothers who praised the Cosco and one who praised the Kantwet-Questor. There were 2 mothers who also mentioned the removable and thus washable harness on the Century. Only 1 negative comment was made about cleanability in reference to the light color of the Ford.

Appearance. Of the 36 mothers who tested the Kantwet-Questor, 30 said they liked its appearance; similar comments were made by 27 who tested the Bobby-Mac CRDs, 19 who tested Century CRDs, and 9 who tested Ford CRDs. There were 12 mothers who complained that the Ford was awkward, gawky-looking, or downright ugly, compared with such comments from 3 mothers who tested the Century, 2 who tested the Kantwet-Questor, and 1 who tested the Bobby-Mac. There were 3 mothers who disliked the general appearance of the Bobby-Mac, as did 1 mother each who tested the Ford and Takata. There were 2 mothers who tested the Ford and 2 who tested the Kantwet-Questor who disliked the colors, whereas 1 mother who tested the Takata disliked the bolster.

Safety. Both the Bobby-Mac and the Kantwet-Questor were considered safe by 29 mothers. There were 3 mothers who praised the Bobby-Mac and 3 who praised the Kantwet-Questor for preventing the child from wiggling out. Of mothers who tested the Bobby-Mac, 5 specifically mentioned the shield as a safety plus, and 5 mothers who tested the Kantwet-Questor mentioned the tether. Even though 6 mothers mentioned the Ford shield as being safe, only 17 mothers thought the seat as a whole was safe. There were 15 mothers who worried that a child could slip out of the Ford CRD, and 2 thought a child would smash his/her face against the shield in a crash. There were 5 mothers who thought it was unsafe to remove the Cosco-Peterson harness with older children, whereas 3 thought the Cosco-Peterson was top-heavy and would pitch over in a crash. Mothers who tested the Century complained about lack of side protection (4 comments) and support for upper body and head; 2 mothers thought a child would climb out of the Century too easily. Of the mothers who tested the Takata, 3 worried about the child's climbing out or said that the harness was too loose (2 comments). The Bobby-Mac received only 3 negative comments on safety: 1 mother worried that a child could undo the buckles, 1 expressed concern that the shield would come off in an accident, and 1 worried that a child would be trapped in a crash. The Kantwet-Questor also received only 3 negative comments: 2 mothers mentioned that the shield bounced too much even when connected, and 1 disliked the shield's being so close to the child's face.

Comfort. The Takata received the most kudos for comfort (23) from mothers who installed it. There were 4 mothers who mentioned the comfort of the bolster padding, 4 who mentioned the height of the CRD, and 2 who mentioned the armrest. The Century, Cosco-Peterson, and Kantwet-Questor received

about the same number of general positive comments on comfort (15, 14, and 15 respectively). Comments specifically relating to the comfort of the padded seat cushion were made by 15 mothers who installed Kantwet-Questor CRDs, 13 who installed Cosco-Peterson CRDs, and 11 who installed Bobby-Mac CRDs. In addition, 6 mothers who installed Ford CRDs thought the padding on the shield added comfort.

Among mothers who installed the Cosco-Peterson, 11 complained that the child could not see over the shield, 3 thought the shield was too confining, and 1 disliked the way her child had to bring his arms up to shoulder height to rest them on the shield. Also, 1 mother complained that there was too much metal to get hot in the sun, and 1 thought the seat would be uncomfortable for sleeping.

Mothers who installed the Kantwet-Questor had few complaints about comfort. That the dark vinyl seat covering would get hot in summer was mentioned by 5 mothers, whereas 2 thought napping would be uncomfortable; 1 mother each mentioned the tendency of vinyl to make children perspire, the limitation on play and interaction caused by the shield, and the tendency of the shield to gouge the child in the stomach.

Mothers who tested the Takata found fault with thin seat padding (5 comments), and the lack of side "wings" to support the child's head when napping (4 comments). Also mentioned were the tendency of the black plastic to get hot in the summers and the relative lowness of the CRD that would not allow the child to see out (2 comments each).

The Century was perceived by 6 mothers as uncomfortable for sleeping. In addition, 5 mothers thought it would be uncomfortable on long trips, 3 criticized the lack of padding, 2 complained that the harness cross-piece came at their child's neck, and 1 disliked it because her child could not see out of the car while riding in it. Also 5 mothers made general negative comments about comfort (e.g., "I don't think it would be comfortable.").

Mothers who tested the Bobby-Mac complained most often about the shield; 16 mothers thought it was too confining and 2 said their children could not see over it. There were 4 mothers who thought the shell was too narrow inside, 4 who considered the seat too low, 2 who mentioned the tendency of the vinyl seat to get hot in the summer, and 1 who made a general negative comment about comfort.

The Ford received the most negative comments about comfort. A total of 19 mothers complained about the lack of padding on the booster seat; and 12 perceived the height of the shield would prevent the child from seeing over it; 2 each mentioned discomfort in sleeping, the tendency of the seat material to get hot, and the lack of comfort on long trips. In addition, 1 mother complained about the lack of a reclining capacity, and 6 mothers made general negative comments about comfort.

Convenience. The Takata, Cosco-Peterson, Kantwet-Questor, and Ford received 3, 2, 2, and 1 positive comments respectively about convenience from mothers who liked the age range to which the seats were adaptable. No specific negative complaints about convenience were made.

Specific CRD component likes. Several mothers liked the shield components of the CRDs; those seats with shields received from 18 (Takata) to 10 (Bobby-Mac) specific comments about the shield. The harness feature also was popular, particularly to parents who tested the Bobby-Mac (9 comments) and the Century (7 comments).

Specific CRD component dislikes. The shield was mentioned as a problem by 12 mothers who tested the Ford because they said it prevented the child's seeing over it and by 4 mothers who thought it prevented toy play and interaction. Of mothers who tested the Bobby-Mac, 7 disliked its shield, mentioning that it came too high up on the child, prevented toy play or interaction, or was too hard to attach. There was 1 mother who tested the Kantwet-Questor who disliked the way the shield must swing down over her child's head, whereas 1 mother who tested the Cosco-Peterson thought its shield would interfere with eating. None of the mothers who tested the Takata complained about its shield.

The tether component of the Century received only 2 negative comments from mothers who would rather not drill a hole in the car. On the other hand, 10 mothers who installed the Kantwet-Questor specifically mentioned the tether as an undesirable feature.

Very few negative comments were made about internal harnesses. Only 1 mother made a general negative comment about the Takata harness, and 2 each commented that the Century harness crosspiece came too high on the child's torso and that the harness by itself did not provide enough protection. Another 2 mothers complained that the Bobby-Mac harness was hard to fasten, 1 thought it was too hard to release, 1 thought it was too easy to release, and 1 thought the harness length was too hard to adjust.

Only 1 mother complained about the Century booster seat component, saying it was too hard. On the other hand, 19 mothers complained that the Ford booster seat was too hard.

Only 1 complaint was made specifically about the CRD shell design. One mother complained that the Kantwet-Questor "wings" would not allow the child to see out to the side. Similarly, only 1 complaint was made about safety belt attachment. One mother thought threading the safety belt through the harness loops each time would be too time consuming.

Instructions. The Bobby-Mac received the fewest positive comments about instructions (5), and the Century received the greatest number (18). Instruction reading level did not seem to make much difference. The Cosco-Peterson illustrations received the fewest positive comments (6), whereas Century and Ford received the greatest number (11 each).

The two simplest seats (Ford and Century) received the fewest negative comments on instructions and illustrations. There were 8 mothers who thought the Century instructions were too complicated or confusing and 2 who thought they were too long. Of the mothers who installed the Ford CRD, 4 thought something had been omitted from the instructions, 2 found them complicated and confusing, and 2 made general negative comments about the instructions. The Cosco-Peterson, Kantwet-Questor, and Takata received 22, 23, and 23 negative comments respectively about instructions.

Although there was a slight tendency for lower SES mothers to complain about the instructions, the mother's approach to the problem seemed to be more important than her reading ability. The most common complaint about the illustrations was that they were too small. Lack of organization and realism were mentioned by a few mothers. Finally, the instructions consisting only of labeled pictures were criticized by some mothers who thought that pictures alone were not sufficient.

### Repeated Use--Longitudinal Sample Component

Quantitative analyses were conducted to determine whether there were differences in installation success in relation to type of CRD (five types) and/or time/experience, as well as whether there were differences in beliefs in relation to type of CRD. Qualitative analyses were focused on mothers' perceptions of CRD characteristics.

#### Quantitative Analyses

Mothers in this project component were observed in installation upon initial use and at three additional times over a 2-month period. As shown in Table 8, overall accuracy of use improved over time,  $\chi^2(3) = 30.08$ ,  $p = .0001$ .

As shown in Table 9, accuracy of installation also improved over time in relation to the specific CRD components. Accuracy of use of the automobile safety belt was better for Periods 2-4 than for Period 1,  $\chi^2(3) = 21.61$ ,  $p = .0001$ . Tether installation also was better for the last three periods than for the first period,  $\chi^2(3) = 8.69$ ,  $p = .03$ . Similarly, more mothers used the internal harness correctly during the last three periods than during the first period,  $\chi^2(3) = 22.67$ ,  $p = .0001$ . Finally, installation of the shield component was better during the last three periods than during the first period,  $\chi^2(3) = 24.84$ ,  $p = .0001$ .

When installation success was considered in relation to type of CRD over the four time periods, cell sizes were too small to permit valid statistical tests. As shown in Table 10, however, there were similar patterns over time, with rates varying by CRD type.

Further examination of success in CRD installation was conducted by considering accuracy of use of each CRD component for each CRD type over the four time periods. Again, cell sizes were too small for valid statistical tests. As shown in Table 11, however, success rates were somewhat different for the various CRD types. There were some mistakes with use of the safety belt, tether, and/or internal harness for all time periods. By the fourth time period, 100% success was achieved with all seats for the shield component. Use of the CRD position and booster seat had 100% accuracy rates for all time periods.

The original design of the repeated use--longitudinal sample component of the study included administration of the CRD Beliefs Questionnaire at each of the four time periods. However, technical problems prevented readministration of the instrument after the first period. Summary data for the various scales are shown in Table 12.

Table 8

Success of Repeated Use--Longitudinal Sample  
 Mothers in CRD Installation Over Time

Installation success	Percent of installations			
	Period 1	Period 2	Period 3	Period 4
Correct	23	69	72	79
Incorrect	77	31	28	21

$\underline{n} = 30.$

Table 9

Success of Repeated Use--Longitudinal Sample  
Mothers in Installation of Specific  
CRD Components Over Time

Installation success	Percent of installations			
	Period 1	Period 2	Period 3	Period 4
Safety belt				
Correct	55	88	96	93
Incorrect	45	12	4	7
Tether				
Correct	9	44	56	70
Incorrect	91	56	44	30
Internal harness				
Correct	33	81	89	86
Incorrect	67	19	11	14
Shield				
Correct	60	100	95	100
Incorrect	40	0	5	0

$\underline{n} = 30.$

Table 10

Success of Repeated Use--Longitudinal Sample  
 Mothers in CRD Installation Relative  
 to CRD Type Over Time

Percent of installations correct					
Time	Bobby-Mac Champion	Century Safe-T-Rider	Cosco- Peterson Safe-T-Shield	Ford Tot-Guard	Kantwet- Questor One-Step
Period 1	29	0	0	71	0
Period 2	71	40	80	100	50
Period 3	83	60	75	100	25
Period 4	86	60	60	100	80

$\bar{n} = 30.$

Table 11

Success of Repeated Use--Longitudinal Sample Mothers  
in Installation of Specific CRD Components  
Relative to CRD Type Over Time -

Percent of installations correct					
Time	Bobby-Mac Champion	Century Safe-T-Rider	Cosco- Peterson Safe-T-Shield	Ford Tot-Guard	Kantwet- Questor One-Step
Safety belt					
Period 1	57	67	17	86	40
Period 2	71	100	90	100	100
Period 3	100	100	75	100	100
Period 4	100	100	60	100	100
Tether					
Period 1	-	17	-	-	0
Period 2	-	40	-	-	50
Period 3	-	80	-	-	25
Period 4	-	60	-	-	80
Internal harness					
Period 1	29	67	33	-	0
Period 2	86	40	100	-	100
Period 3	100	60	100	-	100
Period 4	86	60	100	-	100
Shield					
Period 1	71	-	33	86	40
Period 2	100	-	100	100	100
Period 3	83	-	100	100	100
Period 4	100	-	100	100	100

Note. Not all components are applicable for all CRD types.

n = 30.

Table 12

Car Seat Beliefs of Mothers in Repeated Use--Longitudinal  
Sample in Relation to CRD Type

Scale	N	Mean	Standard deviation
Bobby-Mac Champion			
Acceptance of CRD <sup>a</sup>	7	4.64	.48
Cost to children <sup>a</sup>	7	2.79	.85
Cost to parents <sup>a</sup>	7	2.50	.65
Satisfaction with CRD <sup>a</sup>	7	4.24	.48
CRD use <sup>b</sup>	6	1.08	2.01
Century Safe-T-Rider			
Acceptance of CRD	6	3.96	1.49
Cost to children	6	2.83	.75
Cost to parents	6	2.44	.70
Satisfaction with CRD	6	4.50	.57
CRD use	6	1.42	1.86
Cosco-Peterson Safe-T-Shield			
Acceptance of CRD	6	4.50	1.00
Cost to children	6	2.92	.99
Cost to parents	6	2.19	.41
Satisfaction with CRD	6	3.83	.81
CRD use	6	1.67	2.58
Ford Tot-Guard			
Acceptance of CRD	7	4.14	.40
Cost to children	7	2.86	.73
Cost to parents	7	2.33	.96
Satisfaction with CRD	7	4.12	.68
CRD use	7	1.64	1.82
Kantwet-Questor One-Step			
Acceptance of CRD	5	4.90	.22
Cost to children	5	2.39	.85
Cost to parents	5	2.27	.60
Satisfaction with CRD	5	4.74	.38
CRD use	4	2.63	2.29

<sup>a</sup>Scale = 1 (low) - 5 (high).

<sup>b</sup>Scale = 0 (low) - 5 (high).

## Qualitative Analyses

Mothers who participated in the longitudinal project component were interviewed immediately after CRD installation at the first contact. There were follow-up interviews on CRD use at each week thereafter. Qualitative analyses were done with data from all these interviews. A summary of comments is given in Appendix D.

CRD Installation Interview. Mothers who participated in the longitudinal component of the study had many fewer specific comments (both positive and negative) recorded about the CRDs. They tended to make more general comments and tended to be more positive toward the seat in this, their initial contact. Although some of these differences may be because of differences in the way the observer recorded comments, it also may be partly because they were being loaned the CRDs and perhaps did not want to make too many negative comments about CRDs they were going to be using (at no cost).

The Kantwet-Questor and Ford each received 5 general positive comments about size, the Bobby-Mac and Century received 4 each, and the Cosco-Peterson received 3. There were 2 mothers who commented that the Kantwet-Questor easily accommodated the child, as did 1 mother who used the Century and 1 who used the Bobby-Mac. There was 1 Bobby-Mac user who also mentioned that the seat was lightweight. Two Cosco-Peterson users made general negative comments about CRD size. There were 3 Bobby-Mac users who thought the seat was too small for the child, 1 Cosco-Peterson user and 1 Ford user who thought the seat was too large for the child, and 3 Cosco-Peterson users who thought the shield did not leave enough room for the child.

All the mothers who used the Ford CRDs commented on ease of installation, as did 5 mothers each who used Bobby-Mac, Century, and Kantwet-Questor CRDs and 4 mothers who used the Cosco-Peterson. Of the mothers who used the Ford CRDs, 2 commented on ease of placement of the CRD in the car and 1 on the ease of child placement. There were 2 Kantwet-Questor users, 1 Century user, and 1 Ford user who generally were negative toward installation. A specific comment from a Bobby-Mac user was that the shield was too hard to place on the CRD.

All mothers who used the Bobby-Mac, Century, Cosco-Peterson, and Ford CRDs commented positively about durability. Similar comments were made by 5 mothers who used Kantwet-Questor CRDs. One Ford user commented that the vinyl cover on the shield might tear.

All Bobby-Mac users made general positive comments about appearance, as did 5 mothers who used Cosco-Peterson CRDs, 5 who used Kantwet-Questor CRDs, 4 who used Century CRDs, and 2 who used Ford CRDs. In addition, 1 Century user commented that the CRD was an attractive color. However, 1 Century user and 4 Ford users considered the CRDs awkward or gawky-looking.

All Bobby-Mac mothers generally were satisfied with the safety of the CRD, as were 5 each of the mothers who used the Century, Cosco-Peterson, and Ford CRDs, and 4 who used the Kantwet-Questor. However, 1 Bobby-Mac user and one Ford user generally were negative about the perceived safety, and 1 Kantwet-Questor user thought the child could crawl out too easily.

All Century users made general positive comments about comfort, as did 5 Kantwet-Questor users, 4 Ford users, and 2 Cosco-Peterson users. Of the Bobby-Mac users, 5 commented on the good padding, as did 2 Kantwet-Questor users and 1 Century user. The reclining feature was mentioned by 1 Kantwet-Questor user. There were 2 Ford users, 2 Kantwet-Questor users, and 1 Bobby-Mac user who commented that the CRD was tall enough to allow the child to see out of the car. In addition, 1 Century user commented that the seat presented no barriers to play and interaction, and 3 Ford users mentioned adequate roominess. General negative comments about comfort were made by 1 Kantwet-Questor user. Complaints that the CRD was too low to allow the child to see out were made by 2 Bobby-Mac users and 2 Century users. There was 1 Bobby-Mac user who thought the seat would be uncomfortable for napping. A comment from 1 Ford CRD user was that the shield impaired the child's vision, and 1 said the CRD would be uncomfortable on long trips. Finally, 1 Cosco-Peterson user thought the shield was too confining.

Few specific comments were made about convenience. However, 1 Century user mentioned being able to use the CRD with different ages of children and as a booster seat in restaurants.

There were 4 Bobby-Mac users, 3 Ford users, and 2 Kantwet-Questor users who specifically liked the CRD shield. The internal harness system received positive comments from 4 Bobby-Mac users, 2 Century users, and 2 Cosco-Peterson users. The booster seat aspect of the CRD was mentioned favorably by 1 Century user and 1 Ford user. Of the Kantwet-Questor users, 4 liked the one-step hook-up of the CRD. There was 1 Ford user who said she liked the way the safety belt attached to the CRD, and 4 Century users mentioned the arm rests. However, 1 Ford user complained that the child could not see over the shield, and 1 Bobby-Mac user complained that the shield prevented toy play and interaction. Complaints from 1 Century user and 1 Kantwet-Questor user were that the tether required a hole in the automobile, possibly lowering resale value. A general negative comment about the harness was made by 1 Bobby-Mac user.

Comments from 4 Ford users were that the booster seat was too hard, and 1 Century user thought it was contoured badly. Finally, 2 Bobby-Mac users thought the latch clasping the seatbelt to the shield was hard to use.

General positive comments about the instructions were made by 3 Century users, 2 Cosco-Peterson users, 2 Ford users, and 1 Kantwet-Questor user. However, 2 Ford users and 1 Kantwet-Questor user made general negative comments about instructions. More specifically, 1 Bobby-Mac user and 1 Ford user considered the instructions too complicated and/or technical, and 1 Bobby-Mac user considered the instructions to be badly organized.

CRD Use Interview. Each week after the initial contact, parents were contacted by telephone (5 times) or in person (3 times), at which times the CRD Use Interview was conducted. In addition to information about numbers of times the CRD was used in various contexts, parents were asked questions about CRDs and their attitudes toward them. Parents were asked to describe particular problems they had encountered with the CRDs in the past week, situations they had encountered that had made them feel more (or less) positive toward CRDs, and other general comments about CRDs.

Mothers made few comments about problems encountered in using the CRDs. Most (72%) of the comments they made were made during the first three follow-up contacts, suggesting that some problems may have abated with experience in use. The most common complaint was that the catch on the shield stuck on the Cosco-Peterson (3 complaints) and the Kantwet-Questor (2 complaints). The Kantwet-Questor received no other complaints and the Cosco-Peterson only 1 other--that the toddler could not see out over the shield. Complaints that their toddlers disliked the CRDs were made by 2 mothers who tested the Bobby-Mac, 1 who tested the Century, and 1 who tested the Ford, all of these occurring in the first three follow-up interviews. Two mothers complained that the catch buckle on the Bobby-Mac harness pinched the child's legs, and 2 complained that the toddler could not sleep in the Ford CRD. All other complaints occurred only once each.

The mothers had several comments about incidents that had made them more positive toward CRDs. The most common comment, recorded 25 times (12 for Bobby-Mac, 2 for Century, 1 for Cosco-Peterson, 6 for Ford, and 4 for Kantwet-Questor users) was that the mother had to stop quickly, slam on her brakes, or swerve abruptly, and the CRD protected the child. The comment that "I feel safer" was recorded 7 times (2 for Bobby-Mac, 1 for Century, 2 for Cosco-Peterson, 1 for Ford, and 1 for Kantwet-Questor). Mothers commented 4 times (1 for Bobby-Mac, 1 for Century, and 2 for Cosco-Peterson) that the CRD prevented the child from being a distraction to the mothers while they drove. The comment that "my child likes the seat" was recorded twice for the Cosco-Peterson and once for the Ford, whereas the comment that "having my child in a car seat kept me from getting a ticket from a policeman" was recorded for Century (1) and for Ford (2) users. Comments by mothers who tested Fords (2) were related to reading about a child riding without a CRD being hurt or killed in an accident.

Mothers made very few comments about things that made them feel less positive toward CRDs. There were 2 mothers, 1 who tested a Century CRD and 1 who tested a Ford CRD, who said they read about a car crash in which a child riding in a CRD was killed. The comments that "my child won't sit still more than 2 hours" and that "the CRD makes grocery day harder" were made by 1 mother each, both of whom tested Bobby-Mac CRDs.

The mothers also were asked if there were any other comments they would like to make. The comment that "I like the seat" was made 3 times by Cosco-Peterson users and 2 times by Ford users. Complaints about the plastic seat cracking was made by 1 Bobby-Mac user and 1 Century user. In addition, 1 mother who used a Cosco-Peterson and 1 who used a Ford complained that their children could not sleep in the CRDs, and 2 mothers (1 for Century and 1 for Cosco-Peterson) complained that their friends who do not use CRDs never were stopped by the police and ticketed for it.

#### Repeated Use--Cross-Sectional Sample Component

Quantitative analyses were conducted to determine whether the belief/behavior variables could be used to form systematic clusters of individuals. Qualitative analyses were focused on parents' perceptions of CRD characteristics.

## CRD Ownership

Parents (both mothers and fathers) in the repeated use--cross-sectional sample component of the study were observed installing the toddler CRD currently used. No differences in parents' behaviors or responses were noted between the Tennessee and the Ohio sites, allowing data from the two sites to be combined in reporting results.

A definite pattern emerged in the type of CRD used by parents in this component. The Strollee Wee-Care, a tethered seat, was used by 34 parents (21 mothers and 13 fathers). Bobby-Mac seats with shields requiring the automobile safety belt to be clipped in place over the shield (Bobby-Mac Champion, Deluxe, or 3-N-1) were used by 13 parents (5 mothers and 8 fathers). Another 11 parents (8 mothers and 3 fathers) installed the tethered GM Toddler Love Seat. The Century Travel-Guard was installed by 6 parents (2 mothers and 4 fathers). There were 9 other CRDs used by 3 or fewer parents each. A summary of CRDs used by parents in this component is given in Table 13.

Almost three-quarters of the parents in the sample had owned another type of CRD prior to the one used in the study. Of this group, 33 parents had owned one seat previously, 15 had owned two seats previously, and 6 parents had owned three seats previously. The CRDs previously owned and the number of times they were cited by parents are summarized in Table 14.

## Quantitative Analyses

The success in installation factor was subjected to chi-square analysis (using a criterion of a .10 alpha level). The type of CRD used did not result in differences in success,  $\chi^2(1) = .54$ ,  $p = .46$ . However, parent's gender was significant,  $\chi^2(1) = 2.77$ ,  $p = .10$ . Mothers were successful in correctly installing all components of their CRDs only 21% of the time, in comparison with the fathers' 38% rate of completely correct installation; thus, 62% of all completely correct installations were accomplished by fathers. Child's gender also was a significant factor,  $\chi^2(1) = 2.99$ ,  $p = .08$ . The parents of female children accomplished 67% of the completely correct installations. A final factor found to be significant in determining completely correct installation was the vehicle style in which the CRD was installed. Parents who installed their CRDs in four-door sedans were completely correct in installation only 13% of the time, whereas parents who used two-door sedans achieved 37% success, and parents who used four-door station wagons achieved 39% success.

Results of the cluster analysis revealed that on the basis of the belief and behavior variables, there were three relatively distinct groups of parents. These were mothers who were positive in CRD use, mothers who were not as positive toward CRD use, and fathers (who tended to be less positive in their approach to CRD use).

To get more specific information about situational characteristics related to CRD beliefs, analyses of variance were computed for each variable. As shown in Table 15, several differences were found.

Differences in acceptance of CRD were noted only in relation to family's SES. High-SES parents responded more positively than middle-SES parents.

Table 13

Types of CRDs Used by Parents in Repeated Use--  
Cross-Sectional Sample Component

CRD brand/model	Parent's gender		
	<u>N</u>	Female	Male
Strollee Wee-Care	34	21	13
GM Toddler Love Seat	11	8	3
Bobby-Mac unspecified model	8	4	4
Century Travel-Guard	6	2	4
Century Safe-T-Rider	3	2	1
Bobby-Mac Champion or Deluxe	3	-	3
Century unspecified model	2	1	1
Jamy unspecified model	2	1	1
Peterson unspecified model	2	-	2
Strollee older unspecified model	2	1	1
Bobby-Mac 3-N-1	2	1	1
Kantwet One-Step	1	-	1
Kolcraft unspecified model with shield	1	-	1
Peterson 78-A	1	1	-
Peterson Safe-T-Shield	1	1	-
Questor unspecified model	1	-	1

Table 14

Types of CRDs Previously Owned by Parents in  
Repeated Use--Cross-Sectional Sample Component

CRD brand/model	Number of times cited
GM Infant Love Seat	24
Bobby-Mac (all models)	17
Unknown brand (very old model)	7
Strollee (all models)	7
Century Travel-Guard	6
Dyno-Mite Infant Seat	5
Kantwet (all models)	4
Peterson Safe-T-Shield	3
Teddy-Tot (all models)	3
Century Safe-T-Rider	2
GM Toddler Love Seat	1
Rose harness system	1
Sears	1

Note. Because of multiple previous ownership, the total number of citations is greater than the number of parents.

Table 15

Differences in CRD Beliefs of Parents in Repeated  
Use--Cross-Sectional Sample Component in  
Relation to Situational Variables

Scale	<u>F</u>	<u>df</u>	<u>p</u>
Installation success			
Acceptance of CRD	.24	1, 81	.63
Perceived cost to children	.14	1, 81	.71
Perceived cost to parents	.04	1, 81	.84
Satisfaction with CRD	.26	1, 81	.61
CRD use	.02	1, 80	.89
Number of children under 4 years of age			
Acceptance of CRD	2.19	1, 81	.14
Perceived cost to children	1.30	1, 81	.26
Perceived cost to parents	3.39	1, 81	.07
Satisfaction with CRD	1.81	1, 81	.18
CRD use	.12	1, 80	.73
Number of children 4-17 years of age			
Acceptance of CRD	.07	1, 81	.79
Perceived cost to children	.18	1, 81	.67
Perceived cost to parents	.01	1, 81	.99
Satisfaction with CRD	.95	1, 81	.33
CRD use	1.37	1, 80	.25
Parent's education			
Acceptance of CRD	.01	2, 80	.99
Perceived cost to children	1.80	2, 80	.17
Perceived cost to parents	2.51	2, 80	.09
Satisfaction with CRD	6.64	2, 80	.002
CRD use	2.03	2, 79	.14

Table 15 (continued)

Scale	F	df	p
Parent's age			
Acceptance of CRD	1.49	2, 80	.23
Perceived cost to children	1.81	2, 80	.17
Perceived cost to parents	2.19	2, 80	.12
Satisfaction with CRD	1.56	2, 80	.22
CRD use	2.27	2, 79	.11
Family's income			
Acceptance of CRD	.85	4, 78	.50
Perceived cost to children	.84	4, 78	.50
Perceived cost to parents	2.80	4, 78	.03
Satisfaction with CRD	1.28	4, 78	.28
CRD use	4.32	4, 77	.003
Site			
Acceptance of CRD	.55	1, 81	.46
Perceived cost to children	.01	1, 81	.99
Perceived cost to parents	3.36	1, 81	.07
Satisfaction with CRD	.16	1, 81	.69
CRD use	6.79	1, 80	.01
Parent's gender			
Acceptance of CRD	.21	1, 81	.21
Perceived cost to children	4.81	1, 81	.03
Perceived cost to parents	10.23	1, 81	.002
Satisfaction with CRD	8.97	1, 81	.004
CRD use	.57	1, 80	.45

Table 15 (continued)

Scale	F	df	p
Child's gender			
Acceptance of CRD	.15	1, 81	.70
Perceived cost to children	.17	1, 81	.68
Perceived cost to parents	.62	1, 81	.43
Satisfaction with CRD	.16	1, 81	.69
CRD use	1.70	1, 80	.20
Child's age			
Acceptance of CRD	.73	2, 80	.49
Perceived cost to children	.67	2, 80	.52
Perceived cost to parents	.98	2, 80	.38
Satisfaction with CRD	.58	2, 80	.56
CRD use	4.14	2, 79	.02
Family's SES			
Acceptance of CRD	7.92	1, 81	.01
Perceived cost to children	.26	1, 81	.61
Perceived cost to parents	.05	1, 81	.82
Satisfaction with CRD	.03	1, 81	.86
CRD use	13.85	1, 80	.0004
CRD type <sup>a</sup>			
Acceptance of CRD	1.59	1, 43	.21
Perceived cost to children	3.76	1, 43	.06
Perceived cost to parents	2.19	1, 43	.15
Satisfaction with CRD	.01	1, 43	.95
CRD use	.01	1, 43	.92

Table 15 (continued)

Scale	<u>F</u>	<u>df</u>	<u>p</u>
Vehicle style			
Acceptance of CRD	2.09	2, 75	.13
Perceived cost to children	.01	2, 75	.99
Perceived cost to parents	.89	2, 75	.42
Satisfaction with CRD	1.75	2, 75	.18
CRD use	1.31	2, 74	.28
Vehicle size			
Acceptance of CRD	.24	3, 79	.87
Perceived cost to children	1.25	3, 79	.30
Perceived cost to parents	.95	3, 79	.42
Satisfaction with CRD	.99	3, 79	.40
CRD use	1.99	3, 78	.12

<sup>a</sup>Only the Strollee Wee-Care and the GM Love Seat were included in this analysis.

Differences in perceived cost to children were noted in relation to parent's gender and CRD type. Fathers and parents using the GM Toddler Love Seat perceived a greater cost to children than did either mothers or parents using the Strollee Wee-Care.

Perceived cost to parents differed in relation to number of children under 4 years of age, parent's education, family's income, site, and parent's gender. Differences related to parent's education, however, may be an artifact of confounding of this variable with the parent's gender. Parents who had a graduate degree perceived a greater cost to parents than those who had some college or a college degree; however, 70% of parents holding graduate degrees were males, and 62.5% of parents holding college degrees were females. As found in previous studies, males perceived a greater cost to parents than did females. Only 18 Tennessee parents had some college or higher levels of education, but all 40 Iowa parents had some college, and 32 had college or graduate degrees, whereas only 5 Tennessee parents had college or graduate degrees. Iowa parents perceived a greater cost to parents than did Tennessee parents, but the effects of site and education may not be possible to separate. Cost to parent scores also varied with parent's income; those parents in the \$30,000 to \$34,999 bracket perceived the least cost to parents, in contrast to parents in all other income brackets.

Differences in satisfaction with the CRD were noted in relation to parent's education and parent's gender. As with the cost to parents variable, it is likely that the impact of parent's education on satisfaction is an artifact of parent's gender. Parents with graduate degrees (70% of whom were male) were less satisfied with the CRD than parents with college degrees (62.5% of whom were female) and those with some college.

Differences in extent of CRD use were noted in relation to family income, site, child's age, and family's SES. Greater use was reported by parents with higher family income, parents in Tennessee, parents with younger children (1- and 2-year-olds), and higher SES parents.

### Qualitative Analyses

For the analysis of parent comments, Bobby-Mac Deluxe and Bobby-Mac Champion CRDs responses were combined. Comments about Century Travel-Guard, GM Love Seat, Strollee Wee-Care, and Century Safe-T-Rider are included because at least 3 parents used each. Bobby-Mac 3-N-1, which was used by only 2 parents, is included because it is similar in many respects to the other reported Bobby-Mac seats. The other 10 seats were used only by 1 or 2 parents or were not identified well enough to be categorized adequately for analysis. A summary of comments is given in Appendix D.

CRD size. Century Safe-T-Rider's size was considered appropriate by all of the parents who tested it (2 females and 1 male). General positive comments about CRD size were made by 83% of Century Travel-Guard users (2 females and 3 males), 64% of GM Toddler Love Seat users (6 females and 1 male), 50% of Bobby-Mac 3-N-1 users (1 female), 41% of Strollee Wee-Care users (8 females and 6 males), and 66% of Bobby-Mac Deluxe or Champion users (2 males). All the Bobby-Mac Champion or Deluxe users (3 males) commented that the CRD accommodated the child easily, compared with 33% of Century Travel-Guard users (1 female and 1 male), 11% of Strollee Wee-Care users (3 females and 1 male), and

9% of GM Love Seat users (1 male). Of GM Love Seat users, 27% (2 females and 1 male) considered the seat lightweight, and 9% considered the seat comfortable for small children. Of Strollee Wee-Care users, 14% (4 females and 1 male) thought the CRD fit easily into an auto, and 6% (1 female and 1 male) thought the seat was not too large on the auto seat.

On the other hand, 9% of GM Love Seat users (1 female) and 5% of Strollee Wee-Care users (1 female and 1 male) complained that the CRD was too small for the child, whereas 33% of Bobby-Mac Deluxe or Champion users (1 male) and Century Safe-T-Rider users (1 male and 1 female) and 3% of Strollee Wee-Care users (1 female) complained that the seat was too large for the child. Of GM Love Seat users, 9% (1 female) thought the CRD was too heavy, and 33% of Bobby-Mac Deluxe or Champion users (1 male) complained that the CRD was too large for a small car.

CRD installation ease. All of the Bobby-Mac Champion or Deluxe users (3 males) and 50% of Bobby-Mac 3-N-1 users (1 male) made general positive comments about ease of installation, as did all the Century Safe-T-Rider users (2 females and 1 male), 83% of Century Travel-Guard users (1 female and 4 males), 27% of GM Love Seat users (6 females and 1 male), and 38% of Strollee Wee-Care users (8 females and 6 males). Simplicity of harness connections was noted by 1 female using the GM Love Seat (9%) and 3 females using the Strollee Wee-Care (9%). Ease of buckle operation was noted by 1 female Century Travel-Guard user (17%), and absence of a tether was praised by 1 female Bobby-Mac 3-N-1 user (50%). All Century Safe-T-Rider users (1 female and 1 male), 33% of Century Travel-Guard users (1 female and 1 male), 9% of GM Love Seat users (1 female), and 3% of Strollee Wee-Care users (1 male) complimented ease of placement in the car. Ease of child placement was noted by 9% of Strollee Wee-Care users (2 males and 1 female), 9% of GM Love Seat users (1 female), and 33% of Bobby-Mac Deluxe or Champion users (1 male). There was 1 female Strollee user (3%) who noted that the seat belt remains in place when the child is removed.

On the negative side, 1 male parent who used the Bobby-Mac 3-N-1 (50%) complained that it was hard to thread the seat belt through the frame and that the seat was too bulky for moving in and out of the auto. There was 1 male Century Travel-Guard user (17%) who mentioned a general negative attitude toward ease of installation, and 1 female (17%) mentioned that the seat was too bulky for moving in and out of the auto. Of Bobby-Mac Deluxe or Champion users, 66% (2 males) complained that it was hard to place the child, and 33% (1 male) mentioned that the harness was too hard to adjust and the shield was hard to place on the seat. Of GM Love Seat users, 18% (1 female and 1 male) mentioned general negative attitudes and difficulty in adjusting the harness; 9% (1 female) mentioned concern about drilling a hole for the tether, difficulty in working the harness buckle, and a stiff tether-to-bolt attachment; and another 9% (1 male) disliked having to remove the seat belt each time. Of Strollee Wee-Care users, 9% (2 females and 1 male) mentioned difficulty in placing the child and having to drill a tether bolt hole; 12% (3 females and 1 male) complained that the latches or buckles were hard to work; and 6% (1 female and 1 male) mentioned difficulty in adjusting the tether and working harness buckles.

Durability. All the users of the GM Love Seat (8 females and 3 males), Century Safe-T-Rider (2 females and 1 male), and Bobby-Mac Deluxe or Champion (3 males) made general positive comments about durability, as did 62% of Strollee Wee-Care users (15 females and 6 males), 50% of Bobby Mac 3-N-1 users (1 female), and 33% of Century Travel-Guard users (2 females). A sturdy frame was praised by 33% of Bobby-Mac 3-N-1 users (1 male), 33% of Century Travel-Guard users (2 males), and 97% of GM Love Seat users (1 male). Praise for a sturdy cover/pad was given by 1 female user of the GM Love Seat (9%) and 2 female users of the Strollee Wee-Care (6%).

Complaints that the vinyl covering would tear were made by 1 male who used a Bobby-Mac Champion or Deluxe (33%), 1 female and 3 males who used the Century Travel-Guard (66%), 1 female who used the GM Love Seat (9%), and 5 females and 2 males who used the Strollee Wee-Care (24%). Strollee Wee-Care users also had other complaints; 1 female and 2 males (9%) complained that the hardware broke, 1 male (3%) complained that the harness twisted into a rope-like shape, 1 female (3%) complained that the reclining mechanism broke, 1 male (3%) complained that the harness-positioning slide broke, and 1 female (3%) complained that the harness webbing wore out.

Cleanability. General positive comments about cleanability were made by 50% of Bobby-Mac 3-N-1 users (1 male), 16% of Century Travel-Guard users (1 female), 18% of GM Love Seat users (2 females), and 12% of Strollee Wee-Care users (4 females). In addition, 9% of the GM Love Seat users (1 female) and 6% of the Strollee Wee-Care users (1 female and 1 male) said the CRD could be hosed or showered clean. Ability to remove and clean the harness was noted by 9% of the GM Love Seat users (1 female) and 12% of the Strollee Wee-Care users (2 males and 2 females).

On the negative side, 33% of Bobby Mac-Deluxe or Champion users (1 male) complained that the seat pad was difficult to remove for cleaning, 9% of GM Love Seat users (1 female) complained that the seat pad could not be removed, and 6% of Strollee Wee-Care users (1 male and 1 female) complained that the vinyl padding could not be removed to clean.

Appearance. General positive comments about appearance were made by 83% of Century Travel-Guard users (3 females and 2 males), 66% of Century Safe-T-Rider users (1 female and 1 male) and Bobby-Mac Deluxe or Champion users (2 males), 55% of GM Love Seat users (5 females and 1 male) and 50% of Strollee Wee-Care users (14 females and 3 males). Of Strollee Wee-Care users, 12% (1 female and 3 males) mentioned attractive CRD color; 3% each (1 female) mentioned avoidance of awkward or cheap looks. Of Century Safe-T-Rider users, 33% (1 female) also mentioned attractive colors.

General negative comments about appearance were made by 1 male who used a Bobby-Mac Deluxe or Champion (33%), 1 female who used Century Safe-T-Rider (33%), and 1 female who used a Strollee Wee-Care (3%). Complaints by 33% of Bobby-Mac Deluxe or Champion users were that the seat looked too mechanical (1 male) or that the seat was awkward-looking (1 male).

Safety. General positive comments about safety were made by all Century Safe-T-Rider users (2 females and 1 male) and Century Travel-Guard users (2 females and 4 males), as well as by 50% of Bobby-Mac 3-N-1 users (1 female) and Strollee Wee-Care users (11 females and 6 males), 36% of GM Love Seat

users (4 females), and 33% of Bobby-Mac Champion or Deluxe users (1 male). Several Strollee Wee-Care users also mentioned that the child would not wiggle out (1 female and 1 male); would be protected in a wreck (1 female and 1 male); was held in place by the harness (2 females and 3 males); or was protected by side panels or wings (2 females and 1 male), armrest (1 male), or the tether attachment (1 female and 1 male). GM Love Seat users also occasionally mentioned protection in a wreck (1 female), harness safety (1 male), side panels or "wings" (1 female and 1 male), and tether (1 female and 1 male). Bobby-Mac 3-N-1 users occasionally cited inability of the child to wiggle out (1 female) and the protection of the "wings" (1 female). The protection of the "wings" and of the shield each was mentioned by 1 Bobby-Mac Deluxe or Champion user (male).

Although most parents were happy with the safety of their seats, 1 male (50%) complained that the Bobby-Mac 3-N-1 was top heavy. Another male (33%) complained that the Bobby-Mac Deluxe or Champion buckles could cause trauma. There was 1 female who used the Century Travel-Guard (17%) who complained that the upper body was not well supported, and 1 male (17%) complained that the child could undo the buckles. Of Strollee Wee-Care users, 3% (1 female) complained that buckles would not stay closed, and another 3% (1 female) complained that the child could undo the buckles. Of Century Safe-T-Shield users, 33% (1 male) complained that the upper body was not supported well enough and that the child would not be protected from a side crash and/or flying glass.

Comfort. Most parents who commented favorably on comfort mentioned specific aspects of the CRD. Soft padding was mentioned by 17% of Century Travel-Guard users (1 male), 9% of GM Love Seat users (1 female) and Strollee Wee-Care users (3 males), whereas "wings" on the sides to make napping comfortable were mentioned by 50% of Bobby-Mac 3-N-1 users (1 female), 33% of Century Travel-Guard users (2 males), 18% of GM Love Seat users (1 female and 1 male), and 12% of Strollee Wee-Care users (3 females and 1 male). The reclining feature was mentioned by 35% of Strollee Wee-Care users (6 females and 6 males) and 33% of Bobby-Mac Deluxe or Champion users (1 male). Being able to see out of the auto when seated in the CRD was mentioned as an important child comfort component by 47% of Strollee Wee-Care users (9 females and 7 males), 45% of GM Love Seat users (4 females and 1 male), and 33% of Century Travel-Guard users (1 female and 1 male) and Bobby-Mac 3-N-1 users (1 female). Of GM Love Seat users, 9% (1 female) praised the CRD for posing no barrier to toy play and eating, and 3% (1 female) of Strollee Wee-Care users mentioned the velour finish of the padding.

On the negative side, 18% (2 males) complained that the GM Love Seat was too low to see out. There were complaints from 50% of Bobby-Mac 3-N-1 users (1 female) and 18% of GM Love Seat users (1 female and 1 male) that the seat did not recline. Of GM Love Seat users, 18% (2 males) and 3% of Strollee Wee-Care users (1 female) complained that the seat was too "straight up," causing the child to slump. There were 17% of Century Travel-Guard users (1 female), 9% of GM Love Seat users (1 female), and 15% of Strollee Wee-Care users who complained that sleeping was uncomfortable in the CRD. All the Bobby-Mac 3-N-1 users (1 female and 1 male), 33% of Bobby-Mac Deluxe or Champion users (1 male), 33% of Century Travel-Guard users (1 female and 1 male), 36% of GM Love Seat users (1 female and 3 males), 29% of Strollee Wee-Care users (8 females and 2 males), and 33% of Century Safe-T-Rider users (1 male)

complained that the vinyl was too hot in the summer and too cold in the winter. Another 33% of Bobby-Mac Deluxe or Champion users (1 male), 18% of GM Love Seat users (2 males), and 3% of Strollee Wee-Care users (1 female) complained that the vinyl made the child sweat. Other comments cited less frequently were that the metal clasps got hot and burned the child (1 female and 1 male GM Love Seat users); that the shield was too confining, limiting play and interaction (1 male Bobby-Mac Deluxe or Champion user); that the seat was too narrow (1 male GM Love Seat user); that the padding was too thin (1 male GM Love Seat user and 1 male Strollee Wee-Care user); that the harness came at a bad place--i.e., hitting the child's arms and neck (1 female GM Love Seat user); and that the seat was not comfortable for an older child (1 female GM Love Seat user).

Convenience. The ability to convert the CRD from infant to toddler use was the only specific convenience factor mentioned by parents using the five CRDs considered in these analyses. This was cited by 50% of Bobby-Mac 3-N-1 users (1 female), 21% of Strollee Wee-Care users (5 females and 2 males), and 17% of Century Travel-Guard users (5 females and 2 males).

A complaint from 1 male Century Travel-Guard user (17%) was that the seat was hard to convert from infant to toddler positions. Of Strollee Wee-Care users, 3% (1 female) complained that the seat was hard to get through the door, and another 12% (3 females and 1 male) complained that it was hard to recline the CRD because of the tether connection.

Assessment of specific components. Positive comments about specific CRD components seemed to be general in nature. The shield was mentioned by 50% of Bobby-Mac 3-N-1 users (1 male) and 33% of Bobby-Mac Deluxe or Champion users (1 male). The tether was mentioned by 9% of GM Love Seat users (1 female) and 3% of Strollee Wee-Care users (1 female). The internal harness was mentioned by 33% of Century Safe-T-Rider users (1 female), 26% of Strollee Wee-Care users (5 females and 4 males), and 9% of GM Love Seat users (1 female). Of Century Safe-T-Rider users, 33% (1 male) mentioned the booster seat, whereas 3% of Strollee Wee-Care users (1 male) mentioned the way the safety belt attached to the CRD. Of Strollee Wee-Care users, 9% (2 females and 1 male) mentioned the padded armrest, and 33% of Bobby-Mac Deluxe or Champion users (1 male) mentioned the "wings" on the side of the CRD.

General negative comments about the shield/armrest were made by 33% of Bobby-Mac Deluxe or Champion users (1 male). Of Strollee Wee-Care users, 6% complained that the armrest would not stay up when placing the child in the CRD (1 male and 1 female) and that the shield dented the auto roof (2 females).

Negative comments about the tether component were made by a number of parents. Of Strollee Wee-Care users, 12% (3 females and 1 male) found the tether inconvenient to use, 6% complained about the need for drilling a hole (1 female and 1 male), and 3% (1 female) complained that it was hard to clip the tether to the tether bolt. Of Century Safe-T-Rider users, 33% (1 male) complained that the tether prevented using the seat in other people's cars.

Of Bobby-Mac Deluxe or Champion users, 33% (1 male) complained that the harness was hard to buckle. Of the Bobby-Mac 3-N-1 users, 50% (1 female) complained that the harness was hard to adjust. Of Century Travel-Guard

users, 17% (1 male) complained that there were too many connections on the harness. Of Strollee users, 18% (4 females and 2 males) complained that the harness was hard to buckle, 6% (1 female and 1 male) complained that there were too many connections, 6% (1 female and 1 male) complained that the harness was too short to adjust adequately, 3% (1 female) complained that the harness was hard to adjust, and 3% (1 male) complained that the harness rolled into rope-like shapes.

Vehicle compatibility. General negative comments were made by 33% of the Bobby-Mac Deluxe or Champion users (1 male). Of the Century Safe-T-Rider users, 33% (1 female) complained that the seat belt had to be removed with each use. There were 33% of Bobby-Mac Deluxe or Champion users (1 male) and 17% of Century Travel-Guard users (1 male) who complained that the seat belt buckles would not go through the frame.

Complaints that the seat would not fit bucket seats were made by 9% of GM Love Seat users (1 female) and 3% of Strollee Wee-Care users (1 male). Of Strollee Wee-Care users, 3% (1 female) complained that the seat would not fit a two-door car. Finally, 50% of Bobby-Mac 3-N-1 users (1 male), 33% of Bobby-Mac Deluxe or Champion users (1 male), and 3% of Strollee Wee-Care users (1 male) complained that the CRD tore or marred the auto upholstery.

Instructions. Most parents in this component of the study no longer used the instructions or even knew where they were. However, 50% of Bobby-Mac 3-N-1 users (1 female) and 9% of GM Love Seat users (1 male) commented that the instructions were clear and easy to read. Of Strollee Wee-Care users, 9% (2 females and 1 male) remarked that the instructions were well organized, and 50% of Bobby-Mac 3-N-1 users (1 female) mentioned that the instructions were easy to follow.

On the negative side, 18% of Strollee Wee-Care users (4 females and 2 males) commented that the instructions were confusing and hard to follow. Specific comments about difficulty in understanding instructions about the reclining function were made by 50% of Bobby-Mac 3-N-1 users (1 male) and 3% of Strollee Wee-Care users (1 male).

#### Recommendations to Manufacturers

Parents in all study components were asked to make suggestions to the manufacturers of CRDs. The most commonly occurring comment (52) was that CRDs should be made high enough to allow the child to see out of the automobile. Cloth covers for the vinyl seat pads provided with CRD purchase were requested by 22 parents. A reclining feature or an easier-to-use reclining feature was requested by 21 parents, the same number as wanted a soft seat cushion. There were 16 parents who wanted an easy-to-install CRD, whereas 15 wanted a CRD that converts from infant to toddler positions. "One-step" child placement was requested by 14 parents. There were 13 parent requests for clearer instructions, less expensive CRDs, and quick and easy child placement. A summary of all comments is given in Appendix D.

## V. REVIEW PANEL RECOMMENDATIONS

Two panels of professionals were organized to review study results and make recommendations. One panel, composed of engineers, was focused on improving CRD design for facilitating consumer acceptance and usage. The other panel, composed of educators, was focused on improving instructions and other means of providing usage information to consumers.

### Recommendations for CRD Design

A number of suggestions related to CRD design and CRD-vehicle compatibility were proposed. These include the following:

1. There was unanimous agreement that the CRD should meet all safety standards without use of a top tether strap. The high rate of misuse and non-use of this CRD component makes it apparent that it is not appropriate to rely on it; therefore, the only reasonable alternative seems to be to ban this component or make it optional.

2. All exposed metal parts need to be covered. This is important as a safety as well as comfort feature. Even if metal clips, buckles, or other parts are needed for strength and/or durability, they could be covered with a coating of plastic.

3. All points on the CRD that might pinch the child (or adult) need to be eliminated. Use of a simpler design could help achieve this objective as well as making installation easier for the consumer.

4. Requirement of longer seat belts in all automobiles was recommended. Standardization of type of seat belt buckle would be helpful also, including a small buckle and a retractor system that is not on or near the seat belt buckle.

5. The addition of a foot rest area at the bottom of the CRD was recommended. By extending the bottom, this foot rest could provide a comfort feature and also prevent ripping of vehicle upholstery. On a convertible seat, a one-way hinge could be used for this foot rest component.

6. The padding for the CRD should be removable (perhaps using a design similar to that used for airplane seats). It also should be machine washable.

7. Installation procedures should be apparent--preferably without the necessity of referring to manufacturer's instructions. Included on the CRD itself should be a clear picture of the threading pathway for the automobile seat belt. Inclusion of arrows and/or a colored pathway on the CRD itself to illustrate threading operations might be helpful.

8. A design alternative to that requiring threading the automobile seat belt through or around the car seat would be to have buckles on the CRD itself that would snap into the two ends of the adult lap belt. This option would require standardization of the vehicle lap belt design, possibly with one fixed contact point (on the right side) and a lock-up inertial reel. Adoption of this design would simplify installation of the CRD in the vehicle.

9. A safety concern was related to protection in the event of a side impact. Most CRD designs appear to provide protection primarily in the event of a frontal impact (and possibly rear impact), but more attention might be given to safety afforded in the event of a side impact.

10. Because of the difficulties with use of a top tether strap and because most parents are concerned about having a CRD tall enough for a child to see out from the vehicle, it was recommended that other design alternatives be explored. By adding a flat bottom to the seat, the force could be distributed over a large area; increasing the cross-sectional area on the bottom of the seat and lengthening the base by about 50% would be a possible way to compensate for increased seat height. It might be possible to extend this large flat CRD base with a lip curving downward to insert in the space between the vehicle seat bottom and back, thus holding the CRD in position.

11. All instructions provided by manufacturers should begin with an overview of the design of the CRD. Appropriate illustrations should be included to give the consumer a conceptual overview of the CRD (and possibly the installation procedures).

12. Use of Velcro to attach washable covers or even padding would facilitate comfort for the child and also provide a durable means of attaching the covers. Use of plastic tabs or other breakable means of padding attachment should be avoided.

13. Another possibility for dealing with the problem of tall seats without the use of tethers would be to have a mechanism for attachment to the top of the seat back. Such a design feature would require standardization of heights for vehicle seat backs, however.

14. Another future-oriented recommendation was for development of a harness attachment that could be suspended from the ceiling--possibly even in connection with an adult safety belt system (such as that used by airline pilots) that already would be in place in the vehicle. This would eliminate problems with seat height and might be a standard or an optional feature in a vehicle.

15. Finally, it was recommended that any prospective CRD design be developed with the use of a strong human factors design component. Adjustment to needs of children of different sizes, builds, and temperaments could be facilitated in this way.

#### Recommendations for Improving Consumer Information

Suggestions for consumer information improvement included ones related to design of instructions provided with the CRD by the manufacturer and also ones related to other means of educating consumers. Recommendations included the following:

1. Separate sets of instructions for using a convertible seat in infant and toddler positions should be provided.

2. A branching format might be helpful in presentation of instructions.

3. Each set of instructions--and possibly the label on each CRD--should include a toll-free number that a consumer could use to call for additional information about CRD installation and use.

4. Manufacturers should provide a training program for sales personnel, including a visual demonstration of CRD installation and use. A film might be used for this purpose.

5. It might be advantageous for manufacturers to provide a film or filmstrip on how to install and use a CRD. This might be done at a relatively general level so there would not need to be a separate one for each brand and/or model. However, manufacturers or retailers might use such a film to benefit sales. The procedure used by Formby's (for furniture refinishing) was recommended. Stores might advertise the availability of such a film to help the consumer and use this as a means of attracting customers. Such a film should be 4 to 7 minutes maximum, with about 1 to 2 minutes to attract attention to the importance of the problem and 2 to 4 minutes on specific installation procedures. Materials could be presented in segments to facilitate updating.

6. The box for the CRD should contain clear and accurate pictures showing correct installation and use. If a film is available, this should be noted on the box also.

7. Both films and printed information need to include information relative to consumer attitudes as well as knowledge about CRD use--including correct use.

8. Different styles of type could be used for highlighting information in the instructions.

9. Manufacturers--individually or collectively--could distribute a newsletter. Customers could be provided the opportunity to get on the mailing list by returning a card enclosed with the CRD in the packaging.

10. Establishment of programs through which potential consumers could try different types of CRDs before making a purchase decision is recommended. This might be done in connection with a loaner program or through some agency such as the health department.

11. Manufacturers should be required to provide information on car models (or styles) in which a CRD can--or cannot--be used.

12. Information on CRD use should be provided in as many places as possible. Parents, potential parents, grandparents, and educators might be target groups. Locations such as fathers' waiting rooms at hospitals should be given high visibility.

13. Visual aids should be used as much as possible in manufacturers' instructions.

14. A list of factors that compromise safety should be given with each seat. These should be given in bold type on the instructions plus placed with a permanent label on each CRD.

15. A checklist of factors to determine if the seat is installed correctly (and the child is installed correctly in the seat) should be provided with each CRD. If possible, this might be on a permanently affixed label on each CRD also.

16. All instructions should be pilot tested on naive subjects with limited educational background and no previous CRD experience.

17. An animated cartoon approach is recommended for presenting visual information on steps in CRD installation. Either photographs or drawings could be used, but the illustrated sequence is important. A task analysis should be conducted to determine the most appropriate sequence of steps. This animation approach also would be appropriate for films.

18. Public service announcements on correctness of use should be developed and aired along with those currently used (on restraint use in general or use of CRDs in particular). The dangers of incorrect use should be stressed.

19. Household infant carriers should be labeled clearly as not serving any safety functions and not substitutable for in-vehicle use as CRDs.

20. An advance organizer should be used at the beginning of each presentation of information, whether film, manufacturer's instructions, or illustrations.

## VI. CONCLUSION

In general, the state of the art in the child restraint field is much better than was the case even in the relatively recent past. However, a number of problems remain. Some of these problems appear to be related to CRD design, some to lack of consumer information (or to misinformation), and some to social context.

Based on the results of this study, including analyses by panels of professionals in engineering and education, several general recommendations can be made. These include the following:

1. Tethered seats should be discontinued--or at least be allowed only if they pass the safety standard test procedures without use of the tether

2. Information about the importance of CRD use--and correct use in particular--should be directed to wholesale and retail sales personnel. If possible, incentives for providing good consumer information should be provided.

3. Information to promote restraint use needs to include emphasis on correct CRD use; public information and education programs (e.g., public service announcements) need to be developed with more attention to this dimension. Sources of information for consumers (e.g., a consumer hot line) also need to be made available through public and/or private means, and instructions for contacting such information sources should be offered to each CRD.

4. Manufacturers should organize instructions to facilitate transmission of essential information. This might at the very least include provision of an advance organizer (probably including an illustration of the overall CRD design), a checklist for ascertaining that correct installation had been made, and adequate illustrations or other graphics showing a detailed sequence of steps for installation.

5. The problem of vehicle compatibility should be addressed through cooperation of CRD manufacturers, automobile manufacturers, and regulatory agencies. Improvement of CRD usability may involve standardization and/or modification of vehicles (e.g., safety belts).

6. Alternatives for simplifying use of automobile safety belts need to be developed. Although progress has been made with alleviation of problems with retractors, additional attention needs to be given to design of safety belts that enhance CRD usability and perhaps even facilitate development of new CRD designs. In addition, CRD designers need to be aware of the need for ameliorating misuse of the vehicle safety belts.

7. Provision of information to consumers to assist in a purchase decision that will be satisfactory in the long term should be given priority. Although there are various sets of guidelines available that provide useful information for potential consumers, several points need to be stressed. The "problem of the match" (i.e., vehicle characteristics, family usage patterns, child build and temperament) should be emphasized. Also, consumers need to be

encouraged to try a CRD with the child and vehicle with which it will be used before making a purchase decision.

8. The assistance of public agencies and private organizations should be enlisted in providing information about CRDs for the potential consumer. In particular, there should be programs with examples of the various CRDs on the market where a potential consumer could compare the features of each and perhaps even have information about the advantages and disadvantages of each.

9. Manufacturers might be encouraged to consider information on consumer satisfaction with design and anthropometric considerations as part of the data required for CRD approval. Sensitivity to the growth variations in individual children needs to be considered. For example, although a seat may be labeled as appropriate for a child of a given weight, it might depend on the build of the child as to whether the CRD in fact would be appropriate.

10. Simplified design should be encouraged. The steps for installation of the CRD in the vehicle and the child in the CRD should be as few and as simple as possible. Placement of installation guides directly on the CRD should be included.

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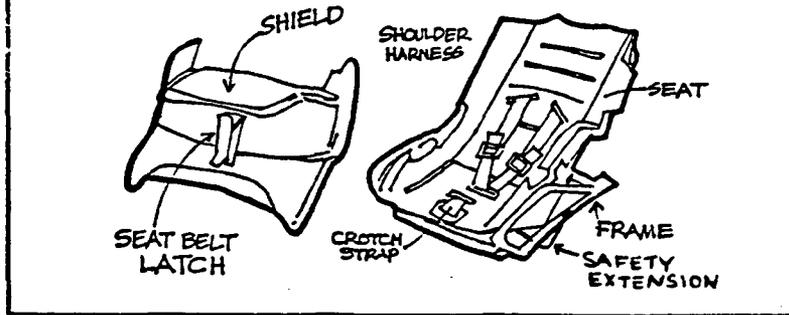
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APPENDIX A  
CRD INSTRUCTION FORMS

# CHAMPION

## CHILD RESTRAINT SYSTEM

### COMPONENTS



A-1

Instructions for  
Bobby-Mac Champion

Form 1:  
Normative reading level

For use exclusively by children who weigh 40 lbs. or less, and are 40 inches or less in height. Infant should ride in "Champion" in rear-facing position in automobile; however, when infant reaches 15 to 18 lbs., "Champion" should be placed forward-facing with safety shield.

#### TO USE SHOULDER HARNESS WITH INFANT AND TODDLER

1. "Champion" comes with shoulder harness assembled for use by toddler whose sitting shoulder height is more than 12 inches.
2. Harness webbing comes through "A" slots as illustrated in Figure 1. Shoulder harness configuration for use by infants whose sitting shoulder heights is 12 inches or less requires webbing to come through slot "B" as illustrated in Figure 1.

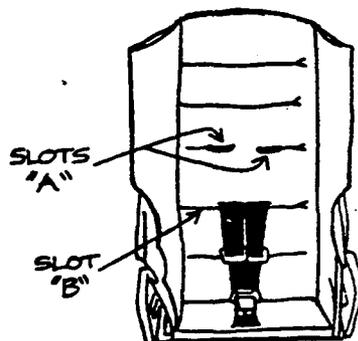
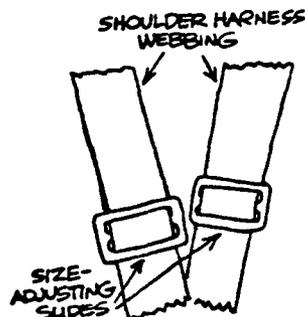


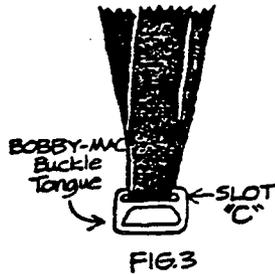
FIG. 1

#### 3. TO REMOVE HARNESS

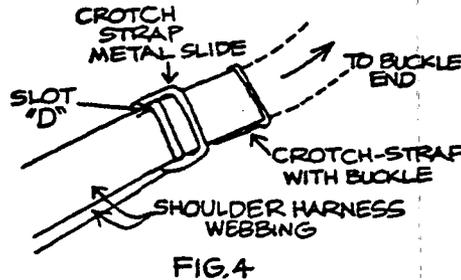
- a. Withdraw both ends of shoulder webbing from metal size-adjusting slides, one on each shoulder webbing as illustrated in Figure 2.



b. Remove webbing from slot "C" of "Champion" buckle tongue as illustrated in Figure 3, withdrawing webbing entirely from same two size-adjusting slides (illustrated in Figure 2), and pull webbing through slots "A" (illustrated in Figure 1) to back of "Champion"



c. Webbing is still attached to crotch-strap-with-buckle through slot "D" of crotch strap metal slide underneath "Champion" as illustrated in Figure 4.



d. Should webbing require laundering, withdraw webbing from crotch strap slide, slot "D," launder, allow to dry, and replace webbing through slot "D" in crotch strap slide, pulling ends of webbing even, one-half for one shoulder and one-half for other shoulder.

4. TO INSTALL HARNESS FOR INFANT USE (12 INCHES AND UNDER SITTING SHOULDER HEIGHT)

a. Each end of harness webbing should be threaded through a size-adjusting slide as illustrated in Figure 2.

b. After pushing slides on each length of webbing far enough down webbing to remain at back of "Champion," thread both ends of webbing through lower slot "B" of "Champion" (illustrated in Figure 1) and pull webbing to front, leaving slides at back of "Champion."

c. After threading both ends of webbing through slot "C" of "Champion" buckle tongue (illustrated in Figure 3), thread both ends of webbing back through lower slot "B" of "Champion," (illustrated in Figure 1).

d. Each end of webbing is now threaded through respective size-adjusted slide at back of "Champion" removing excess webbing to back of "Champion" out of infant's way.

5. TO INSTALL HARNESS FOR TODDLER USE (OVER 12 INCHES SITTING SHOULDER HEIGHT)

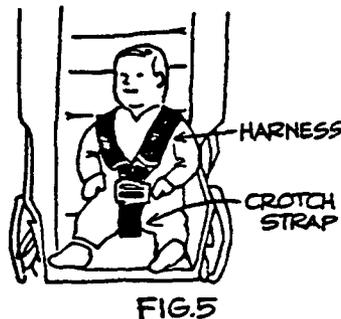
a. Thread webbing ends through two slots "A" (one webbing end in each slot) from back of "Champion" to front as illustrated in Figure 1.

b. After threading each end of harness webbing through a size-adjusting slide (illustrated in Figure 2), slip part way up each length of harness webbing and thread both ends of webbing through slot "C" of "Champion" buckle tongue as illustrated in Figure 2.

TO SECURE CHILD IN "CHAMPION"

1. Place your child in "Champion" and put shoulder harness over each shoulder.

2. Slip "Champion" buckle tongue onto crotch strap buckle and snap buckle closed (as illustrated in Figure 5).



3. Now adjust shoulder harness by use of size-adjusting slides so straps fit child snugly. After shoulder harness is adjusted to fit child, thread ends of harness webbing back through size-adjusting slides as illustrated in Figure 6, pulling tight to prevent slippage.

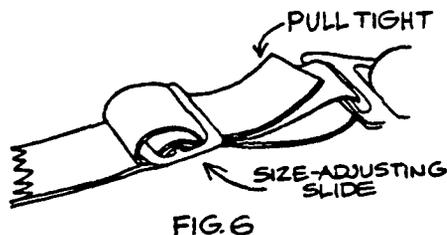


FIG. 6

**TO PLACE INFANT IN REAR-FACING POSITION**

1. If automobile seat back is adjustable, place it carefully upright before you put shoulder harness through slot "B" as illustrated in Figure 1.
2. Place "Champion" in reclining position number 2, number 3. or number 4 of automobile seat facing automobile seat back, never reclining beyond position number 4. Be sure locking bar is snapped all the way into the positioning slots to lock bar in place.
3. Proceed with directions 1 through 3 as outlined in the foregoing section entitled, TO SECURE CHILD IN "CHAMPION."
4. TO USE WITH LAP BELT ONLY
  - a. To anchor "Champion" in automobile in infant rear-facing position, thread automobile lap belt through arms "E" and through anchor slots "F-Front" of seat bucket as illustrated in Figures 7 and 8.

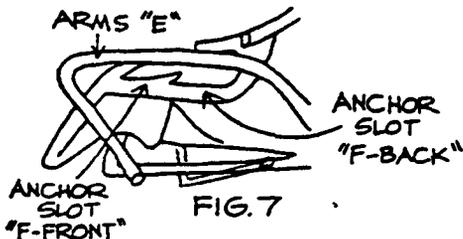


FIG. 7

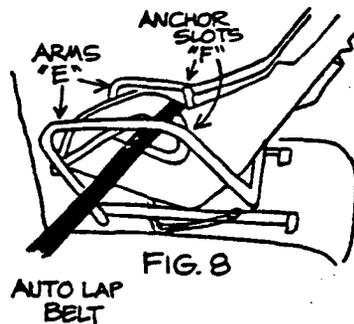


FIG. 8

- b. Press "Champion" firmly into automobile seat cushion and automobile seat back. Pull automobile lap belt as tight as possible as illustrated in Figure 8.
- c. If automobile lap belt has an automatic wind-up device, be sure belt wind-up device has taken up all slack as there should be no slack in automobile lap belt.

**5. TO USE WITH SEPARATE SHOULDER BELT/LAP BELT**

If shoulder belt is permanently attached to lap belt but is not a continuous loop, thread both lap belt and shoulder belt according to preceding INFANT REAR-FACING POSITION directions 1 through 3. See Figures 7 and 9.

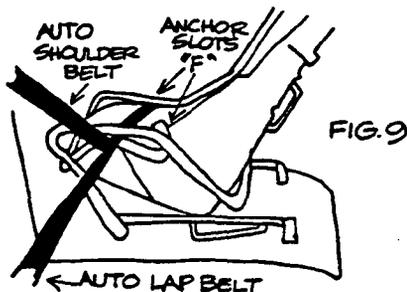
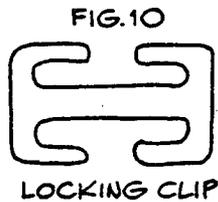


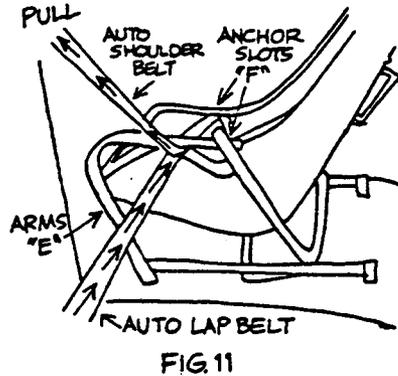
FIG. 9

6. TO USE WITH CONTINUOUS LOOP LAP/SHOULDER BELT

a.. To make use of this system, it is necessary to purchase a locking clip from the Bobby Mac Company, P.O. Box 209, Scarsdale, NY 10583, \$3.35 including shipping and handling (Figure 10).

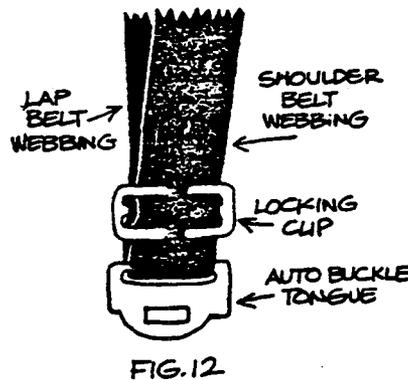


b. Insert both the automobile lap belt and shoulder belt through arms "E" and through anchor slots "F-Front" of seat bucket. Buckle the device as illustrated in Figures 7 and 11.



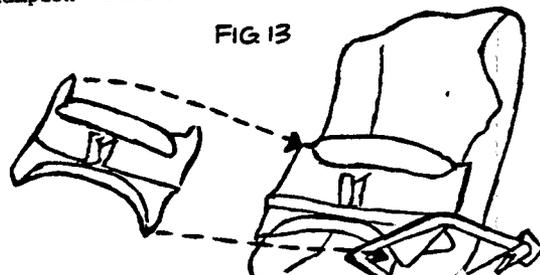
c. Secure "Champion" firmly into automobile seat cushion and automobile seat back.

d. Extend shoulder portion of continuous loop webbing until all slack is out of lap belt portion of webbing (Figure 11). Taking hold of doubled webbing and automobile buckle tongue, disengage from automobile buckle receptacle and keep tight grasp of webbing so it cannot slip. Fold both layers of webbing and insert into one side of locking clip, then other side, about 1/2" above buckle tongue, Figure 12. Re-engage automobile buckle tongue in buckle receptacle. If "Champion" is firmly pressed into automobile seat cushion and seat back, and if all slack has been eliminated from lap belt portion of webbing, "Champion" will be properly secured on automobile seat.



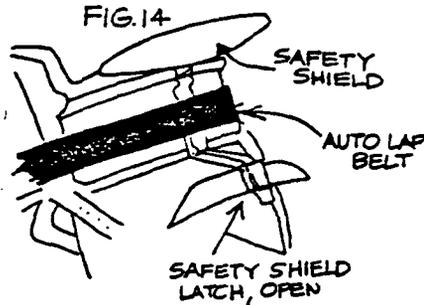
TO USE IN FORWARD-FACING POSITION

1. If automobile seat is adjustable, place it fully upright before adjusting the harness through slot "A" for your toddler.
2. Adjust "Champion" in its number 1 or number 2 position on the automobile seat. Never recline it beyond position number 2.
3. Follow directions 1 through 3 as outlined under TO SECURE CHILD IN "CHAMPION". Snap the safety shield on the front of the "Champion" seat bucket as illustrated in Figure 13.



4. TO USE WITH LAP BELT ONLY

a. Place automobile lap belt around safety shield across the open safety shield latch as illustrated in Figure 14 before buckling it.



b. Press "Champion" firmly into automobile seat cushion and automobile seat back. Pull automobile lap belt as tight as possible.

c. If automobile has automatic wind-up device, be sure belt wind-up device has taken up all slack as there should be no slack in automobile lap belt.

d. Lock the safety shield latch so that it secures the automobile lap belt as illustrated in Figure 15.

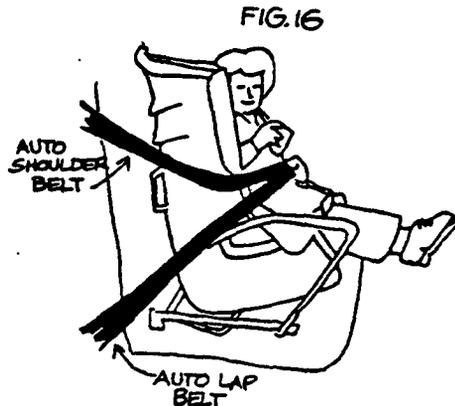


FIG. 15

5. TO USE WITH SEPARATE SHOULDER BELT/LAP BELT

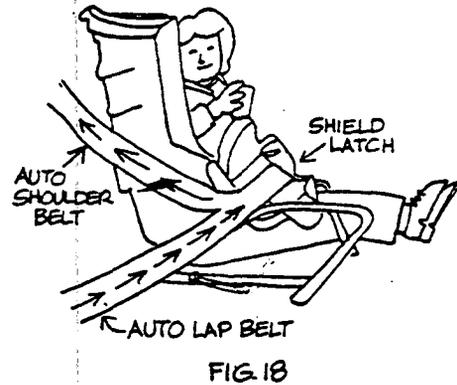
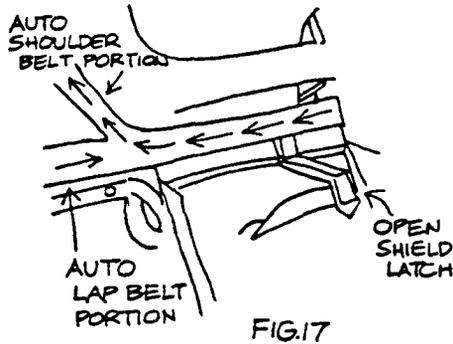
a. If automobile shoulder belt is permanently attached to lap belt but is not a continuous loop, secure the automobile lap belt according to preceding FORWARD-FACING POSITION, LAP BELT ONLY directions 4a through 4d (see Figures 14 and 15).

b. Shoulder belt can be placed out of the way behind "Champion" or brought back across the front of the shield under the face guard portion of the shield as illustrated in Figure 16.



7. TO USE WITH CONTINUOUS LOOP LAP/SHOULDER BELT

- a. With the use of the Safety Shield latch, Figures 14 and 15, it is not necessary to use the locking clip, Figure 10.
- b. Extend lap belt webbing across "Champion" Safety Shield over open Shield latch, Figure 14. Lock automobile buckle tongue in automobile buckle receptacle. Bring shoulder belt webbing back over lap belt webbing on Safety Shield, over open Shield latch, Figure 17.
- c. Position "Champion" firmly into automobile seat cushion and automobile seat back.
- d. Extend shoulder portion of continuous loop webbing until all slack is eliminated from lap belt portion of webbing, Figure 17, and then lock the Safety Shield latch over both lap belt and shoulder belt webbing. Run slack portion of shoulder belt webbing under face-guard of Safety Shield to side of "Champion," Figure 18.



"Champion" cannot be used on automobile seats which pivot forward as a unit; whose seat backs fold forward unless such seat or seat back is equipped with locking device; or whose seats do not face forward.

When used in the infant rear-facing position, the automobile seat back facing "Champion" should be padded to its full height and should be free of hard objects like a radio speaker grill. You should adjust the head restraint on the automobile seat back to its lowest position. Never position "Champion" so that your infant faces a built-in center armrest or dividing line between folding seat backs.

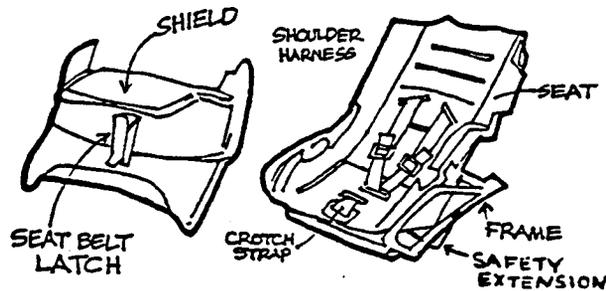
"Champion," whether occupied or not, should always be securely belted to the automobile as it may harm passengers in the automobile in an accident if it is loose.

If you leave "Champion" in automobile in hot weather, cover it with heavy cloth or a towel to prevent vinyl and metal parts from absorbing heat from the sun. Always test for heat before placing your child in the "Champion".

If the warnings in these instructions are not followed, it is possible that your child could be injured in an accident situation.

# CHAMPION

## CHILD RESTRAINT SYSTEM COMPONENTS



A-2

Instructions for  
Bobby-Mac Champion

Form 2:  
Reduced reading level

Use only with child who weighs 40 lbs. or less, and is 40 inches or less in height.

Infant should ride in rear facing mode. When child reaches 15 to 18 lbs., use forward facing mode with safety shield.

### TO USE SHOULDER HARNESS WITH INFANT AND TODDLER

1. Use shoulder harness with toddler whose sitting shoulder height is more than 12 inches. Harness webbing goes through "A" slots. See Figure 1.

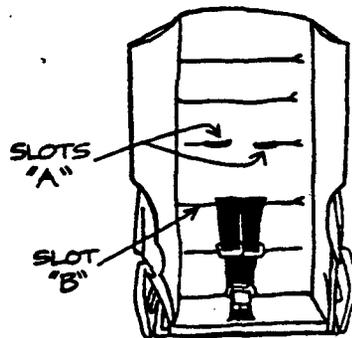
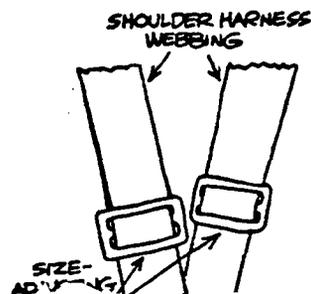


FIG. 1

2. Shoulder harness webbing for infant whose sitting shoulder height is 12 inches or less goes through slot "B." See Figure 1.

### 3. TO REMOVE HARNESS

- a. Withdraw both ends of shoulder webbing from metal size-adjusting slides, one on each shoulder webbing. See Figure 2.



b. Remove webbing from slot "C" of buckle tongue. See Figure 3. Withdraw webbing entirely from same two size-adjusting slides. See Figure 2. Pull webbing through slots "A" to back. See Figure 1.

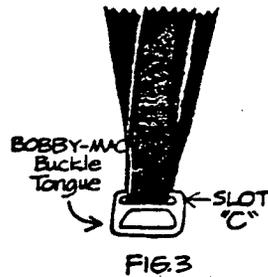


FIG.3

c. Webbing is still attached to crotch-strap-with-buckle through slot "D." See Figure 4.

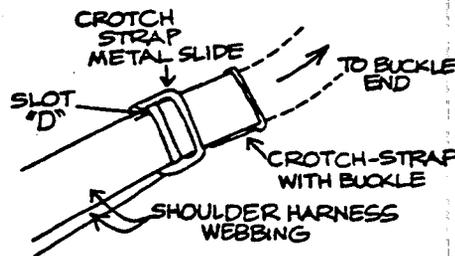


FIG.4

d. To wash webbing, withdraw webbing from crotch strap slide (slot "D"). Wash, allow to dry. [Replace webbing through slot "D." Pull ends of webbing even, one half for each shoulder.]

4. TO INSTALL HARNESS FOR INFANT USE (12 INCHES AND UNDER SITTING SHOULDER HEIGHT)

a. Thread each end of harness through size-adjusting slide (Figure 2).

b. Push slides on each length of webbing far enough down to stay at back of "Champion". Thread both ends of webbing through lower slot "B" (Figure 1). Pull webbing to front. Leave slides at back of "Champion."

c. Thread both ends of webbing through slot "C" of "Champion" buckle tongue (Figure 3). Thread both ends of webbing back through lower slot "B" (Figure 1).

d. Each end of webbing is now threaded back out of infant's way.

5. TO INSTALL HARNESS FOR TODDLER USE (OVER 12 INCHES SITTING SHOULDER HEIGHT)

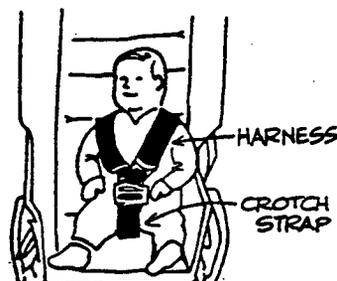
a. Thread webbing ends through two slots "A." Thread from back to front as shown in Figure 3.

b. Thread each end of harness webbing through size-adjusting slide (Figure 2). Slip part way up each length of webbing. Thread both ends of webbing through slots "C." Buckle tongue as shown in Figure 3.

TO SECURE CHILD IN "CHAMPION"

1. Put child in "Champion." Put shoulder harness over each shoulder.

2. Slip "Champion" buckle tongue onto crotch strap buckle. Snap buckle closed (Figure 5).



3. Adjust shoulder harness using size-adjusting slides. Straps should fit child snugly. Thread ends of harness webbing back through size-adjusting slides. See Figure 6. Pull tight to keep from slipping.

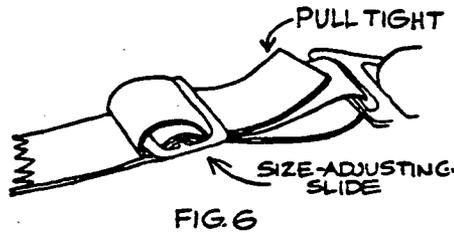


FIG. 6

**TO PLACE INFANT IN REAR-FACING POSITION**

1. If auto seat back is adjustable, place it fully upright. Put shoulder harness through slot "B." (see Figure 1 ).
2. Place "Champion" in reclining position. Numbers 2, 3, or 4 may be used. Place in auto seat facing seat back. Never recline past position number 4. Snap locking bar firmly in place.
3. Follow 1 through 3 of section TO SECURE CHILD IN "CHAMPION."
4. TO USE WITH LAP BELT ONLY
  - a. For rear facing position, thread auto lap belt through arms "E." Then thread through slots "F-Front" of seat bucket. See Figures 7 and 8.

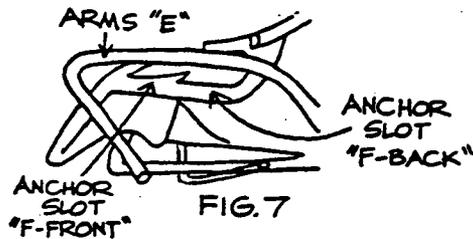


FIG. 7

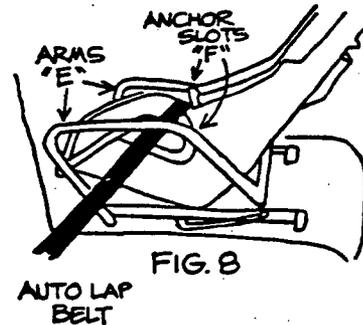


FIG. 8

b. Press "Champion" firmly into auto seat cushion and seat back. Pull auto lap belt tight. See Figure 8.

c. If auto lap belt has wind-up, be sure all slack is out. Do not have slack.

**5. TO USE WITH SEPARATE SHOULDER BELT/LAP BELT**

For shoulder belt attached to lap belt (not continuous loop), thread both as in 1 through 3 of INFANT REAR FACING POSITION. See Figures 7 and 9.

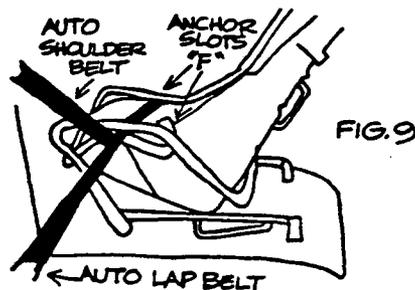
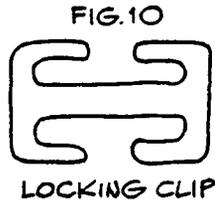


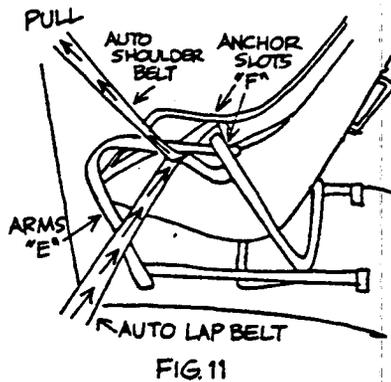
FIG. 9

6. CONTINUOUS LOOP LAP/SHOULDER BELT

a. To use this system, you must buy a locking clip. See Figure 10. Write to Bobby Mac Company, P. O. Box 209, Scarsdale, NY 10583. Send \$3.35 including shipping and handling.

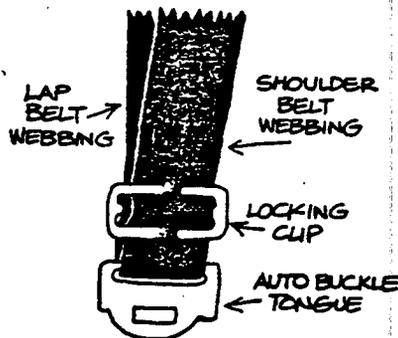


b. Put both auto lap belt and shoulder belt through "E" and "F-Front" of seat bucket. Buckle. See Figures 7 and 11.



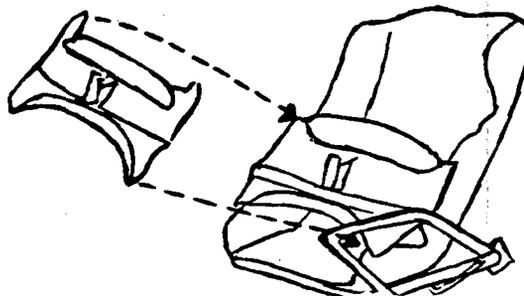
c. Press "Champion" firmly into auto seat cushion and seat back.

d. Pull shoulder part of strap until all slack is out of lap part. See Figure 11. Take hold of doubled straps and auto buckle tongue. Remove from auto buckle holder. Keep a tight grasp of straps so it won't slip. Fold both layers of straps and put into one side of locking clip, 1/2" above buckle tongue. Then put in other side. See Figure 12. Put auto seat tongue in buckle holder again. Press "Champion" firmly into auto seat cushion and back. Make sure all slack is out of lap belt. "Champion" will then be properly secured.



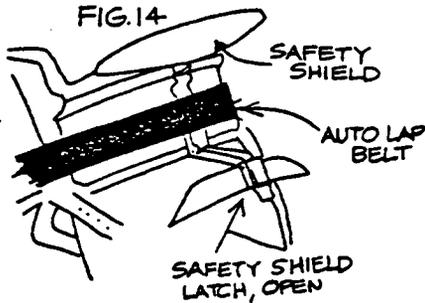
TO USE IN FORWARD-FACING POSITION

1. Place adjustable auto seat upright. Adjust harness through slots "A" for toddler.
2. Adjust "Champion" in number 1 or 2 position. Place on auto seat. Do not recline past number 2.
3. Follow 1 through 3 in TO SECURE CHILD IN "CHAMPION." Snap safety shield on the front of seat buckle. See Figure 13.



4. TO USE WITH LAP BELT ONLY

- a. Pull auto lap belt around safety shield across open latch. See Figure 14. Buckle lap belt.



- b. Press "Champion" firmly into auto seat cushion and back. Pull auto lap belt tight.
- c. If auto lap belt has wind-up, take up slack.
- d. Lock safety shield latch to secure lap belt. See Figure 15.

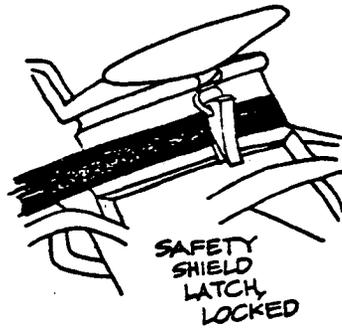
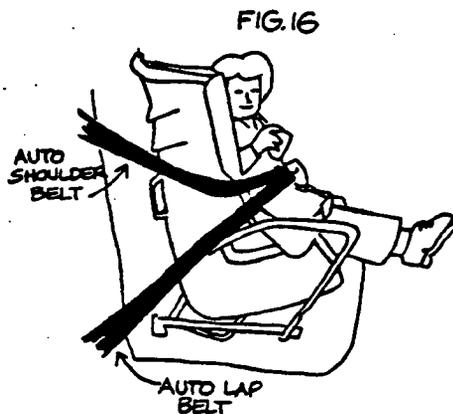


FIG. 15

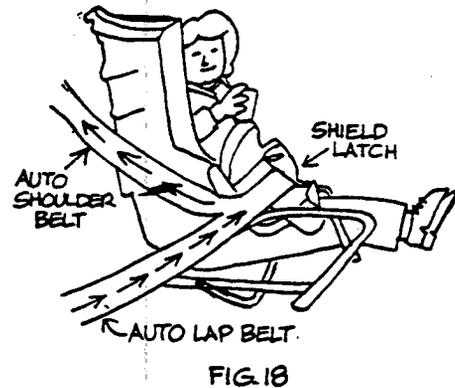
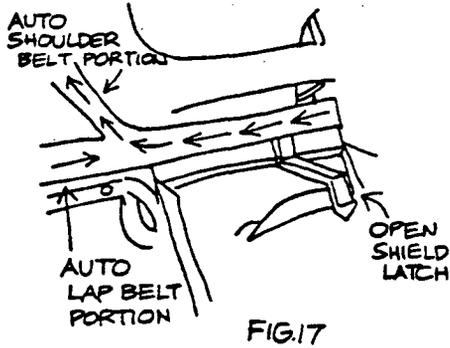
5. TO USE WITH SEPARATE SHOULDER BELT/LAP BELT

- a. For shoulder belt attached to lap belt, secure lap belt. (This is not for continuous loop). See 4a - 4d of FORWARD FACING POSITION, LAP BELT ONLY. See Figures 14 and 15.
- b. Place shoulder belt in back of "Champion" or back across front of shield under face guard. See Figure 16.



7. CONTINUOUS LOOP LAP/SHOULDER BELT

- a. Locking clip is not needed with Safety Shield latch. See Figures 14 and 15.
- b. Put lap belt across Safety Shield over open latch. See Figure 14. Lock auto buckle tongue in holder. Bring shoulder strap back over lap belt strap on Safety Shield, over open latch. See Figure 17.
- c. Press "Champion" firmly into auto seat cushion and back.
- d. Pull shoulder strap until all slack is out of lap belt. See Figure 17. Lock Safety Shield latch over lap belt strap and shoulder belt strap. Run slack part of shoulder belt strap under faceguard of Safety Shield to side of "Champion" See Figure 18.



Auto seats must now pivot forward as a unit. Auto seat backs which fold forward must have locking device. Auto seats must face forward. Use with autos with standard lap belt. Use with autos with shoulder belt/lap belt units.

Auto seat back should be fully padded for infant rear facing position. Auto seat back should not have hard objects on it. Auto headrest on seat back should be at lowest level. Do not face infant to center armrest. Do not face infant to line between folding seat backs.

Belt "Champion" to auto when not used. It can hurt those in auto in a crash if it is loose.

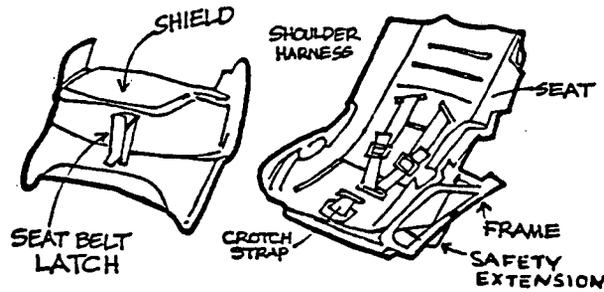
Cover "Champion" with cloth when left in hot sun. Test seat for heat before placing child in "Champion."

Your child could be hurt in a crash if you do not follow these directions.

# CHAMPION

## CHILD RESTRAINT SYSTEM

### COMPONENTS

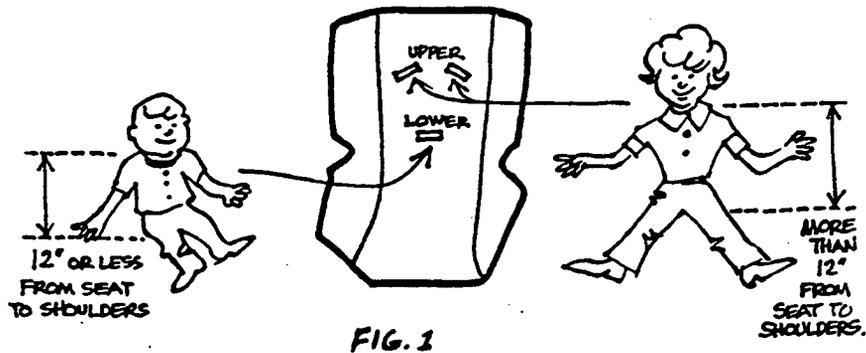


A-3

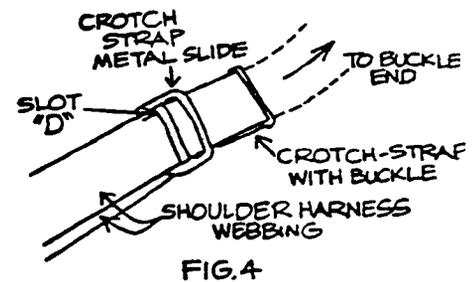
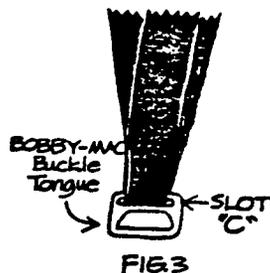
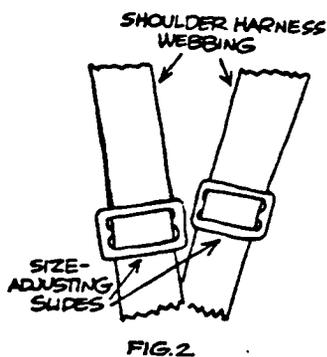
Instructions for  
Bobby-Mac Champion

Form 3:  
Pictures only

TO USE SHOULDER HARNESS WITH INFANT AND TODDLER



TO REMOVE HARNESS



**TO SECURE CHILD IN "CHAMPION"**

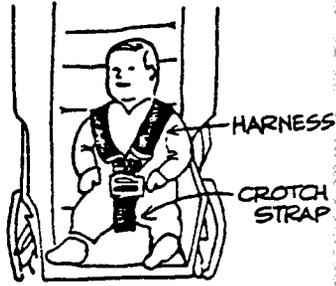


FIG.5

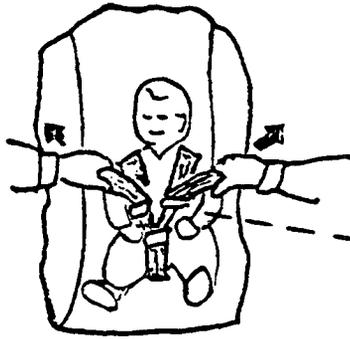
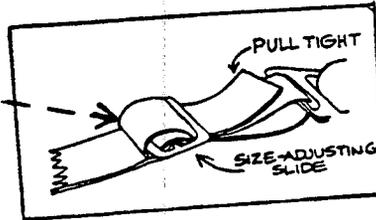
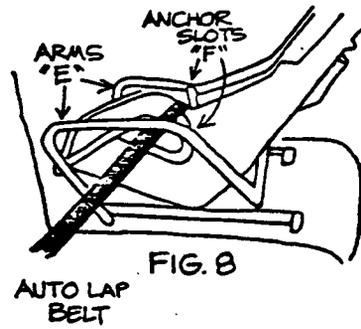
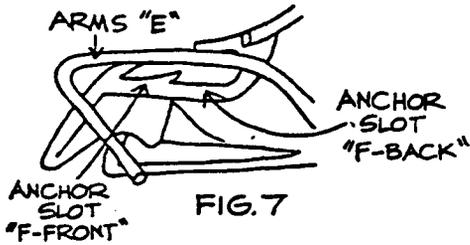


FIG.6

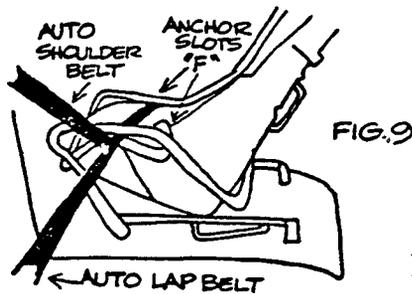


**TO USE WITH INFANT IN REAR FACING POSITION**

**TO USE WITH LAP BELT ONLY**



**TO USE WITH SEPARATE SHOULDER BELT/LAP BELT**



TO USE WITH CONTINUOUS LOOP LAP/SHOULDER BELT

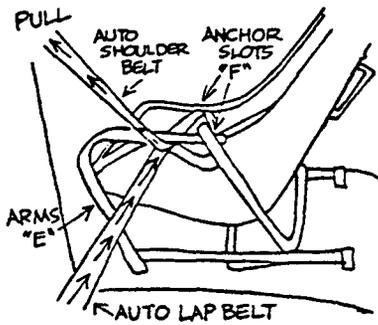
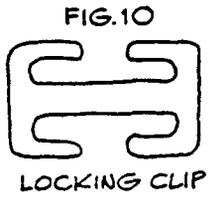


FIG. 11

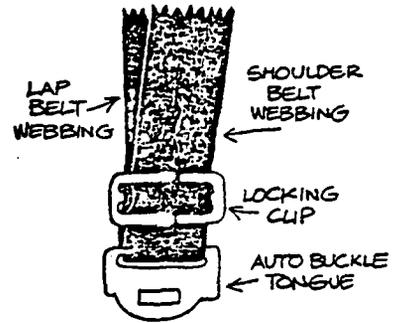


FIG. 12

TO USE WITH TODDLER IN FORWARD FACING POSITION

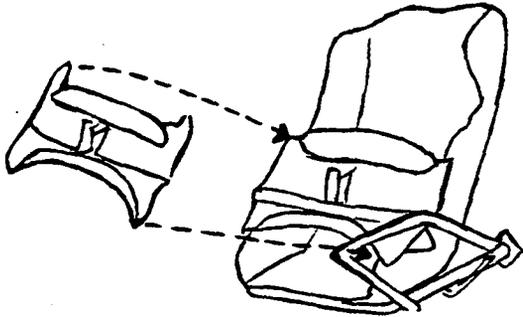


FIG. 13

TO USE WITH LAP BELT ONLY

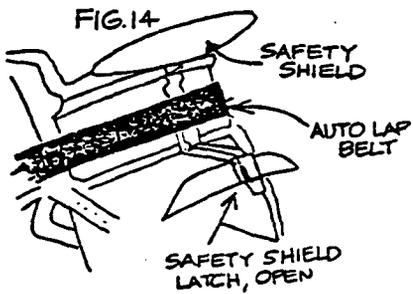
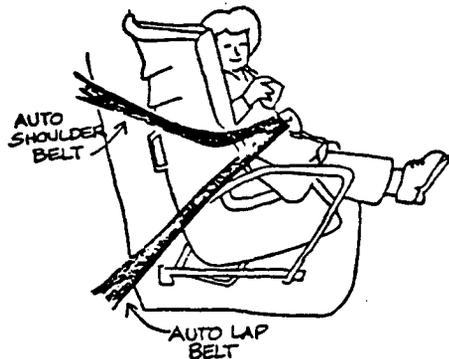


FIG. 15

TO USE WITH SEPARATE SHOULDER BELT/LAP BELT

FIG.16



TO USE WITH CONTINUOUS LOOP LAP/SHOULDER BELT

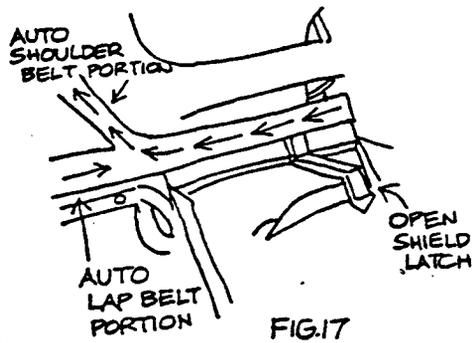


FIG.17

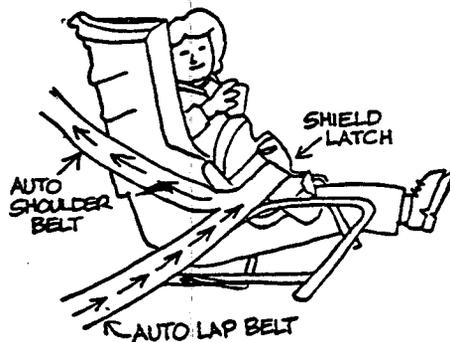
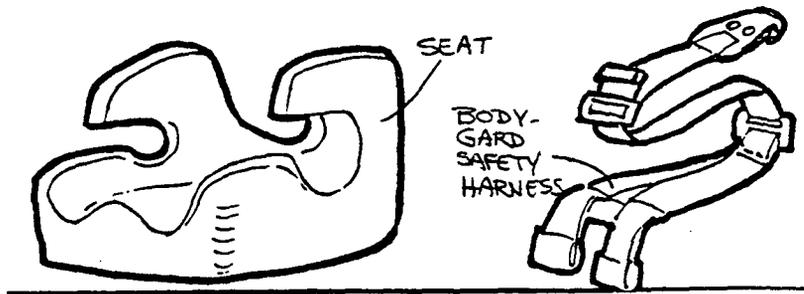


FIG.18

# SAFE-T-RIDER

## SEAT COMPONENTS

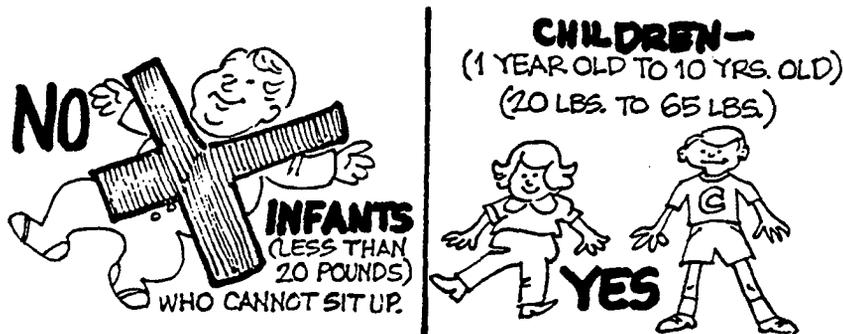


A-4

Instructions for  
Century Safe-T-Rider

Form 1:  
Normative reading level

The "Safe-T-Rider" is suitable for a child who is capable of sitting upright and whose weight is between 20 and 65 lbs. (approximately 1 to 10 years old).



### TO USE WITH COMBINATION LAP AND SHOULDER BELTS

1. After placing "Safe-T-Rider" on automobile seat, firmly against seat back, position child on "Safe-T-Rider."
2. Thread auto lap belt under the "Safe-T-Rider" arms with the auto shoulder belt across the child's chest, away from child's neck (Figure 1), and lock auto lap buckle in place below "Safe-T-Rider" arm, adjusting buckle as close to automobile seat bench as possible if auto lap buckle section is adjustable. On automobiles with reclining bucket seats, some seat adjustments may be required to improve the position of the shoulder belt across the child's chest.

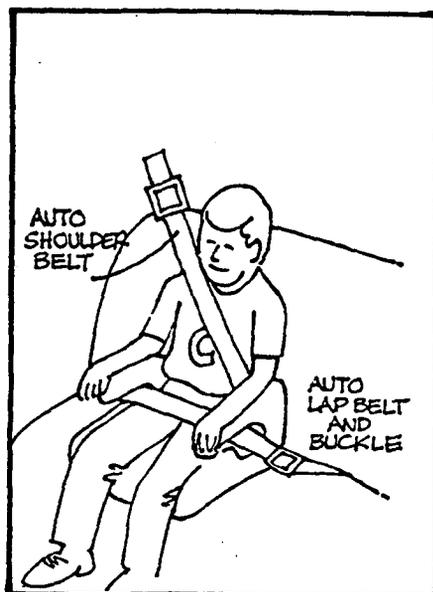


Fig. 1

TO USE WITH VANS, HATCHBACKS, STATION WAGONS, AND UTILITY TRUCKS

1. Place "Safe-T-Rider" on automobile seat, firmly against seat back. Position child on "Safe-T-Rider" and place Body-Gard Safety Harness across the child's chest as illustrated in Figure 3.
2. After adjusting Safety-Harness across child's chest, thread auto lap belt through loops of Safety Harness, making sure the auto lap belt passes under the two arms of the "Safe-T-Rider."
3. Lock auto lap belt buckle in place. If buckle section is adjustable, adjust the buckle as close to the automobile seat bench as possible.
4. Select a suitable anchor bracket mounting location on the floor of the vehicle as illustrated in Figure 5. The location must be:
  - a. On a flat metal surface which is a welded-in integral part of the vehicle body. Do not attach the anchor bracket assembly to folding seat back panels or movable load floors, filler panels, spare tire covers, or any screw-on panels.
  - b. In a position clear of fuel tank, fuel lines, brake lines, exhaust systems, etc.
  - c. In a position where the angle between the "Safe-T-Rider" top strap and the load floor does not exceed 45° (horizontal angle):
  - d. As close to the centerline of the "Safe-T-Rider" as possible, but in no case must the angle between the "Safe-T-Rider" centerline and top strap exceed 20° (side to side angle).

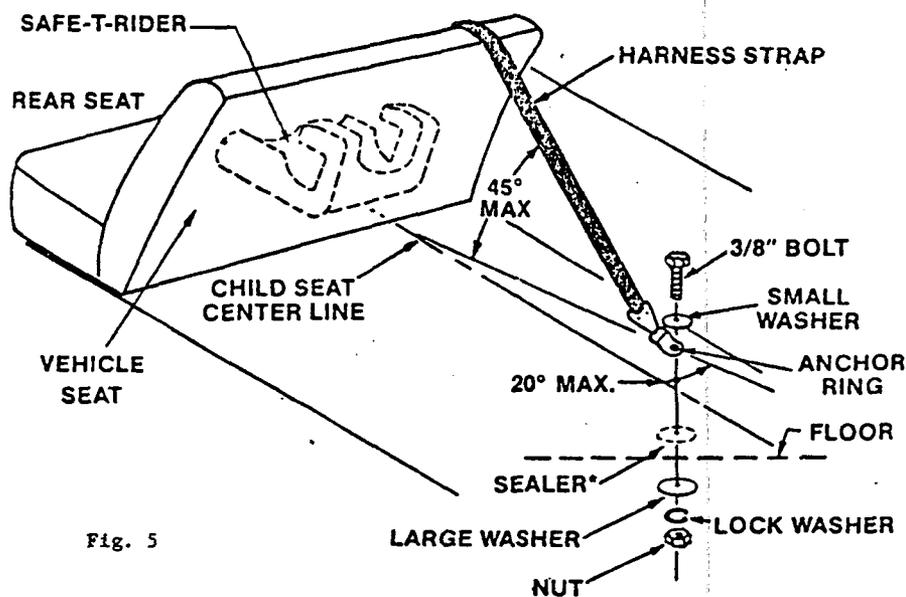


Fig. 5

If conditions (a), (b), (c), and (d) cannot be met, do not use "Safe-T-Rider" in that seating position, but move it to another seating position which satisfies conditions (a), (b), (c), and (d).

5. Drill a 3/8 inch diameter hole through the floor at the selected location and assemble and securely tighten the bolt with small washer, anchor ring, large washer, lock washer, and nut to the floor using a suitable sealer around the hole. (Suitable sealers include silicone bath tub caulking, butyl house caulking, or acrylic house caulking.) If the hole has been drilled through the floor to the outside of the vehicle, make sure that the hole is properly sealed to prevent exhaust fumes from entering the vehicle.

6. Use the "Safe-T-Rider" only in the rear seating position for which the anchor ring has been installed and as directed in the instructions under number 2 and Figure 3 - (TO USE WITH AUTO LAP BELT AND BODY-GARD SAFETY HARNESS). Latch the "Safe-T-Rider" harness clip to the anchor ring as illustrated.

Never use "Safe-T-Rider" with auto lap belt alone. Maximum protection can be achieved only by using (1) auto lap belt and shoulder belt or (2) auto lap belt and Body-Gard Safety Harness.

Use Body-Gard Safety Harness with "Safe-T-Rider" seat only. Any other use could be dangerous to child's safety.

Remove Body-Gard Safety Harness whenever "Safe-T-Rider" seat is not present or in use so child will not become accidentally entangled.

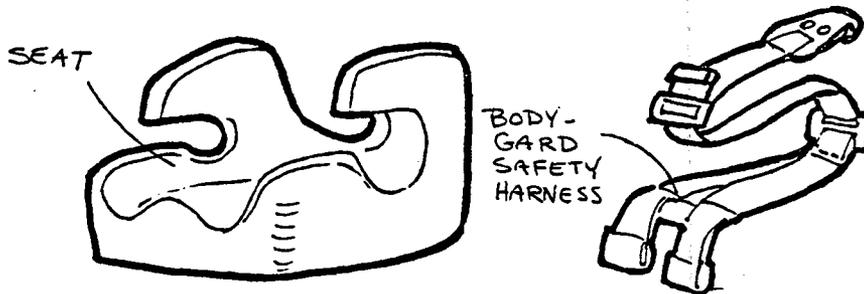
In the event that the "Safe-T-Rider" anchorage assembly is removed, the 3/8 inch diameter hole must be properly resealed to prevent exhaust fumes from entering the vehicle.

If you have problems in installing the rear anchor bolt assembly, contact your automobile dealer.

In vehicles equipped with inertia style safety belts that have a slotted attachment to the webbing which permits the latch to slide along the webbing, a locking clip should be used. This will prevent the latch plate from sliding freely along the webbing and secure the child more firmly. To order locking clips send \$2.00 to Century Products, Inc., 1366 Commerce Drive, Stow, Ohio 44224.

# SAFE-T-RIDER

## SEAT COMPONENTS

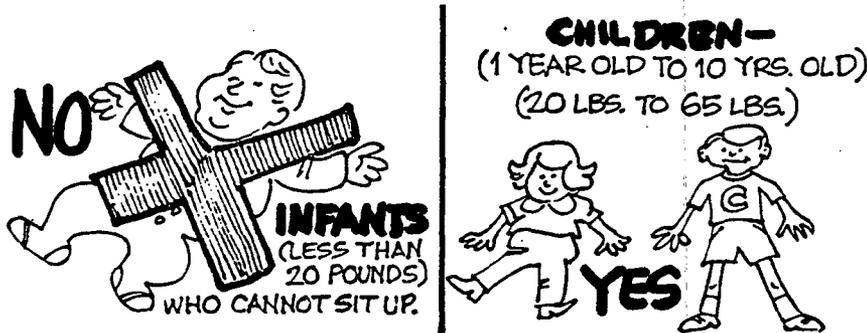


A-5

Instruction for  
Century Safe-T-Rider

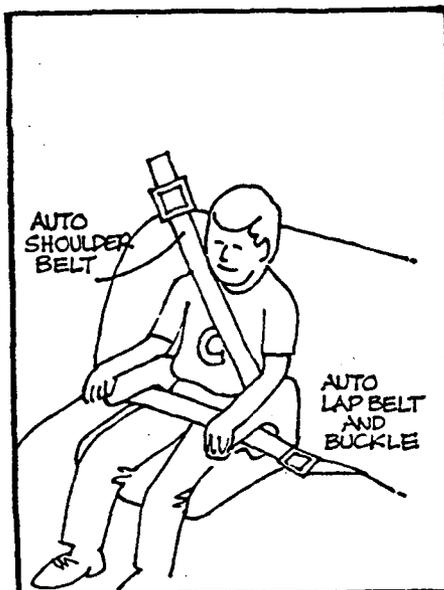
Form 2:  
Reduced reading level

The "Safe-T-Rider" is for a child who can sit upright. The child should be 20 to 65 lbs. The child should be about 1 to 10 years old.



### TO USE WITH COMBINATION LAP AND SHOULDER BELTS

1. Place "Safe-T-Rider" on auto seat. Press it firmly against seat back. Put child on "Safe-T-Rider".
2. Thread auto lap belt under "Safe-T-Rider" arms. Auto shoulder belt should be across child's chest away from neck. See Figure 1. Lock auto lap buckle in place below "Safe-T-Rider" arm. Adjust buckle close to auto seat bench if it can be adjusted. Some autos have reclining bucket seats. You may need to make seat adjustments. This will help to place shoulder belt in right place on child's chest.

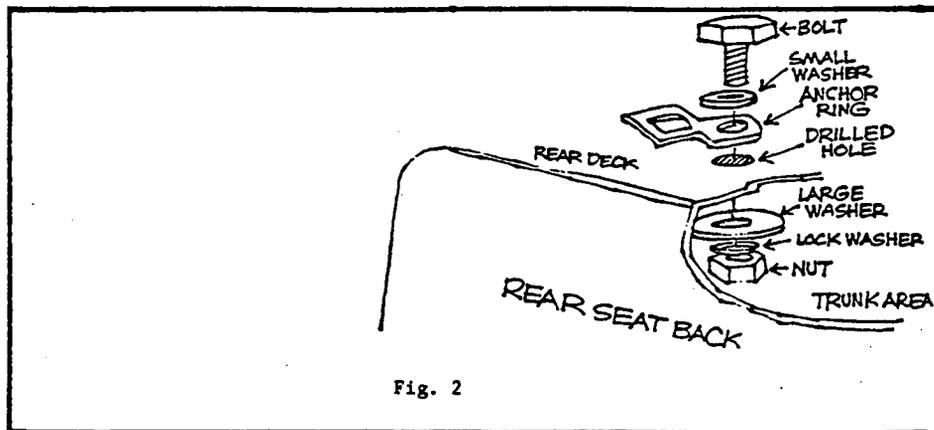


TO USE WHEN NO SHOULDER BELT IS AVAILABLE (REAR SEAT POSITION ONLY) WITH AUTO LAP BELT AND BODY-GARD SAFETY HARNESS

1. In order to use the Body-Gard Safety Harness, the rear anchor bolt assembly, provided, must be installed as illustrated in Figure 2.

a. Install metal anchor ring on the rear deck directly behind the position to be used for the "Safe-T-Rider" by drilling a 3/8 inch hole into the rear deck. Do not drill this hole closer than 3 inches from a speaker opening or less than 6 inches from the rear seat.

b. On the bolt provided, preassemble small washer and anchor ring. Place bolt assembly together with suitable sealer into drilled hole. (Suitable sealers include silicone bath tub caulking, butyl house caulking, or acrylic house caulking.) From inside trunk compartment, assemble large washer, lock washer, and nut. Tighten the nut securely.

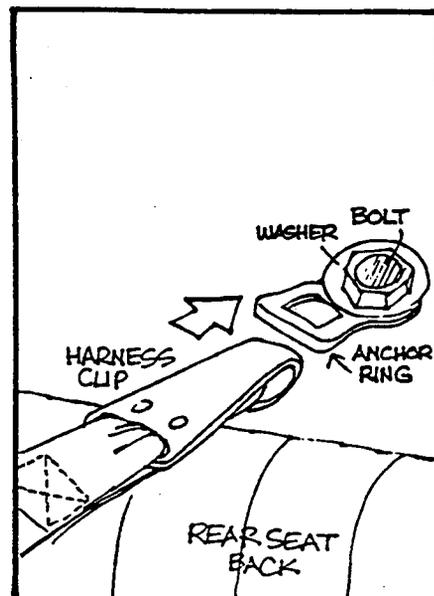
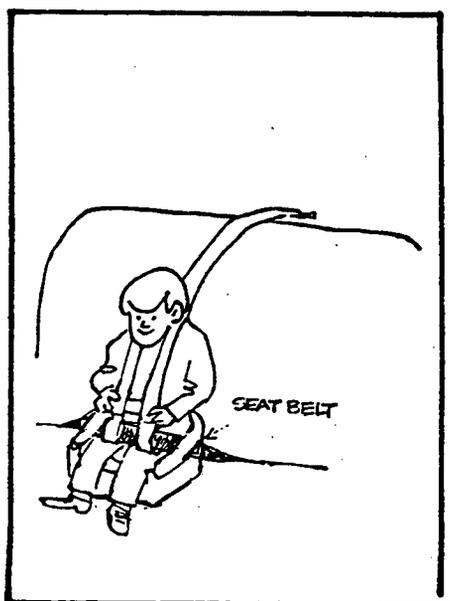


2. Put child on "Safe-T-Rider" and place Body-Gard Safety Harness across the child's chest as shown in Figure 3. Snap Body-Gard Harness clip securely into anchor ring. (Figure 4)

3. After adjusting Safety Harness across child's chest, thread auto lap belt through loops in Safety Harness, making sure the auto lap belt passes under the two arms of the "Safe-T-Rider."

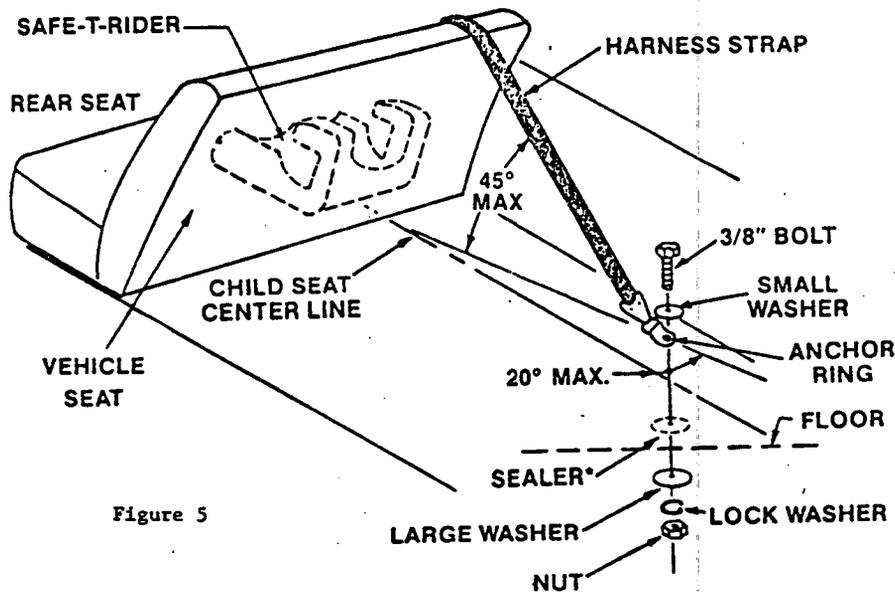
4. Lock auto lap belt buckle in place. If buckle section is adjustable, adjust the buckle as close to the automobile seat bench as possible.

5. The Body-Gard Safety Harness must fit firmly but comfortably across the child's chest. Tighten or loosen harness by adjusting metal slide behind child's head.



TO USE WITH VANS, HATCHBACKS, STATION WAGONS, AND UTILITY TRUCKS

1. Place "Safe-T-Rider" on auto seat. Press it firmly against seat back. Put child on "Safe-T-Rider". Place harness across child's chest. See Figure 3.
2. Adjust harness across child's chest. Thread lap belt through loops of harness. Make sure lap belt is under seat's two arms.
3. Lock lap belt buckle. Adjust close to auto seat bench.
4. Select a place to put mounting on floor. See Figure 4. Place should be:
  - a. On a stable metal part of auto.
  - b. Clear of gas tank, brake lines, etc.
  - c. Where angle of top strap and load floor is not more than a 45° angle.
  - d. Close to centerline of "Safe-T-Rider".



5. Drill a 3/8 inch hole through floor. Assemble bolt. Seal around hole. (Suitable sealers include silicone bath tub caulking, butyl house caulking, or acrylic house caulking.) Make sure no exhaust fumes can come in vehicle.

6. Use "Safe-T-Rider" only in rear seat. See directions TO USE WITH AUTO LAP BELT AND BODY-GARD SAFETY HARNESS. See Figure 3. Latch harness clip to anchor ring as shown.

Never use "Safe-T-Rider" with lap belt alone. Use auto lap belt and shoulder belt. Or use auto lap belt and harness.

Use harness with "Safe-T-Rider" seat only.

Remove harness when not using.

If you remove anchor assembly, seal hole. Exhaust fumes might come in.

Ask auto dealer if you need help with anchor bolt assembly.

A locking clip may be needed. This keeps latch plate from sliding along straps. To order, send \$2.00 to Century Products, Inc., 1366 Commerce Drive, Stow, Ohio 44224.

# SAFE-T-RIDER

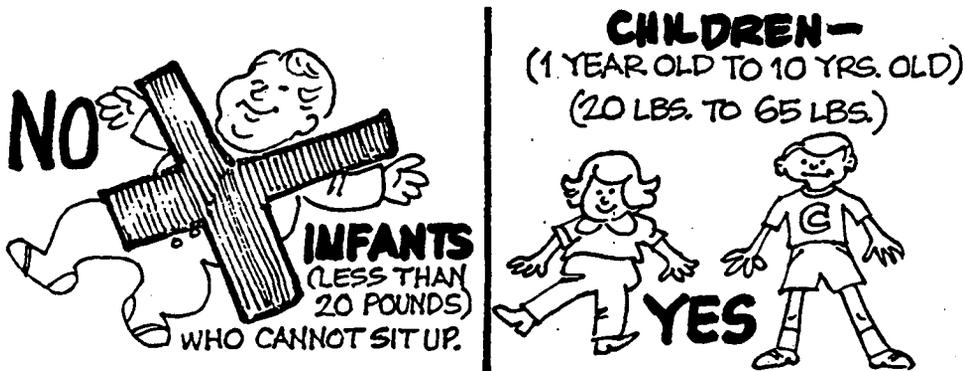
## SEAT COMPONENTS



A-6

Instructions for  
Century Safe-T-Ride

Form 3:  
Pictures only



TO USE WITH COMBINATION LAP AND SHOULDER BELTS

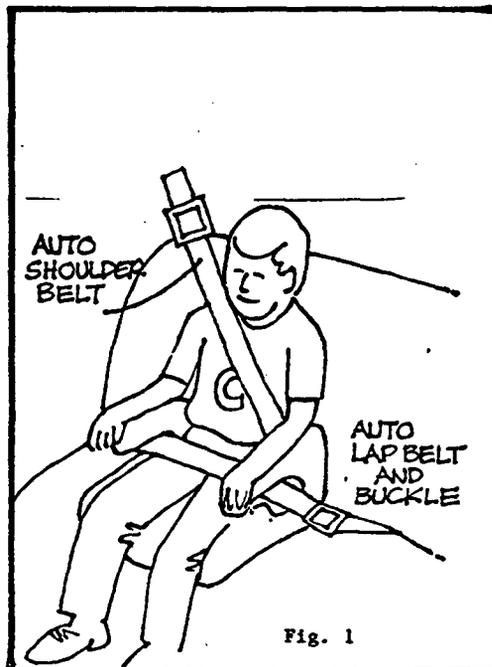
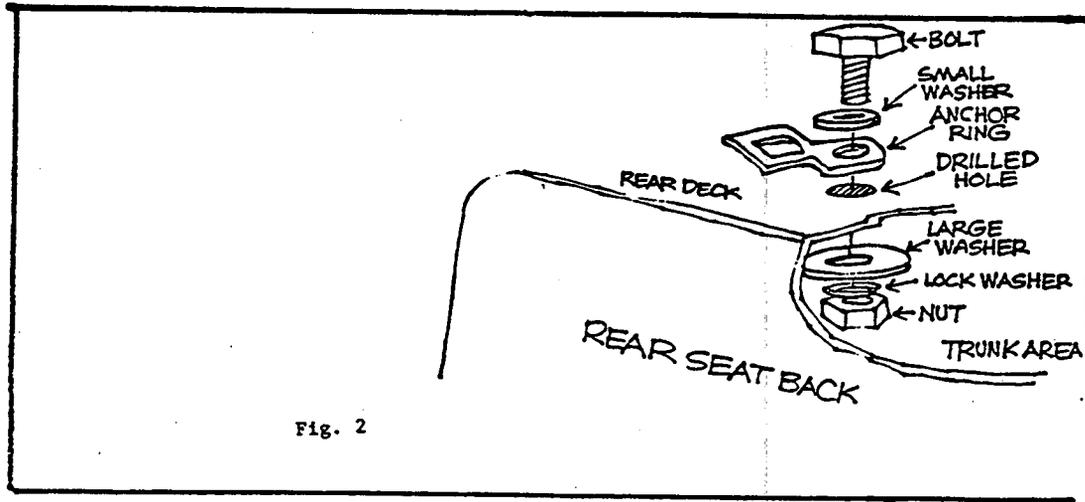


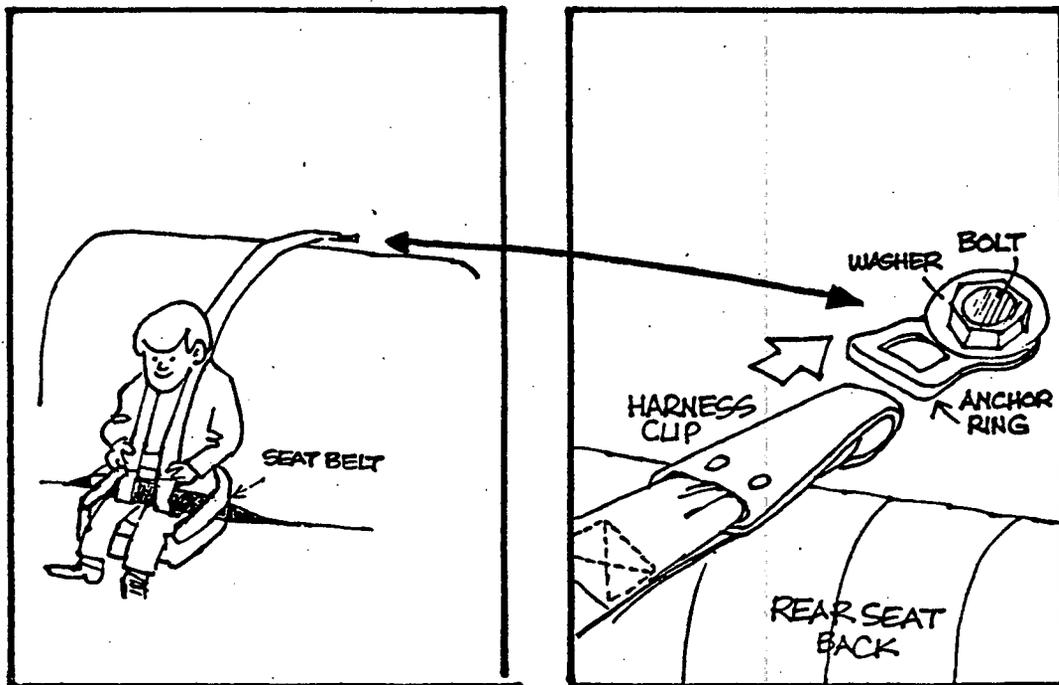
Fig. 1

TO USE WHEN NO SHOULDER BELT IS AVAILABLE (REAR SEAT POSITION ONLY) WITH AUTO LAP BELT AND BODY-GARD SAFETY HARNESS--

To Install Anchor Bolt Assembly in Rear Deck of Auto



To Connect Body-Gard Harness Clip to Anchor Assembly in Rear Deck.



TO USE WITH VANS, HATCHBACKS, STATION WAGONS, AND UTILITY TRUCKS

To Install Anchor Bolt Assembly in Floor of Van, Hatchback, Station Wagon, or Utility Truck

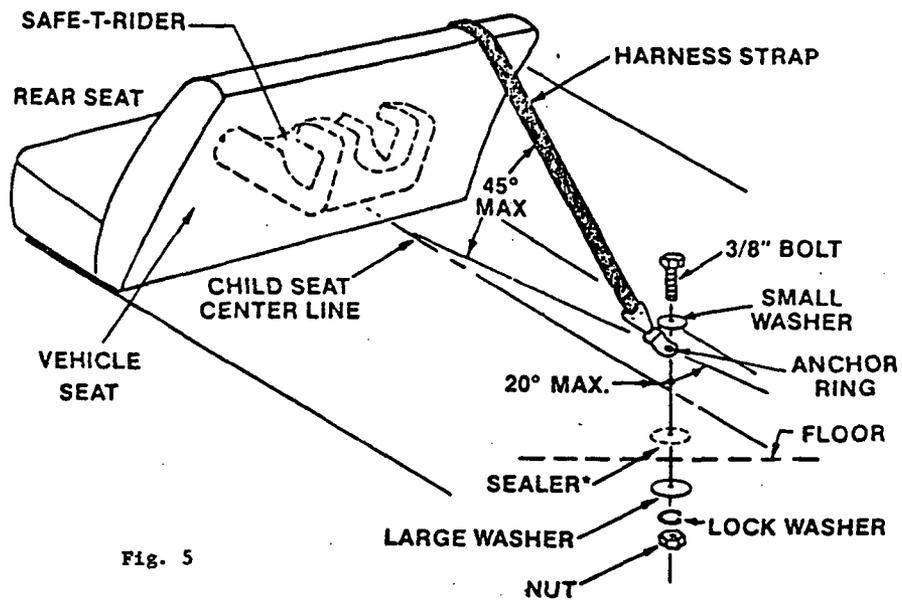
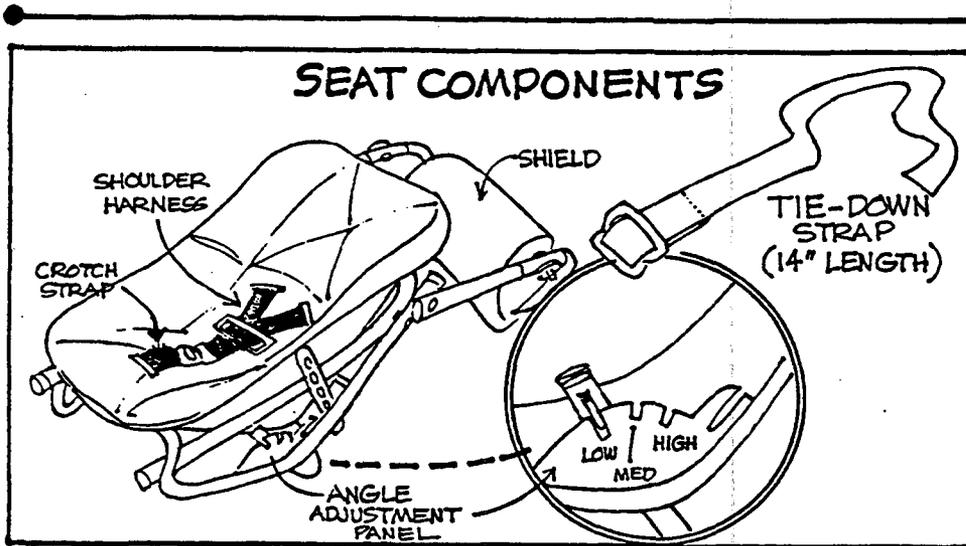


Fig. 5

# SAFE-T-SHIELD



A-7

Instructions for  
Cosco-Peterson  
Safe-T-Shield

Form 1:  
Normative reading  
level

The "Safe-T-Shield" is designed for use only by children who weigh 40 lbs. or less and whose height is 40 inches or less.

## To Place INFANT in Rear Facing Position (for children under 17 lbs.)

1. The "Safe-T-Shield" is shipped from the factory with the harness system adjusted for use by infants. Since the shield is not designed for use in the rear facing infant position, extend release buttons, swing the shield behind the "Safe-T-Shield", and strap the shield to the adjustment tube with the special white strap provided (Figures 1, 2, and 3). For infants, it is necessary to adjust the "Safe-T-Shield" to the lowest reclining position.

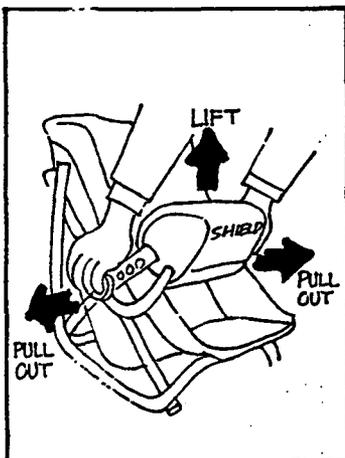


Fig. 1

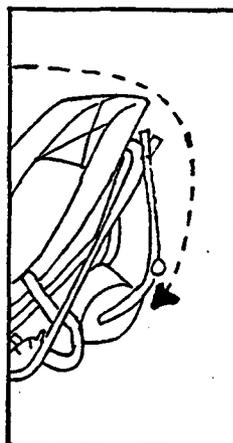


Fig. 2

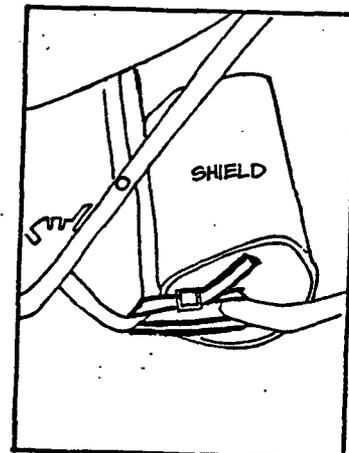


Fig. 3

2. Before installing the "Safe-T-Shield" in your automobile is the best time to adjust the harness straps to fit your infant and to practice using the harness. Undo the harness retainer on one side only, release the buckle and position your infant in the car seat (with the amount of clothing the infant will be wearing while traveling--remember a coat or snowsuit will make a difference).

3. Put the shoulder straps over the child's head and buckle to the crotch strap, adjusting the shoulder straps if they are too tight or too loose (as illustrated in Figure 4'). The harness should be as snug as permissible while allowing for the infant's comfort and clothing. After adequate adjustment has been made, attach the harness retainer to the shoulder strap in the upper chest area as illustrated in Figure 5. The harness retainer assists in keeping the straps from slipping off the infant's shoulders; therefore, it is always necessary that it be used. (Note: With a small infant, you may desire to position a rolled towel or blanket beside the child to provide side support for the child's comfort.)

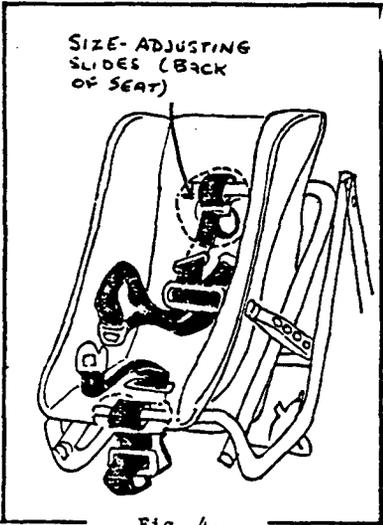


Fig. 4.



Fig. 5

4. Secure the "Safe-T-Shield" in your automobile so that your infant will be looking toward the rear of the automobile. Remember, if at all possible, use a rear seat location since the center of the rear automobile seat is the safest location to position the "Safe-T-Shield".

5. Insert the automobile seat belt through the frame of the "Safe-T-Shield" (as illustrated in Figure 6) and if you are installing the unit in the right front passenger seat and the automobile lap and shoulder belts are one unit, insert both of the belts through the frame of the "Safe-T-Shield". Buckle the automobile belt and adjust it as tightly as possible.

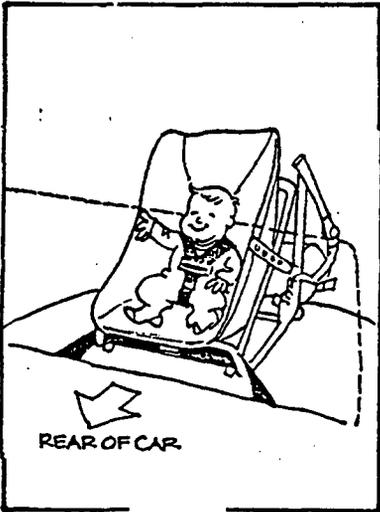


Fig. 6

To Place Toddler in Forward Facing Position (For children between 17 and 40 lbs. and less than 40 inches in height)

1. Since the harness straps are not used in the forward facing toddler position, you may remove and store them. If you have been using the "Safe-T-Shield" in the infant position, it will be necessary to swing the shield over and secure it in front.

2. Position the "Safe-T-Shield" on the automobile seat so that your toddler will face the front of the automobile. Remember, the rear center seating position is the safest seating location; however, if you don't have a center seating position, the right or left rear seating position is the next safest location for the "Safe-T-Shield".

3. Insert the automobile seat belt through the tubular frame or through the belt guides (as illustrated in Figure 7) if the "Safe-T-Shield" is placed in the rear seat of the automobile. If it is necessary that the "Safe-T-Shield" be placed in the right front seating position, Figure 8 should be consulted. Buckle the automobile belt. Make sure it tightly secures the car seat in whatever seating position is used. Check at times for tightness.

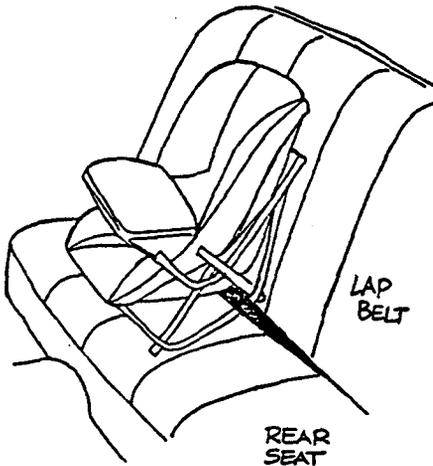


Fig. 7

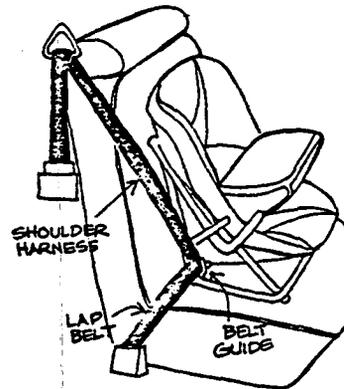


Fig. 8

4. The "Safe-T-Shield" can be adjusted to two reclining positions with the adjustment lever. On some automobile seats, readjustments to the seat are needed when changing from one reclining position to another. (Note: Because of the limited headroom in some automobiles, you may find the seat needs to be in the middle or lowest position to swing the shield completely overhead.)

5. After disengaging the release button on the arm tube and then swinging the shield overhead, position your toddler in the seat and lower the shield until you are able to lock the shield into a position as snugly to the child's chest as possible, while allowing for your toddler's comfort (Figures 9 and 10). When lowering or raising the shield, have your toddler raise his/her hands. The adjustment position which will be necessary for you to use will be determined by your toddler's size and the amount of clothing your child is wearing. Always position the shield as close to the chest as possible. Check to be certain the locking pins on both sides are locked in an equivalent adjustment position. (Note: If your toddler sits too low in relation to the shield, position a small pad on top of or stuffed under the seat cushion if the child is not over 34 inches tall.)

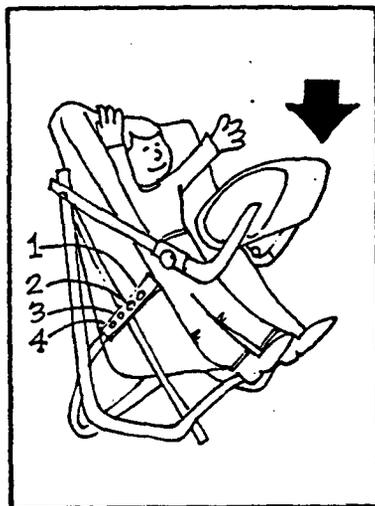


Fig. 9

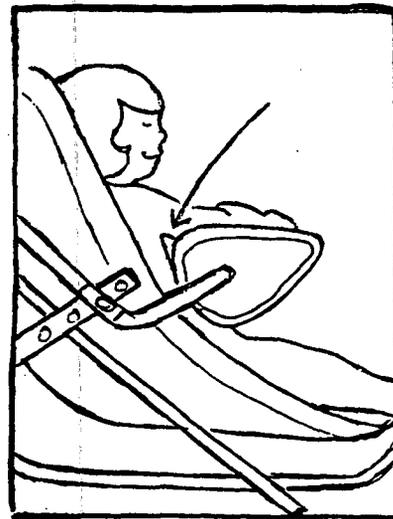


Fig. 10

### To Place Child in Right Front Seating Position

Extend the automobile seat belt until all its length is completely out of the belt retractor, insert both the lap belt and shoulder harness through the frame or the belt guides, buckle, and then adjust the shoulder harness until the child is held securely. (Note: Use only where the lap belt can be tightened securely as some automobiles have latch plates with a slotted attachment that allows the latch plate to slide along the belt as illustrated in Figure 11. This type of system does not hold the "Safe-T-Shield" securely and requires a locking clip (not provided) as illustrated in Figure 11. A locking clip may be purchased by writing to the address below:

Cosco/Peterson  
2525 State Street  
Columbus, TN 47201  
ATTN: Customer Service.

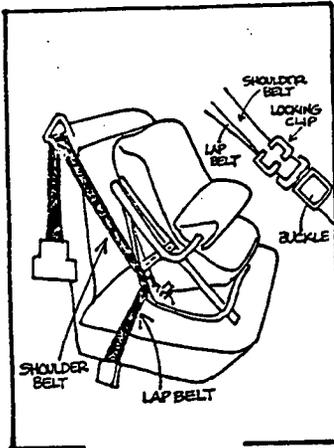
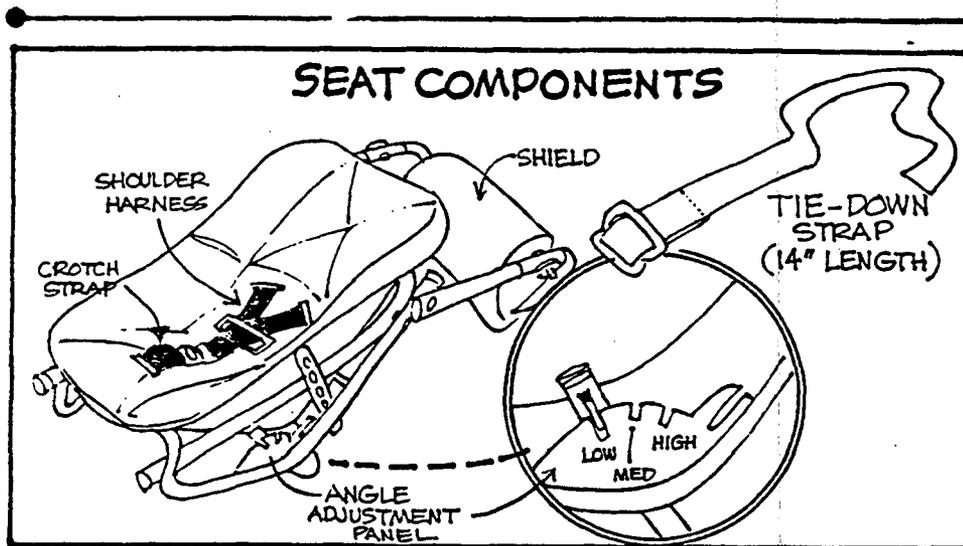


Fig. 11

Automobiles parked in direct sunlight will allow your "Safe-T-Shield" and buckles to become very hot. To avoid discomfort to your child, take the following preventive measures: (a) park automobile in shade or direction that keeps sun from shining directly on car seat; (b) cover the "Safe-T-Shield" with a light sheet or blanket; and (c) test the seat and buckle with a sensitive portion of your body before you place your child in the "Safe-T-Shield". "Safe-T-Shield" is for use in 1968 and later model passenger cars with factory installed seat belts only. The "Safe-T-Shield" should not be used with hinged back seats unless they are equipped with a locking latch or inertia latch (see your automobile instruction manual). The "Safe-T-Shield" should be used on forward facing automobile seats only. The "Safe-T-Shield" should be securely belted to the automobile even when not occupied so that in an accident, the unsecured car seat will not injure other occupants.

Failure to follow each of these instructions can result in your child striking the vehicle's interior during a sudden stop or crash.

# SAFE-T-SHIELD



A-8

Instructions for  
Cosco-Peterson  
Safe-T-Shield

Form 2:  
Reduced reading level

The "Safe-T-Shield" is for a child who weighs 40 lbs. or less and whose height is 40 inches or less.

## To Place Child in Rear Facing Position (For a Child Under 17 lbs.)

1. The "Safe-T-Shield" has the harness ready for use by an infant. The shield is not used in rear facing mode. Therefore, pull buttons out and swing shield behind car seat. Strap shield with white strap. See Figures 1, 2, and 3. Adjust "Safe-T-Shield" to lowest reclining position.

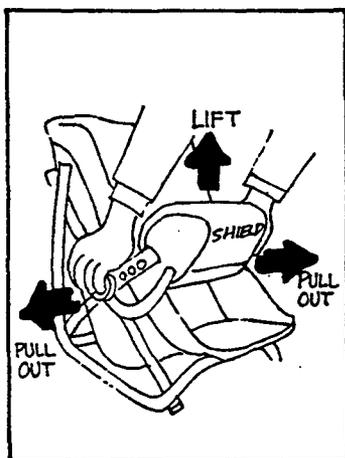


Fig. 1

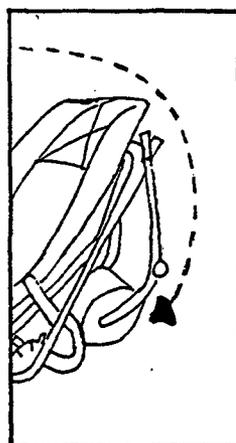


Fig. 2

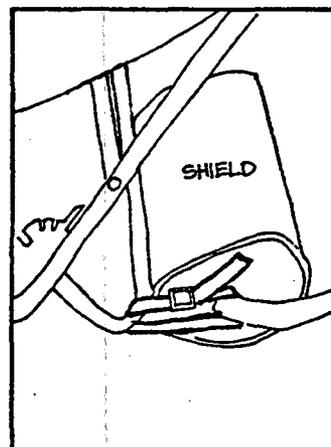


Fig. 3

2. Adjust harness straps to fit your infant. Practice this before you place "Safe-T-Shield" in auto. Undo harness retainer on one side only. Release the buckle. Place child in car seat with clothes he/she will wear while traveling.

3. Put shoulder strap over child's head. Buckle crotch strap. Adjust shoulder straps if too tight or loose. See Figure 4. The harness should be snug but comfortable to child. Attach harness retainer to shoulder strap in upper chest area. See Figure 5. The harness keeps straps from slipping off child's shoulders. Always use it. (Note: with small infant, you may put blanket beside him/her for support.)

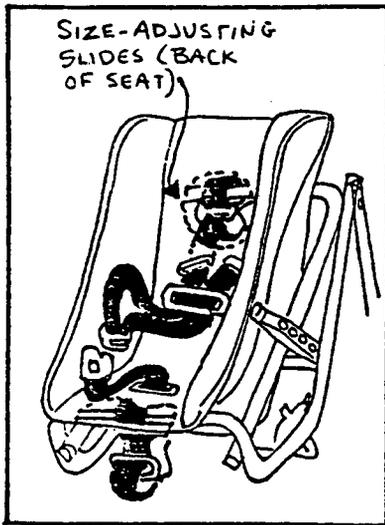


Fig. 4

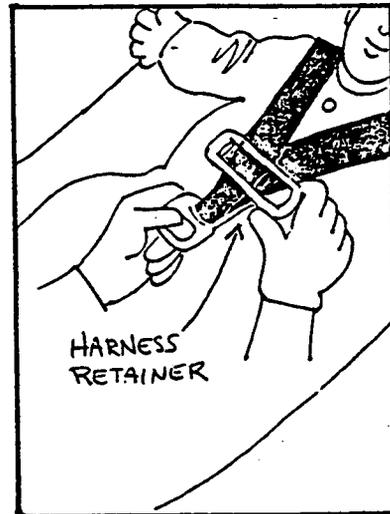


Fig. 5

4. Place car seat so infant looks toward rear of auto. Place "Safe-T-Shield" in rear of auto if possible. The center of rear seat is safest place.

5. Put auto seat belt through frame of car seat. See Figure 6. For right front auto seat, if auto lap and shoulder belts are one unit, put belts through frame. Buckle auto belt. Adjust as tightly as possible.

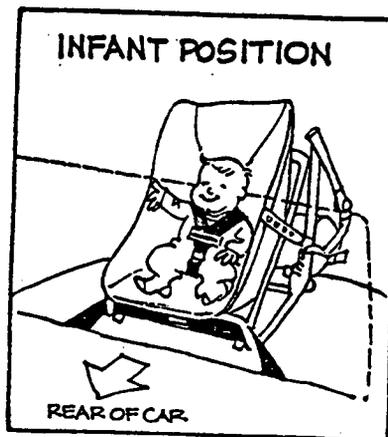


Fig. 6

**To Place Toddler in Forward Facing Position (For Children Between 17 and 40 Lbs. and Less Than 40 Inches in Height**

1. Harness straps are not used in forward facing mode. Remove and store them. If "Safe-T-Shield" has been used in infant position, swing shield to front.

2. Put "Safe-T-Shield" on auto seat so child faces front of auto. The center of the rear auto seat is the safest place. However, the next safest place is the rear right or left auto seat.

3. Put auto seat belt through frame or belt guides when used in rear seat of auto. See Figure 7. For right front seat, see Figure 8. Buckle auto belt. Make sure it firmly secures car seat. Check it for tightness.

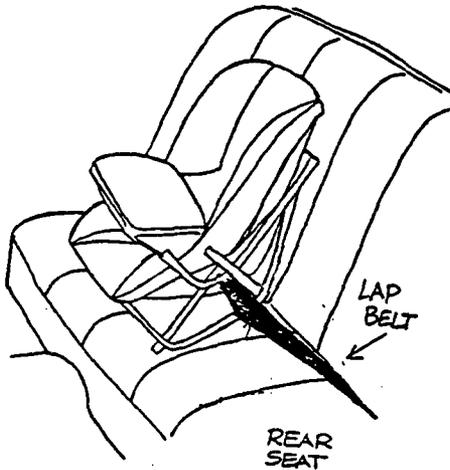


Fig. 7

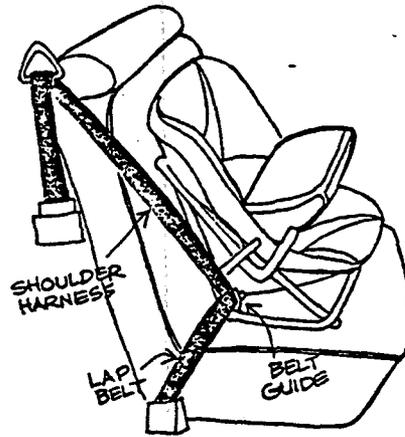


Fig. 8

4. The "Safe-T-Shield" can be put in two reclining positions. For some auto seats, you must adjust seat belt when you change the reclining position. (Note: Because of headroom in some autos, the lowest position may be needed. Then the shield can be moved overhead easily).

5. Pull buttons on side tubing. Swing shield overhead. Put child in seat. Lower shield until you can lock it in place. It should be snug to child's chest but comfortable (Figures 9 and 10). Have your child raise his/her arms when lowering shield. The child's clothing affects position of shield. Locking pins at sides should be in same place on each side. (Note: If child is too low in seat, put pad on top of or under seat cushion. The child should not be over 34 inches tall.)

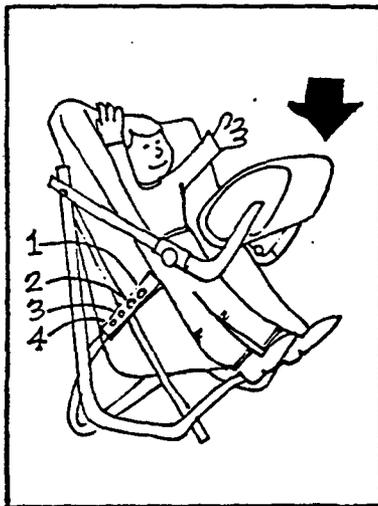


Fig. 9

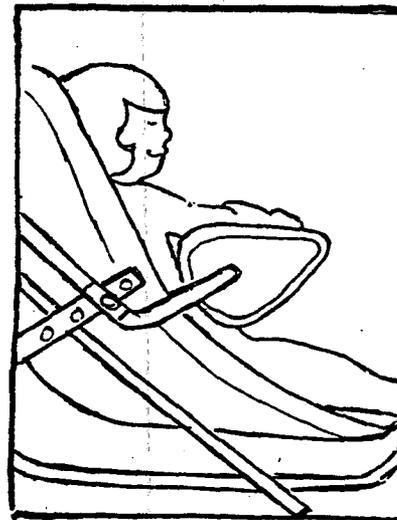


Fig. 10

### To Place Child in Right Front Seating Position

Pull auto seat belt out to full length. Put both lap belt and shoulder harness through frame or belt guides. Buckle. Then adjust shoulder harness. Child should be held securely. (Note: Use only where lap belt can be tightened securely.) Some autos allow latch plate to slide along belt. See Figure 11. This requires a locking clip (Figure 11). A locking clip may be bought by writing to the address below:

Cosco Peterson  
2525 State Street  
Columbus, TN 47201  
ATTN: Customer Service

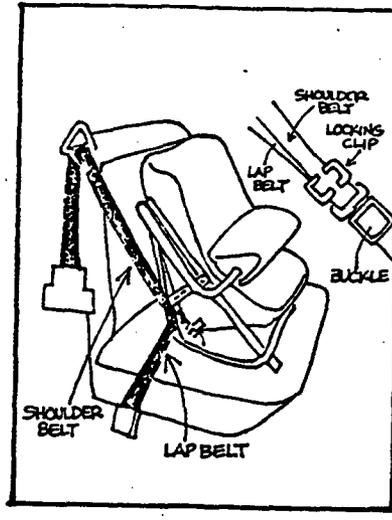


Fig. 11

Your "Safe-T-Shield" becomes hot when car is in sun. Park your car in shade or out of direct sun. Cover seat with light blanket or sheet. Check seat before putting child in "Safe-T-Shield".

This seat is only for use in 1968 and later cars with factory seat belts.

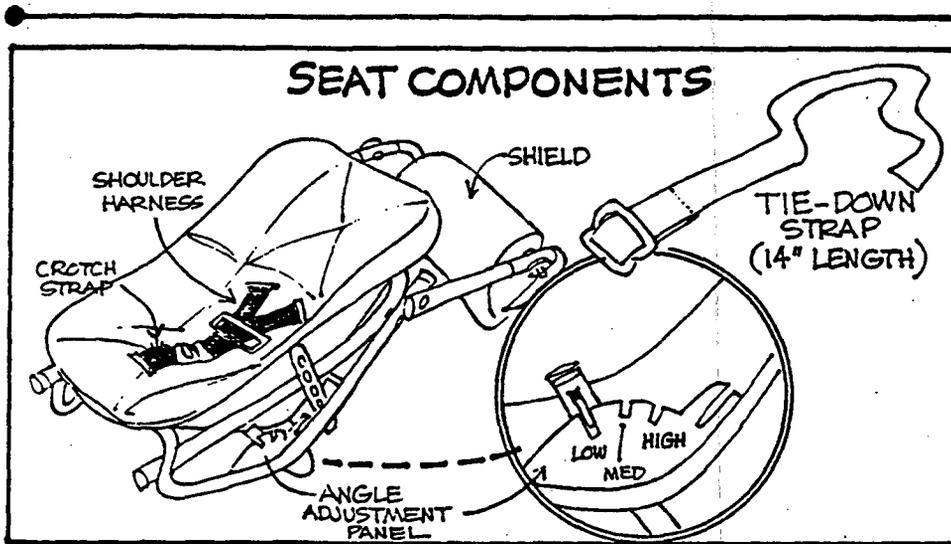
The "Safe-T-Shield" should not be used with hinged seats unless secured (check your auto book).

This seat should be used only on forward facing auto seats.

The "Safe-T-Shield" should be belt to auto when not in use. In a crash, it might hurt those in car.

Failure to follow each instruction can result in your child striking the vehicle's interior during a sudden stop or crash.

# SAFE-T-SHIELD



A-9

Instructions for  
Cosco-Peterson  
Safe-T-Shield

Form 3:  
Pictures only

To Place INFANT in Rear Facing Position (for children under 17 lbs.)

To Adjust Shield

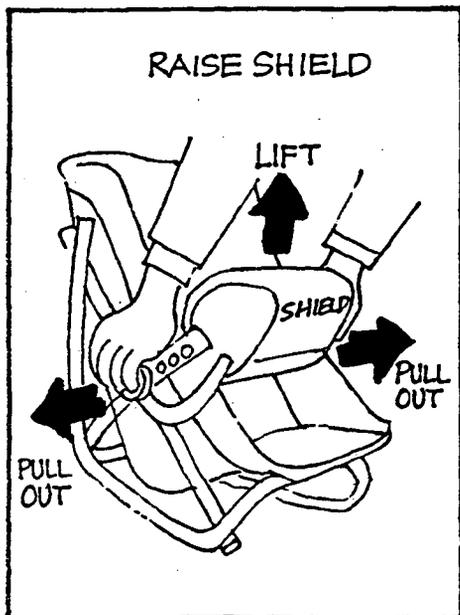


Fig. 1

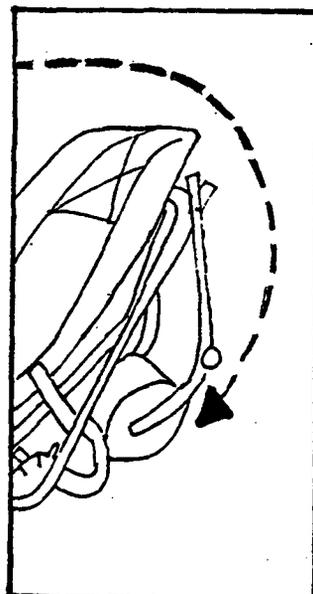


Fig. 2

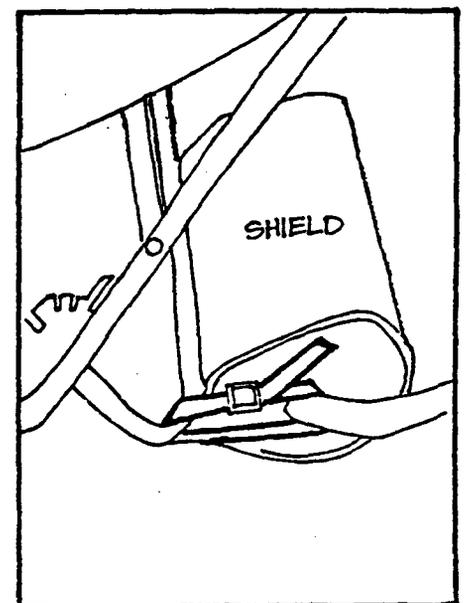


Fig. 3

To adjust Harness

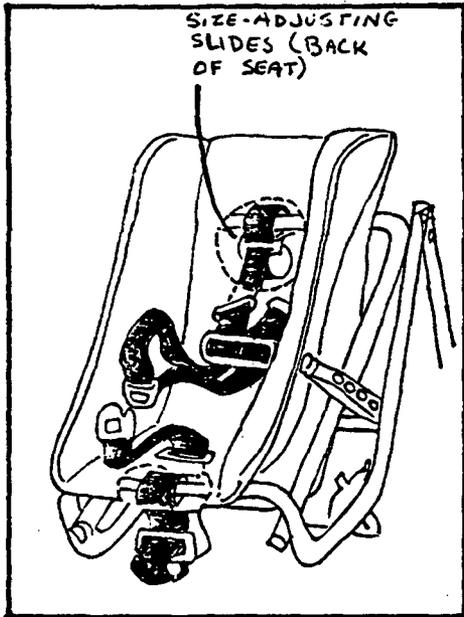


Fig. 4



Fig. 5

To Insert Auto Seat Belt

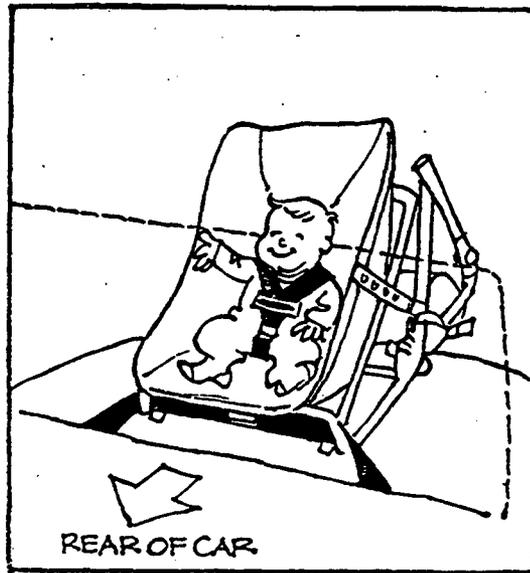


Fig. 6

To Place TODDLER in Forward Facing Position (for children between 17 and 40 lbs. and less than 40 inches in height)

To Remove Harness

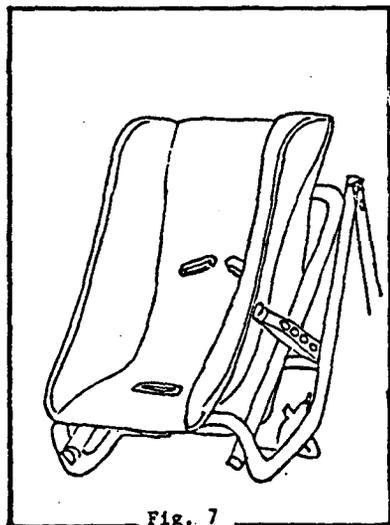


Fig. 7

To secure safety belt around car seat

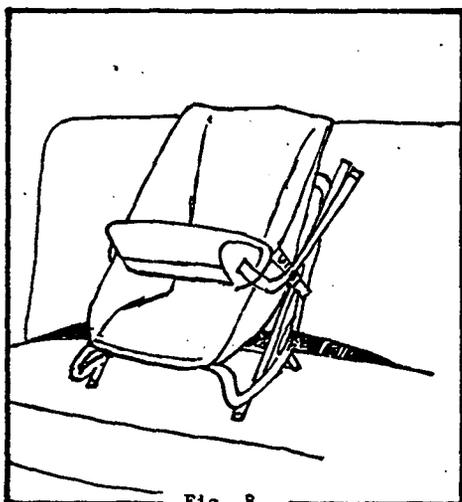


Fig. 8

To Use in Rear Seat

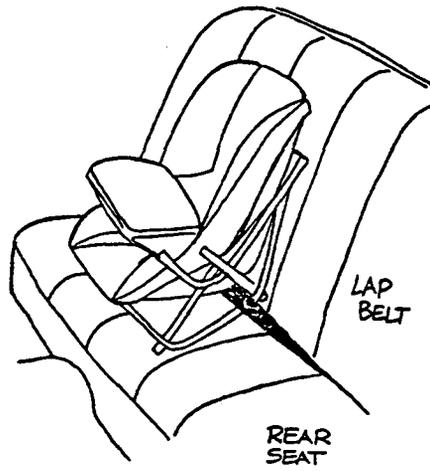


Fig. 9

To Position Shield Securely Against Toddler's Chest

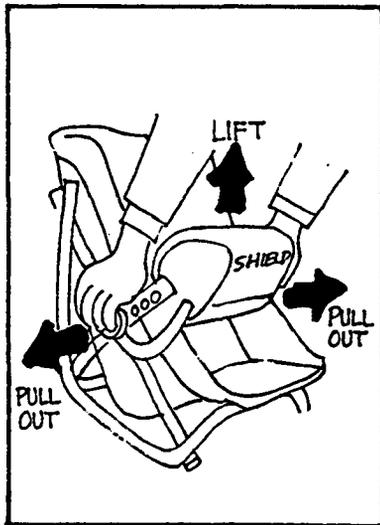


Fig. 10

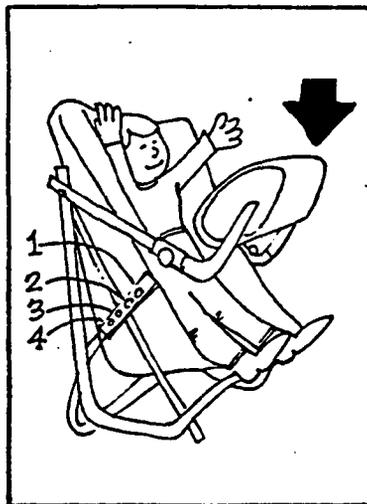


Fig. 11

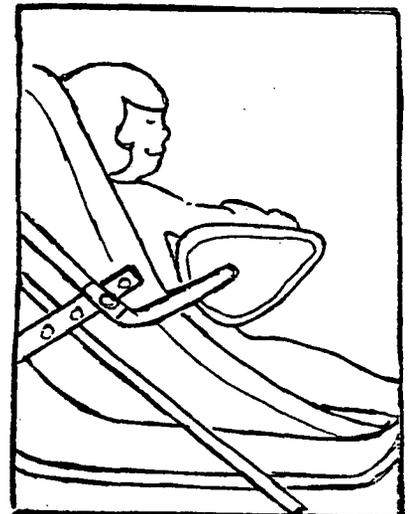


Fig. 12

To Use in Front Seat

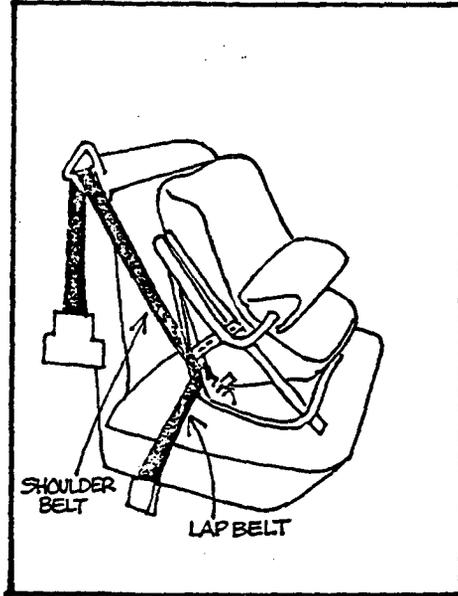


Fig. 13

To Use With Continuous Loop Belt

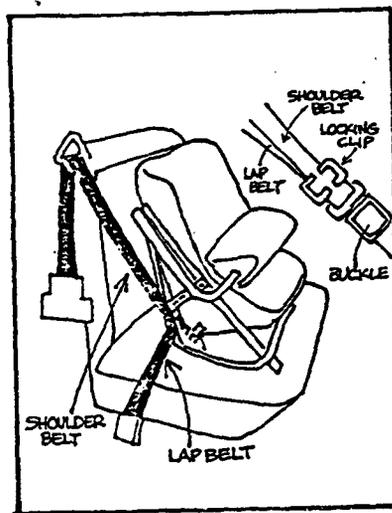
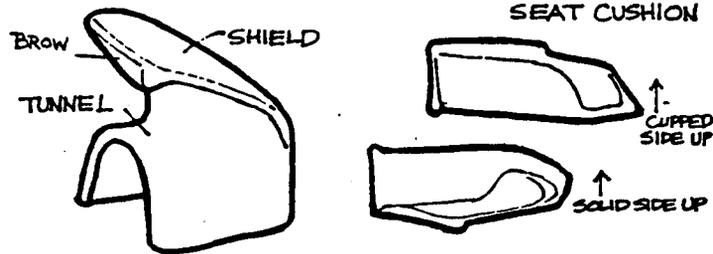


Fig. 14

# CAR SEAT and PARTS



A-10

Instructions for Ford Tot-Guard

Form 1:  
Normative reading level

"Tot Guard" is for use only by children who meet all four of the following requirements: (1) at least one year of age, (2) weight of 20 to 50 lbs., (3) a seated height of 19 to 28 inches, and (4) a standing height of 46 inches or less.

The removable seat cushion can be used in two ways or be removed to accommodate children of various seating heights: highest position (4½ inches elevation) for short child; intermediate position (3 inches elevation) for intermediate height child; or cushion removed (child on car seat cushion) for tall child (illustrated in Figure 1).

The removable seat cushion should not be used by children with seated heights between 25 and 28 inches; however, it is required for children with seated heights between 19 and 21 inches. For children with seated heights between 21 and 25 inches, if the child can see over the shield when seated on the seat, the seat cushion should not be used at all. If some elevation seems required, the intermediate side (3 inches elevation) should be tried. If the child still cannot see well enough, the seat cushion should be flipped over so that the maximum elevation of 4½ inches is provided.

The top of the child's head must not be higher than three inches above the top of the seat back or any head restraint in its highest adjustable position.

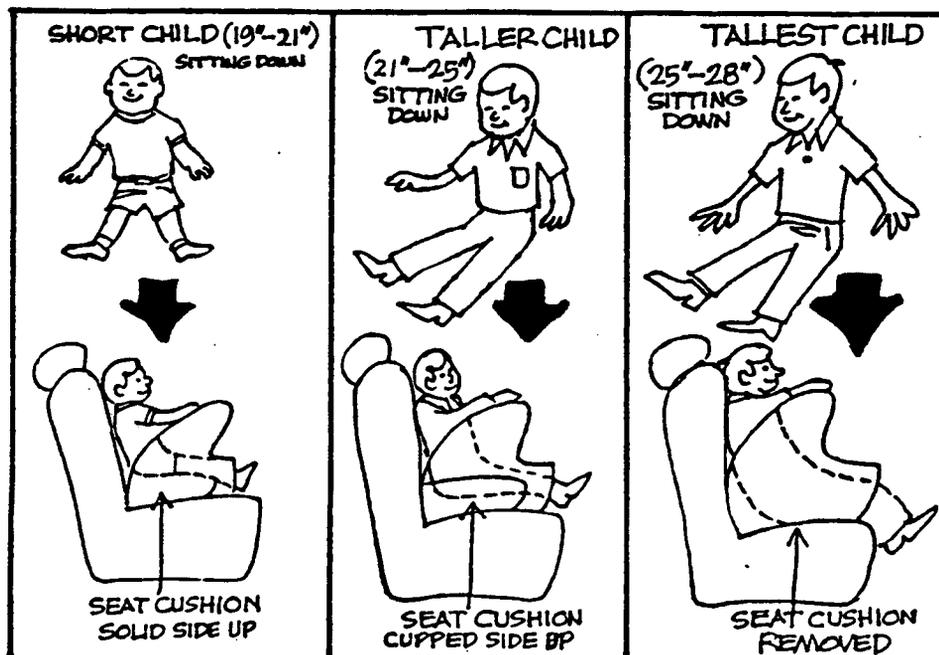


Figure 1

After arranging removable seat cushion on the automobile seat at desired location, position the child on the cushion and position the shield in front of the child. If the removable seat cushion is not required, position the child directly on the automobile seat and position shield in front of the child. All recliner automobile seat backs must be in their full upright position.

TO USE IN 1974 AND LATER MODEL PASSENGER CARS:

Right Hand Front Seat:

After extending lap belt and shoulder belt to their full length from retractors, keep the belts completely extended and pass the shoulder belt under the brow and the lap belt over the tunnel of the "Tot Guard". Then insert the belt tongue into the buckle, release the tension on the belts to allow the retractors to pull the belts in, and pull the lap belt toward the retractor to engage the lap belt tightly around the "Tot Guard" tunnel as illustrated in Figure 2. Elevate the automobile headrest behind the child if necessary.

Right and Left Hand Rear Seat:

Pull the lap belt from the retractor around the "Tot Guard" tunnel and insert into the buckle. Pull the lap belt toward the retractor to engage the lap belt tightly around the "Tot Guard" tunnel as illustrated in Figure 2.

Center Rear Seat and Center Front Seat:

Insert the lap belt tongue into the buckle and tighten the webbing around the "Tot Guard" tunnel until the shield is held firmly on the seat as illustrated in Figure 2.

TO USE IN OLDER VEHICLES WITHOUT SHOULDER BELT OR WITH A SEPARATE SHOULDER BELT:

Position the "Tot Guard" on automobile seat and secure lap belt, adjusting lap belt tightly around the tunnel.

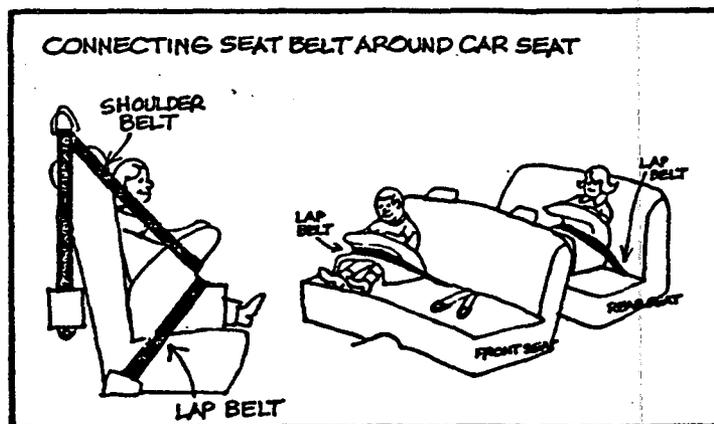


Figure 2

TO USE IN VEHICLES WITH THE CONTINUOUS LOOP SAFETY BELT SYSTEM:

The locking clip must be employed to snugly adjust the lap belt portion around the "Tot Guard" when the "Tot Guard" is positioned at the right hand front seat location.

- Step 1: After attaching the locking clip to the intersection of the shoulder and lap portions of the belts adjacent to the sliding tongue, engage the seat belt around the "Tot Guard" as shown in these instruction sheets, pulling the lap portion through the sliding tongue so that the belt fits snugly around the tunnel.
- Step 2: Grasp the webbing next to the tongue and disengage the tongue from the buckle. Without allowing any webbing to slip through the tongue, thread both pieces of webbing through the locking clip as shown in Figure 3.

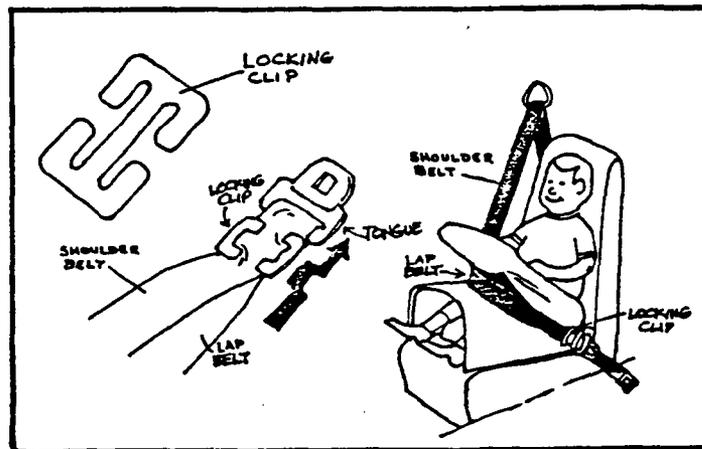


Figure 3

- Step 3: After snapping tongue into buckle, make sure the belt tension over the tunnel is as preset in Step 1. If tension is loose or too tight, readjust the locking clip so that the belt fits snugly around the "Tot Guard" tunnel.

Once the locking clip has been properly set, the seat belt system will retain the adjustment for the "Tot Guard".

When the "Tot Guard" usage is interrupted, such as an adult or another larger child using that seating location, remove the locking clip and retain and readjust per Steps 1, 2, and 3 for the next "Tot Guard" usage.

If the automobile is equipped with ignition interlock system and the "Tot Guard" is used on the right front seat, it may be necessary to disconnect the automobile seat belt every time the ignition is turned off. The belts must be completely retracted and reconnected before starting the engine.

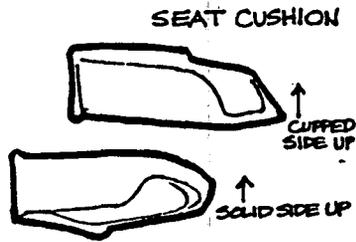
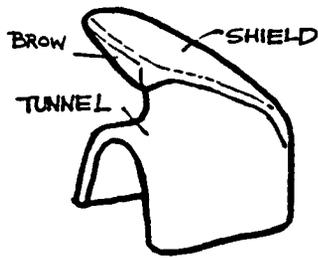
"Tot Guard" may be used only in locations indicated on the label and the pad must be in place on the shield and securely attached.

Care should be taken to center the "Tot Guard" prior to fastening the lap belt.

When not occupied, secure the "Tot Guard" with a lap belt or store in the trunk of the automobile.

Failure to follow each of the installation instructions can result in your child striking the vehicle's interior during a sudden crash.

# CAR SEAT and PARTS



A-11

Instructions for  
Ford Tot-Guard

Form 2:  
Reduced reading level

Use "Tot Guard" with a child who is at least one year old. The child should only weigh 20 to 50 lbs. The seated height of the child should be 19 to 28 inches. The standing height should be 46 inches or less.

Use the removable seat cushion in three ways. For a short child, use highest side (4½ inches high). For a medium height child, use medium side (3 inches high). For tall child, do not use the cushion. See Figure 1.

Remove seat cushion if child is between 25 and 28 inches when seated. Use the cushion when a child's seated height is between 19 and 21 inches. If the child is 21 to 25 inches when seated and can see over shield, remove cushion. If child cannot see well enough, try medium side or highest side.

The child's head must not be more than 3 inches above the top of the auto seat or headrest.

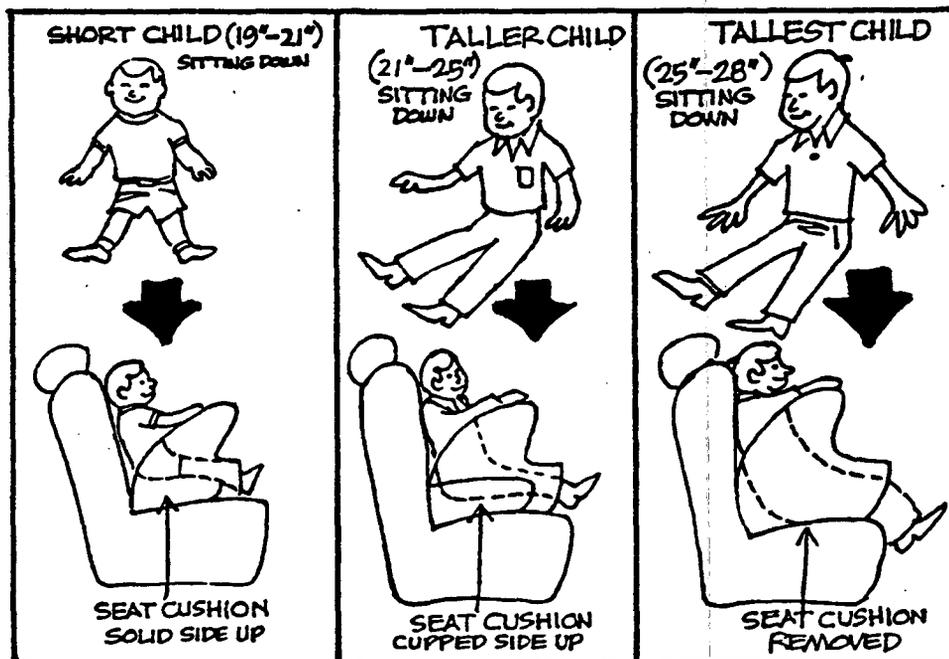


Figure 1 104

Put cushion at desired location. Put child on cushion. Put shield in front of child. If cushion is not required, put child on auto seat. Put shield in front of child. The auto seat must not be reclined.

TO USE IN 1974 AND LATER MODEL PASSENGER CARS:

Right Hand Front Seat:

Pull lap belt and shoulder belt to full length. Keep belts fully extended. Pass shoulder belt under the brow and lap belt over the tunnel of "Tot Guard". Snap belt tongue into buckle. Release the tension on belts. Allow the belts to be pulled in. Pull lap belt toward retractor so it is tight around "Tot Guard" tunnel. See Figure 2. Raise auto headrest if needed.

Right and Left Hand Rear Seat:

Pull lap belt around "Tot Guard" tunnel. Snap into buckle. Pull lap belt toward retractor so lap belt will be tight around tunnel. See Figure 2.

Center Rear Seat and Center Front Seat:

Snap the lap belt tongue into buckle. Tighten belt around tunnel until shield is held firmly. See Figure 2.

TO USE IN OLDER CARS WITHOUT SHOULDER BELT OR WITH A SEPARATE SHOULDER BELT:

Put "Tot Guard" on auto seat. Secure lap belt. Adjust lap belt tightly around tunnel.

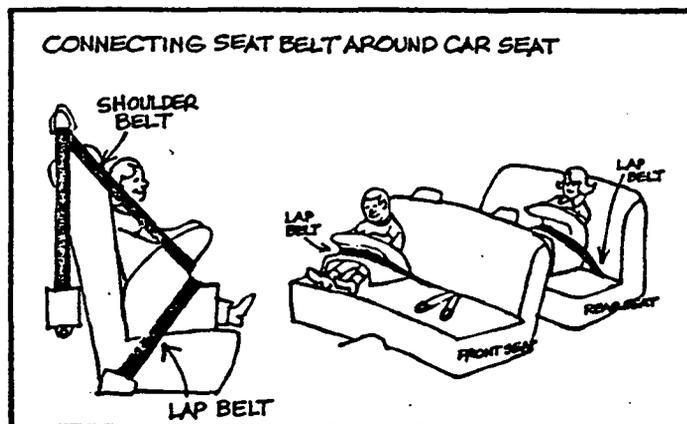


Figure 2

TO USE IN CARS WITH THE CONTINUOUS LOOP SAFETY BELT SYSTEM:

When "Tot Guard" is in right hand front seat, use locking clip to secure the safety belts around "Tot Guard".

Step 1: Attach lock clip to shoulder and lap portions of belts next to sliding tongue. Put seat belt around "Tot Guard" as shown in Figure 2 and pull lap portion through sliding tongue. Belt should fit snugly around tunnel.

Step 2: Grasp webbing next to tongue and remove tongue from buckle. Without allowing webbing to slip through tongue, thread both pieces of webbing through locking clip. See Figure 3.

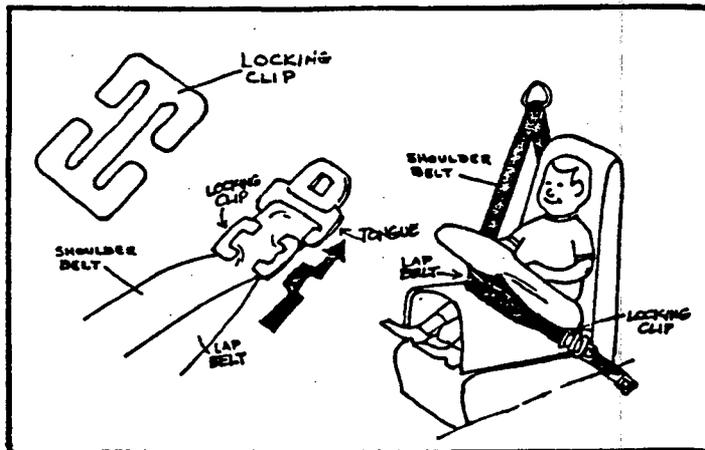


Figure 3

Step 3: Snap tongue into buckle. Make sure tension on belt is still same as in Step 1. If loose or tight, readjust clip. Belt should be snug around "Tot Guard" tunnel.

Some autos will not start unless auto seat belt is fastened. When you use "Tot Guard" on right front seat, unlatch seat belt when you stop engine. Release belt. Latch again before you start car.

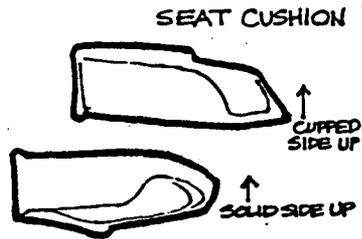
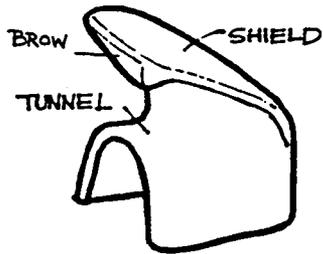
"Tot Guard" may be used only in locations shown on the label. The pad must be in place on the shield and securely attached.

Center the "Tot Guard" before fastening the lap belt.

When child is not in "Tot Guard", secure it with lap belt or store it in trunk.

Failure to follow each of the installation instructions can result in your child striking the car's interior during a sudden crash.

# CAR SEAT and PARTS

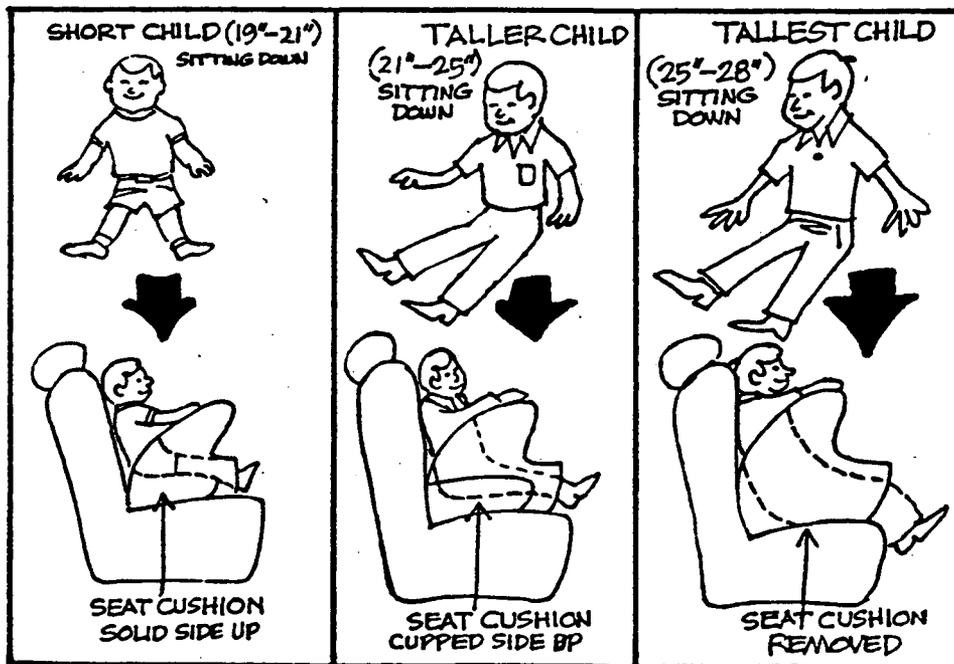


A-12

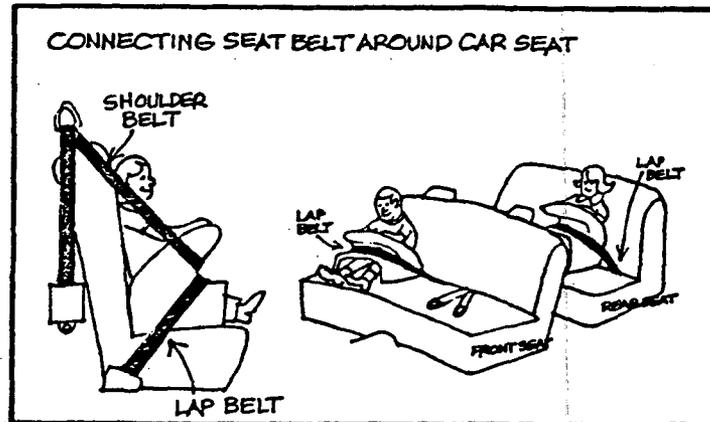
Instructions for  
Ford Tot-Guard

Form 3:  
Pictures only

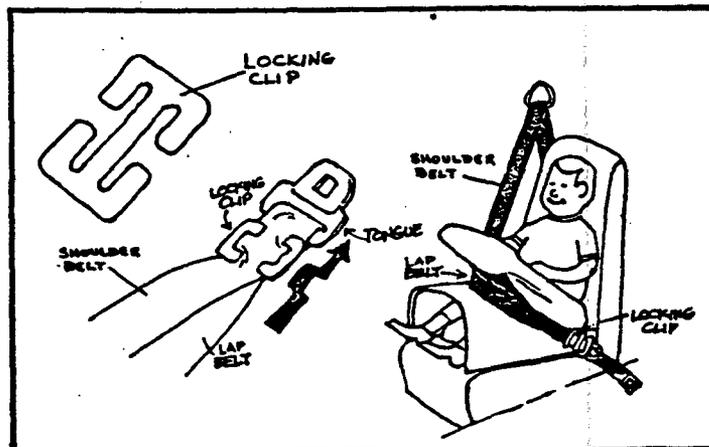
## TO POSITION CUSHION

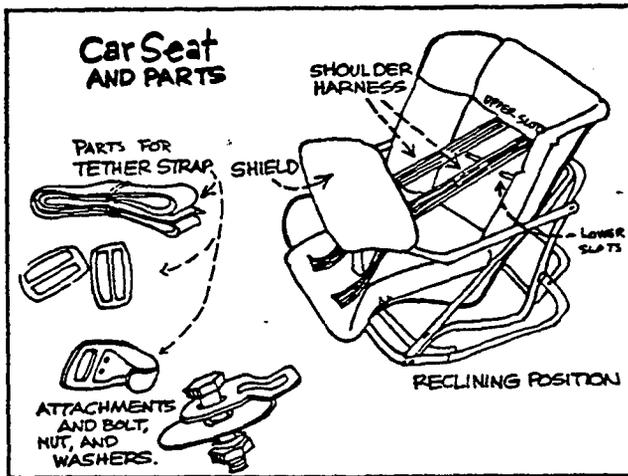


TO INSTALL "TOT GUARD" IN CAR



TO INSTALL LOCKING CLIP ON CONTINUOUS LOOP SAFETY BELTS





A-13

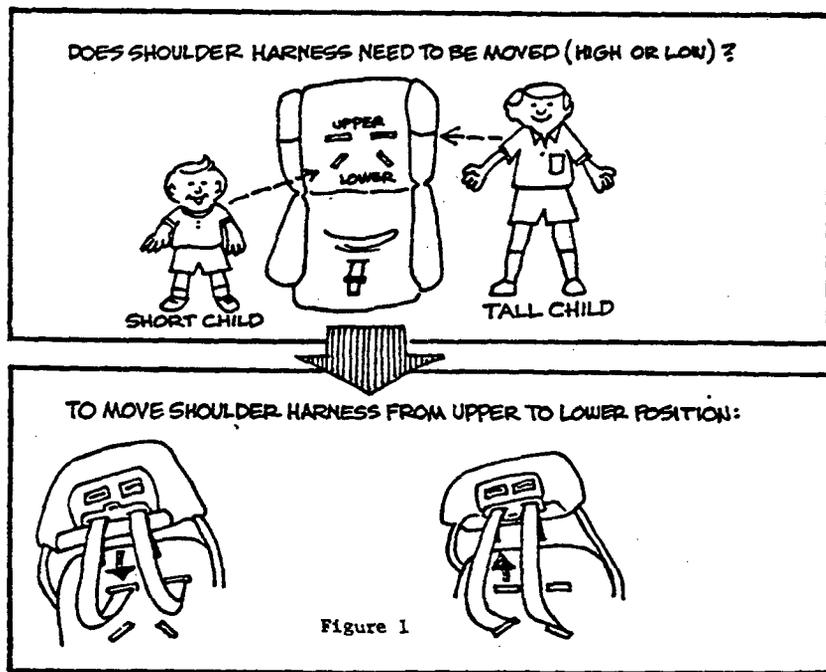
Instructions for Kantwet-Questor One-Step

Form 1:  
Normative reading level

The "One Step" is contoured to accommodate any child less than 43 inches in height and less than 43 lbs. in weight.

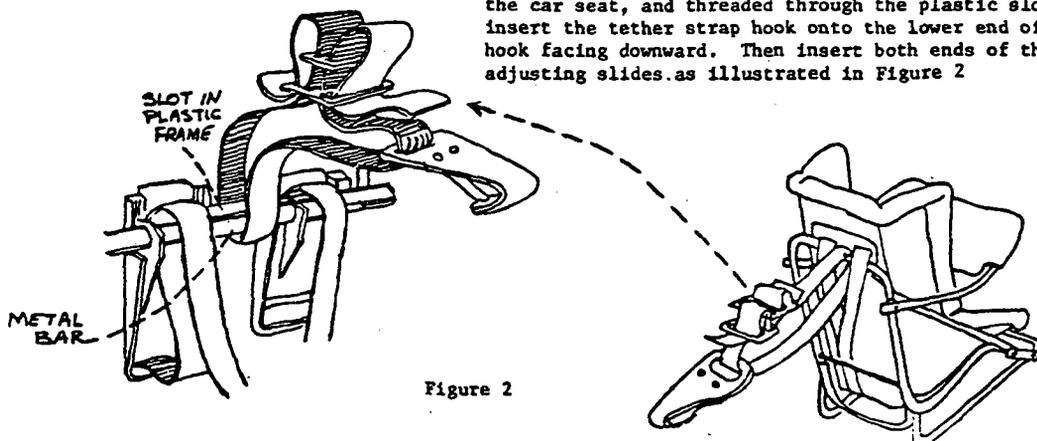
To Change Shoulder Harness In Seat Back

Remove shoulder harness from shield. Rethread harness through desired slots in back of shells as shown in Figure 1 and rethread end of shoulder harness straps to the metal plate on the shield as shown in Figure 1. Follow routing of straps exactly as shown in Figure 1 for correct function of the harness system.



To Attach Tether Strap

The tether strap should be inserted underneath the top horizontal bar on the back of the car seat, and threaded through the plastic slot in the car seat behind the car. Next insert the tether strap hook onto the lower end of the strap with the opening part of the hook facing downward. Then insert both ends of the tether strap through the two size-adjusting slides as illustrated in Figure 2



To Install Tether Bolt for Using "One Step" in Rear of Auto

Install the bolt provided by drilling a 3/8 inch hole through sturdy metal in the rear filler panel. Install the bolt and bolt plate with the bolt plate at least 8 inches from the "One Step" car seat back and installed in the center rear auto seating position when possible. (Station wagon and van owners should consult an automobile dealer for best installation location.)

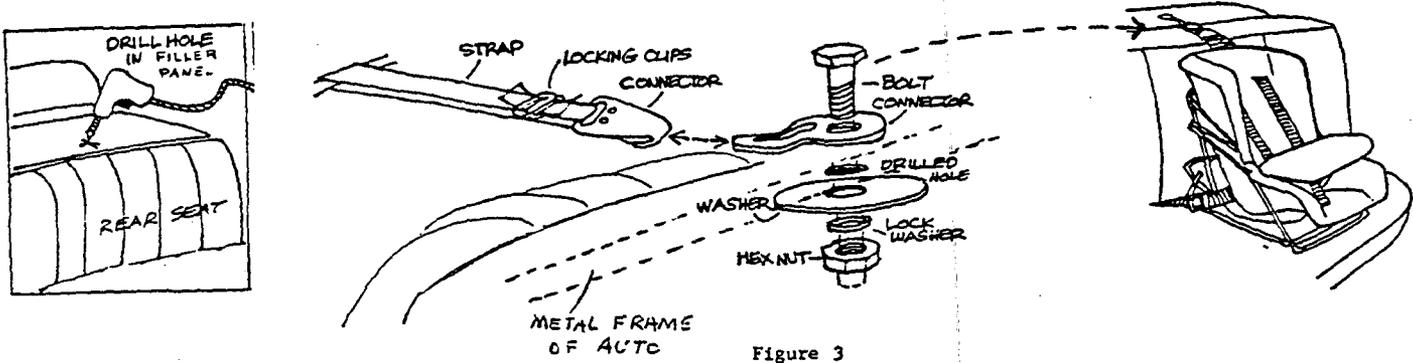


Figure 3

To Use "One Step" in the Front Seat of Auto

To Use car seat in the front seat, attach the strap hook to the rear lap belt. Be sure the strap is tight. See Figure 4.

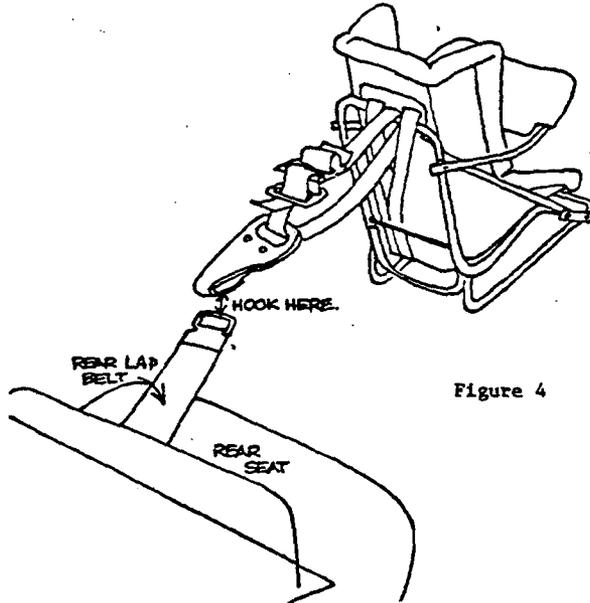


Figure 4

To Adjust Seating Angle

To adjust from an upright to a recline position, grasp with one hand the rear tubular bar as shown in Figure 5 and pull back and up while pushing down on top of the seat until it is in the fully reclined position. Never adjust seating angle with child in seat.

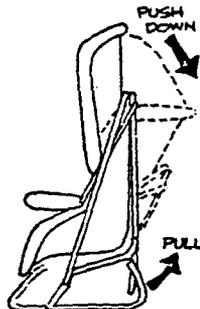


Figure 5

To adjust from recline to an upright position, grasp the top of the seat and rear tubular bar as shown in Figure 6. Pull up on the top of the seat and push down on the rear tubular bar at the same time.

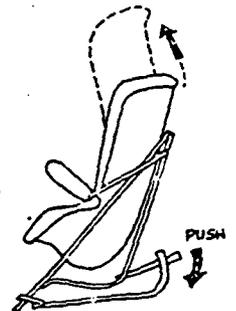


Figure 6

### To Use in Forward Facing Position

Use the "One Step" system in the forward-facing position for children weighing 17 to 43 lbs. and less than 43 inches in height.

The anchor strap must be threaded around the tubing frame as shown in Figure 7. Tighten anchor strap firmly so that the back of the "One Step" is pulled securely against auto seat back.

The "One Step" may be used in the upright or reclined position in the forward facing position. Do not adjust seating angle with child in the "One Step".

Fasten the auto belt through the tubular frame as in Figure 7 and tighten firmly so that car seat is pressed tightly against auto seat and auto seat back.

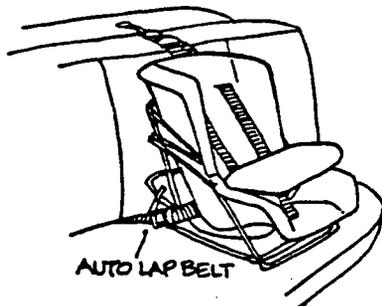


Figure 7

### Rear Facing Position

The "One Step" system's rear facing position is required for use by infants from birth to 17 lbs. and less than 26 inches in height.

If an adjustable head restraint is on the auto seat back against which the "One Step" system is placed, it must be in its lowest position.

The auto seat back against which the "One Step" system is placed should be upholstered to the full seat back height and should be free of any hard objects.

Place the "One Step" system on the auto seat, facing toward the rear, preferably in the center rear location. Thread the auto seat belt and shoulder belt if attached, as shown in Figure 8 and tighten the auto seat belt firmly.

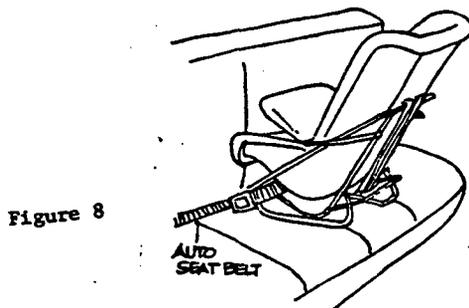


Figure 8

Do not use the "One Step" with any lap-shoulder belt system which allows the webbing to slide freely through the latch plate in both directions when the belt system is fastened unless a locking clip is used. All lap belts with wind-up devices must be fully extended or locked when used to restrain the "One Step". Excessive slack in the vehicle restraint systems could reduce the amount of protection because it would not be able to properly restrain the seat and child in an accident.

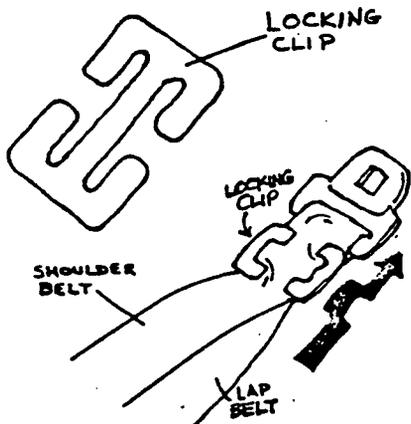
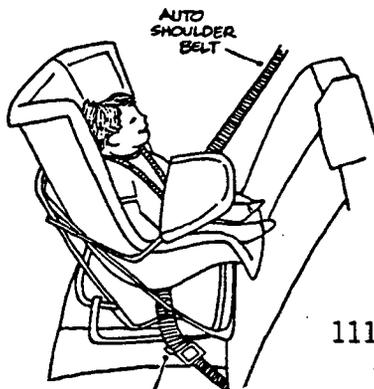


Figure 9



### To Adjust Shoulder Harness

To tighten the shoulder harness, attach the crotch strap buckle to the metal plate on the front of the shield and pull ends of the harness webbing as shown in Figure 10. Make sure both shoulder straps are tightened equally. Tighten snugly, until only two fingers can fit between strap and child.

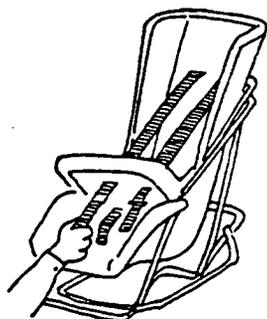


Figure 10

To loosen shoulder harness, unbuckle the crotch strap, lift the metal plate with the thumb and pull on straps as shown in Figure 11. This method is also used to unthread the harness from shield to change strap location in the seat back slots.

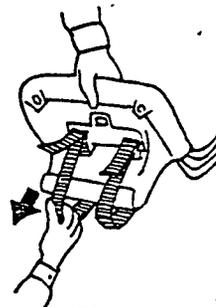


Figure 11

Place this child restraint in a rear facing position when using it with an infant.

Not recommended for use in center front seating position when the distance between the center seating position seat belt straps is less than the base of "One Step" because this car seat may interfere with quick access to all front seat belt buckles in an emergency.

For use in 1968 and later passenger cars, vans, and trucks that are equipped with lap belts and only in those seating positions which allow this car seat to be restrained by BOTH the vehicle lap belt AND the "One Step" tether strap as outlined in this instruction booklet.

Use ONLY with forward facing vehicle seats.

Not for use with hinged or folding seats or seat backs unless the seat or seat back is equipped with a latch.

The rear center seating position is the safest location in most vehicles for installing a child restraint system.

For safety and convenience, the shield is designed to automatically raise when the buckle is released.

The shield, in order to provide maximum protection, is designed to rest gently on the lap of the child.

The push button buckle release is designed to meet Federal specifications to release between 12 and 20 pounds force. This design feature allows quick removal of the child from the seat in an emergency, yet prevents the child from disengaging the buckle accidentally.

Practice adjusting the seating angle and harness of the One Step without the child in the seat to become familiar with the system.

Secure this child restraint with a vehicle belt as specified in these instructions.

Secure the top anchorage strap provided with this child restraint as specified in the instructions.

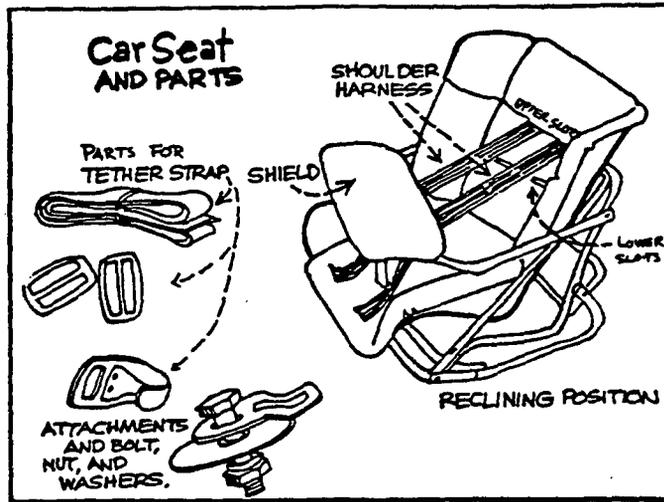
The shoulder harness and crotch strap are combined. Tightening the harness automatically adjusts the crotch strap.

The restraint system should be securely belted to the vehicle, even when not occupied, since in a crash an unsecured child restraint system may injure other occupants.

While no child restraint can guarantee protection of your child in a crash, your strict adherence to the installation and instructions will enhance the pleasure and safety of this product.

The metal hardware and upholstery of the "One Step", just as any other metal part in your vehicle, becomes hot in direct sunlight and might possibly cause flesh burn. When leaving the car seat during sunny weather, the seat should be covered with a cloth. Prior to placing the child in the car seat, remove the cloth and touch the upholstery and hardware to check their temperature before placing your child in the seat.

Failure to follow each of the installation instructions can result in your child striking the vehicle's interior during a sudden crash.



A-14

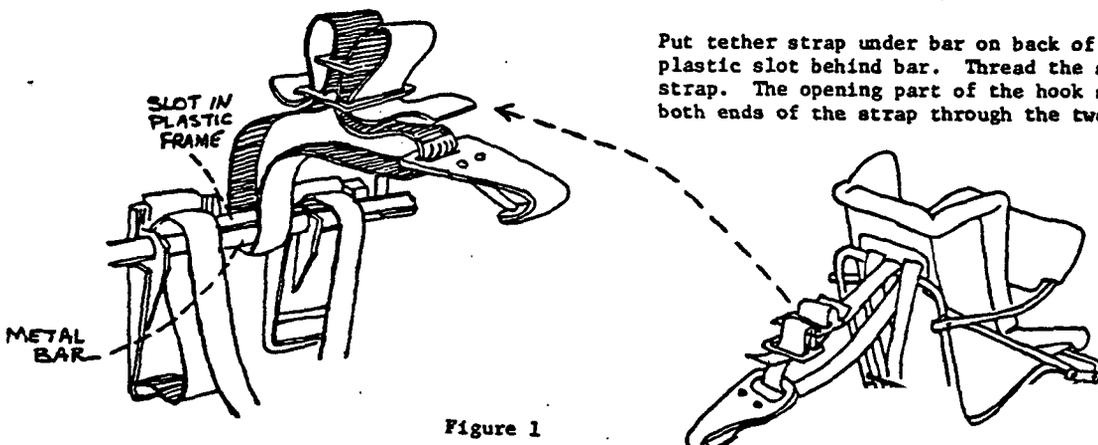
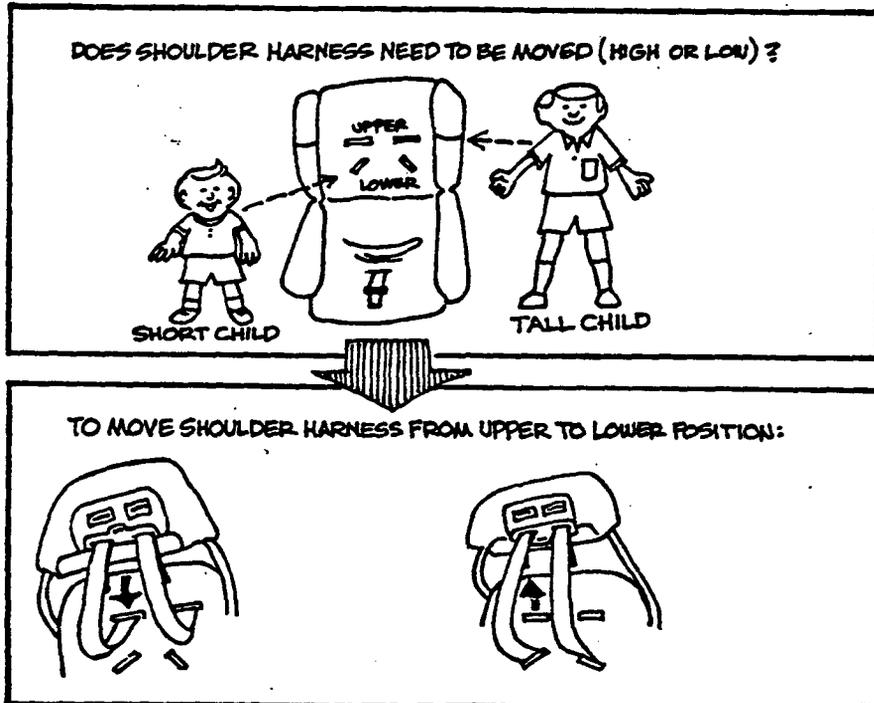
Instructions for Kantwet-Questor One-Step

Form 2:  
Reduced reading level

Use "One Step" with a child who is less than 43 inches in height and less than 43 lbs. in weight.

To Change Shoulder Harness In Seat Back

Remove shoulder harness from shield. Put harness through slots. Put end of shoulder harness strap through metal plate on shield.



Put tether strap under bar on back of car seat. Thread strap through plastic slot behind bar. Thread the strap hook on the lower end of the strap. The opening part of the hook should face downward. Then thread both ends of the strap through the two size-adjusting slides. See Figure 1

Figure 1

To Install Tether Bolt for Using "One Step" in Rear of Auto

To use car seat in the rear of you car, install bolt.

Drill a 3/8 inch hole through metal in the rear panel of car. Install the parts as shown in Figure 2. The bolt should be 8 inches from the car seat back. Bolt should be placed in the center of panel if possible. (Station wagon and van owners should ask car dealer where to place bolt.) Hook strap to bolt.

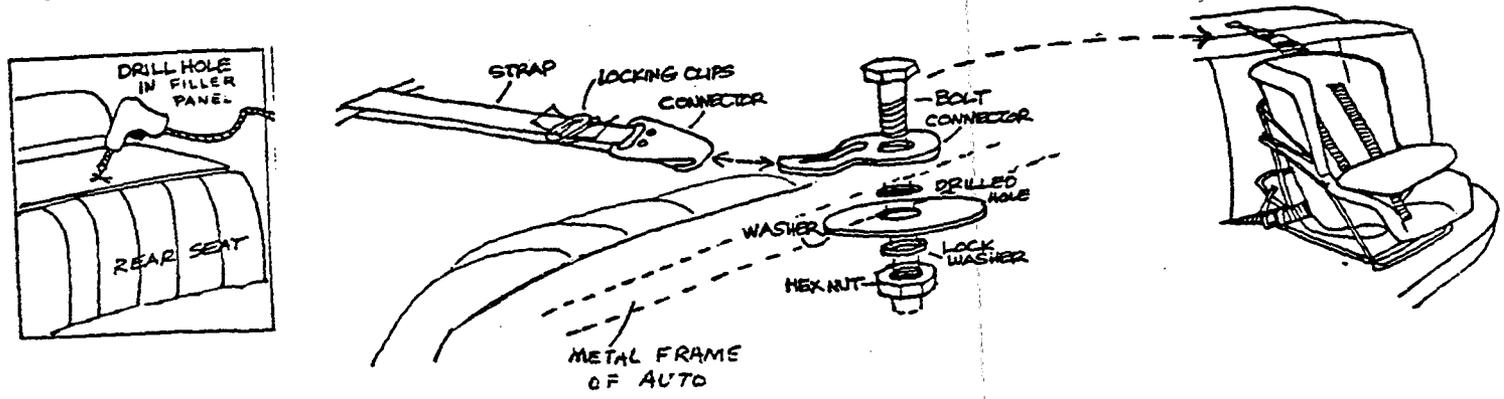


Figure 2

To Use the "One Step" in the Front Seat of Auto

To Use car seat in the front seat, attach the strap hook to the rear lap belt. Be sure the strap is tight. See Figure 3.

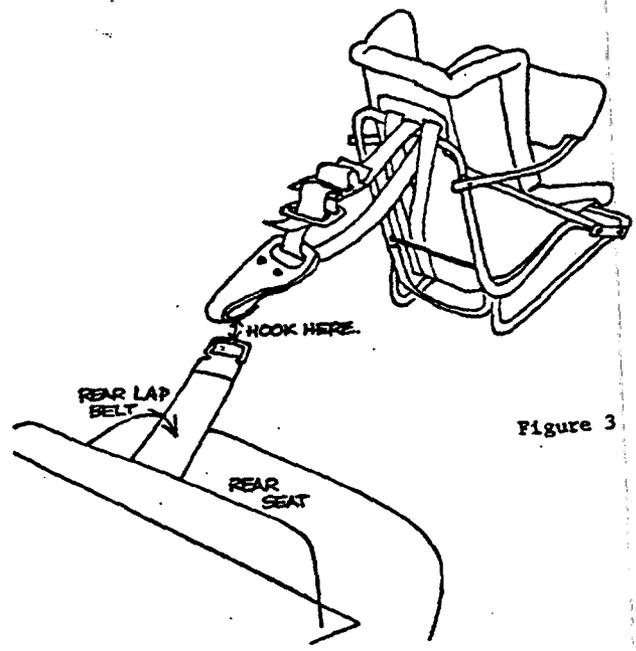
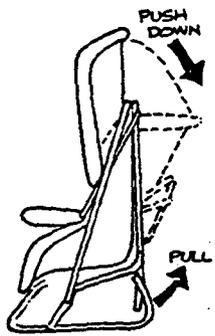


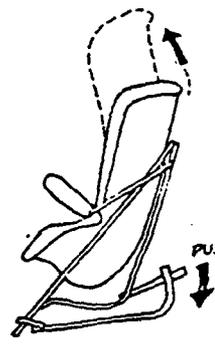
Figure 3

To Adjust Seating Angle

To move from "upright" to "recline", hold the rear bar and pull back and up. At the same time push down on the top of the seat. See Figure 1. Do not adjust seat angle with child in seat.



To move from "recline" to "upright", hold the top of the seat and pull. Push down on the rear bar at the same time.



Forward Facing Position

Use "One Step" in forward facing position with child who weighs 17 to 43 lbs. and is less than 43 inches in height.

The anchor strap must be put around frame as shown in Figure 5. Tighten anchor strap firmly. "One Step" should be pulled against auto seat.

"One Step" may be used upright or reclined in forward facing position. Don't adjust seat angle with child in "One Step".

Put auto belt through frame. See Figure 5. Tighten firmly.

Raise shield. Place child in seat. Lower shield. Attach crotch strap buckle. Adjust shoulder harness.

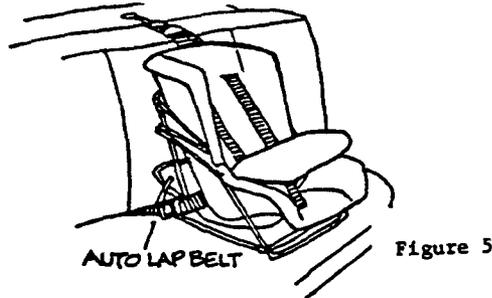


Figure 5

Rear Facing Position

Use rear facing position with infants from birth to 17 lbs. and less than 26 inches in height.

If auto has adjustable head restraint, put it in lowest position.

The auto seat back should all be upholstered. It should be free of hard objects.

Place "One Step" on auto seat. Face it toward the rear. The center rear is best. Thread auto seat belt (and shoulder belt if attached) as shown in Figure 6. Tighten auto belt firmly.

Raise the shield. Place infant in seat. Lower shield over infant's head. Attach crotch strap buckle to shield plate. Tighten shoulder harness.

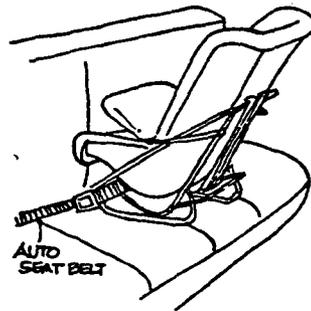


Figure 6

The anchor strap is not needed in the rear facing position

Do not use "One Step" if auto belt system allows straps to slide both ways unless you use locking clip. Lap belts with wind up should be fully extended or locked. Slack could be harmful to child in a wreck.

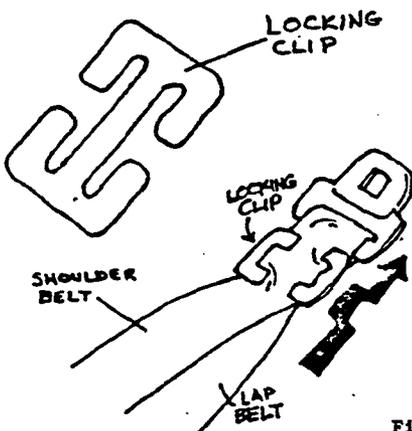
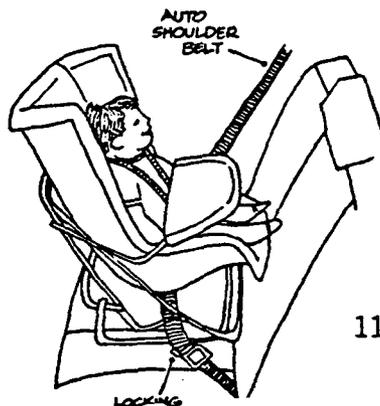


Figure 7



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### To Adjust Shoulder Harness

To tighten the shoulder harness, attach the crotch strap buckle to the metal plate on the front of the shield. Pull ends of harness straps. See Figure 8 Tighten both shoulder straps equally. Tighten snugly. You should be able to fit only two fingers between strap and child.

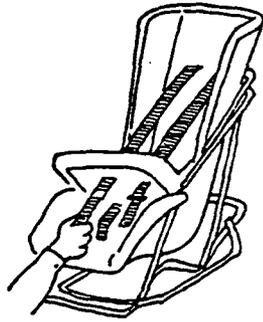


Figure 8

To loosen shoulder harness, unbuckle the crotch strap. Lift the metal plate. Pull on straps. See Figure 9 Do the same thing to undo the harness from the shield.

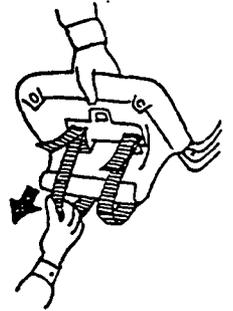


Figure 9

Use "One Step" in rear facing position with an infant.

Do not use in center front seat if base of "One Step" does not fit between the two seat belts. (You may not be able to get to the front seat belt buckles in an emergency.)

For use in 1968 and later passenger cars, vans, and trucks which have lap belts. You should use both the lap belt and tether strap with "One Step".

Use only with auto seats which face forward.

Do not use with hinged or folding auto seats unless they have a latch.

The center of the rear seat is the safest place for the "One Step".

Do not use "One Step" if auto belt system allows straps to slide both ways unless you use locking clip. Lap belts with wind up should be fully extended or locked. Slack could be harmful to child in a wreck.

Order locking clip by sending check or money order for \$2.00 to address below:

CAR SEAT LOCKING CLIP  
Questor Juvenile Furniture Company  
1801 Commerce Drive  
Piqua, Ohio 45356

6236 South St. Andrew Place  
Los Angeles, CA 90047

1404 10th Avenue  
Jasper, Al 35501

The "One Step" shield automatically raises when buckle is released.

The shield should rest gently in the child's lap.

The push button buckle release is designed to release between 12 and 20 lbs. of force. This allows you to remove the child quickly in an emergency. However, the child can't release the buckle by accident.

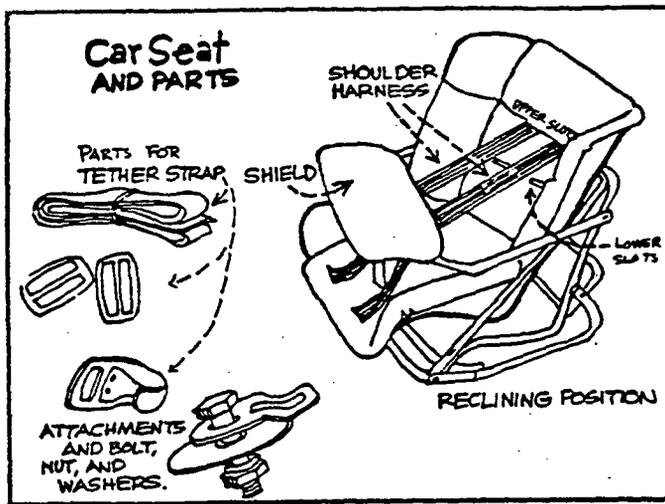
Practice adjusting the seating angle and harness without the child in the seat.

Use an auto belt with "One Step" as shown in these instructions.

Use a top anchorage strap with "One Step" as shown in Figure 6.

The shoulder harness and crotch strap are together. When you tighten the harness, you also adjust the crotch strap.

Failure to follow each of the installation instructions can result in your child striking the auto's interior during a sudden crash.

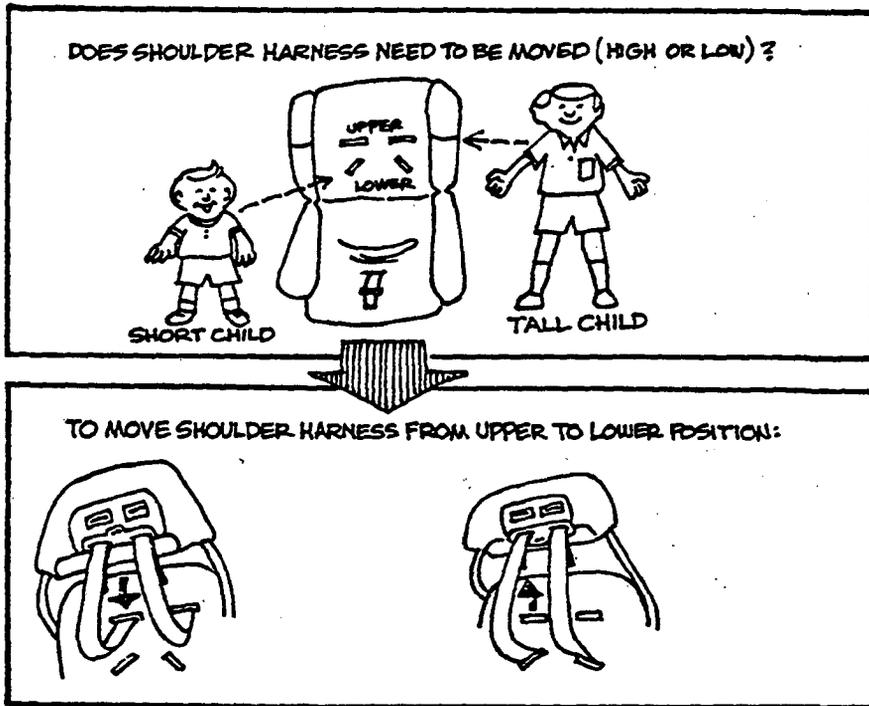


A-15

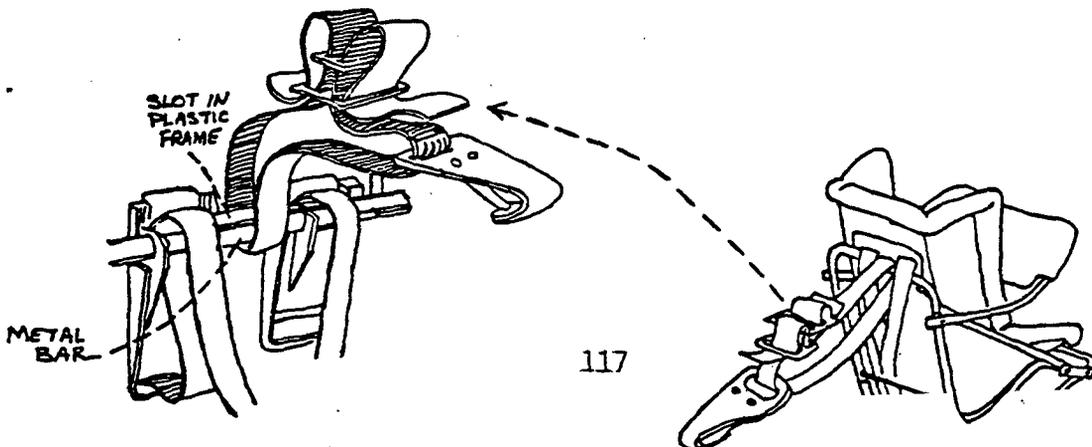
Instructions for Kantwet-Questor One-Step

Form 3:  
Pictures only

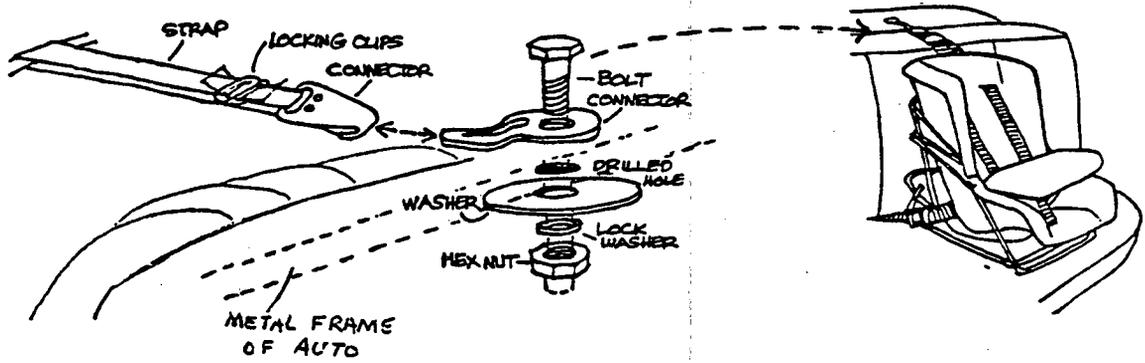
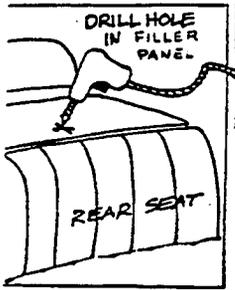
To Change Shoulder Harness In Seat Back



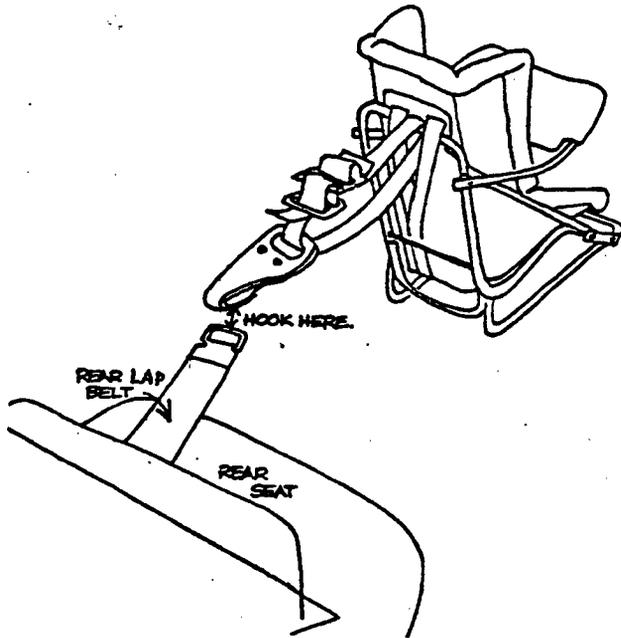
To Attach Tether Strap



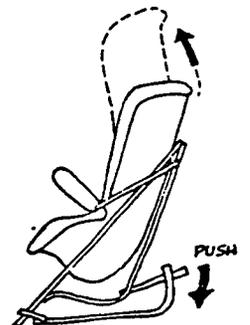
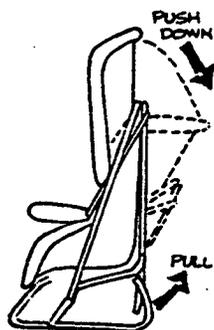
o Install Tether Bolt for Using "One Step" in Rear of Auto



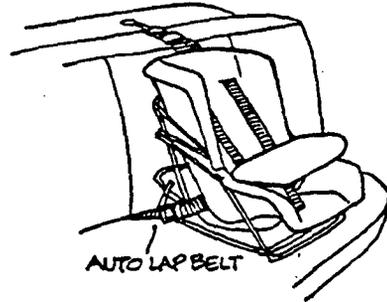
o Use the "One Step" in the Front Seat of Auto



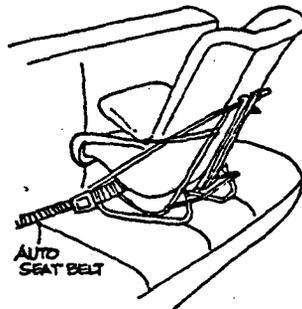
To Adjust Seating Angle



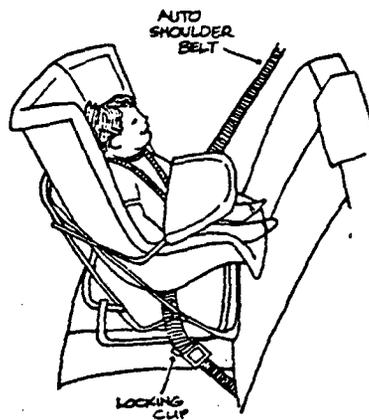
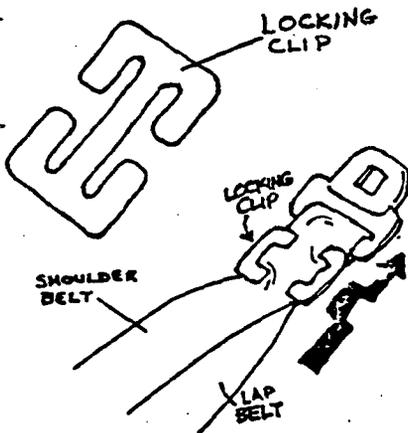
To Use in Forward Facing Position



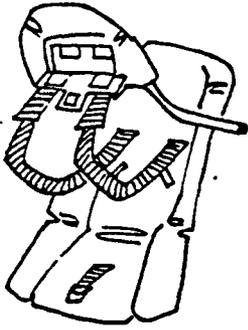
To Use in Rear Facing Position



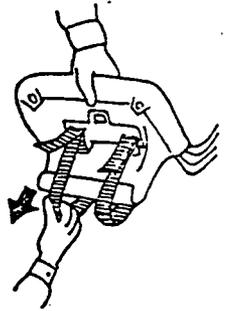
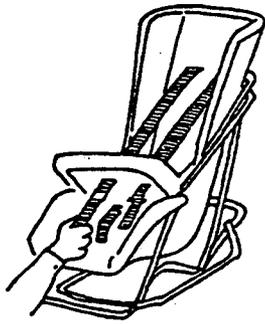
To Use "One Step" with Continuous Loop Safety Belt



To Place Child in "One Step"



To Adjust Shoulder Harness



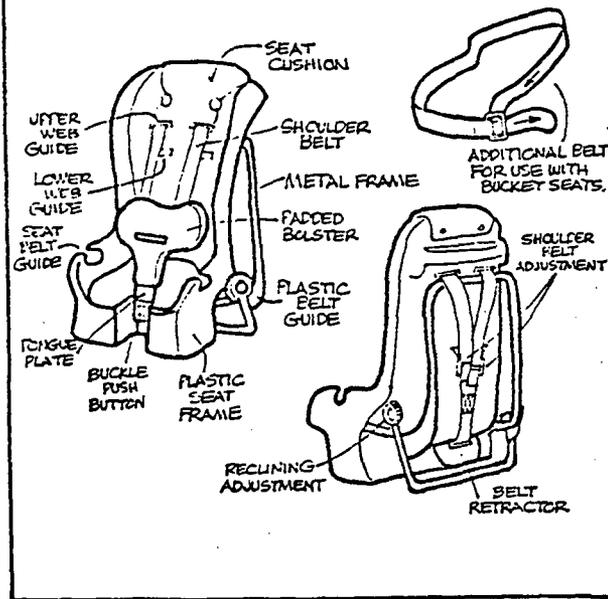
# The GUARDIAN Child Seat

COMPONENTS:

A-16

Instructions for  
Takata Guardian

Form 1:  
Normative reading level



The "Guardian" is designed for use only by children who are between 7 months and 4 years old, weigh between 20 and 36 lbs., are between 26 and 37 inches in height, and are capable of sitting upright by themselves.

**TO USE "GUARDIAN" IN REAR FACING POSITION (INFANT UNDER 12 MONTHS OF AGE)**

1. The "Guardian" should be used in a rear facing position with an infant and should be adjusted to the reclining position as illustrated in Figures 1, 2, and 3.

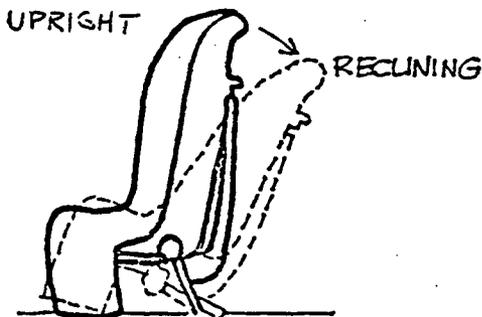


Fig. 1

UPRIGHT

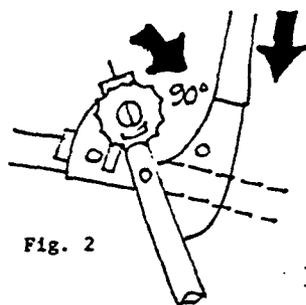


Fig. 2

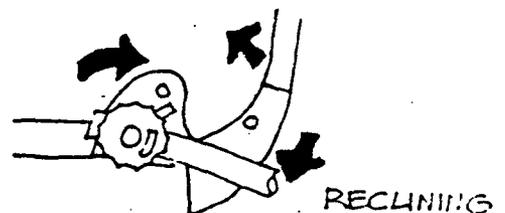


Fig. 3

RECLINING

2. The "Guardian" should be secured by an adult seat belt assembly which should be passed through the notch on both arms of the seat as illustrated in Figures 4 and 5.

3. To securely fasten the adult belt, the tongue plate of the seat belt assembly should be inserted into the buckle until you hear a "click" which indicates the "Guardian" is properly secured.

4. Adjust the adult seat belt until there is no slack and check to see that the belt is not twisted and that the buckle of the adult seat belt assembly is not touching the metal frame of the "Guardian."

The "Guardian" should be secured to bucket seats with the additional belt provided as illustrated in Figure 5.

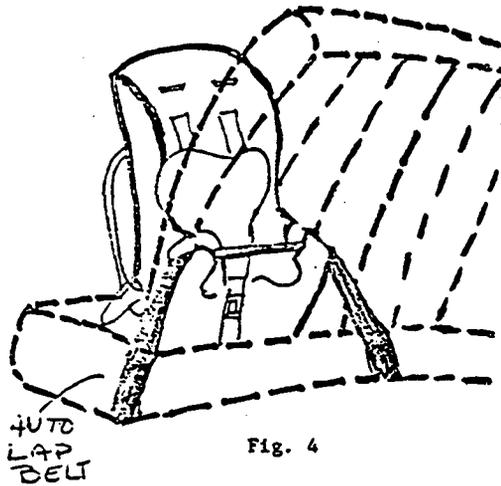


Fig. 4

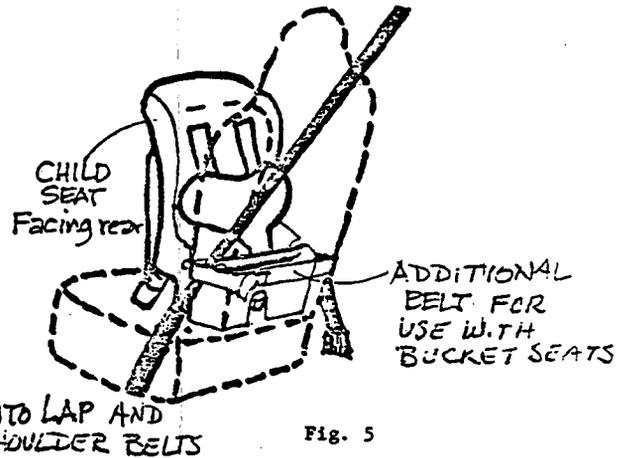


Fig. 5

**TO USE IN FORWARD FACING POSITION (FOR CHILD 12 MONTHS OF AGE OR OLDER)**

1. The "Guardian" should be secured by an adult seat belt assembly with the three-point belt system going through between the seat and the metal frame (Figure 6).

The "Guardian" may be used in either the upright or the reclining position when used in the forward facing mode, as illustrated in Figures 1, 2 and 3.

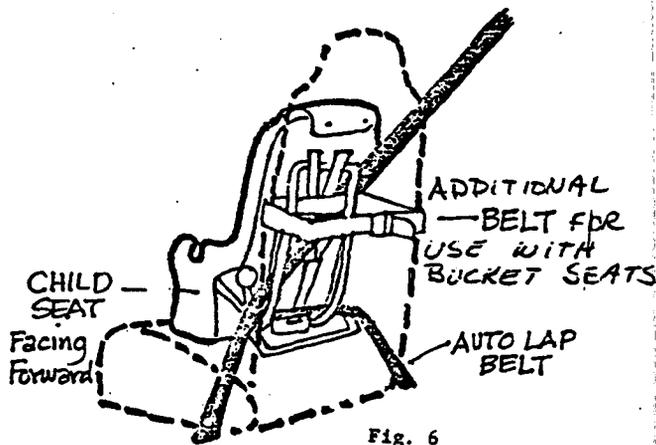


Fig. 6

The "Guardian" should not be used with only a two-point seat belt assembly (lap belt only) when it is used in a forward facing position on the front seat.

2. Insert the tongue plate of the "Guardian" into the buckle until you hear a "click," making the seat belt assembly securely buckled.

3. Adjust the adult seat belt until there is no slack and check to see that the belt is not twisted and that the buckle of the adult seat belt is not touching the metal frame of the "Guardian."

When the "Guardian" is used on the front seat, it should be secured with a three-point seat belt assembly (lap and shoulder belt combination), and an additional belt (supplied with the "Guardian") should be used to strap the "Guardian" to the seat back of bucket seats (illustrated in Figures 7, 8, and 9).

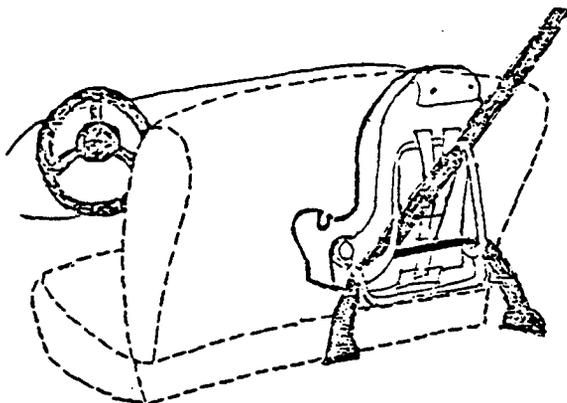


Fig. 7

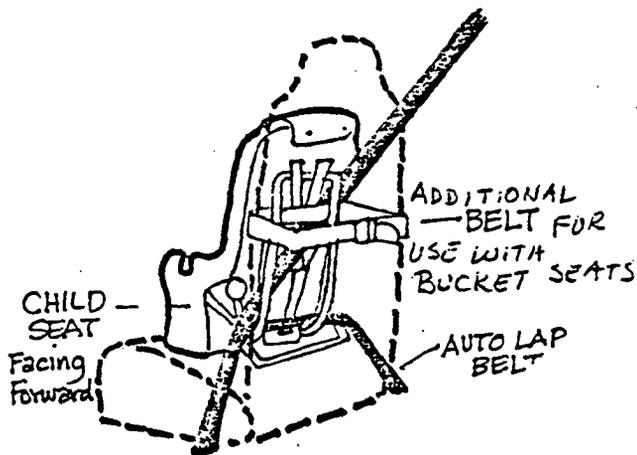


Fig. 8

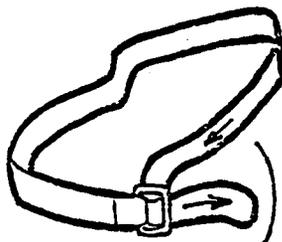


Fig. 9  
ADDITIONAL BELT  
FOR USE WITH  
BUCKET SEATS.

If the front seat is equipped with a three-point (lap and shoulder) belt with an "emergency locking retractor" and the front seat is not a bucket seat to which the "Guardian" can be strapped with the extra belt, the "Guardian" should be used in the back seat only.

Do not use the "Guardian" in the front seat if the front seat is a bench seat (not bucket seat) and is equipped with "emergency locking retractors."

Do not use "Guardian" with any lap-shoulder belt system which allows the webbing to slide freely through the latch plate in both directions when the belt system is fastened unless a locking slip is used.

## TO PLACE CHILD IN THE "GUARDIAN"

1. Push the buckle release in the front center of the "Guardian" and at the same time, lift the padded center bolster. The tongue plate of the child seat belt assembly is integrated into the center "foot" portion of the bolster. Lift and place the bolster over the top of the seat, remembering that the "Guardian" is equipped with a seat belt retractor that is sensitive to any rapid movement of the seat belt webbing. To avoid "locking" the retractor, move the bolster and the seat belt webbing slowly and if the retractor "locks", simply pause, allow the webbing to retract a little, then proceed.
2. After positioning the child in the "Guardian," elevate the bolster over the head of the child, and position the child's head between the two shoulder belts which will be arranged on the child's shoulders as illustrated in Figure 10.

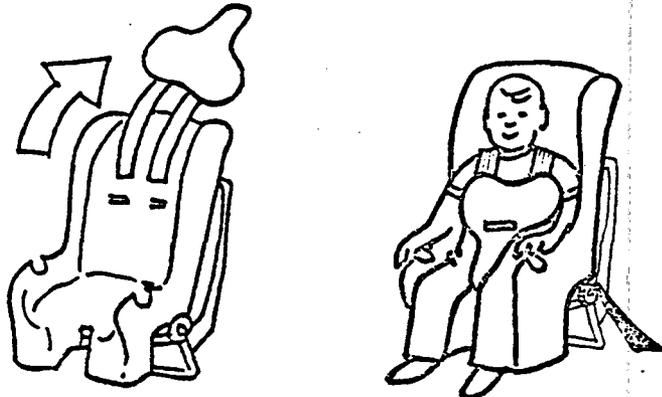


Fig. 10

3. After inserting the tongue plate on the bolster into the buckle (located at the front center of the seat), you will hear a "click" when the buckle is engaged.
4. Slightly lift the padded bolster to verify that the buckle is properly engaged and check the shoulder belts to verify that they are not twisted.
5. To allow the child to get out of the seat, press the buckle release button, and lift the padded bolster over the child's head.

Note: The two shoulder belts on the "Guardian" can be adjusted to match the size of the child by removing the harness from one set of guides and inserting and re-inserting the webbing through the webbing guide holes on the seat. The webbing length can be re-adjusted (Figures 11 and 12).

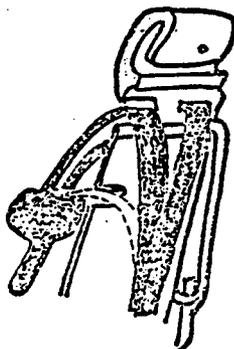


Fig. 11

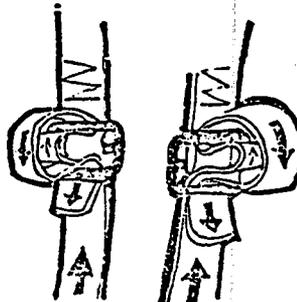


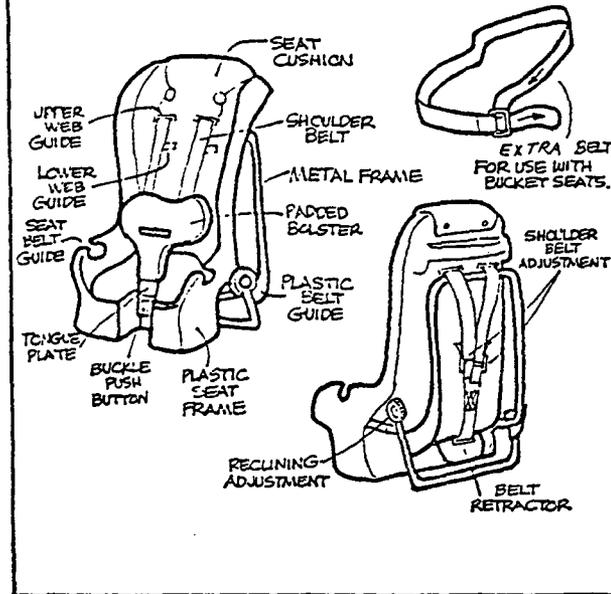
Fig. 12

# The GUARDIAN Child Seat COMPONENTS:

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Instructions for  
Takata Guardian

Form 2:  
Reduced reading level



The "Guardian" is for a child between 7 months and 4 years old. The child should weight between 20 and 36 lbs. The child should be between 26 and 37 inches in height. The child should be able to sit upright alone.

## TO USE "GUARDIAN" IN REAR FACING POSITION (INFANT UNDER 12 MONTHS OF AGE)

1. Use "Guardian" rear facing for infant. Adjust to reclining position. See Figures 1, 2, and 3.

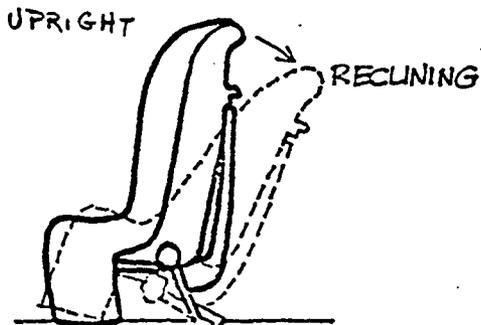


Fig. 1

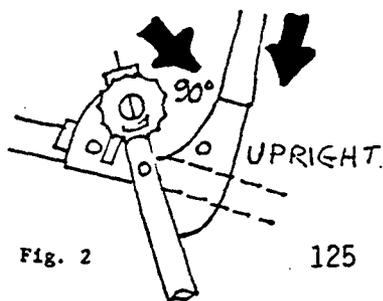


Fig. 2

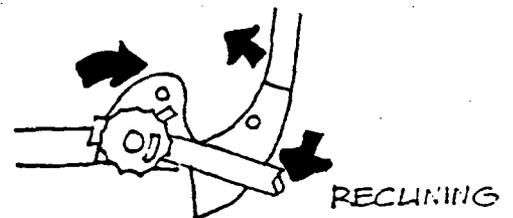


Fig. 3

2. Secure "Guardian" with adult seat belt unit. Pass seat belt unit through notch on back arms of seat. See Figures 4 and 5.

3. Put tongue plate of seat belt unit into buckle until it "clicks."

4. Adjust adult seat belt so there is no slack. Check to see belt is not twisted. Buckle of adult seat unit should not touch metal frame of "Guardian".

"Guardian" should be strapped to bucket seats with extra belt. (See Figure 5.)

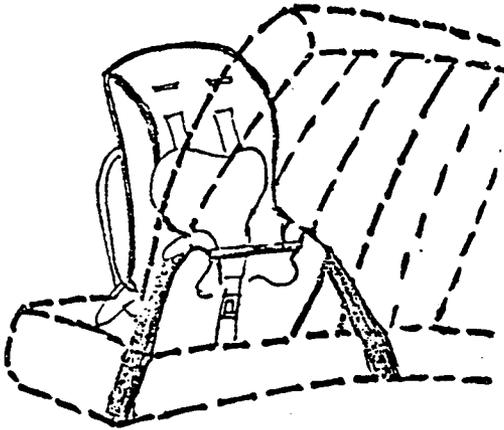


Fig. 4.

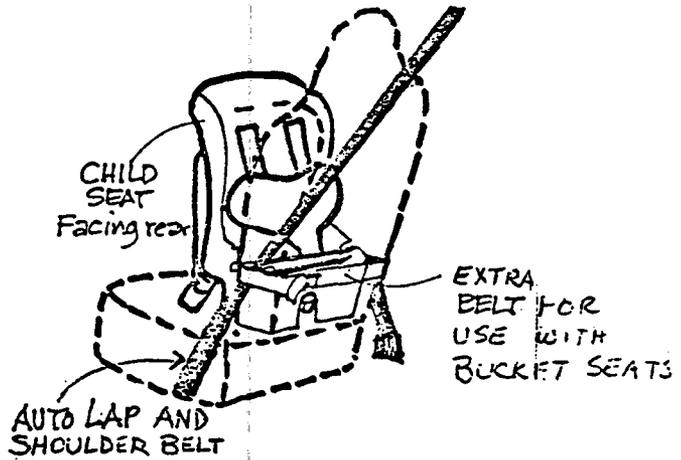


Fig. 5

TO USE IN FORWARD FACING POSITION (FOR CHILD 12 MONTHS OF AGE OR OLDER)

1. Use adult seat belt unit with three-point belt system. Secure by putting belt system between seat and metal frame. See Figure 6. Seat may be upright or reclined. See Figures 1, 2 and 3.

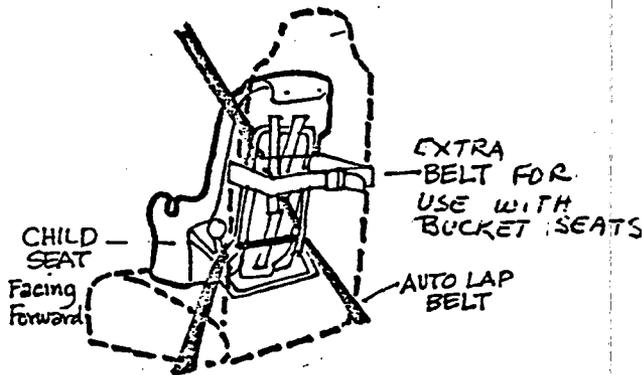


Fig. 6

For forward facing position, do not use "Guardian" with only a two-point seat belt unit on the front seat. (This means lap belt only.)

2. Put tongue plate of "Guardian" into buckle. Make sure it "clicks."

3. Adjust adult seat belt until there is no slack. Check to see that belt is not twisted. Make sure buckle of adult seat belt is not touching metal frame of "Guardian."

For using "Guardian" on front seat, secure with a three-point seat belt unit. This includes lap and shoulder belt combination. An extra belt is supplied with "Guardian" and is used to strap "Guardian" to the seat back of bucket seats. See Figures 7, 8, and 9.

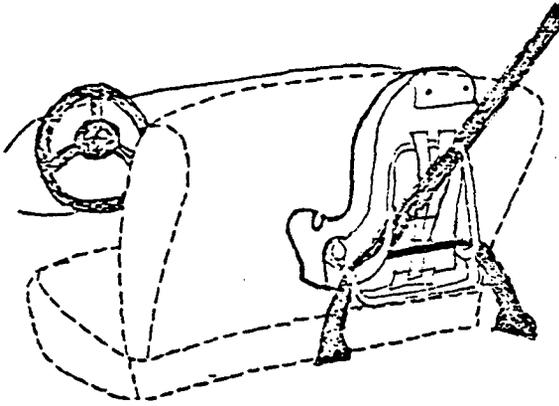


Fig. 7

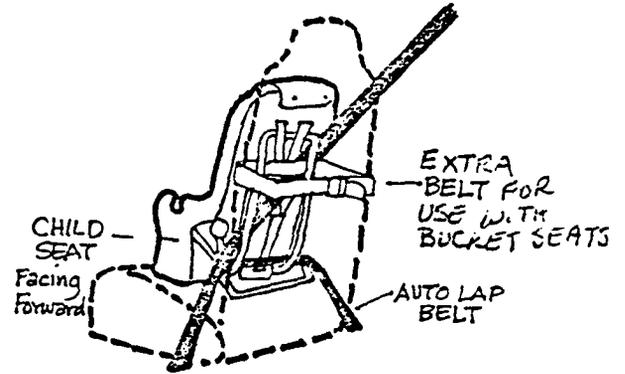


Fig. 8

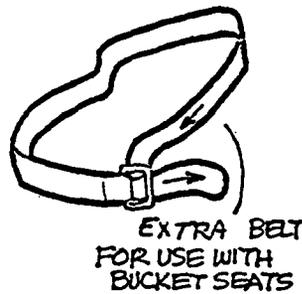


Fig. 9

If front seat has three-point belt with an "emergency locking retractor" and is not a bucket seat to which "Guardian" can be strapped with extra belt, use "Guardian" in back seat only. Do not use "Guardian" in front bench seat (not bucket seat) with "emergency locking retractors."

Do not use car seat if auto belt system allows straps to slide both ways unless you use a locking clip.

TO PLACE CHILD IN THE "GUARDIAN"

1. Push buckle release in front center of "Guardian".
2. At same time, lift padded center bolster.
3. Lift bolster over top of seat. Move it slowly to prevent "locking".
4. Put child in "Guardian".
5. Lift bolster over child's head. Put child's head between two shoulder belts. The belts should lie on child's shoulders as shown in Figure 10.

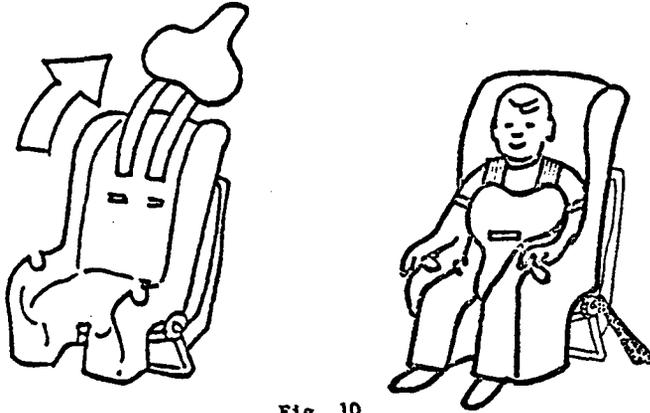


Fig. 10

6. Put tongue plate into buckle until you hear a "click".
7. Lift bolster a little to make sure buckle is in place.
8. Make sure shoulder belts are not twisted.
9. To allow child to get out of the seat, press buckle release button and lift bolster over child's head.

Note: Adjust shoulder belt for size of child. Remove strap and put it in other guides. See Figure 11. The straps can be adjusted, too. See Figure 12.

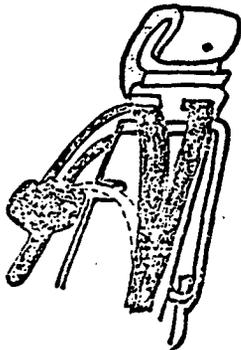


Fig. 11

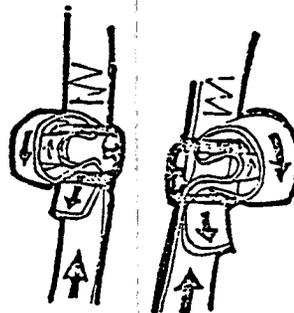


Fig. 12

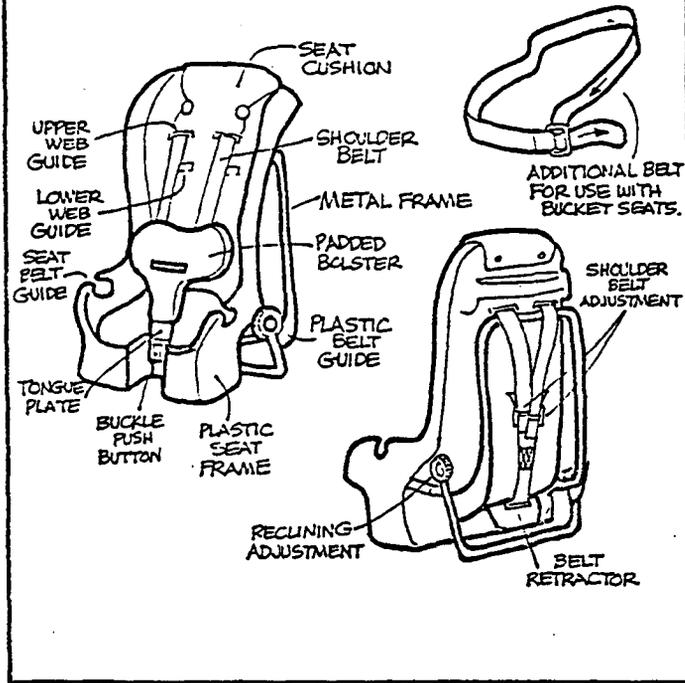
# The GUARDIAN Child Seat

COMPONENTS:

A-18

Instructions for  
Takata Guardian

Form 3:  
Pictures only



TO ADJUST INTO RECLINING POSITION

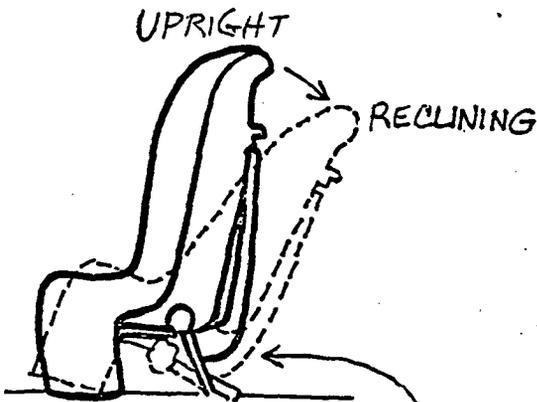


Fig. 1

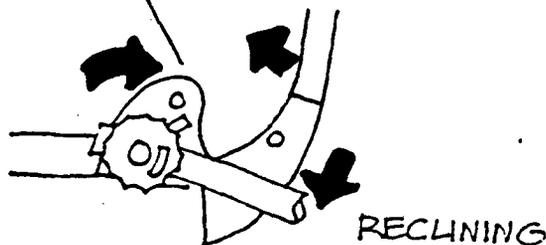


Fig. 2

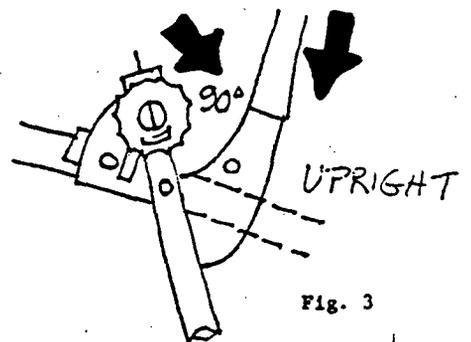


Fig. 3

USE "GUARDIAN" IN REAR FACING POSITION (INFANT UNDER 12 MONTHS OF AGE)

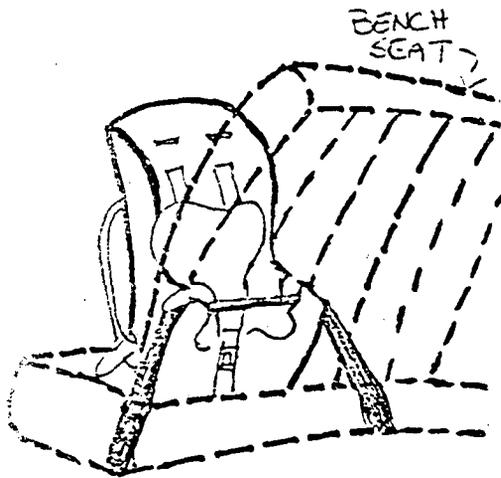


Fig. 4

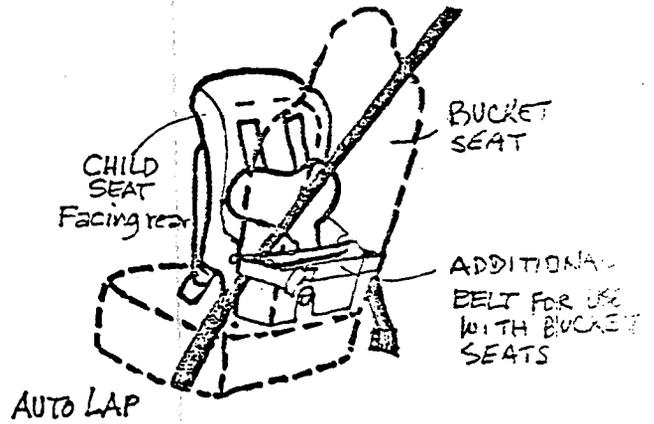


Fig. 5

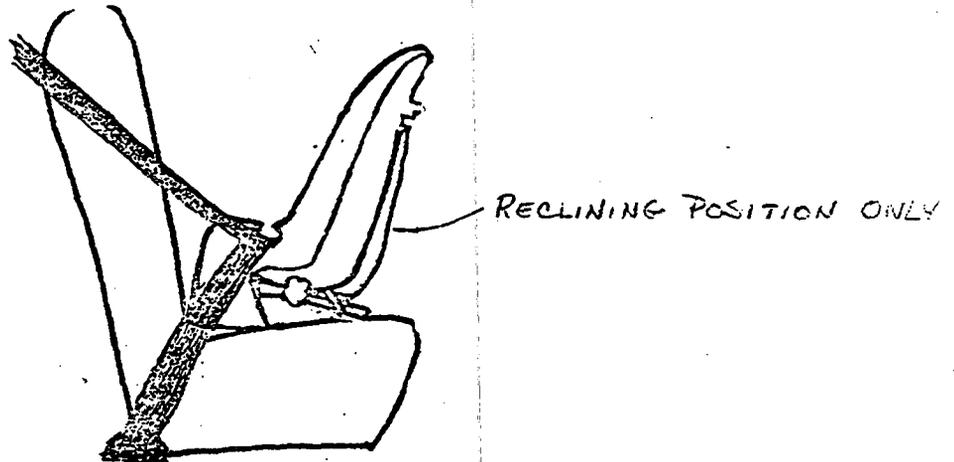


Fig. 6

USE IN FORWARD FACING POSITION (FOR CHILD 12 MONTHS OF AGE OR OLDER)

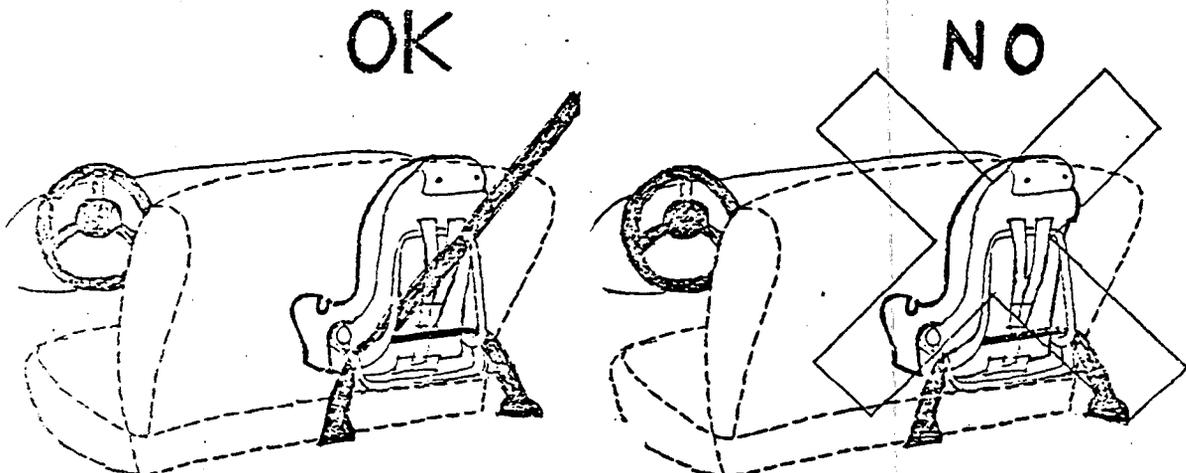


Fig. 7

TO USE WITH BUCKET SEATS

OK

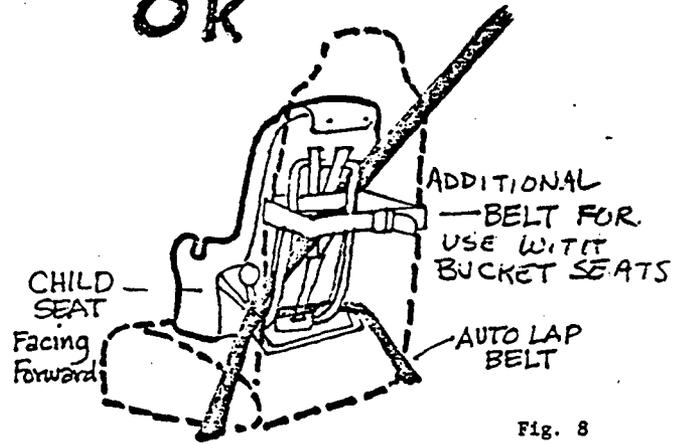
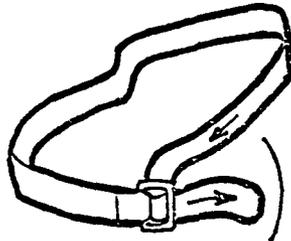


Fig. 8



ADDITIONAL BELT FOR USE WITH BUCKET SEATS.

Fig. 9

TO SELECT UPRIGHT OR RECLINING POSITION.

OK

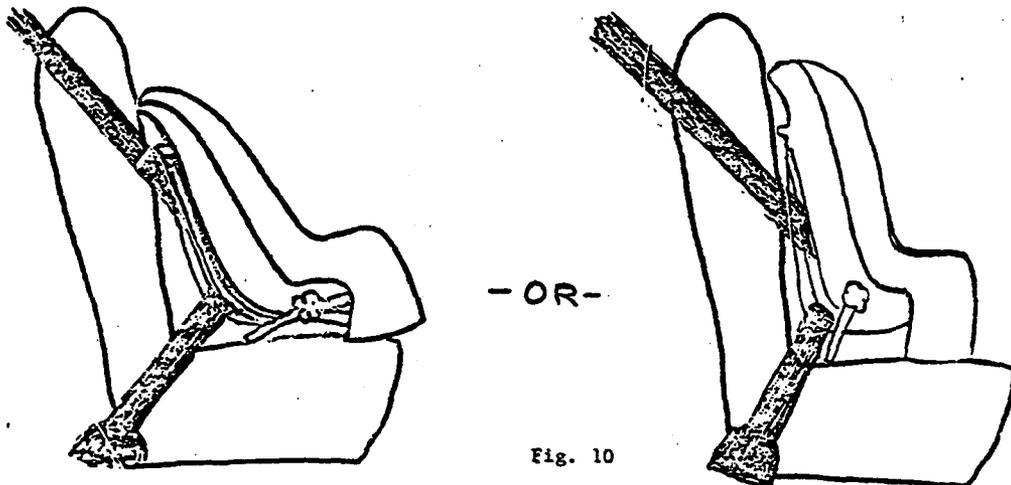


Fig. 10

USE WITH CONTINUOUS LOOP SEAT BELTS

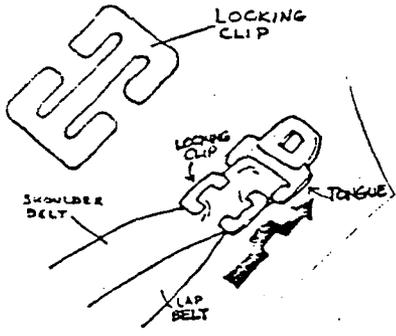


Fig. 11

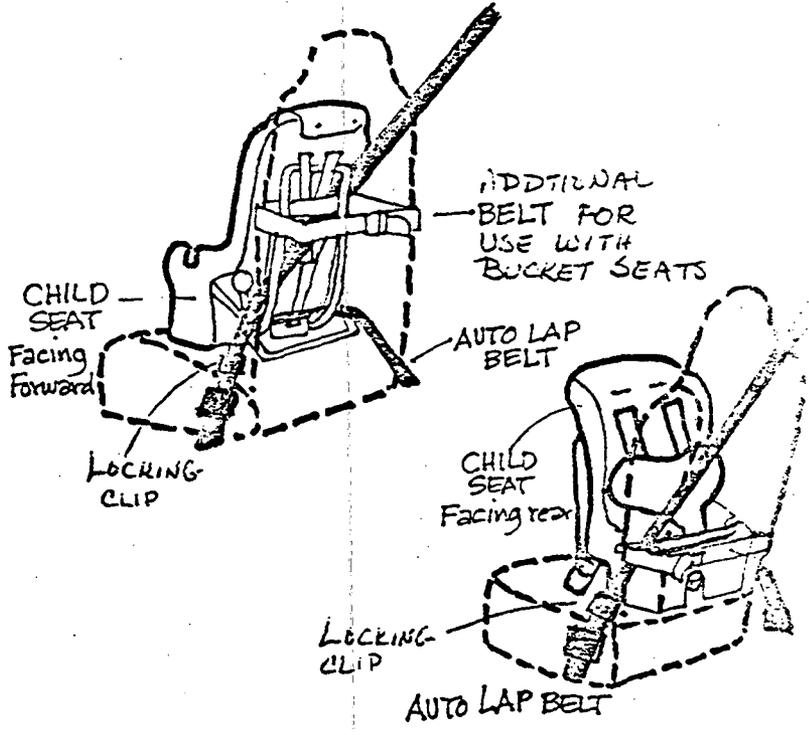


Fig. 12

TO PLACE CHILD IN SEAT

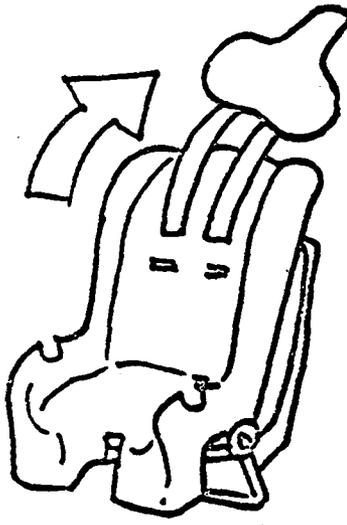


Fig. 13

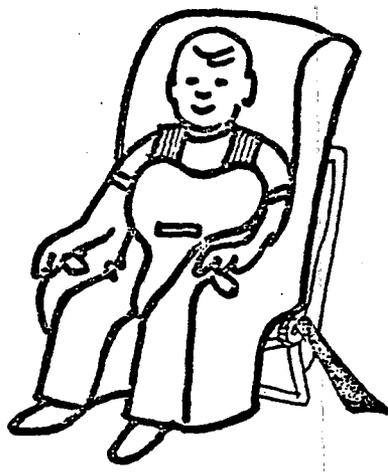


Fig. 14

TO DECIDE ON SHOULDER HARNESS POSITION

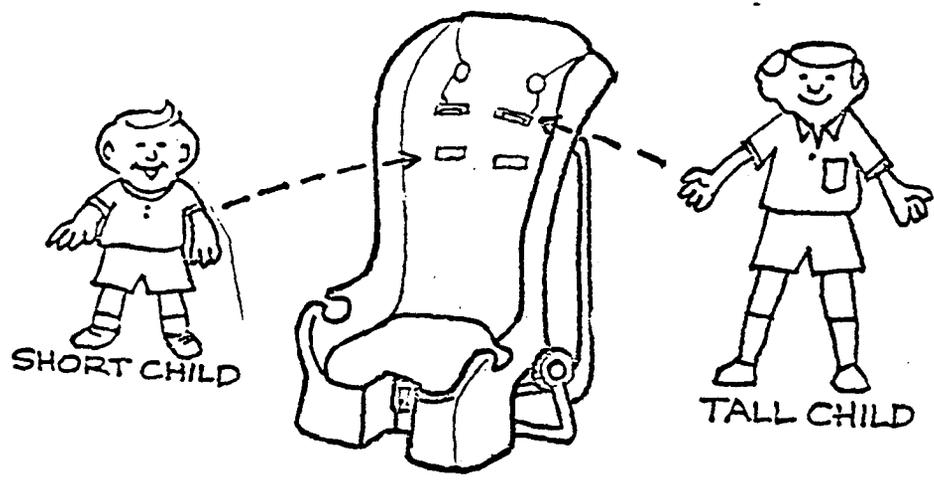


Fig. 15

TO MOVE OR ADJUST SHOULDER HARNESS

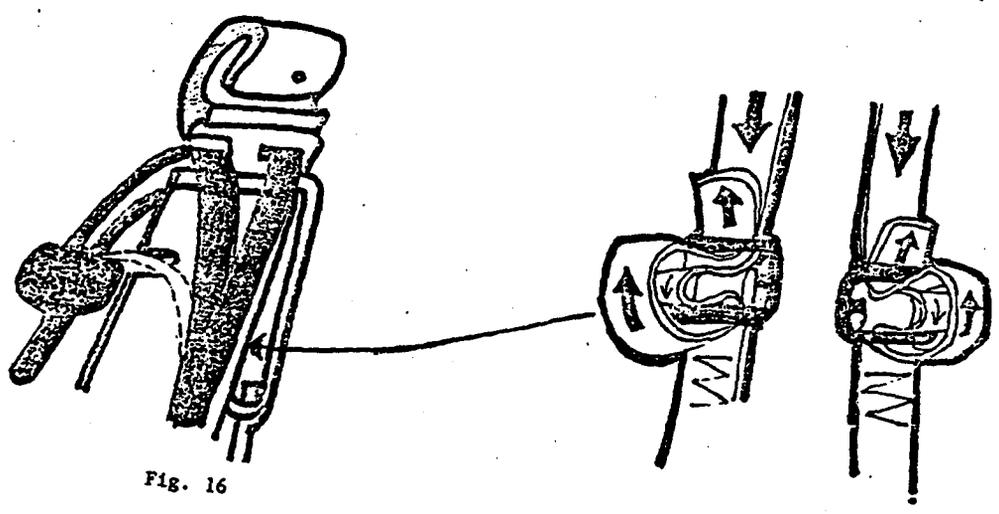


Fig. 16

Fig. 17

APPENDIX B  
INSTRUMENTS

Subject Code: \_\_\_\_\_

Date: \_\_\_\_\_

B-1

OBSERVATION OF CRD INSTALLATION

Site: 1 = IA 2 = IL 3 = TN 4 = WA

Parent's gender: 1 = Female 2 = Male

Child's gender: 1 = Female 2 = Male

Child's age: 1 = 1 year 2 = 2 years 3 = 3 years

Family's SES: 1 = Low 2 = Middle 3 = High

CRD: 1 = Bobby-Mac Champion 5 = Kantwet-Questor One-Step  
2 = Century Safe-T-Rider 6 = Takata Guardian  
3 = Cosco-Peterson Safe-T-Shield 7 = Other (Specify: \_\_\_\_\_)  
4 = Ford Tot-Guard

Instructions: 1 = Normative reading level 4 = Manufacturer's  
2 = Reduced reading level 5 = None provided  
3 = Labeled pictures only

Vehicle style: 1 = 2-door sedan 5 = Pickup  
2 = 4-door sedan 6 = Van  
3 = 2-door station wagon 7 = Other (Specify: \_\_\_\_\_)  
4 = 4-door station wagon

Vehicle size: 1 = Subcompact 2 = Compact 3 = Mid size 4 = Full size

Vehicle year, make, and model: \_\_\_\_\_

Attempted seat choice: 1 = Front seat 2 = Rear seat 3 = Both

Final seat choice: 1 = Front seat 2 = Rear seat

Final seating position: 1 = Driver's side 2 = Center 3 = Passenger's side

Approach to problem: 1 = Read instructions before installing  
2 = Attempted installation before reading instructions  
3 = Simultaneously read and installed  
4 = Never referred to instructions  
5 = No instructions available

Child placement: 1 = Before placing CRD in car  
2 = After CRD in car but before installation  
3 = After partial CRD installation  
4 = After complete CRD installation  
5 = Other (Specify: \_\_\_\_\_)

Time of installation: Beginning: \_\_\_\_\_ Ending: \_\_\_\_\_

Success in installation: 1 = Correct 2 = Incorrect

Problems in installation:

Safety belt: 1 = Correct 3 = Not used  
4 = Incorrect (Specify: \_\_\_\_\_)

Tether: 1 = Correct 2 = Not applicable 3 = Not used  
4 = Incorrect (Specify: \_\_\_\_\_)

Internal harness: 1 = Correct 2 = Not applicable 3 = Not used  
4 = Incorrect (Specify: \_\_\_\_\_)

Shield: 1 = Correct 2 = Not applicable 3 = Not used  
4 = Incorrect (Specify: \_\_\_\_\_)

CRD position: 1 = Correct 2 = Not applicable  
4 = Incorrect (Specify: \_\_\_\_\_)

Seat belt clip: 1 = Correct 2 = Not applicable 3 = Not used  
4 = Incorrect (Specify: \_\_\_\_\_)

---

Parent Behaviors

---

Verbal

Nonverbal

---

Subject Code: \_\_\_\_\_

B-2

Date: \_\_\_\_\_

### CAR SEAT BELIEFS

I. Below are listed some tasks that most people have tried at one time or another. Please circle one number for each task to show the extent to which you think it would be easier or harder than installing the car seat you used.

		Much harder	Somewhat harder	Undecided	Somewhat easier	Much easier
1.	Pumping your own gasoline	1	2	3	4	5
2.	Changing a tire on your car	1	2	3	4	5
3.	Putting a new license plate on your car	1	2	3	4	5

II. Below are listed some tasks associated with child care. Please circle one number for each task to show the extent to which you think it would be easier or harder than putting your child in the car seat you used.

		Much harder	Somewhat harder	Undecided	Somewhat easier	Much easier
1.	Changing a child's diaper	1	2	3	4	5
2.	Putting a child in a high Chair	1	2	3	4	5
3.	Putting a child in a snowsuit or winter coat	1	2	3	4	5

III. Below are listed some behaviors related to how well you like the car seat you used. Please circle one number for each item to show how likely you would be to do each of these things.

		Very satisfied	Somewhat Unlikely	Undecided	Somewhat Likely	Very likely
1. Buy this car seat for your child	1	2	3	4	5	
2. Recommend this car seat to your friends	1	2	3	4	5	
3. Use this car seat with your child on <u>long trips</u>	1	2	3	4	5	
4. Use this car seat with your child on <u>short trips</u>	1	2	3	4	5	

IV. Below are listed some things that influence how well people like car seats for use with their children. Please circle one number for each item to show how satisfied you are with this feature of the car seat you used.

	Very dissatisfied	Somewhat dissatisfied	Undecided	Somewhat satisfied	Very satisfied
1. Size	1	2	3	4	5
2. Instructions for use	1	2	3	4	5
3. Ease of installation	1	2	3	4	5
4. Durability	1	2	3	4	5
5. Appearance	1	2	3	4	5
6. Safety	1	2	3	4	5
7. Comfort	1	2	3	4	5

Subject code: \_\_\_\_\_

V. Below are listed some statements related to the use of children's car seats. Please circle one number for each statement to show the extent to which you agree or disagree with the statement.

	<i>Strongly disagree</i>	<i>Mildly disagree</i>	<i>Undecided</i>	<i>Mildly agree</i>	<i>Strongly agree</i>
1. Children do not like to ride in car seats.	1	2	3	4	5
2. Car seats cost more than they are worth.	1	2	3	4	5
3. Most car seats are comfortable for children.	1	2	3	4	5
4. Car seats take up too much room in the car.	1	2	3	4	5
5. A child riding in a car seat is much less likely to be hurt in a car wreck.	1	2	3	4	5
6. Children behave better when they ride in car seats.	1	2	3	4	5
7. Most children feel safer riding in car seats than riding loose in a car.	1	2	3	4	5
8. Car seats are inconvenient to use.	1	2	3	4	5
9. Most children feel too confined riding in car seats.	1	2	3	4	5
10. Most car seats are easy to install.	1	2	3	4	5
11. It is harder for a child to nap when riding in a car seat.	1	2	3	4	5
12. Children riding loose in a car may distract the driver and cause a wreck.	1	2	3	4	5

VI. Below are questions about your use of a car seat with your child. Please circle one number for each item to show how often you have used a car seat.

1. Out of the last five short trips (about 20 minutes or less) you took with your child, how many times did you use a car seat with your child?

0 1 2 3 4 5

2. Out of the last five long trips (one hour or more) you took with your child, how many times did you use a car seat with your child?

0 1 2 3 4 5

VII. Below are listed some statements about the government's role in providing for the health and safety of children and families. Please circle one number for each statement to show the extent to which you agree or disagree with the statement.

		<i>Strongly disagree</i>	<i>Mildly disagree</i>	<i>Undecided</i>	<i>Mildly agree</i>	<i>Strongly agree</i>
1.	The government should <u>not</u> require child-proof lids on medicine bottles.	1	2	3	4	5
2.	It is a good idea to have a law which requires parents to use special car seats with their children.	1	2	3	4	5
3.	There should be a law that children's garments be flame-proof.	1	2	3	4	5
4.	States should <u>not</u> require drivers and passengers to wear seat belts.	1	2	3	4	5
5.	The government should <u>not</u> require children to get shots.	1	2	3	4	5
6.	All states should have laws requiring parents to use special car seats with their children.	1	2	3	4	5
7.	There should be a law which requires only nontoxic paint to be used on children's toys.	1	2	3	4	5
8.	The government should <u>not</u> require parents to use car seats with their children.	1	2	3	4	5

Subject Code: \_\_\_\_\_

B-3

Date: \_\_\_\_\_

SOCIODEMOGRAPHIC INFORMATION

I. For each item in the following section, write the answer in the blank at the right of the question.

1. How many children under 4 years old do you have? \_\_\_\_\_
2. How many children 4-17 years old do you have? \_\_\_\_\_
3. How many children 18 years or older do you have? \_\_\_\_\_
4. What is your occupation? \_\_\_\_\_
5. What is your mate's occupation (if married)? \_\_\_\_\_

II. For each item in the following section, circle the number at the left of the answer that best describes you.

- |  |  |
|--|--|
| <ol style="list-style-type: none"><li>1. What is the highest level of school you have completed?<br/><br/>1 = No formal education<br/>2 = Less than high school<br/>3 = High school or GED<br/>4 = Vocational/technical school<br/>5 = Some college<br/>6 = College degree<br/>7 = Graduate degree</li><li>2. What is your marital status?<br/><br/>1 = Married<br/>2 = Separated<br/>3 = Divorced<br/>4 = Widowed<br/>5 = Single<br/>6 = Cohabiting (single and living with mate)</li><li>3. How old are you?<br/><br/>1 = Less than 20 years old<br/>2 = 20-24 years old<br/>3 = 25-29 years old<br/>4 = 30-34 years old<br/>5 = 35-39 years old<br/>6 = 40-44 years old<br/>7 = 45 years or older</li></ol> | <ol style="list-style-type: none"><li>4. To which ethnic group do you belong?<br/><br/>1 = Asian<br/>2 = Black<br/>3 = Hispanic<br/>4 = White<br/>5 = Other (Please specify: _____)</li><li>5. How many times in the past have you used a car seat with a child?<br/><br/>1 = Never<br/>2 = 1-2 times<br/>3 = 3-5 times<br/>4 = 6-10 times<br/>5 = More than 10 times</li><li>6. What was your <u>total family income</u> last year before taxes?<br/><br/>1 = Less than \$ 5,000<br/>2 = \$ 5,000 - \$ 9,999<br/>3 = \$10,000 - \$14,999<br/>4 = \$15,000 - \$19,999<br/>5 = \$20,000 - \$24,999<br/>6 = \$25,000 - \$29,999<br/>7 = \$30,000 - \$34,999<br/>8 = \$35,000 - \$39,999<br/>9 = \$40,000 - \$44,999<br/>10 = \$45,000 - \$49,999<br/>11 = \$50,000 or more</li></ol> |
|--|--|

Subject Code: \_\_\_\_\_

B-4

Date: \_\_\_\_\_

CRD INSTALLATION INTERVIEW

You have just tried to install a car seat and put your child in it. I would like to ask you some questions about your experience.

1. How do you feel about the size of the car seat? (Probe) Is there anything else about size?
  
2. Do you have any comments about the instructions that you were given for the car seat? (Probe) Is there anything else about the instructions?
  
3. What is your opinion about the ease of installation of the car seat? (Probe) Is there anything else about the ease of installation?
  
4. Would you comment on the durability of the car seat? (Probe) Is there anything else about the durability of the seat?
  
5. How do you feel about the appearance of the car seat? (Probe) Is there anything else about the appearance of the seat?
  
6. What is your opinion of the safety of the seat for your child? (Probe) Is there anything else about the safety of the seat?

7. What do you think about the seat in terms of comfort for your child?  
(Probe) Is there anything else about comfort?
  
8. What features of the seat you used did you like particularly?  
(Probe) Are there any other features that you like?
  
9. What features of the seat you used did you dislike particularly?  
(Probe) Are there any other features that you dislike?
  
10. Would you be willing to give up (features liked) for (tradeoffs)?  
(Probe) Which feature do you prefer?
  
11. Would you prefer (tradeoffs) instead of (features disliked)?  
(Probe) Which feature do you prefer?
  
12. If you could tell the manufacturer about how to improve car seats, what would you suggest? (Probe) Are there other suggestions you would like to make?

Subject Code: \_\_\_\_\_

13. Have you ever owned another type of car seat? What kind? (Probe) Is there any other kind you have used?
  
14. Is there any other kind of car seat with which you are familiar? What kind? (Probe) Are there any other kinds?
  
15. (If "yes" to Item 13 and/or 14) What things about that seat (those seats) did you like particularly? (Probe) Was there anything else you liked?
  
16. (If "yes" to Item 13 and/or 14) What things about that seat (those seats) did you dislike particularly? (Probe) Was there anything else you did not like?
  
17. Would you be willing to give up (features liked) for (tradeoffs)? (Probe) Which feature do you prefer?
  
18. Would you prefer (tradeoffs) instead of (features disliked)? (Probe) Which feature do you prefer?

19. Under what conditions are you most likely to use the car seat? (Probe)  
Is there any other situation that makes you especially likely to use the seat?
20. Under what conditions are you least likely to use the car seat? (Probe)  
Is there any other situation that makes you especially likely not to use the seat?

Subject Code: \_\_\_\_\_

B-5

Date: \_\_\_\_\_

CRD USE INTERVIEW

1. How many times have you used the car seat in the last week? \_\_\_\_\_

2. How many times have you transported your child without using the car seat in the last week? \_\_\_\_\_

3. Have other people than you (or your spouse) transported your child during the last week?

1 = Yes 2 = No

4. (If "yes" to Item 3) Did the person(s) who transported your child use a car seat?

1 = Yes 2 = No

5. (If "yes" to Item 4) Whose car seat did they use?

1 = Parent's CRD 2 = Own CRD

6. How many times did you transfer the car seat from one car to another during the last week? \_\_\_\_\_

7. When you used the car seat last week, how often did you use each of these parts correctly?

Safety belt: 1 = Always 2 = Usually 3 = Sometimes 4 = Never

Tether: 1 = Always 2 = Usually 3 = Sometimes 4 = Never  
5 = Not applicable

Internal harness: 1 = Always 2 = Usually 3 = Sometimes 4 = Never  
5 = Not applicable

Shield: 1 = Always 2 = Usually 3 = Sometimes 4 = Never  
5 = Not applicable

8. (If "yes" to Item 3) If another person transported your car seat from one car to another, did he or she use each of these parts correctly?

Safety belt: 1 = Yes 2 = No 3 = Don't know

Tether: 1 = Yes 2 = No 3 = Don't know  
4 = Not applicable

Internal harness: 1 = Yes 2 = No 3 = Don't know  
4 = Not applicable

Shield: 1 = Yes 2 = No 3 = Don't know  
4 = Not Applicable

9. In the last week, are there any special problems you have had with the car seat?

1 = Yes 2 = No

10. (If "yes" to Item 9) What kind of problems?

11. In the last week has there been any event or situation which has made you feel more positive about car seats?

1 = Yes 2 = No

12. (If "yes" to Item 11) What was it?

13. In the last week has there been any event or situation which has made you feel more negative about car seats?

1 = Yes 2 = No

14. (If "yes" to Item 13) What was it?

15. Are there any other comments or questions you have at this time about your car seat?

APPENDIX C  
INFORMED CONSENT FORMS

Initial Use Component  
Parent's Informed Consent Form

I understand the following:

1. The purpose of this project is to find out what things about car seats for children make them easy or hard to use. This project will help manufacturers of car seats make the seats easier to use.
2. I will be asked to look at or read the directions for a car seat, install the seat, and put my child in it. Then I will be asked to answer some questions about using child car seats and about the car seat I installed. I also will be asked to give some personal information about myself such as my level of education and occupation. This will take about 40 minutes of my time.
3. Any information I am asked to give will be kept confidential. My name will not be used in any reports. Only the total information from a group of mothers will be used in reports about this project.
4. No risks either to myself or my child are expected from my participation in this project. If I agree to participate, I will be given a copy of the story book For Pete's Sake, which is about child passenger safety.
5. I am under no obligation to participate in this study, and I can decide at any time not to continue in this project. If I do withdraw, it will not affect me or my child negatively in any way.
6. Additional information regarding this project can be obtained by contacting \_\_\_\_\_.

I, \_\_\_\_\_, agree to participate in this project under the conditions stated.

Signed \_\_\_\_\_

Date \_\_\_\_\_

Repeated Use--Cross-Sectional Sample Component  
Parent's Informed Consent Form

I understand the following:

1. The purpose of this project is to find out what things about car seats for children make them easy or hard to use. The results from this project will help us understand how child car seats can be improved to make them more usable.
2. I will be asked to install the child car seat I use for my child in my car and place my child in the seat. Then I will be asked to give some personal information about myself (such as age and education) and to answer some questions about using child car seats and seat belts and about other health and safety issues. This will take about 30 minutes of my time.
3. Any information I am asked to give will be kept confidential. My name will not be used in any reports. Only the total information from a group of parents will be used in reports about this project.
4. No risks either to myself or my child are expected from my participation in this project. If I agree to participate, I will be given a copy of the story book For Pete's Sake, which is about child passenger safety.
5. I am under no obligation to participate in this study, and I can decide at any time not to continue in this project. If I do withdraw, it will not affect me or my child in any way.
6. Addition information about this project can be obtained by contacting \_\_\_\_\_.

I, \_\_\_\_\_, agree to participate in this project under the conditions stated.

Signed \_\_\_\_\_

Date \_\_\_\_\_

Repeated Use--Longitudinal Sample Component  
Parent's Informed Consent Form

I understand the following:

1. The purpose of this project is to find out what things about car seats for children make them easy or hard to use. The results from this project will help us understand how child car seats can be improved to make them more usable.
2. I will be given the opportunity to borrow a child car seat until my child is 4 years old. At that time, the car seat is to be returned to the Tennessee Highway Patrol loaner program.
3. If the child car seat I am loaned is one that includes a tether strap, I am willing to have a tether bolt installed in my car. I can install the bolt myself or have it done at no cost to me at the Area Vocational School in Knoxville.
4. I will be asked to give some personal information about myself (such as age and education) and to answer some questions about the use of child car seats. I also will be contacted weekly over a 2-month period by telephone or in person to determine problems I may be having with the use of the car seat and to observe the way I am using the car seat.
5. Any information I am asked to give will be kept confidential. My name will not be used in any reports. Only the total information from a group of parents will be used in reports about this project.
6. No risks either to myself or my child are expected from my participation in this project. If I agree to participate, I will be given a story book, For Pete's Sake, which is about child passenger safety.
7. I am under no obligation to participate in this study, and I can decide at any time not to continue in this project. If I do withdraw, I will return the rented child car seat to the Transportation Center at The University of Tennessee. I understand that if I do withdraw, the only cost to me will be having to return the child car seat.
8. Additional information about this project can be obtained by contacting \_\_\_\_\_.

I, \_\_\_\_\_, agree to participate in this project under the conditions stated.

Signed \_\_\_\_\_

Date \_\_\_\_\_

**APPENDIX D**

**QUALITATIVE ANALYSIS OF COMMENTS BY PARENTS  
IN ALL PROJECT COMPONENTS**

Table D-1  
 Comments About CRDs by Parents in  
 Initial Use Sample Component

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step	Takata Guardian
Size of CRD						
<b>Positive</b>						
General positive (unspecified)	24	22	18	13	24	29
CRD height is appropriate		1				
CRD is lightweight	1	4	1		1	5
CRD accommodates child easily			1		7	3
CRD does not take up too much room in auto		6				
<b>Negative</b>						
General negative (unspecified)	14		1	1		
CRD is too small for child	8	4	13		4	3
CRD is too large for child		4		8	1	1
CRD is too heavy			6			
CRD is too large for compact car	1			2	2	
CRD takes up too much room in auto seat				7		
Shield does not leave room for child	4		4			
CRD is too tall, bumps automobile ceiling					1	
CRD is too short, does not support child's head						1

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Table D-1 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step	Takata Guardian
CRD has harness at bad place (hits neck, arms)		3				
CRD is too bulky			2			
<b>Ease of installation</b>						
<b>Positive</b>						
General positive (unspecified)	29	31	32	34	18	31
CRD is easy to place in car/remove from car	2	3	2		2	2
It is easy to place child in CRD	2	4	3	4	3	
No tether is required				1		
Harness connections are simple	1					
<b>Negative</b>						
General negative (unspecified)	2	1	2	1	6	1
Seatbelt must be removed every time		1				
It is hard to place child in seat or remove child	1					
Tether hole must be drilled					4	
Tether installation is too hard; tether should be preinstalled					5	
Tether is too time-consuming to use					3	

Table D-1 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step	Takata Guardian
<b>Durability</b>						
<b>Positive</b>						
General positive (unspecified)	24	29	31	35	22	28
Buckles and straps are sturdy	1					
Frame is sturdy						1
Cover/pad is sturdy		1	3			
<b>Negative</b>						
General negative (unspecified)	1	1		1		1
Vinyl covering will tear/split	5	1	1	1	19	3
Frame is flimsy	2				1	
Reclining mechanism would break	1					
Shield could break/come loose	1					
Shield-securing mechanism might fail			2			
Harness-positioning slide might break					1	
Attachment of vinyl cover to seat is insecure	1					
<b>Cleanability</b>						
<b>Positive</b>						
General positive (unspecified)			3	4	1	
Seat cushion removes for cleaning				1		
Harnesses can be removed and cleaned		2				

Table D-1 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step	Takata Guardian
<b>Negative</b>						
Color shows dirt				1		
<b>Appearance</b>						
<b>Positive</b>						
General positive (unspecified)	27	19	31	9	30	25
CRD matches car interior or has attractive color	2		4		1	2
CRD does not show dirt	2					1
<b>Negative</b>						
General negative (unspecified)	3			1		1
Colors are drab and uninteresting				2	2	
CRD is awkward, gawky-looking, ugly	1	3		12	2	
CRD is cheap-looking		1				
Attachment of vinyl to seat is sloppy					1	
Shield/bolster component is ugly						1
<b>Safety</b>						
<b>Positive</b>						
General positive (unspecified)	29	22	22	17	29	24
Child cannot wiggle out	3		2	1	3	

Table D-1 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step	Takata Guardian
In a wreck/quick stop, child would be protected			5			
Harness is positioned to hold shoulders back	2	1			4	7
Padded shield/armrest is protective	5		4	6	2	3
Tether is protective		2			5	
Child is automatically harnessed with shield connection					1	
Child cannot undo buckles/shield connection					1	2
Clamp holding seat belt in place is protective	2					
<b>Negative</b>						
General negative (unspecified)		2		2		
Seat is too hard to absorb impact				1		
Child can crawl or slip out too easily		2		15		3
Harness buckles could cause trauma in wreck						1
Shield may come off in accident	1					
Shield is too "bouncy" even when fastened					2	
Shield is too close to face/thorax; shield could cause trauma			1	2	1	
CRD is not safe for small children				1		
Seat is top-heavy but untethered and could tip			3			1
Upper body is not supported adequately		2				
There is no protection from side crash/flying glass		4				

Table D-1 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step	Takata Guardian
Child could undo buckles	1					
Child could be trapped in seat in accident	1					
Bolt in filler panel may not be secure		1				
Harness should be used with all ages			5	1		
Harness is too loose						2
Comfort						
Positive						
General positive (unspecified)	9	15	14	8	15	23
CRD is well-padded	11		13	6	15	4
"Wings" on side allow napping, or CRD is comfortable to nap in	1		2		4	1
CRD reclines	5		1		3	1
CRD is tall enough to allow child to see out of auto		5	3	4	13	4
CRD is not a barrier to toy play, eating, interaction		2			1	1
CRD allows some movement while protecting child					1	
CRD will not get too hot in summer			1			1
CRD is adequately roomy				3		
CRD has armrest						2
CRD positions legs comfortably						1

Table D-1 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step	Takata Guardian
<b>Negative</b>						
General negative (unspecified)	1	5		6		2
Child sits too low to see out	6	1				2
CRD does not recline				1		
CRD has no "wings" by head, child's head droops when napping, or CRD is generally uncomfortable for sleeping		6	1	2	2	4
Metal clasps get hot and burn child			1			
Vinyl is hot in summer, cold in winter	2			2	5	2
Vinyl makes child perspire					1	
Shield is too confining, will not allow play/interaction	16		3	4	1	
Child cannot see over shield	2		11	12		
Seat is too narrow	4					
Padding is too thin or CRD is not padded		3		19		5
CRD is not comfortable on long trips		5		2		
Shield hits child in stomach					1	
Shield forces child to hold arms straight up			1			
Harness comes at bad place (neck, arms)		2				

Table D-1 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step	Takata Guardian
<b>Convenience</b>						
<b>Positive</b>						
CRD converts for different ages			2	1	2	3
CRD can be used as infant carrier	1					1
CRD can be used as booster seat		1				
No harness connections are required			1			
Child can get in without removing seat belt				1		
<b>Negative</b>						
CRD is hard or impossible to convert from infant to toddler configuration		1		2		
CRD is hard to transfer because of tether						3
<b>Specific components--Shield</b>						
<b>Positive</b>						
Shield/bolster is good	10		12	12	15	18
Armrest is good		1				
<b>Negative</b>						
General negative (unspecified)	7				1	
CRD is hard to put on seat	2					

Table D-1 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step	Takata Guardian
Child cannot see over shield				12		
Swinging shield over child's head scares child					1	
Shield comes too high on child	2					
Seatbelt clasp on shield is hard to use	1					
Shield prevents toy play, eating, interaction	2		1	4		
Shield should be more level on top					1	

Specific components--Tether

Positive

Tether/tether clip is acceptable		1			4	
Fact that CRD has no tether is appreciated				1		

Negative

General negative (unspecified)					10	
Tether means that CRD cannot be used in friend's car		2				

Table D-1 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step	Takata Guardian
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Specific components--Internal harness

Positive

Internal harness is acceptable	9	7	2		4	5
One-step shield/harness connection is good			8		14	10
Fact that CRD has no harness is appreciated				1		

Negative

General negative (unspecified)						1
Harness is hard to buckle	2				1	
Buckles come in bad place	1					
Harness is hard to adjust	1					
Child can undo harness	1					
Harness is too hard to release	1					
Harness is hard to thread on seat belt		2				
Child needs more protection than harness provides		2				

Specific components--Booster seat

Positive

Booster seat is not confining (older kids do not feel like babies)		3		1		
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Table D-1 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step	Takata Guardian
<b>Negative</b>						
Booster seat is too hard		1		19		
<b>Specific components--Shell</b>						
<b>Positive</b>						
Shape of CRD shell is acceptable			2			
"Wings" on side by head are acceptable					3	
Contour of seat is acceptable						1
Reclining feature is acceptable	2					
<b>Negative</b>						
Wings obstruct side vision					1	
<b>Specific components--Seat belt attachment</b>						
<b>Positive</b>						
Seat belt attaches easily to CRD	1	1	1			
<b>Negative</b>						
Seat belt must be removed each time CRD is used		1				

Table D-1 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step	Takata Guardian
<b>Instructions</b>						
<b>Positive</b>						
General positive (unspecified) Instructions are easy to read, clear	5	18	12	15	10	12
			1	1	2	
<b>Negative</b>						
General negative (unspecified) Instructions should be divided by infant/toddler configuration	7		11	2	13	5
Print is too small	3					
Instructions are too complicated, confusing, technical	1					
Instructions are organized badly or are not in order of task	7	8	8	2	7	12
Sections are omitted	1		1			1
Instructions are too wordy, too long	2			4		
Instructions need more pictures, fewer words	12	2	2		2	5
					1	
<b>Illustrations</b>						
<b>Positive</b>						
General positive (unspecified)	9	12	6	11	8	10

Table D-1 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step	Takata Guardian
<b>Negative</b>						
General negative (unspecified)		1	3	1	4	10
Shield connection is not shown well	1					
Illustrations are too small	1		1		1	
Illustrations leave steps out						1
Illustrations are not realistic	2		1	3	1	1
Illustrations need better labeling	2					
"Just pictures" are not enough	5		1	2		
Pictures are too complicated			1			1
Illustrations are misleading				2		

Table D-2

Comments About CRDs by Parents in Repeated Use--  
Longitudinal Sample Component

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step
Size of CRD					
<b>Positive</b>					
General positive (unspecified)	4	4	3	5	5
CRD is lightweight	1				
CRD accommodates child easily	1	1			2
<b>Negative</b>					
General negative (unspecified)			2		
CRD is too small for child	3				
CRD is too large for child			1	1	
Shield does not leave room for child			3		
Ease of installation					
<b>Positive</b>					
General positive (unspecified)	5	5	4	6	5
CRD is easy to place in car/remove from car				2	
It is easy to place child in CRD				1	

Table D-2 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step
<b>Negative</b>					
General negative (unspecified) Shield is hard to place on seat	1	1		1	2
<b>Durability</b>					
<b>Positive</b>					
General positive (unspecified)	7	6	6	6	5
<b>Negative</b>					
Vinyl covering will tear/split				1	
<b>Appearance</b>					
<b>Positive</b>					
General positive (unspecified) CRD matches car interior, has attractive color	7	4	5	2	5
		1			

Table D-2 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step
<b>Negative</b>					
CRD is awkward, gawky-looking, ugly		1		4	
<b>Safety</b>					
<b>Positive</b>					
General positive (unspecified)	6	5	5	5	4
<b>Negative</b>					
General negative (unspecified)	1			1	
Child can crawl or slip out too easily					1
<b>Comfort</b>					
<b>Positive</b>					
General positive (unspecified)		6	2	4	5
CRD is well-padded	5	1			2
CRD reclines					1
CRD is tall enough to allow child to see out of auto	1			2	2

Table D-2 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step
CRD is not a barrier to toy play, eating, interaction CRD is adequately roomy		1		3	
<b>Negative</b>					
General negative (unspecified)					1
Child sits too low to see out	2	2			
CRD has no "wings" by head, child's head droops when napping, or CRD is generally uncomfortable for sleeping	1				
Child cannot see over shield				1	
Seat is too narrow	1				
CRD is not comfortable on long trips				1	
Harness is too confining			1		
<b>Convenience</b>					
<b>Positive</b>					
CRD converts for different ages		1			
CRD can be used as booster seat		1			

Table D-2 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step
<b>Specific components--Shield</b>					
<b>Positive</b>					
Shield/booster is good	4			3	2
Armrest is good			4		
<b>Negative</b>					
Child cannot see over shield				1	
Shield prevents toy play, eating, interaction	1				
<b>Specific components--Tether</b>					
<b>Negative</b>					
Tether requires hole and reduces auto resale value			1		1

Table D-2 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step
Specific components--Internal harness					
Positive					
Internal harness is acceptable One-step shield/harness connection is good	4	2	2		4
Negative					
General negative (unspecified)	1				
Specific components--Booster seat					
Positive					
Booster seat is not confining (older kids do not feel like babies)		1		1	
Negative					
Booster seat is too hard Booster seat is contoured badly		1		4	

Table D-2 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet- Questor One-Step
Specific components--Seat belt attachment					
Positive					
Seat belt attaches easily to CRD				1	
Negative					
It is too hard to latch belt in place	2				
Instructions					
Positive					
General positive (unspecified)		3	2	2	1
Negative					
General negative (unspecified) Instructions are too complicated, confusing, technical		1		2	1
Instructions are organized badly or are not in order of task	1				1

Table D-3

Comments About CRDs by Parents in Repeated Use--  
Cross-Sectional Sample Component

Comments	Bobby- Mac 3-N-1	Bobby- Mac Deluxe or Champion	Century Travel- Guard	GM Love Seat	Strollee
Size of CRD					
<b>Positive</b>					
General positive (unspecified)	1F	2M	2F, 3M	6F, 1M	8F, 6M
CRD is lightweight				2F, 1M	
CRD accommodates child easily		3M	1F, 1M	1M	3F, 1M
CRD fits into car easily					4F, 1M
CRD does not take up too much room in auto					1F, 1M
CRD is comfortable for infants and young children				1F	
<b>Negative</b>					
CRD is too small for child				1F	1F, 1M
CRD is too large for child		1M	1M, 1F		1F
CRD is too heavy				1F	
CRD is too large for compact car		1M			
Shield does not leave room for child		1			

Table D-3 (continued)

Comments	Bobby-Mac 3-N-1	Bobby-Mac Deluxe or Champion	Century Travel- Guard	GM Love Seat	Strollee
Ease of installation					
Positive					
General positive (unspecified)	1M	1F, 4M	1F, 4M	3F	10F, 3M
Seat belt remains in place when child is removed					1F
CRD is easy to place in car/remove from car	1F, 1M		1F, 1M	1F	1M
It is easy to place child in CRD		1M		1F	1F, 2M
No tether is required	1F				
Buckles work easily			1F		
Harness connections are simple				1F	3F
Negative					
General negative (specified)			1M	1F, 1M	
Seat belt must be removed every time				1M	
It is hard to place child in seat or remove child		2M			2F, 1M
Harness cannot be adjusted enough/harness is hard to adjust		1M		1F, 1M	1F, 1M
Shield is hard to place on seat		1M			
Shield/armrest will not stay up when installing					1F
Latches are hard to open/close					3F, 1M
Tether hole must be drilled				1F	2F, 1M

Table D-3 (continued)

Comments	Bobby- Mac 3-N-1	Bobby- Mac Deluxe or Champion	Century Travel- Guard	GM Love Seat	Strollee
Seat belt is hard to thread through frame	1M				
Harness buckle is hard to work				1F	1F, 1M
Tether-to-bolt attachment is too stiff				1F	
CRD is too bulky for moving in and out of car	1M		1F		

Durability

Positive

General positive (unspecified)	1F	1F, 5M	2F	9F, 2M	15F, 6M
- Frame is sturdy	1M		2M	1M	
Cover/pad is sturdy				1F	2F

Negative

Vinyl covering will tear		1M	3M, 1F	1F	6F, 2M
Hardware (buckles, snaps) breaks					1F, 2M
Harness becomes twisted, rope-like					1M
Harness webbing will stretch					1F
Reclining mechanism would or did break					1F
Harness positioning slide might or did break					1M
Webbing wore out					1F

Table D-3 (continued)

Comments	Bobby- Mac 3-N-1	Bobby- Mac Deluxe or Champion	Century Travel- Guard	GM Love Seat	Strollee
<b>Cleanability</b>					
<b>Positive</b>					
General positive (unspecified)	1M		1F	2F	4F
CRD can be hosed or showered clean				1F	1F, 1M
Seat cushion removes for cleaning				1F	2F, 1M
<b>Negative</b>					
Seat pad does not remove to clean			1F	1F, 1M	
Seat pad is difficult to remove to clean	1M				
<b>Appearance</b>					
<b>Positive</b>					
General positive (unspecified)	1F	2M	3F, 2M	5F, 1M	14F, 3M
CRD matches car interior, has attractive color					1F, 3M
CRD does not look awkward					1F
CRD does not look cheap					1F

Table D-3 (continued)

Comments	Bobby- Mac 3-N-1	Bobby- Mac Deluxe or Champion	Century Travel- Guard	GM Love Seat	Strollee
<b>Negative</b>					
General negative (unspecified)		1M			
CRD has too many gizmos, is too "mechanical" looking		1M			
CRD is drab, has uninteresting colors or not enough color choices					1M
CRD is awkward, galky-looking, ugly		1F			
<b>Safety</b>					
<b>Positive</b>					
General positive (unspecified)	1F	1M	3F, 3M	4F	11F, 6M
Child cannot wiggle out	1F				1F, 1M
In a wreck/quick stop, child would be protected				1F	1F, 1M
Harness is positioned to hold shoulders back				1M	2F, 3M
Side panels (wings) protect head/neck	1F	1F, 1M		1F, 1M	2F, 1M
Padded shield/armrest is protective		1M	1M		1M
Tether is protective				1F, 1M	1F, 1M
Child cannot undo buckles/shield connection					1F

Table D-3 (continued)

Comments	Bobby- Mac 3-N-1	Bobby- Mac Deluxe or Champion	Century Travel- Guard	GM Love Seat	Strollee
<b>Negative</b>					
Harness buckles could cause trauma in wreck		1M			
Seat is top-heavy but untethered and could tip	1M				
Upper body is not supported adequately			1F		
Child could undo buckles			1M		1F
Snaps/buckles will not stay closed					1F
<b>Comfort</b>					
<b>Positive</b>					
General positive (unspecified)		1M	1F	1F	3M
CRD is well padded			1M	1F	3M
"Wings" on side allow napping, or CRD is comfortable to nap in	1F		2M	1F, 1M	3F, 1M
CRD reclines		1M			6F, 6M
CRD is tall enough to allow child to see out of auto	1F		1F, 1M	4F, 1M	9F, 7M
CRD is not a barrier to toy play, eating, interaction				1F	
Velour finish is comfortable					1F

Table D-3 (continued)

Comments	Bobby- Mac 3-N-1	Bobby- Mac Deluxe or Champion	Century Travel- Guard	GM Love Seat	Strollee
<b>Negative</b>					
Child sits too low to see out				2M	
CRD does not recline	1F			1F, 1M	
Seat is too straight up so child slumps				2M, 1F	
CRD has no "wings" by head, child's head droops when napping, or CRD is generally uncomfortable for sleeping			1F	1F	3F, 2M
Metal clasps get hot and burn child				1F, 1M	
Vinyl is hot in summer, cold in winter	1F, 2M	1F, 1M	1F, 1M	1F, 3M	8F, 2M
Vinyl makes child perspire		1M		2M	1F
Shield is too confining, will not allow play/interaction		1M			
Seat is too narrow				1M	
Padding is too thin or CRD is not padded				1M	1M
Harness comes at a bad place (neck, arms)				1F	
CRD is not comfortable for older child					1F
<b>Convenience</b>					
<b>Positive</b>					
CRD converts for different ages	1F		1F		5F, 2M

Table D-3 (continued)

Comments	Bobby- Mac 3-N-1	Bobby- Mac Deluxe or Champion	Century Travel- Guard	GM Love Seat	Stroller
<b>Negative</b>					
CRD is hard or impossible to convert from infant to toddler configuration			1M		
CRD is awkward to get through car door					1F
Reclining is difficult because of tether connection					3F, 1M
<b>Vehicle compatibility</b>					
<b>Negative</b>					
General negative (unspecified)		1M			
CRD will not fit bucket seats				1F	1M
CRD will not fit two-door car					1F
Large seat belt buckle will not fit frame		1M			
CRD tears auto upholstery	1M	1M			1M
<b>Specific components--Shield</b>					
<b>Positive</b>					
Shield booster is good	1M	1M			
Armrest is soft, well-padded					2F, 1M

Table D-3 (continued)

Comments	Bobby- Mac 3-N-1	Bobby- Mac Deluxe or Champion	Century Travel- Guard	GM Love Seat	Strollee
<b>Negative</b>					
General negative (unspecified) Shield will not stay up when putting child in Shield pokes hole in auto ceiling or dents ceiling		1M			1F, 1M 2F
<b>Specific components--Tether</b>					
<b>Positive</b>					
Tether/tether clip is acceptable				1F	1F
<b>Negative</b>					
Tether requires hole and reduces auto resale value It is hard to clip tether to bolt Tether is inconvenient to use					1F, 1M 1F 3F, 1M

Table D-3 (continued)

Comments	Bobby- Mac 3-N-1	Bobby- Mac Deluxe or Champion	Century Travel- Guard	GM Love Seat	Strollee
Specific components--Internal harness					
Positive					
Internal harness is acceptable				1F	5F, 4M
Negative					
Harness is hard to buckle		1M			4F, 2M
Harness has too many connections				1M	1F, 1M
Harness is hard to adjust	1F				1F
Harness is too short even when adjusted					1F, 1M
Harness rolls into rope-like shape			1M		1M

Specific components--CRD shell

Positive

"Wings" on side by head are acceptable	1M
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Table D-3 (continued)

Comments	Bobby- Mac 3-N-1	Bobby- Mac Deluxe or Champion	Century Travel- Guard	GM Love Seat	Strollee
Specific components--Seat belt attachment					
Positive					
Seat belt to attaches easily to CRD					1M
Negative					
Big seat belt buckles will not go through CRD		1M	1M		
Instructions					
Positive					
Instructions are easy to read, clear, and easy to follow		1F		1M	
Instructions are well organized				2F, 1M	
Instructions are easy to follow		1F			

Table D-3 (continued)

Comments	Bobby- Mac 3-N-1	Bobby- Mac Deluxe or Champion	Century Travel- Guard	GM Love Seat	Stroller
Negative					
Instructions are hard to follow or confusing				4F, 2M	
Reclining function is hard to understand	1M				

**Note:** Comments are reported only for types of CRDs used by several parents in the sample. F = females, M = Males.

Table D-4

Comments About Attitudes Toward CRDs by Parents in  
Repeated Use--Longitudinal Sample Component

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet Questor One-Step
Problems with CRD					
Catch sticks on shield			2		2
Seat is too small for child	1				
CRD tears auto upholstery	1				
Child does not like CRD	2	1		1	
Clip between legs pinches child	2				
Child cannot see out		1			
CRD will not fit small cars				1	
Child tries to sit on knees	1				
Heavy clothing requires harness adjustment	1				
Shield is too tight/narrow	1				
Harness is uncomfortable	1				
Seat belt is barely long enough				1	
Fingers are pinched by buckles	1				
Shield is not a good idea			1		
Child cannot sleep in CRD				2	
Situations making parents more positive toward CRDs					
Parent had to stop quickly	12	2	1	6	4
Parent avoided ticket for "child not restrained"		1		2	
Parent saw TV public service ad				1	
Child stays put when parent leaves car briefly	2				
Child opened door of car and was prevented from falling out	1				
Parent feels safer with CRD	2	1	2	1	1
Child is prevented from distraction	1	1	2		

Table D-4 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet Questor One-Step
Child likes seat			2	1	
Parent read of child hurt/ killed without CRD				2	
Friend got ticket for not having CRD				1	
Child slept well on trip in CRD	1				
CRD will help child develop safety belt habit	1				
Situations making parents more negative toward CRDs					
Parent read of infant killed in CRD		1		1	
Child will not sit still for over 2 hours	1				
Grocery day is harder with CRD	1				
Other comments					
Parent likes the seat				3	2
Seats are necessary	1				
Plastic seat is cracking	1	1			
Parent should tighten safety belt more	1				
It is awkward to carry baby in CRD				1	
Child cannot sleep in CRD			1	1	
CRD needs more padding				1	
Child cannot see out	1				
Padding is poorly anchored					1
Parent does not use CRD because it is too aggravating					1
Parent likes the padding	1				
Parent likes the shield	1				
Friends who do not use CRDs are never stopped by cops		1	1		

Table D-4 (continued)

Comments	Bobby-Mac Champion	Century Safe-T- Rider	Cosco- Peterson Safe-T- Shield	Ford Tot- Guard	Kantwet Questor One-Step
Seat is good for child this age		1			
CRD is better than child running free		1			
Car seat makes holes in auto upholstery	1				

Table D-5

## Recommendations by Parents for Improvement of CRDs

Comments	Number of parents
Omit tethers	3
Provide cloth cover for vinyl seat	22
Make seat "one-step" for child placement	14
Use harness for all ages	5
Make shield thinner	1
Make seat high enough to allow child to see out	52
Make seat convertible infant-to-toddler	15
Make buckles easy to work	1
Make shield so it does not swing over head	2
Leave room so child can eat, play, interact	10
Pad shield thickly	3
Use tether to secure CRD	1
Make shields smaller (lower)	5
Make harness straps longer	1
Make instructions clearer	13
Use a more comfortable seat cover material	1
Include reclining feature or make CRD easier to recline	21
Make CRD lightweight	4
Provide tray for play and snacking	8
Make CRDs sturdy	2
Make CRDs easy to clean	3
Use colors that do not show dirt	2
Use system that prevents child from wiggling out	8
Make connections "child proof"	5
Make CRD less expensive	13
Make CRD easy to install	16
Make seat more comfortable	7
Include toys or pictures to entertain child	7
Eliminate exposed metal that can get hot and burn child	5
Include harness system with auto when manufactured	3
Make CRD so that child can climb in and out	2
Make seat small and easy to handle	1
Improve sleeping comfort for older child	3
Make Rose harness again	1
Make child placement easy and quick	13
Make CRD comfortable for sleeping	4
Make one-piece CRD	2
Pad seat cushion well	21
Make CRD washable	1
Make CRD smaller	1
Provide headrest for infants and others	7
Omit harnesses	6

Table D-5 (continued)

Comments	Number of parents
Omit shield	4
Use material that will not rip	11
Make CRD usable in small cars	3
Make CRD so it will not tear auto upholstery	5
Make pads removable for cleaning	5
Make a seat for older (bigger) kids	5
Make shield tighter	1
Make entire seat of durable molded vinyl	1
Attach shield permanently to CRD	1
Make bottom of seat same width as auto seat	1
Use lighter colors so CRD does not get hot	1
Make seat fold up for storage	1
Make harness "quick release"	5
Make hardware more durable	2
Make CRD less cumbersome	2
Provide specific crash-test information	2
Make harness straps longer	3
Make harnesses easier to adjust	4
Use inertial harnesses	2
Design a "passive" restraint for kids	1
Give specific warnings of what would happen if specific components are not used	1
Design CRD for bucket seats	1