EFFECTS OF INTERVENTION ON BOOSTER SEAT PURCHASE:
A FIELD STUDY

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(ABSTRACT)

Motor vehicle crashes remain a leading cause of death and injury for US children, despite improved crashworthiness of vehicles and effective restraint systems for children of all ages. Children who are too large for child safety seats (a child restraint system for children from birth to 4 years old) are often restrained improperly or not at all. These children should be restrained in a booster seat which is a type of child safety seat designed for children who have outgrown their convertible seat and are not large enough to fit properly in an adult seat belt. For this reason, the use and correct use of occupant protection for 4-9 year old children in particular needs to be addressed.

For proper restraint, children who have outgrown child safety seats require booster seats used with vehicle lap/shoulder belts. This present study attempted to determine if raising risk perception and/or lowering cost of compliance would influence more parents to purchase booster seats for their children who should be restrained in them.

A field study with 128 participants with four treatment groups was conducted to test the following two hypotheses. 1) Informational pamphlets and dollars off coupons will reduce compliance cost and thereby induce the purchase of booster seats, 2) informational pamphlets will increase risk perception. Of the 128 participants, 37 (from various treatment groups) purchased booster seats,
and 100% of those who purchased, reported that they use them each time their child rides in a vehicle.

Unlike previous studies on risk perception of consumers, this study went beyond post measures of attitude change and assessed actual purchase behavior through self-reports from the participants. In so doing, this study was able to draw inferences about the effects of the interventions on purchase behavior. The analyses indicated that intervention of any kind was more effective than no intervention in influencing the purchase of a booster seat. Thus, the intervention encouraged adoption of a safety product.

This study hopes to achieve a change in people’s perception of booster seats regarding the safety of children in vehicles. In addition, possibly influencing future legislation regarding child passenger safety.
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Table of Contents

Acknowledgements ........................................................................................................ iv
List of Figures................................................................................................................... vi
List of Tables.................................................................................................................... viii
1. Introduction ..................................................................................................................... 1
   1.1 Rationale................................................................................................................. 1
2. Review of Literature ...................................................................................................... 9
   2.1 Developmental Aspects of Children Related to Occupant Protection .................. 9
   2.2 Consequences for Non-Restraint Use ................................................................. 11
   2.3 What is a Booster Seat and How Does it Work?............................................... 14
   2.4 Risk Perception and Warnings............................................................................ 16
   2.5 Child Safety Seat Laws in the United States....................................................... 20
3. Experimental Method ................................................................................................. 23
   3.1 Research Objectives............................................................................................ 23
   3.2 Experimental Hypotheses.................................................................................... 24
   3.3 Participants.......................................................................................................... 24
   3.4 Experimental Design......................................................................................... 25
   3.5 Experimental Procedures................................................................................... 28
4. Results And Discussion ............................................................................................... 31
   4.1 Survey descriptive statistics.............................................................................. 31
   4.2 Overview of analyses......................................................................................... 32
   4.3 Descriptive statistics on purchase behavior...................................................... 33
   4.4 Hypothesis 1: Effect of treatment on purchase behavior................................. 33
   4.5 Self reported results of post-test 2 questionnaire.............................................. 36
   4.6 Hypothesis 2: Effect of treatment on risk perception......................................... 40
   4.7 Further analyses on effect of child age group on risk perception......................... 46
5. Conclusions ................................................................................................................. 47
6. Topics for future research .......................................................................................... 50
7. References..................................................................................................................... 52
Appendix A ....................................................................................................................... 60
Appendix B ....................................................................................................................... 63
Appendix C ....................................................................................................................... 65
Appendix D ....................................................................................................................... 70
Appendix E ....................................................................................................................... 74
Appendix F ....................................................................................................................... 76
LIST OF FIGURES

Figure 1. Close to lower bound for booster seat use. Four years, 42 pound child, 
booster seat allows for properly fitting adult seat belt. .................................3
Figure 2. Close to upper bound for booster seat use. Seven years, 55 pound 
child, booster seat allows for properly fitting adult seat belt .........................4
Figure 3. Close to lower bound for booster seat use. Four years, 42 pound child, 
adult seat belt does not fit properly, should be in a booster seat. .....................6
Figure 4. Close to the upper bound for use of booster seat. Seven years, 55 
pound child, adult seat belt does not fit properly, should be in a booster seat. 7
Figure 5. Low shield booster seat. ......................................................................14
Figure 6. A variety of belt-positioning booster seats......................................15
Figure 7. Experimental design for treatments..................................................25
Figure 8. Number of participants who purchased a booster seat within each 
treatment........................................................................................................33
Figure 9. Individual risk perception questions included in the pre- and post-test.42
Figure 10. Trial effect on risk perception pre- and post-test. ..............................44
Figure 11. Risk perception pre-test and risk perception post-test by gender. .....46
LIST OF TABLES

Table 1. Descriptive statistics by age category and gender. ....................... 32
Table 2. A 2 x 2 contingency table of treatment and purchase behavior........ 34
Table 3. A 2 x 2 contingency table of treatment and control group by purchase
behavior. .................................................................................................... 34
Table 4. A 2 x 2 contingency table of pamphlet + coupon group and control group
by purchase behavior. ............................................................................. 35
Table 5. A 2 x 2 contingency table of pamphlet group and control group by
purchase behavior. .................................................................................. 35
Table 6. A 2 x 2 contingency table of coupon group and control group by
purchase behavior. .................................................................................. 36
Table 7. Reasons given for not purchasing a booster seat. .......................... 37
Table 8. Reasons given that would motivate purchase of a booster seat. ........ 39
Table 9. Table of means for each risk perception question included in the pre-
and post-tests. ......................................................................................... 41
Table 10. Means of risk perception pre-test and post-test by gender. .......... 45
1. INTRODUCTION

1.1 Rationale

Motor vehicle crashes remain a leading cause of death and injury for US children, despite improved crashworthiness of vehicles and effective restraint systems for children of all ages. According to the Fatal Analysis Reporting System and General Estimates Systems (National Highway Traffic Safety Administration, 1997b), 1,791 children aged 0-14 years sustained fatal injuries and 282,000 were non-fatally injured in motor vehicle crashes in 1997. Approximately 1 out of every 3 injury-related deaths among children aged 12 years and younger is the result of a motor vehicle crash, and these crashes are the leading cause of death for children ages 5-12 (Insurance Institute for Highway Safety, 1997). Every day, an average of eight children under age 15 die and nearly 900 are injured in motor vehicle crashes (National Highway Traffic Safety Administration, 1997d).

Among children ages 15 and under who are fatally injured as occupants of motor vehicle crashes in 1997, more than 60% were not using safety restraints at the time of the collision (National Safety Council, 1998). In the past two decades, with implementation of mandatory restraint-use laws, overall death and injury have decreased, yet non-use and misuse of child restraint systems remain the major risk factors for death and injury to children (National Highway Traffic Safety Administration, 1997d).

In motor vehicles crashes, there are three types of collision forces that can have a lethal impact on passengers. The first is the force directly thrust upon the passenger from the collision between the motor vehicle and another object. The second is any
collision that may occur between the passenger’s body and the interior of the vehicle. The third involves the violent collision of body organs within the body frame. The latter two forces in particular attest to the crucial importance of consistent use of safety restraints in motor vehicles. This is supported by fatality data showing that most people killed in motor vehicle crashes were not using safety restraints, leaving little doubt that the use of seat belts reduces fatalities (Evans, 1986; Sewell et al, 1986).

Children are particularly vulnerable to crash forces, as their bodies cannot tolerate the levels of energy that an adult can, and their dimensions can turn them into missiles in the vehicle during a crash. Thus, children should always be in safety restraints when riding in a motor vehicle. The public generally agrees. Survey data show that the overwhelming majority of the public believes infants and toddlers should always be in safety seats, and that children should be required to use seat belts when they outgrow safety seats (Katcher, Bull, Palmer, Rodgers, Smith, Spivak, and Tully, 1996). While observational data indicate that actions do not always follow words, these surveys still show the majority of children using safety restraints (Boyle and Sharp, 1997).

As more and more children use safety restraints, placing children in inappropriate restraint systems becomes an increasingly serious issue. Infants up to about one year old and at least 20 pounds should ride facing the rear of the vehicle in an infant-only or convertible safety seat (these are child safety seats for children ages birth to 4 years old). Children at least one year old, weighing no less than 20 pounds and up to 40 pounds should ride facing forward in a convertible safety seat.

Children who have outgrown their convertible seats should ride in booster seats until adult belts fit them properly. Booster seats are a type of child safety seat designed
for children who have outgrown their convertible child safety seat. The booster seat raises a child up so that the lap and shoulder belts fit properly. As shown in Figure 1 and Figure 2, seat belts fit when the lap belt stays low and snug across the hips without riding up over the stomach, and the shoulder belt does not cross the face or front of the neck. Even though parents agree that children should be restrained, only 6% of children fitting the weight and size requirements for booster seats use them (Decina and Knoebel, 1996). Only 50% of those restrained in a booster seat are properly secured (Decina and Knoebel, 1997).

![Figure 1. Close to lower bound for booster seat use. Four years, 42 pound child, booster seat allows for properly fitting adult seat belt.](image-url)
Figure 2. Close to upper bound for booster seat use. Seven years, 55 pound child, booster seat allows for properly fitting adult seat belt.

Data from NHTSA’s Motor Vehicle Occupant Safety Survey 1996 (Boyle and Sharp, 1997), indicate that many children are being shifted from child safety seats to seat belts prematurely, before their bodies are large enough for the seat belts to fit them properly (Boyle and Sharp, 1997). Improper fit can lead to injuries in the event of motor vehicle crashes. For example, small children may “submarine” under a loose belt, or lurch forward. Unfortunately, the survey data do not point to any particular reason for the premature shifting to adult safety belts.

Analysis of the National Automotive Sampling System (National Highway Traffic Safety Administration, 1997c) database showed that while children age 6-12 make up
43.1% of the child occupant population, they sustain 55.4% of the injuries. Even when restrained, they are more likely to be injured (37.2% injured compared to 29.2% of younger children). Although the most severe injuries are usually head injuries, restrained older children are more likely to have abdominal or pelvic injuries.

Children who are too large for child safety seats are often restrained improperly or not at all. For this reason, the correct use of occupant protection for children aged 4-9 in particular needs to be addressed. A recent observational study in four states, Mississippi, Missouri, Pennsylvania and Washington indicated that, of children weighing 40-60 lbs., 75% were improperly restrained and 19% were unrestrained (Decina and Knoebel, 1997).

For proper restraint, children who have outgrown child safety seats require booster seats used with vehicle lap/shoulder belts. Lap/shoulder belts usually do not fit children properly until they are 58 inches tall, have a sitting height of 29 inches, and weigh 80 pounds (Klinich, Pritz, Beebe, Welty, and Burton, 1994). Therefore, children less than 10 years old will probably be too small to use a lap/shoulder belt without a booster seat.

As shown in Figure 3 and Figure 4, when smaller children are restrained with only a lap belt or a poorly fitting lap/shoulder belt, the belt tends to ride up onto the abdomen, allowing the pelvis to slide under the belt. This places pressure directly on the abdominal organs and may lead to the child flexing over the belt above the hips, resulting in abdominal and or spinal injuries (Lane, 1994).
Figure 3. Close to lower bound for booster seat use. Four years, 42 pound child, adult seat belt does not fit properly, should be in a booster seat.
Figure 4. Close to the upper bound for use of booster seat. Seven years, 55 pound child, adult seat belt does not fit properly, should be in a booster seat.

The current literature does not address the issues of why parents do not use booster seats after their children no longer fit in a child safety seat and before they properly fit in an adult seat belt. Assumptions can be made as to why parents do not put their children in booster seats. Some assumptions might include, low perception of risk for having a child in and adult safety belt, lack of education, as well as the absence of legislation mandating the use of child restraints until children properly fit in adult safety belts. The current study tested the effectiveness of an intervention to raise risk perception in parents to the point that they will place children in this age and weight range in booster seats. This was achieved by giving parents the information designed
to effectively increase risk perception and reduce the cost of compliance for the booster seat.

The purpose of this study was three-fold: To assess the current risk perception of parents of children who fit the age and weight requirements, to test the effectiveness of lowering the cost of compliance for the purchase of a booster seat, as well as the effectiveness of statistics, warnings and consequences. Risk perception refers to people’s perception, awareness and knowledge of hazards, including potential consequences, associated with a situation or set of circumstances (Slovic, Fischhoff, and Lichtenstein, 1980).
2. REVIEW OF LITERATURE

2.1 Developmental Aspects of Children Related to Occupant Protection

To understand why seat belts do not fit children properly, as well as the consequences of placing children in them, it is imperative to understand the development of their bodies, realizing that children are not miniature adults. Children’s anatomy differs from adults in many ways that cannot be overlooked in the proper selection of developmentally appropriate occupant restraint systems. A classic paper by Burdi, Huelke, Snyder and Lowrey (1969) describes the need for specially designed and selected vehicle restraint systems for children.

Salient features of child development relevant to occupant protection include rapid changes in weight, height, and body proportions. Infants and young children have a disproportionately large head size, high center of gravity, relatively poor head support because of weaker neck structures, soft pliable bones of the skull that are less protective of the intracranial contents, and cartilaginous cervical vertebrae that are being replaced slowly by bone. Skeletal and facial injuries can disrupt growth plates, resulting in subsequent abnormal growth (Burdie et al., 1969).

The abdominal organs, liver, spleen, and kidneys of children are less protected by the rib cage compared to adults, and the bladder is less protected by the bony pelvis, thus making these organs susceptible to injury in a crash. The anterior superior iliac spines, the anchor points for the adult seat belt, are not adequately developed in children younger than 10 years old to function in this capacity, therefore, the belt is neither well positioned nor secure (Burdie et al., 1969).
The ratio of sitting height to total height decreases with growth. The curvature of
the vertebral spine and the tilt of the pelvis result in children not sitting upright, so adult
seat belts designed for upright posture do not fit well. Posture changes with growth,
allowing the child to assume an erect posture. However, behavioral characteristics of
the child, such as the inability to sit still and perfectly erect for a sustained period of
time, often result in the child either maneuvering out of the system or altering the fit
(Burdie et al., 1969).

Adult belts tend to ride up over the abdomen and place the load directly on the
abdomen. The child is at risk for flexing over the belt in a crash and for the pelvis to
submarine under the belt. The seat-belt syndrome, a spinal fracture (usually lumbar or
sacral) associated with an internal abdominal injury, is related to compression of internal
abdominal organs and hyperflexion of the spine over the lap belt system. Lap/shoulder
belts may be similarly problematic. The cervical seat-belt syndrome, fractures or
fracture-subluxations of the proximal cervical spine with or without head injuries, may
result from hyperflexion of the neck over the secured torso. The buckle of the
lap/shoulder belt may sit high against the child’s abdomen and slide up during a
collision, thereby increasing the chance of submarining under the belt. The shoulder
portion of the belt does not sit on the average child’s shoulder, but rather either lies
against the child’s neck or is placed behind the child or under the arm, disrupting the
optimal function of the integral restraint system. Child restraint systems must be
designed to distribute forces over a large portion of the body, protect the organs not well
protected by bony skeletal structures, and account for both the sitting posture of the
child and the inability of the iliac spines to serve as anchor points for the belt systems
(Burdie et al., 1969).
2.2 Consequences for Non-Restraint Use

Johnson, Rivara, and Soderber (1994) noted that although 68% of 5 to 9 year old children were protected in some manner, only 35% were optimally positioned in a booster seat rather than in an adult seat belt. The strongest risk factor for injury was the non-use of restraints, and lap/shoulder harnesses were only 38% effective for 5-14 year olds. The researchers concluded that restraints designed for adults are not as effective for the school-age child as are safety seats for the preschool child (Johnston et al., 1994). Agran, Castillo, and Winn (1992) compared motor vehicle crash injuries of restrained and unrestrained children aged 4-14 years. Analyses were performed separately for ages 4-9 years and 10-14 years because of differences related to the fit of seat belts. The results suggest that lap/shoulder belts may provide less protection for 4-9 year olds than 10-14 year olds (Agran et al., 1992).

Many studies cited in the literature have investigated injury patterns of school-age children involved in motor vehicle crashes as passengers. Some studies have focused on intra-abdominal injuries sustained from belted restraints. Osberg and Di Scala (1992) presented data for 413 children injured severely enough in motor vehicle crashes to require hospitalization. Of the 123 children in this study who were belted 57.1% of them had abdominal injuries alone and 42.9% had abdominal and external injuries (Osberg and Di Scala, 1992).

Sivit, Taylor, Newman, Bulas, Gotschall, Wright, and Eichelberger (1991) researched 61 children who were restrained in lap-styled safety belts as passengers in motor vehicle crashes. Each had linear ecchymosis or bruising across the abdomen. After more extensive tests in the hospital 13 children had lumbar spine injuries and 14
had injured a hollow viscus (bowel or bladder), five children had both spine and hollow viscus injuries (Sivit et al., 1991). Tso (1993) conducted a statewide research effort in Maryland with pediatric abdominal injuries in restrained (in an adult safety belt) automobile passengers. Forty-two children's records were examined of which 19 sustained belt related abdominal wall bruising or erythema. Twenty-three children had abdominal visceral injuries without external seat belt marks (Tso et al., 1993).

Spinal injuries have been studied in unrestrained and improperly restrained children in motor vehicle crashes. In a study conducted by Givens, Polley, Smith, and Hardin (1996) 20 patients aged 8 years or less who were restrained in lap-shoulder safety belts were investigated. Of the 20 patients, 10 had low cervical spine injuries (below C4) and the other 10 had isolated cervical spine injuries. It is concluded in this study that the occurrence of cervical spine injuries despite lap-shoulder belt use suggests that efforts should be focused on refinement of motor vehicle restraint devices in young school-aged children (Givens et al., 1996).

Thirty-five children with lumbar spine injuries were evaluated by Glass, Sivit, Strum, Bulas, and Eichelberger (1994) of which the majority of these children (31) were injured in motor vehicle crashes. Most of them (27 of 35, 77%) were restrained by lap-styled safety belts. These 27 children suffered from linear abdominal or flank ecchymosis, described as lap-belt ecchymosis (Glass et al., 1994). Strum, Glass, Sivit and Eichelberger (1995) identified seven children diagnosed with compression fractures. All seven patients were restrained with adult lap-type seat belts at the time of their injury. Four of the seven patients sustained associated injuries. One child died on the day after admission of a massive closed head injury. All of the six that survived had abdominal wall contusions consistent with lap-belt injuries (Sturm et al., 1995).
Other studies have focused on spinal and intestinal injuries. Ten children in a study conducted by Newman, Bowman, Eichelberger, Botschall, Taylor, Johnson and Thomas (1990) sustained lap-belt injury. In this study there were five children with lumbar spine injury, four with combined lumbar spine and intestinal injuries and one child with intestinal injuries. All ten children presented with a characteristic transverse abdominal ecchymosis (Newman et al., 1990). In a study conducted by Reid, Letts, and Black (1990) seven cases of "chance" fractures or flexion distraction spinal injury were reported. These chance fractures were particularly noted in the children restrained only by the lap belt of the vehicle (Reid et al., 1990).

Safety belts do reduce morbidity, but a school-age child may sustain abdominal or spinal injury as a result of using a seat belt. Findings from the above mentioned studies indicate that incorrect positioning of lap/shoulder restraints place children at an increased risk of injury. Seat belts are designed for adults, and the younger or smaller child with a stature less than that of the smallest adult may have an inherent injury potential.

Belt fit is seldom good for this age group, according to a study from NHTSA released in 1994 (Klinich et al., 1994). The study looked at sizes of children in the 6-12 age group and used a representative sample to test the restraints in three models of vehicles: a mini-van, a compact car, and a mid-sized car. The children's fit in the lap/shoulder belts was best in the compact car and worst in the mini-van.

One significant cause of poor belt fit was the “slouch factor.” This occurred because the vehicle seats were deeper than the length of the child's body from buttock to knee, so the child was unable to bend the legs naturally without slumping. When the children tried several models of belt-positioning boosters, the fit of the belts was
considerably improved. The study determined that most “adult” belt systems do not fit children under 4’5” (seated height of about 30”) and under 80 pounds (Klinich et al., 1994).

2.3 What is a Booster Seat and How Does it Work?

There are two types of booster seats available for children weighing more than 40 pounds and who have outgrown the convertible seats: low-shield (see Figure 5) and belt-positioning (see Figure 6) booster seats. Belt-positioning boosters use the lap/shoulder belt in the vehicle and provide upper torso restraint. Shield boosters are the only option for vehicles that have only lap belts and were once recommended when no shoulder belts were available. They do not meet current federal standards for children over 40 pounds and should not be used, and thus will not be considered further in this study.

Figure 5. Low shield booster seat.
Figure 6. A variety of belt-positioning booster seats.

Booster seats help prevent injuries and correct the incompatibility of fit between the child and the adult seat belt by helping to position the lap and shoulder belts properly across the pelvis and shoulder. Booster seats may also help make safety belts more comfortable for children, decreasing the likelihood that children will place the shoulder belt under their arm, behind their back, or remove the safety belt altogether. They are designed to decrease the potential for the “lap belt syndrome,” which is
caused by the belt riding up onto the abdomen of the child and the child hyperflexing over the belt.

As stated in a previous section, one of the assumptions that can be inferred for non-use of booster seats is that of perceived risk tied to using booster seats.

2.4 Risk Perception and Warnings

Risk perception is a term that refers to people’s perception, awareness and knowledge of hazards, including potential consequences, associated with a situation or set of circumstances (Slovic et al., 1980). An important factor in considering the hazards associated with any situation or product is the perception or knowledge of the people involved. However, an understanding of people’s knowledge about a particular hazard or situation is not always an adequate basis for making decisions about warning designs. An important consideration is what knowledge they have available at the time the warning is needed (Wogalter, DeJoy, and Laughery, 1999).

A number of studies have shown that people tend to base their decisions to protect themselves upon degree of perceived risk. Wogalter et al. (1987) reported that perceived hazardousness correlated highly with the degree of precaution reported by subjects when using a product. It is generally believed that safe behaviors become more likely to the extent the product is perceived as being dangerous, or conversely, become less likely if a product is perceived as being safe (Wogalter et al., 1987).

Perceptions of risk seem to be determined by the perceived severity and probability of accidents associated with an activity (Slovic et al., 1980). Perceived severity of injury has been found to be the best single predictor of perceived risk to date. Probability of injury provided a small but significant increment in the prediction of
perceived risk (Wogalter et al., 1987). A benign or aversive experience may influence perceived risk. Based on research in the field of people’s responses to natural disasters, Dorris and Purswell (1977) concluded that the extent to which a product is perceived to be hazardous is influenced by past experience with the product. If a warning is presented without an incident occurring, the likelihood of responding to subsequent warnings is lessened.

The ultimate measure of warning effectiveness is actual behavioral compliance. Wogalter and Dingus (1999) state that given its importance, there are surprisingly few behavioral studies in the warnings literature, probably because their implementation is difficult and behavior is difficult to measure. Many studies use questionnaires to measure behavioral intentions to warning-related variables. Nevertheless, sometimes questionnaire studies that include measures of behavioral intention are the best one can do given limited resources (Wogalter and Dingus, 1999) and due to ethical constraints.

The behavior of other people has been found to have a very strong influence on warning compliance. A study conducted by Wogalter, McKenna, and Allison (1988) reported 100% compliance by subjects when a confederate complied with a warning. Whether or not the high degree of compliance was mediated by increased risk perceptions due to other people’s safe behavior is unknown.

Wogalter, DeJoy, and Laughery (1999) outline a model of human information processing applied to the processing of warning. When viewing warnings humans undergo a series of mental operations. They discuss a five stage process which includes information arrival at the senses, comprehension and memory, perceived hazard and familiarity, compliance decision, and finally, correct safe behavior, which is the ultimate desired outcome of a warning (Wogalter et al., 1999).
Comments obtained during focus groups in a study by Bradbard and Lisboa-Farrow (1995) suggest that emphasizing the use of car seats must be a life-or-death matter. Furthermore, participants indicated they would likely act on the basis of the message conveyed by advertisements which were direct, non-ambiguous, and forceful. In addition, participants were told that between 70-90% of car seats are misused, and the focus groups agreed that, given this information, they would want a knowledgeable person to look at their car seat for correct installation (Bradbard and Lisboa-Farrow, 1995).

While the respondents in this study generally agreed that it is equally important to have an infant or a toddler secured in a car seat, most acknowledged that they are less likely to insist their toddler be in a car seat. They speculated that one reason for this is that mothers of newborns and infants tend to be more protective of their children than do mothers of toddlers. Some reported that mothers tend to view newborns as helpless, and tend to view toddlers as physically confident to protect themselves in the event of a crash. Participants also felt that toddlers can, both verbally and physically, demonstrate their displeasure about being restrained in a car seat through persistent protests, and for some parents the protests are so aversive they choose not to use the restraint system (Bradbard and Lisboa-Farrow, 1995).

In a 1996 NHTSA study (Boyle and Sharp, 1997), staying for a short time in the car was the most frequently mentioned reason drivers gave for not placing their children in car seats. The second most mentioned reason was “the child doesn’t like it,” followed by “no room in the car.” The study also stated other reasons for children under age 6 not being in car seats. These include such statements as, “the child uses a seat
belt,” “the child is too big for a child seat,” “the child doesn’t like it,” “won’t stay in it,” and “they don’t own a car seat” (Boyle and Sharp, 1997).

Rosenfeld and Sandhu (1996) randomly sampled caregivers by questionnaire to determine the prevalence of injury counseling opportunities. They found that substantial opportunities existed for injury prevention counseling. They also noted a significant negative association between children’s ages and regular use of seat belts. Use of car seats or seat belts decreased from 97% for infants and toddlers, to 91% for younger children, to only 79% for older children ages 5 to 10.

Intervention strategies using multiple approaches have suggested effectiveness in reducing motor vehicle occupant injuries in children less than 5 years. A report from the Massachusetts Statewide Childhood Injury Prevention Program that used multiple approaches documented decreased motor vehicle occupant injuries in children ages 0-5 years (Guyer, Gallagher, Chang, Azzara, Cupples, and Colton, 1989). Examples of the multiple approaches included prevention counseling by the pediatrician, exposure to prevention programs via media and community presentations, and a child auto restraint legislative law enacted in the Commonwealth of Massachusetts (Bass, Mehta, and Ostrovsky, 1991; Guyer et al., 1989). Over a two year period, Guyer et al. (1989) found a 55% reduction in motor vehicle occupant injuries among households with children ages 0-5 years in the communities in which these interventions took place.

A NHTSA study (Decina and Knoebel, 1996) addressing the patterns of child safety seat misuse had findings which suggested that child weight, family relationship (e.g., parent, grandmother, grandfather, etc.), driver restraint use, and passive occupant protection systems were related to child safety seat use and misuse. However, other factors, such as driver gender and age, driver travel distance and time, driver familiarity
with vehicle, number of vehicle occupants, child safety seat acquisition patterns, and
target child seat position, showed little if any relationship with child safety seat use or
misuse.

In a two-decade review of child health education research, Pless and Arsenault
(1987) concluded that traditional community-education methods are generally
ineffective. Rather, they concluded that those programs which target specific groups
and combine education with legislation or social learning principles are much more
effective and successful (Pless and Arsenault, 1987). Numerous studies have
established the motivating benefits of educational programs in conjunction with extrinsic
rewards (Geller, 1989; Geller, 1998; Geller, Davis, and Spicer, 1983; Geller, Rudd,
Kalscher, Streff, and Lehman, 1987; Lehman and Geller, 1990). However, the lack of
long-term impact, once the extrinsic rewards are withdrawn, have raised questions
(Geller, 1989; Geller et al., 1987; Lehman and Geller, 1990).

2.5 Child Safety Seat Laws in the United States

Low usage rates of booster seats may in part be attributed to gaps in child
passenger safety laws and seat belt laws which often leave children ages 4 through 16
unprotected. For example, under most states’ provisions, a 10 year-old can ride
legally in the back seat unrestrained because seat belt laws only apply to front seat
occupants. Many states fail to address the issue of children as passengers in the cargo
area of pickup trucks. Examples of gaps include laws which do not cover children up to
16 years, and which allow young children to be in seat belts instead of child restraint
seats.
No states have provisions for 4-9 year old children to be restrained in child safety devices at this time, despite the serious misfit problems described earlier. Furthermore, there are some states, e.g. Connecticut, Michigan, New Jersey, New Mexico, South Carolina, South Dakota and Texas, that allow 1-, 2-, and 3-year-olds to substitute adult safety belts for child safety seats. Other gaps, such as exemptions for out-of-state and overcrowded vehicles and exemptions if the driver is not the child’s legal guardian, make it even more difficult to reduce injuries. As of January 1, 1998, all states have child restraint use laws that require protection for children under 4 years of age, with a few states less than 5 years of age (National Highway Traffic Safety Administration, 1998).

The state of Virginia, in which the current study takes place, has child passenger safety laws that state children under 4 years old must be in a child safety seat and that a seat belt may be substituted for a child safety seat between the ages of 4 and 16. See Appendix A for a full list of child restraint and safety belt laws, for children under the age of 16, throughout the US. However, these laws do not necessarily mandate child safety seats as the required form of child restraint.

Research has shown that legislation and its enforcement can have a powerful effect upon increasing passenger restraint use (Centers for Disease Control, 1993; Geller, 1998; Guerin and MacKinnon, 1985; National Highway Traffic Safety Administration, 1997a; Rivara, Thompson, and Cummings, 1999; Wagenaar and Webster, 1985). It is interesting to note that even adult safety belt laws have an effect on the increased number of children riding in child safety seats (Centers for Disease Control, 1993).
Therefore the purpose of this study was to implement a field experiment to assess current risk perception about booster seats, to explore influences on risk perception using information as an intervention and to test the effectiveness of incentives in reducing cost of compliance.
3. EXPERIMENTAL METHOD

3.1 Research Objectives

This project investigated current risk perception among parents whose children are not using booster seats but should be, according to their age, and weight. Follow-up risk perception after exposure to a pamphlet containing a warning label, statistics, and consequences regarding nonuse, as well as the amount of change in risk perception, was evaluated as a function of reading the pamphlet and/or receiving a coupon towards the purchase of a booster seat. For the purposes of this study "risk perception" was operationally manipulated through the inclusion or exclusion of an informational pamphlet describing the hazards associated with not using booster seats. In addition, purchase behavior and opinions regarding booster seats and general child safety while driving in a vehicle measured risk perception.

The focus of this research was to:

1. Investigate current risk perception of parents, selected from customers of a local retail store that sells children's merchandise, who have children aged 3.5-8 years old and weigh 35-80 pounds, who are not restrained in a booster seat, but should be.
2. Assess the amount of change in risk perception after being exposed to an informative pamphlet, a coupon (for the reduction of cost for a booster seat), or both the pamphlet and coupon, and determine whether these interventions were sufficient to influence the purchase and use of a booster seat.
3.2 Experimental Hypotheses

The following hypotheses were formulated:

_Hypothesis 1:_ The experimental treatment groups (pamphlet + coupon, pamphlet, coupon) will reduce compliance cost and thereby induce purchase of booster seats compared to the control group.

_Hypothesis 2:_ The experimental treatment groups (pamphlet + coupon, pamphlet) will increase risk perception.

3.3 Participants

One hundred twenty eight (32 per each of four groups) volunteers were selected (see Appendix B for screening questionnaire) from customers walking into a retail toy store in a southwest Virginia community. All participants had a child who was 3.5-8 years of age and 35-80 pounds (the child did not need to be present at that time). Each child was not currently using a booster seat in the vehicle in which he/she was primarily transported.

Participants were identified in the study using a coding scheme to maintain anonymity (e.g., Subject 1 = S001). All participant information and data sheets were confidential. The participants were compensated for their time and participation by being entered into a drawing for a free color television. Participants were allowed to withdraw from the study at any time without penalty.
3.4 Experimental Design

Figure 7 presents the experimental design that was used in this study. The between-subjects study evaluated whether an increase in the participants’ risk perception induced the purchase of a booster seat after exposure to one of the following conditions: 1) a pamphlet and coupon, 2) a pamphlet, 3) a coupon, or 4) no treatment at all (control group). In addition, the effect of each condition on the purchase rate of a booster seat was determined. The dependent variables were the participants’ change in risk perception and whether they purchased the product. All participants were randomly assigned to one of the four groups.

<table>
<thead>
<tr>
<th>Experimental Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Group 1</td>
</tr>
<tr>
<td>Group 2</td>
</tr>
<tr>
<td>Group 3</td>
</tr>
<tr>
<td>Group 4 (Control Group)</td>
</tr>
</tbody>
</table>

O_A = Pre-test: Risk perception evaluation - written questionnaire and first entry for a color television (time 1).
O_B = Post-test 1: Risk perception evaluation - written questionnaire (time 2).
O_C = Post-test 2: Purchase behavior evaluation - telephone questionnaire and second entry for a color television (time 3).
X_1 = Treatment 1: Pamphlet
X_2 = Treatment 2: Coupon

Figure 7. Experimental design for treatments.
Pre-test – The pre-test questionnaire consisted of questions pertaining to the participant's background and basic risk perception issues having to do with child car seats. Items containing Likert-type scales were used, as well as demographic questions (see Appendix C).

Post-test 1 – The post-test 1 questionnaire consisted of the same questions contained in the pre-test questionnaire in order to assess the change in risk perception after being subjected to the pamphlet. Questions using Likert-type scales were used (see Appendix D).

Post-test 2 – A telephone call was placed to the participant 30 days after the risk perception measure to find out whether or not they had purchased a booster seat. Participants who reported "yes" were asked why they bought a booster seat, the name of the manufacturer, and how often they were using it. In addition, if the participant did purchase a booster seat, they were asked if anything unusual had happened in the past 30 days, such as a car crash involving a family member or a friend. If they did not buy a booster seat, they were asked, why not, and what it would take to get them to buy one (see Appendix E).

Pamphlet – The pamphlet contained a warning label, a true story of a child who was killed because he was restrained in an adult seat belt instead of a booster seat, statistics, and consequences of nonuse. These features were included because previous researchers determined that they were the factors that would have the strongest influence on risk perception and cost of compliance (DeJoy, 1989; Wogalter, 1988; Wogalter and Dingus, 1999). The statistics which were included, but not limited to, were use and nonuse, fatalities, injuries, age and
weight of the child, and growth issues. Statistics were communicated using the format found most effective by Conzola and Wogalter (1998). In addition, Young and Laughery (1994), as well as Schacherer (1993), found that intentions to behave in a safe manner were affected by three psychological components: 1) variables related to perceived severity of the hazard/injury, 2) the novelty of the hazard and whether exposure was voluntary, and 3) how familiar the product or item was to the person. Each of these three components was applied in the pamphlet used in this study (see Appendix F).

Coupon – A discount coupon was given for any high back booster seat at the retail store where the experiment was conducted. The store and experiment sponsor split the cost of the discount. The coupons’ value of $30.00 represented a 30-60% discount off of a high back booster seat, which ranged from $50-$100 (see Appendix G).

Threats to internal validity must be taken into account when engaging in this type of study. One threat to internal validity was experimental mortality or differential loss of respondents from the comparison groups, which is a typical challenge for researchers conducting field studies that require repeated contact with participants. Given these challenges, and to minimize the impact of experimental mortality, participants were offered an incentive to stay in the study. The incentive was two opportunities for entrance into a drawing for a color television.
3.5 Experimental Procedures

Participants were recruited at a local store that sells merchandise for children. The pre-test and post-test 1 were administered to participants on the same day, with all groups completing the questionnaires within one weekend. Each day was dedicated to two of the four treatment groups. On day one, participants were assigned to the second and fourth intervention groups (groups not receiving a coupon) and on day two, participants were assigned to intervention groups 1 and 3 (groups receiving a coupon). The groups that did not receive coupons were assigned on the first day in an attempt to avoid participants seeing others walking around the store with coupons and wondering why they did not receive one.

Thirty days after each participant answered pre-test and post-test 1, they were telephoned and asked questions from post-test 2 regarding purchase behavior.

The four groups received treatments as follows:

**Group 1:**

Group 1 was given a pretest questionnaire and then administered a pamphlet to read. After reading the pamphlet, they answered post-test questionnaire 1. Participants were given a discount coupon for a booster seat at that retail store, and were asked if the experimenter could call them in 30 days to complete the short post-test questionnaire 2.

**Group 2:**

Group 2 was given a pretest questionnaire and then given a pamphlet to read. After reading the pamphlet, they answered post-test questionnaire 1. They were then asked if they could be called in 30 days to complete the short post-test questionnaire 2.
Group 3:

Group 3 was given pre-test questionnaire 1. They were given a discount coupon for a booster seat at that retail store and they were asked if they could be called in 30 days to complete the short post-test questionnaire 2.

Group 4:

Group 4 was the control group. They received no pamphlet or coupon, and entered the experiment at pre-test 1. They were then asked if they could be called in 30 days to complete the short post-test questionnaire 2.

As the potential participants entered the retail store they were approached and asked if they had a child between the ages of 3.5 and 8 years old. If no, they were thanked for their time. If yes, they were asked for the child's weight and whether or not the child currently sits in a booster seat. If the weight of the child was between 35 and 80 pounds and the child was riding in the vehicle in anything but a booster seat they were entered into the study.

At the onset of the study, the participant was required to read and sign an informed consent that consisted of a short general purpose statement that had been approved by the Virginia Polytechnic Institute and State University IRB Committee (IRB #99-341). All participants were offered a copy of the consent form to retain for his or her records. Participants were informed within the written instructions to notify the experimenter if they did not have a child who fit the above-mentioned description.

Participants were given written general instructions prior to being administered their pre-test questionnaire. The pre-test consisted of seven questions having to do with the participants’ perceived awareness of the risk and injury associated with not placing children in booster seats when they should be restrained in them. Once the pre-test
was completed, each participant was exposed to the treatment(s) or non-treatment associated with their randomly assigned condition.
4. RESULTS AND DISCUSSION

4.1 Survey descriptive statistics

Out of 211 potential participants approached by the experimenter, 128 (61%) volunteered to participate in the study, 40 (19%) refused participation and 43 (20%) had children who were already in booster seats. The acceptance rate was probably higher than in other field studies targeting consumers because of the incentive offered (at the onset of the experiment each participant was made aware that their name would be placed into a drawing for a color television). The major factor for refusal was time constraints. For example, participants would say that their child had to get to a birthday party, or that they had just run into the store for a quick purchase and their family was waiting in the car outside. The sample consisted of 28 males and 100 females. Descriptive statistics by age category and gender are included in Table 1. The majority of the participants were between the ages of 26 and 40 (77%).

At the end of each participant's final questionnaire on the initial treatment day, each participant gave permission for the experimenter to call them in 30 days to ask some follow up questions (post-test 2). As many as four call backs per participant were made because participants were unavailable at the time of the initial call. A 100 percent response rate was obtained for post-test 2, which was conducted over the telephone. This is a very high response rate in survey research, and is a result of the four callbacks that captured participants who were not available at the time of the initial call.
Table 1. Descriptive statistics by age category and gender.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 20 years</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>20 - 25 years</td>
<td>3</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>26 - 30 years</td>
<td>5</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>31 - 35 years</td>
<td>7</td>
<td>29</td>
<td>36</td>
</tr>
<tr>
<td>36 - 40 years</td>
<td>8</td>
<td>31</td>
<td>39</td>
</tr>
<tr>
<td>41 - 45 years</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>46 - 50 years</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Over 50 years</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>100</td>
<td>128</td>
</tr>
</tbody>
</table>

4.2 Overview of analyses

Different analyses were performed to test the hypotheses. In the first analysis, a Fisher’s exact test was used to determine the effects of treatment on purchase behavior. In addition, a repeated measures analysis of variance (ANOVA) was used to determine the effects of treatment and other independent variables, such as gender and child age group, on change in risk perception for pre-test (trial 1) to post-test 1 (trial 2). Finally, a multivariate analysis of variance (MANOVA) and subsequent univariate ANOVAs were performed in an attempt to determine which pairs of risk perception questions in the pre- and post-tests had the most impact on any significance found in previous analyses.
4.3 Descriptive statistics on purchase behavior

Of the 37 participants who purchased a booster seat, there were 11 (34%) in the coupon + pamphlet group, 12 (38%) in the pamphlet only group, 13 (41%) in the coupon only group, and 1 (3%) in the control group (see Figure 8).

![Number of Participants Who Purchased a Booster Seat Within Each Treatment](image)

**Figure 8.** Number of participants who purchased a booster seat within each treatment.

4.4 Hypothesis 1: Effect of treatment on purchase behavior

To test the first hypothesis, that treatment will have an effect on purchase behavior, analyses were conducted using Fisher's exact test. A 2 x 2 Fisher's exact test, using treatment and purchase revealed a significant chi-square value, $\chi^2 (3) = 14.10$, $p < 0.001$, indicating there were significant differences across groups (see Table 2).
Table 2. A 2 x 2 contingency table of treatment and purchase behavior.

<table>
<thead>
<tr>
<th></th>
<th>Pamphlet</th>
<th>No Pamphlet</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coupon</td>
<td>11</td>
<td>13</td>
<td>24</td>
</tr>
<tr>
<td>No Coupon</td>
<td>12</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>23</strong></td>
<td><strong>14</strong></td>
<td><strong>37</strong></td>
</tr>
</tbody>
</table>

The coupons were saved and returned to the experimenter by the retail store. They were used to verify that an actual purchase was made after a participant reported a purchase. There was a 100% agreement of purchase between the participants' self-reports and their returned coupons. It can be inferred from this agreement that the self-reports of purchase from the pamphlet only and control groups were true.

Further, the identical $\chi^2$ was calculated when experimental intervention groups were combined and compared to the control group (see Table 3 for the 2 x 2 contingency table of raw data).

Table 3. A 2 x 2 contingency table of treatment and control group by purchase behavior.

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>No Treatment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase</td>
<td>36</td>
<td>1</td>
<td>37</td>
</tr>
<tr>
<td>No Purchase</td>
<td>60</td>
<td>31</td>
<td>91</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>96</strong></td>
<td><strong>32</strong></td>
<td><strong>128</strong></td>
</tr>
</tbody>
</table>
In addition, a Fisher's exact test comparing the control group with each separate treatment revealed significant differences (see Tables 4, 5, 6). When looking at all treatment groups, significantly more participants from the pamphlet + coupon, pamphlet only, and coupon only groups purchased a booster seat as compared to the control group. However, comparisons between experimental intervention groups revealed no significant differences.

Table 4. A 2 x 2 contingency table of pamphlet + coupon group and control group by purchase behavior.

<table>
<thead>
<tr>
<th></th>
<th>Pamphlet + Coupon</th>
<th>No Pamphlet or Coupon</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase</td>
<td>11</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>No Purchase</td>
<td>21</td>
<td>31</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>32</td>
<td>64</td>
</tr>
</tbody>
</table>

Table 5. A 2 x 2 contingency table of pamphlet group and control group by purchase behavior.

<table>
<thead>
<tr>
<th></th>
<th>Pamphlet</th>
<th>No Pamphlet</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase</td>
<td>12</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>No Purchase</td>
<td>20</td>
<td>31</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>32</td>
<td>64</td>
</tr>
</tbody>
</table>
Table 6. A 2 x 2 contingency table of coupon group and control group by purchase behavior.

<table>
<thead>
<tr>
<th></th>
<th>Coupon</th>
<th>No Coupon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>No Purchase</td>
<td>19</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>32</td>
</tr>
</tbody>
</table>

From the above analysis it is clear that when compared with no treatment, both the pamphlet and coupon interventions induced purchase behavior.

4.5 Self reported results of post-test 2 questionnaire

The following is a content analysis on responses to the post-test 2 questionnaire. Of the participants who purchased booster seats, it was self reported that 100% of them were using the booster seat each time their child rode in the vehicle. However, 89% of the participants who purchased seats had not yet sent in their registration card to the manufacturer. Each participant was urged to do so, since that is the only way the manufacturer can apprise purchasers of a product recall and how to remedy the recall. In addition, each participant was asked if anything unusual had happened in the past 30 days, such as a car crash involving a family member or a friend. This question was asked in an attempt to verify that the purchase of booster seats was due to the intervention and not a recent incident that happened to the participant. Five participants who had purchased booster seats reported that a family member or friend was in a crash. The following are the five incidents that were reported:

- Family member in a crash, no injuries, no children in vehicle (2)
- Friend hit a deer, no injuries, no children in vehicle (1)
- Family member in a crash, fatally injured, no children in vehicle (1)
- Friend in a crash, fatally injured, no children in vehicle (1)

All five of the above participants who reported vehicle crashes involving family members or friends had purchased their booster seats before these crashes. It can be inferred that these crashes did not affect their purchase behavior.

Participants who did not purchase a booster seat were asked why not (a list of example reasons were provided including an "other" option) and to identify the one factor that would motivate them to make the purchase (there were no examples of motivators given to the participant). See Table 7 for the reasons given for not purchasing a booster seat. Potential motivators towards the purchase of a booster seat are provided in Table 8.

**Table 7. Reasons given for not purchasing a booster seat.**

<table>
<thead>
<tr>
<th>Reasons for not purchasing a booster seat</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too expensive</td>
<td>4</td>
</tr>
<tr>
<td>Did not feel it was necessary for their child to sit in a booster seat</td>
<td>44</td>
</tr>
<tr>
<td>Planning to buy one but haven't had the chance</td>
<td>5</td>
</tr>
<tr>
<td>Not willing to make their child sit in a booster seat</td>
<td>9</td>
</tr>
<tr>
<td>Feels the seat belt fits the child well</td>
<td>15</td>
</tr>
<tr>
<td>Feels the child is too big to sit in a booster seat</td>
<td>7</td>
</tr>
<tr>
<td>Haven't made the decision to buy one yet</td>
<td>2</td>
</tr>
<tr>
<td>My child is so large now, she wouldn't be able to use one long enough to make it worth my while</td>
<td>1</td>
</tr>
<tr>
<td>Not recommended by my pediatrician</td>
<td>1</td>
</tr>
</tbody>
</table>

(Note that more than one response may have been self-reported by the same participant.)
It is interesting to note that only four participants reported that the reason for not purchasing a booster seat was that the seats were too expensive. This may be one reason that the group that received two interventions (pamphlet + coupon) did not have the highest rate of purchase. It can be inferred that the cost of compliance was not a major issue and that for this group (pamphlet + coupon), the pamphlet was the stronger intervention and the coupon was merely an extra added incentive to purchase.

Forty-four of the participants self-reported that they did not feel it was necessary for their child to sit in a booster seat and 15 participants felt that the seat belt fit their child well. These responses were similar in the sense that they were contrary to the information provided in the pamphlet. Of the 59 participants who gave the above two answers, eight were in the pamphlet + coupon group, eight were in the pamphlet only group, 21 were in the coupon group and 22 were in the control group. While these numbers do not show a significant Chi-square between the groups, when collapsing the two groups that received pamphlets (16) and the two groups that did not receive pamphlets (43), there is a significant difference, $\chi^2 (1) = 12.34, p < 0.001$ between the collapsed groups.

The Communication-Human Information Processing model proposed by Wogalter et al. (1999) may allow speculation of what might have been occurring when participants reported these feelings. It might have been that the participants did not feel that the source of the information being given to them was from a credible source (i.e. from a student at a university versus from their pediatrician or a law enforcement officer), or that the information medium was not presented to them in a manner conducive to their learning style. In addition, it is possible that the participant did not
read the pamphlet (if they received one) carefully enough and thus, did not receive the full impact of the information.

Table 8. Reasons given that would motivate purchase of a booster seat.

<table>
<thead>
<tr>
<th>Reason that would motivate purchase of a booster seat</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing a child who got killed because he/she was not in a booster seat</td>
<td>2</td>
</tr>
<tr>
<td>If it were a law</td>
<td>46</td>
</tr>
<tr>
<td>See another child hurt by not using a booster seat</td>
<td>6</td>
</tr>
<tr>
<td>Nothing would motivate me to purchase a booster seat</td>
<td>9</td>
</tr>
<tr>
<td>If I thought my child was in danger not being in a booster seat</td>
<td>1</td>
</tr>
<tr>
<td>If we had another child</td>
<td>1</td>
</tr>
<tr>
<td>If the booster seats looked different</td>
<td>1</td>
</tr>
<tr>
<td>If I had more information regarding booster seats</td>
<td>1</td>
</tr>
<tr>
<td>If we were traveling a long distance, my child only rides in the car for very short periods of time</td>
<td>1</td>
</tr>
<tr>
<td>Peer pressure at the adult level</td>
<td>1</td>
</tr>
<tr>
<td>If it were free</td>
<td>1</td>
</tr>
</tbody>
</table>

Forty-six participants self-reported that they would only use a booster seat if it were a law to do so. It is possible that these participants merely have a resistance to behavior change. Although the pamphlet contained the story of an actual event ending in fatality, there is a possibility that because it was not a personal event to the participants it did not have as much impact on changing attitudes. It is suspected that these participants did not have an accessible personal event in their memory that might have given them a direct experience to help them form a different attitude toward behavioral change and risk perception (Taylor, Peplau, and Sears, 1997).
According to Geller (1999) and Watson and Tharp (1993), there are three types of behaviors: other-directed, self-directed and automatic. Other-directed behavior occurs from following someone else’s instruction, e.g. an operation manual or a law. Once a person has internalized the appropriate instructions or laws, the behavior becomes a self-directed behavior. Finally, after some behaviors are performed frequently and consistently over a period of time, they become automatic behaviors. It seems that the participants who responded with, "if it were a law", are exhibiting other-directed behavior. Because of the above self-reported response, it is imperative that legislation be changed to include children between the ages of 4 and 8 years in the child safety seat laws.

4.6 Hypothesis 2: Effect of treatment on risk perception

Table 9 shows the means and standard deviations for each of the six risk perception questions given during risk perception pre-test and risk perception post-test. A lower mean value indicates a lower risk perception.
Table 9. Table of means for each risk perception question included in the pre- and post-tests.

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-test Mean(Std. Dev.)</th>
<th>Post-test Mean(Std. Dev.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Up to what age should children have to be restrained in a booster seat?</td>
<td>4.34(1.58)</td>
<td>5.88(1.64)</td>
</tr>
<tr>
<td>2. There should be a law requiring the restraint of children between the ages of 4 and 8 while in a vehicle.</td>
<td>4.72(0.68)</td>
<td>4.45(0.94)</td>
</tr>
<tr>
<td>3. Parents should be required by law to have children under the age of 8 restrained in some type of child car seat.</td>
<td>3.69(1.30)</td>
<td>3.84(1.18)</td>
</tr>
<tr>
<td>4. What do you think the minimum fine should be for violation of child car seat laws?</td>
<td>3.94(2.32)</td>
<td>5.48(1.05)</td>
</tr>
<tr>
<td>5. Booster seats are effective at protecting children up to age 8.</td>
<td>3.55(0.97)</td>
<td>4.08(1.04)</td>
</tr>
<tr>
<td>6. Where do you believe it is safest to place your child in the vehicle?</td>
<td>1.98(0.13)</td>
<td>1.97(0.18)</td>
</tr>
</tbody>
</table>

A MANOVA was performed on the difference scores from the six individual risk perception questions and revealed no significant effect for gender. If only a multivariate test is used effects on individual variables may be missed. Therefore, univariate tests were performed on the six risk perception questions and revealed a significant gender effect on risk perception question #4, $F(1,63) = 5.99, p < .01$ (What do you think the minimum fine should be for violation of child car seat laws?). Figure 9 illustrates the change in risk perception for each of the six risk perception related questions.

A comparison of the means revealed that males had a significantly higher mean ($M = 3.00, SD = 2.71$) than did females ($M = 1.18, SD = 2.29$) for question #4. It can be speculated that males were more strongly affected by the intervention of the pamphlet.
Their stronger punishment orientation (Hartlaub, 1998) was expressed by choosing a higher fine for offenders, as compared to females, from risk perception pre-test to risk perception post-test.

Figure 9. Individual risk perception questions included in the pre- and post-test.

Using the participants' answers to the six risk perception related questions presented in both the pre-test and post-test (only groups who received the informational pamphlet will be analyzed, see Figure 7), two new variables were created, which were a result of the summed responses on each of the six items for each participant. It should be noted that one question was removed from the original seven risk related questions due to evident confusion among the participants regarding the question itself as well as the scale values. These new variables will henceforth be referred to as risk perception
pre-test and risk perception post-test. These variables were treated as dependent variables in the ANOVA models. Means were derived from the sums of each participant’s scores divided by the number of participants.

The risk perception pre-test measure was tested for homogeneity of variance and distribution normality and proved to not have statistically different variances as well as have normal distributions. The following analyses, which tested risk perception pre- and post-test, were performed on only the groups that received the pamphlet intervention (i.e. pamphlet + coupon and pamphlet only) as these were the only groups which completed both pre-test 1 and post-test 1 (see Figure 7).

A one-way repeated measures ANOVA on gender was conducted on risk perception pre- and post-test measures. The ANOVA revealed a significant overall change from risk perception pre-test to risk perception post-test, $F(1,60) = 62.10, p < .0001$, regardless of gender or treatment (see Figure 10). Comparisons of the means showed that risk perception increased significantly from pre-test ($M = 22.22, SD = 4.61$) to post-test ($M = 25.70, SD = 3.66$). This result supported the effect of the intervention.
A significant interaction effect was found for change in risk perception by gender, $F(1,60) = 9.02, p < 0.005$. Post hoc analyses (least squares difference) revealed that males had significant changes from risk perception pre-test to risk perception post-test (see Table 10). In addition, univariate analyses revealed a significant main effect for gender, $F(1,60) = 4.82, p < 0.05$, on risk perception pre-test, while there were no significant main effects for risk perception post-test.
Table 10. Means of risk perception pre-test and post-test by gender.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Risk Perception Pre-test</td>
<td>13</td>
<td>19.76</td>
<td>4.46</td>
<td>11 - 28</td>
</tr>
<tr>
<td></td>
<td>Risk Perception Post-test</td>
<td>13</td>
<td>26.00</td>
<td>3.27</td>
<td>19 - 30</td>
</tr>
<tr>
<td>Female</td>
<td>Risk Perception Pre-test</td>
<td>51</td>
<td>22.84</td>
<td>4.48</td>
<td>11 - 30</td>
</tr>
<tr>
<td></td>
<td>Risk Perception Post-test</td>
<td>51</td>
<td>25.63</td>
<td>3.78</td>
<td>17 - 30</td>
</tr>
</tbody>
</table>

Post hoc analyses (least squares difference) revealed that females (M = 22.84, SD = 4.48) had a significantly higher risk perception pre-test than males (M = 19.77, SD = 4.46, see Figure 11). Since females already had a higher risk perception, a substantial increase in risk perception after intervention would have been difficult to induce. This may be the result of a ceiling effect phenomenon, a reduced likelihood of increasing a score on any measure due to previously high scores on an initial measure (Martin, 2000).
4.7  Further analyses on effect of child age group on risk perception

Using the age of the participants' children, an independent variable was developed with two levels, younger (3.5 - < 6 years of age) and older (6-8 years of age). A one-way repeated measures ANOVA on child age was conducted on risk perception. The analysis revealed a significant overall increase in risk perception, $F(1,60) = 10.41$, $p < 0.005$, regardless of treatment or child age group.
5. CONCLUSIONS

The present study sought to determine if the intervention of pamphlets and coupons could influence purchase behavior and raise risk perception. This study demonstrated that intervention as straightforward as a pamphlet and a coupon could alter how people perceive the risks of not using booster seats.

Unlike previous studies on risk perception of consumers, this study went beyond post measures of attitude change and assessed actual purchase behavior through self-reports from the participants. In so doing, this study was able to draw inferences about the effects of the interventions on purchase behavior. As discussed earlier, the non-parametric analyses indicated that intervention of any kind was more effective than no intervention in influencing the purchase of a booster seat. Thus, the intervention encouraged adoption of a safety product.

Although studies in consumer safety product adoption are few in number, some studies have examined the effect of an intervention on actual behavior. Lagrecque, Dostaler, Houde, Boissonneault, Grimard and Paradis (1994) examined the effect of a pamphlet and coupon on the purchase of bicycle helmets. This research found that pamphlets and coupons could be effective in promoting bicycle helmet purchase, which is very similar to the findings of this study regarding promoting the purchase of booster seats.

According to Fischhoff, Bostrom and Quadrel (2000), people need to understand the risks, as well as the benefits, of their choices concerning the use of certain safety devices before they will adopt the safety device. Several studies have demonstrated Fischhoff's proposition. For instance, Little, Griffin, Kelly, Dickson and Sadler (1998)
found that educational intervention had a highly significant effect on the knowledge of contraception pill rules. The findings of McGuckin, Waterman, Porten, Bello, Caruso, Juzaitis, Krug, Mazer and Ostrawski (1999) documented that education of patients regarding their role in monitoring handwashing compliance among health care workers can increase soap usage and handwashing. In addition, Burton, Waddell, Tillotson and Summerton (1999) found that carefully selected and presented information about back pain can have a positive effect on patients' beliefs.

Several researchers such as Wogalter, Desaulniers, and Brelsford (1987) have demonstrated that both expected frequency of consequences and severity of consequences affect decisions or intentions to act safely. However, it appears that severity of injury has a greater effect than probability on risk perception as Young, Wogalter, and Brelsford (1992) investigated. In addition, Young and Laughery (1994), as well as Schacherer (1993), found that intentions to behave in a safe manner were affected by three psychological components: 1) variables related to perceived severity of the hazard/injury, 2) the novelty of the hazard and whether exposure was voluntary, and 3) how familiar the product or item was to the person. Each of these three components was applied in the pamphlet used in this study.

Beyond the effects of a pamphlet intervention, this study revealed important information about similarities in responses to interventions as well as differences. For example, this study found gender differences at the initial measure of risk perception. Women had higher perceptions of risk related to child safety in vehicles. This finding is supported by previous findings of Mesch (2000), which stated that women have higher perceptions of risk relating to a number of situations and events.
Women are given primary child care responsibilities in the US, which may in turn influence their schemas regarding child passenger safety. Since women are more likely to have played nurturing games in their childhood and to be more nurturing, their risk perceptions that involve children are a reflection of the socialization process (Taylor et al., 1997). Davidson and Freudenburg (1996) reported that the role as nurturer and care provider, a role largely performed by women, is associated with concern about health and safety issues in general, and consequently about environmental risks. This finding is also supported by Geller's (1996) principle that "all perception is biased and reflects personal history, prejudices, motives, and expectations" (p. 243). In that regard, females' higher risk perceptions are a reflection of biases related to history and possibly expectations.

One of the risk perception questions that revealed a significant gender difference was related to fines for people who violated child safety seat laws. Compared to females, males chose higher fines as a penalty for violation of child restraint laws. Based on these results, males seem to have a stronger punishment orientation towards the recommended punishment of criminals, compared to females. A study by Hartlaub (1998) resulted in a similar finding, indicating that males had stronger punishment orientation while females had a stronger rehabilitation orientation (e.g. wanted to educate rather than punish).

According to Geller’s (1996) principle of long-term behavior change, people need "to change inside as well as outside" (p. 243). Consistent with this principle, this study demonstrated changes in attitude (being the inside) and reported differences in purchase behavior (being the outside).
6. TOPICS FOR FUTURE RESEARCH

This study left some questions unanswered. Geller (1996) stated that the current rate of safety belt use in the US is about 67%, which is a dramatic improvement from the 15% compliance rate documented prior to statewide interventions including belt-use laws, educational campaigns, and large-scale enforcement blitzes by local and state police officers. Further studies will assess if similar issues are occurring in the child passenger safety area.

In addition, Geller (1996) has been urging transportation and safety professionals to stop using the term "child restraints" for child safety seats. He suggests that the word restraint implies discomfort and fails to convey the devices' true function and that "child safety device" would be a more appropriate word to use. Further studies will assess if a change in language helps alter attitudes or behaviors of consumers regarding child safety seats.

Another unanswered question is the role of socioeconomic status in the purchase behavior or adoption of a safety product? Some studies such as Reid, McNeil, Williams and Powles (1995) found that pamphlets and counseling did not influence risk perception for low socioeconomic groups. The current study was conducted at a retail store that possibly may not cater to those of lower socioeconomic status. The fact that the sample was not highly diverse in terms of socioeconomic status could explain why cost of compliance was not a major factor in this study. Further studies will be designed to address this question.

In addition, subsequent studies will develop a more reliable measure of risk perception and pilot test the measure to enhance reliability. These studies will be
designed to identify underlying constructs that make up risk perception, in an effort to
design a valid and reliable measure of risk perception.
7. REFERENCES


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OVERVIEW OF UNITED STATES LAWS REGARDING CHILD SAFETY SEATS AND SEAT BELTS
<table>
<thead>
<tr>
<th>State</th>
<th>Safety Seat Age</th>
<th>May Substitute Safety Belt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>Under 6</td>
<td>Either 4 or 5 years of age</td>
</tr>
<tr>
<td>Alaska</td>
<td>Under 4</td>
<td>4 thru 15 years of age</td>
</tr>
<tr>
<td>Arizona</td>
<td>Thru 4 or less than 40 lbs.</td>
<td>No</td>
</tr>
<tr>
<td>Arkansas</td>
<td>Under 4 or less than 40 lbs.</td>
<td>Between 4 &amp; 14 years of age</td>
</tr>
<tr>
<td>California</td>
<td>Under 4 or less than 40 lbs.</td>
<td>No</td>
</tr>
<tr>
<td>Colorado</td>
<td>Under 4 or less than 40 lbs.</td>
<td>No</td>
</tr>
<tr>
<td>Connecticut</td>
<td>Under 4</td>
<td>Between 1 &amp; 4 years of age in rear seat</td>
</tr>
<tr>
<td>Delaware</td>
<td>Under 4</td>
<td>No</td>
</tr>
<tr>
<td>Dist. Of Columbia</td>
<td>Under 3</td>
<td>Between 3 &amp; 6 years of age</td>
</tr>
<tr>
<td>Florida</td>
<td>Under 4 or less than 40 lbs.</td>
<td>Rear seatbelt under 16</td>
</tr>
<tr>
<td>Georgia</td>
<td>Thru 4</td>
<td>3 or 4 years of age</td>
</tr>
<tr>
<td>Hawaii</td>
<td>Under 3</td>
<td>When 3 years of age</td>
</tr>
<tr>
<td>Idaho</td>
<td>Under 4 or less than 40 lbs.</td>
<td>No</td>
</tr>
<tr>
<td>Illinois</td>
<td>Under 4</td>
<td>Between 4 &amp; 6 years of age</td>
</tr>
<tr>
<td>Indiana</td>
<td>Under 3</td>
<td>Between 3 &amp; 5 years of age</td>
</tr>
<tr>
<td>Iowa</td>
<td>Under 3</td>
<td>Between 3 &amp; 6 years of age</td>
</tr>
<tr>
<td>Kansas</td>
<td>Under 4</td>
<td>Between 4 &amp; 13 all seat positions</td>
</tr>
<tr>
<td>Kentucky</td>
<td>40&quot; and Under</td>
<td>No</td>
</tr>
<tr>
<td>Louisiana</td>
<td>Under 5</td>
<td>Between 3 &amp; 5 years of age in rear seat</td>
</tr>
<tr>
<td>Maine</td>
<td>Under 4</td>
<td>Between 4 &amp; 18 years of age</td>
</tr>
<tr>
<td>Maryland</td>
<td>Under 4 or less than 40 lbs.</td>
<td>Between 4 &amp; 16 years of age</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>Under 6</td>
<td>Under 5 years of age</td>
</tr>
<tr>
<td>Michigan</td>
<td>Thru 3</td>
<td>1 thru 3 years of age in rear seat</td>
</tr>
<tr>
<td>Minnesota</td>
<td>Under 4</td>
<td>4 thru 10 years of age in rear seat</td>
</tr>
<tr>
<td>Mississippi</td>
<td>Under 4</td>
<td>No</td>
</tr>
<tr>
<td>Missouri</td>
<td>Under 4</td>
<td>No</td>
</tr>
<tr>
<td>Montana</td>
<td>Under 2</td>
<td>Between 2 &amp; 4 years of age</td>
</tr>
<tr>
<td>Nebraska</td>
<td>Under 4 or less than 40 lbs.</td>
<td>Between 4 &amp; 5 years of age</td>
</tr>
<tr>
<td>Nevada</td>
<td>Under 5 or less than 40 lbs.</td>
<td>No</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>Under 5</td>
<td>5 thru 18 all seating positions</td>
</tr>
<tr>
<td>New Jersey</td>
<td>Under 5</td>
<td>Between 1 1/2 to 5 years of age in rear seat</td>
</tr>
<tr>
<td>New Mexico</td>
<td>Under 5</td>
<td>Between 1 &amp; 5 years of age in rear seat</td>
</tr>
<tr>
<td>New York</td>
<td>Under 4</td>
<td>Over 4 years of age up to age 10</td>
</tr>
<tr>
<td>North Carolina</td>
<td>Under 4</td>
<td>Between 4 &amp; 12 years of age</td>
</tr>
</tbody>
</table>
## STATE HIGHWAY SAFETY LAWS – CHILD PASSENGER PROTECTION

Adopted with permission from the National Highway Traffic Safety Administration

<table>
<thead>
<tr>
<th>State</th>
<th>Safety Seat Age</th>
<th>May Substitute Safety Belt</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Dakota</td>
<td>Under 3</td>
<td>3 thru 10 years of age</td>
</tr>
<tr>
<td>Ohio</td>
<td>Under 4 or less than 40 lbs.</td>
<td>No</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>Under 5</td>
<td>No Under 4 in rear, 4-5 in front or rear</td>
</tr>
<tr>
<td>Oregon</td>
<td>Under 4 or less than 40 lbs.</td>
<td>Over 4 years of age, over 40 lbs.</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>Under 4</td>
<td>Over 4 years of age</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>5 or Under</td>
<td>Over 3 thru 12 years of age</td>
</tr>
<tr>
<td>South Carolina</td>
<td>Under 4</td>
<td>Between 1 &amp; 6 years of age in rear seat</td>
</tr>
<tr>
<td>South Dakota</td>
<td>Under 2</td>
<td>Between 2 &amp; 5 years of age</td>
</tr>
<tr>
<td>Tennessee</td>
<td>Under 4</td>
<td>No</td>
</tr>
<tr>
<td>Texas</td>
<td>Under 2</td>
<td>Between 2 &amp; 4 years of age</td>
</tr>
<tr>
<td>Utah</td>
<td>Under 2</td>
<td>Between 2 &amp; 10 years of age</td>
</tr>
<tr>
<td>Vermont</td>
<td>Under 5</td>
<td>Between 5 &amp; 12 years of age</td>
</tr>
<tr>
<td>Virginia</td>
<td>Under 4</td>
<td>Between 4 &amp; 16 years of age</td>
</tr>
<tr>
<td>Washington</td>
<td>Under 3</td>
<td>Between 3 &amp; 10 years of age</td>
</tr>
<tr>
<td>West Virginia</td>
<td>Under 3</td>
<td>Between 3 &amp; 5 years of age</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>Under 4</td>
<td>Between 4 &amp; 8 years of age</td>
</tr>
<tr>
<td>Wyoming</td>
<td>Under 3 or less than 40 lbs.</td>
<td>No</td>
</tr>
</tbody>
</table>
APPENDIX B

Screening Questionnaire
Screening Questionnaire
(verbally administered by researcher)

1. Are you the parent of a child between the ages of 3.5 and 8 years?
   ☑ Yes (Continue)
   ☑ No (Thank you for your time)

2. If yes, how old is this child? ________________

3. Is this child between 35 and 80 pounds?
   ☑ Yes (Continue)
   ☑ No (Thank you for your time)

4. If yes, how much does this child weigh? ________________

5. How is the child restrained when he or she is riding in your vehicle?
   ☑ No restraint (enter study)
   ☑ Seat belt (enter study)
   ☑ Convertible child safety seat (enter study)
   ☑ Booster seat (Thank you for your time)

6. Were you planning on buying any type of child safety seat today?
   ☑ Yes, what type? ________________ (if booster seat, thank you for your time)
   ☑ No (enter study)

Assigned Participant Number ____________________________
APPENDIX C

Pre-Test Questionnaire
Participant Number __________________

Please complete the following questionnaire by responding to the questions to the best of your ability. There is no “right” or “wrong” answer for each question, and all responses will be kept confidential.

1. Do you wear your seat belt when driving or riding in the front seat of a vehicle?

<table>
<thead>
<tr>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Seldom</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

2. Where do you believe it is safest to place your child in the vehicle?

- Front seat
- Back seat

3. Did your child ride in a child seat during the first 4 years of his/her life?

- Yes
- No

4. Have you ever seen or heard of a type of car seat called a booster seat?

- Yes
- No

5. Have you ever used a booster seat when driving with your child?

- Yes
- No

6. It is important that I always wear my seat belt while in a vehicle.

<table>
<thead>
<tr>
<th>Highly Disagree</th>
<th>Disagree</th>
<th>Not Sure</th>
<th>Agree</th>
<th>Highly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

7. There should be a law requiring the restraint of children between the ages of 4 and 8 while in a vehicle.

<table>
<thead>
<tr>
<th>Highly Disagree</th>
<th>Disagree</th>
<th>Not Sure</th>
<th>Agree</th>
<th>Highly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

8. Parents should be required by law to have children under the age of 8 restrained in some type of child car seat.

<table>
<thead>
<tr>
<th>Highly Disagree</th>
<th>Disagree</th>
<th>Not Sure</th>
<th>Agree</th>
<th>Highly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
9. There should be tougher punishment for not having children between the ages of 4 and 8 restrained in a child car seat.

![Rating Scale]

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Disagree</td>
<td>Disagree</td>
<td>Not Sure</td>
<td>Agree</td>
<td>Highly Agree</td>
</tr>
</tbody>
</table>

10. Booster seats are effective at protecting children.

![Rating Scale]

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Disagree</td>
<td>Disagree</td>
<td>Not Sure</td>
<td>Agree</td>
<td>Highly Agree</td>
</tr>
</tbody>
</table>

11. What is the reason why your child does not always ride in a booster seat while in a vehicle. Check all that apply.

- Uses a seat belt
- Only going for a short ride in the vehicle
- Child doesn't like the booster seat
- In a hurry and don’t have time to buckle the child in the booster seat
- Do not have a booster seat with me
- Child won’t stay in the booster seat
- Child is too big for the booster seat
- No room for the booster seat in the vehicle
- Cannot afford a booster seat
- Other (specify) _______________________________________________________

12. How safe is your child riding in a seat belt?

![Rating Scale]

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Safe</td>
<td>Somewhat Safe</td>
<td>Not Sure</td>
<td>Safe</td>
<td>Very Safe</td>
</tr>
</tbody>
</table>

13. What do you think the minimum fine should be for violation of child car seat laws?

- No Fine
- $1 – 24
- $25 – 49
- $50 – 74
- $75 – 99
- $100 or more
- Don’t know
14. Up to what age should children have to be restrained in a booster seat?

- Under 2 years-old
- Under 3 years-old
- Under 4 years-old
- Under 5 years-old
- Under 6 years-old
- Under 7 years-old
- Under 8 years-old

15. What is your age? _________

16. Are you

- Male
- Female

17. What is your marital status?

- Married
- Divorced
- Widowed
- Separated
- Never been married
- A member of an unmarried couple

18. What is the highest grade or year of school you have completed?

- Some High School
- Completed High School or GED
- Some college
- College Degree
- Some Graduate Work
- Completed Master’s Degree
- Completed Doctorate
- Post-Doctorate Work
19. Which of the following categories best describes your total household income before taxes in 1999?

- Less than $5,000
- $5,000 to $14,999
- $15,000 to $29,999
- $30,000 to $49,999
- $50,000 to $74,999
- $75,000 to $99,999
- $100,000 or more
- Not sure

20. What is your current employment status?

- Employed for wages
- Self-employed
- Out of work
- Homemaker
- Student
- Retired
- Unable to work
APPENDIX D

Post-Test 1 Questionnaire
Participant Number ____________________

Please complete the following questionnaire by responding to the questions to the best of your ability. There is no “right” or “wrong” answer for each question, and all responses will be kept confidential.

1. How safe is your child riding in a seat belt?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Safe</td>
<td>Somewhat Safe</td>
<td>Not Sure</td>
<td>Safe</td>
<td>Very Safe</td>
</tr>
</tbody>
</table>

2. Up to what age should children have to be restrained in a booster seat?

- Under 2 years-old
- Under 3 years-old
- Under 4 years-old
- Under 5 years-old
- Under 6 years-old
- Under 7 years-old
- Under 8 years-old

3. There should be a law requiring the restraint of children between the ages of 4 and 8 while in a vehicle.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Disagree</td>
<td>Disagree</td>
<td>Not Sure</td>
<td>Agree</td>
<td>Highly Agree</td>
</tr>
</tbody>
</table>

4. Parents should be required by law to have children under the age of 8 restrained in some type of child car seat.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Disagree</td>
<td>Disagree</td>
<td>Not Sure</td>
<td>Agree</td>
<td>Highly Agree</td>
</tr>
</tbody>
</table>
5. There should be tougher punishment for not having children between the ages of 4 and 8 restrained in a child car seat.

![Rating scale: 1-5 with options Highly Disagree, Disagree, Not Sure, Agree, Highly Agree.]

6. What do you think the minimum fine should be for violation of child car seat laws?

- No Fine
- $1 – 24
- $25 – 49
- $50 – 74
- $75 – 99
- $100 or more
- Don’t know

7. Booster seats are effective at protecting children.

![Rating scale: 1-5 with options Highly Disagree, Disagree, Not Sure, Agree, Highly Agree.]

8. Where do you believe it is safest to place your child in the vehicle?

- Front seat
- Back seat

9. It is important that I always wear my seat belt while in a vehicle.

![Rating scale: 1-5 with options Highly Disagree, Disagree, Not Sure, Agree, Highly Agree.]


Participant Number __________

May I call you in 30 days to ask you a few more questions? At that time you will be entered into the drawing for the color television for a second time.

⊙ Yes  ⊙ No

If yes, please furnish me with the following information. This information will not be used for any reason other than to call you in 30 days, after which time it will be destroyed.

Name _____________________________________________

Phone Number ______________________________________

What is the best time of the day to reach you?

⊙ Daytime  ⊙ Evening

Is there any particular time in the daytime or evening that you would like to be called?

___________________________________________________

Thank you for your time, and have a nice day.
APPENDIX E

Post-Test 2 Questionnaire
Participant Number _____________________

Please answer the following questions by responding to the best of your ability. There is no “right” or “wrong” answer for each question, and all responses will be kept confidential.

1. Have you purchased a booster seat in the last 30 days?
   ☐ Yes (continue to question 2)
   ☐ No  (continue to question 6)

2. Are you using the booster seat you have just purchased?
   ☐ Yes   ☐ No

3. Who is the manufacturer of your new booster seat?

4. Have you sent in your registration card for the booster seat?
   ☐ Yes   ☐ No

5. Has anything unusual happened in the past 30 days such as a car crash involving a family member or a friend?

Thank you for participating in my study. You will now be entered, for the second time, into the drawing for the color television.

6. If no, why did you not purchase a booster seat in the last 30 days?

7. What would it take to get you to buy a booster seat for your child?

Thank you for participating in my study. You will now be entered, for the second time, into the drawing for the color television.
What is a booster seat?

1. Booster seats are a type of child safety seat designed for children who have outgrown their convertible child safety seat and are not yet big enough to fit in an adult seat belt.

2. The booster seat raises your child up so that the lap and shoulder belts fit properly.

3. The shoulder belt should fit across the shoulder and the lap belt must lie low and flat across the hips.

4. Seat belts are make to fit adults, so if the shoulder belt crosses your child’s throat, or the lap belt crosses the stomach, he or she is too small for it and should stay in a booster seat.

STATISTICS REGARDING BOOSTER SEAT USAGE

• Motor vehicle crashes are the leading cause of death for children of every age from five through fifteen.

• National Highway Traffic Safety Administration (NHTSA) reports show that 52.6% of fatally injured 4 through 7 year-old passengers were totally unrestrained and of children who were restrained by seatbelts there were 43% much more seriously injured than they needed to be.

• 6 out of 100 children who should be in booster seats are actually in them.

• Only half of the above 6% are in booster seats correctly.

• Children who are 40 to 80 pounds and 4 to 8 years old do not fit properly in adult seat belts.

CONSEQUENCES FOR NOT USING BOOSTER SEATS

• A child restrained in an adult seat belt may submarine out from under the lap portion of the seat belt.

• A child restrained in an adult seat belt may have the shoulder portion of the seat belt injure his/her neck, with possible decapitation.

• Injuries found in children age 4 to 8 years include: Head and face, internal injuries, neck and upper back muscles, spine fractures, extremity fractures as well as psychological trauma.

• Seat-belted children sustain intra-abdominal injures during crashes.

CURRENT VIRGINIA STATE LAW

• All children under the age of 4 must be in a child safety seat.

• Children between the ages of 4 and 16 may substitute a child safety seat with an adult seat belt.
This is a true story told by Patty. The names have been changed.

My 4-year-old son, Ryan, was killed on June 18, 1996 on an interstate in the Washington mountains. I was driving our family sports utility vehicle while Ryan, wearing a seat belt, was sleeping. The car flipped three times, and while my seat belt held me, Ryan was thrown from the vehicle because the adult belt was too loose for his small size.

When I came to I heard somebody saying, “Get her in the ambulance.” I said, “I can’t go, we’ve got to get Ryan.” I vaguely remember someone in the distance saying, “There are no other survivors here,” as I was pushed into the ambulance. I was thinking, “I can’t believe this…this doesn’t happen to people like me.”

The state patrol found Ryan’s seat belt still fastened. The seat belt didn’t hold him because he was not big enough. The ejection killed him.

Never in my life had I run up against anything so hard as his death. Death is not negotiable. You cannot plead it back. You cannot bargain.

The first question any parent asks is, “Why me?” I am an educated woman. I knew the laws. The law said it was okay to put him in a seat belt.

I’m very angry. I see the limitation of car seat laws. Their purpose is not being met, which is to save kids’ lives. They save lives from infancy to the fourth birthday, but after that, you’re on your own.

Every single day I see parents whizzing by with the littlest kids in adult seat belts. I really want to scream at these complete strangers and tell them, “Put that child in a booster seat!” There is nothing worse than the pain after losing a child.

**WARNING**

- Adult seat belts do not correctly fit children 4 to 8 years old and/or 40 to 80 pounds.

- Adult seat belts can seriously injure or kill a child if worn during a crash.

- Children 4 to 8 years old and/or 40 to 80 pounds riding in a motor vehicle should be in a booster seat.
APPENDIX G

Coupon
This coupon is good for thirty dollars off any high back booster seat.
Must be redeemed at Toys R Us in Roanoke, Virginia

SKU 997961
SKU 997973

Coupon Expires

Study No.
VITA

Suzanne Lynn Stevens was born on August 12, 1964, in Los Angeles, California. She received a B.E.D. in Environmental Design from the University of Colorado, in Boulder, Colorado in August of 1986. For a short period she designed hotel casinos and then worked for the Design and Construction Department for the largest Savings and Loan on the West Coast, designing over 100 banking facilities. She entered the Human Factors Engineering program (safety engineering option) at Virginia Tech in the fall of 1997. Her research interests include child passenger safety and the design of effective child safety seats. She has been trained by the National Highway Traffic Safety Administration as a Certified Child Passenger Safety Technician.

Suzanne is currently the President of the Human Factors and Ergonomic Society (HFES) Student Chapter and has served as both President and Vice President of the American Society of Safety Engineers (ASSE) Student Section. Additionally, she is an active member of the American Association of University Woman (AAUW), Society of Women Engineers (SWE), and Alpha Pi Mu (APM). She has earned many scholarships including 2 years of NIOSH funding, ASSE National Foundation Graduate Scholarship, ASSE Kenneth J. Deurmier Scholarship, AAUW Career Development Grant, AAUW/YMCA Women’s Leadership Award, and the SWE Lynn Salembier Re-entry Scholarship.