

EFFECTS OF INFORMATION ON PURCHASE OF BOOSTER SEATS

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Abstract

Motor vehicle crashes remain a leading cause of death and injury for children of all ages in the U.S., despite improved crashworthiness of vehicles and more effective restraint systems. Children who are too large for child safety seats (a child restraint system for children birth to 4 years old) are often restrained improperly or not at all. For effective protection, these children should be restrained in a booster seat (child safety seat for children 4-9 years of age) used with vehicle lap/shoulder belts. For this reason, the use and correct use of occupant protection for 4-9 year old children needs attention.

A field study with 128 participants was conducted using a pre- and post-test design with 4 treatment groups to test the hypotheses that informational pamphlets and dollars-off coupons will induce the purchase of booster seats. Of the 128 participants, 37 purchased booster seats, and 100% of those who purchased reported using them each time their child rode in a vehicle.

Analyses indicated that intervention of any kind was more effective than no intervention in influencing the purchase of a booster seat.

Introduction

Data from the National Highway Traffic Safety Administration (NHTSA) Motor Vehicle Occupant Safety Survey 1996 (1), indicate that many children are shifted prematurely from child safety seats to seat belts before their bodies are large enough for the seat belts to fit properly (1). 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 (2) 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 (3).

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 (4). Therefore, children less than 10 years old will probably be too small to use a lap/shoulder belt without a booster seat.

The current literature does not address reasons 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 an adult safety belt, lack of education, and the absence of legislation mandating the use of child restraints until children properly fit in adult safety belts. The purpose of this study was two-fold: to test the effectiveness of dollars-off coupons as an incentive to motivate booster seat purchase and use, and to test the effectiveness of statistics, warnings, and consequences embedded in an informational pamphlet.

Method

One hundred twenty eight volunteers were selected (32 per each of four groups), using a 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.

The between-subjects study evaluated whether the intervention of an informational pamphlet and/or a coupon induced the purchase a booster seat. The groups were as follows: 1) a pamphlet and coupon, 2) a pamphlet, 3) a coupon, or 4) no treatment at all (control group). All participants were randomly assigned to one of the four groups. Figure 1 presents the experimental design that was used in this study.

	Experimental Conditions				
	Pre-test	Pamphlet	Post-test1	Coupon	Post-test 2
Group 1	O _A	X ₁	O _B	X ₂	O _C
Group 2	O _A	X ₁	O _B		O _C
Group 3	O _A			X ₂	O _C
Group 4 (control)	O _A				O _C

O_A = Pre-test: Written questionnaire and first entry for a color television (time 1).
O_B = Post-test 1: Written questionnaire (time 2).
O_C = Post-test 2: Purchase behavior evaluation - telephone questionnaire and second entry for a color television (time 3).
X₁ = Treatment 1: Pamphlet
X₂ = Treatment 2: Coupon

Figure 1. Experimental design of study.

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. 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. Post-test 2 consisted of a telephone call that 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.

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 adopting a safety device (5-7). Statistics that were included, but not limited to, were, percentages of use and nonuse, fatalities, injuries, and age and weight for proper fit. Statistics were communicated using the format found most effective by Conzola and Wogalter (8). In addition, Young and Laughery (9), as well as Schacherer (10), 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.

The discount coupon was 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.

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. Participants were given written general instructions prior to being administered their pre-test questionnaire. Once the pre-test was completed, each participant was exposed to the treatment(s) or non-treatment associated with their randomly assigned condition.

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.

Results

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. 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. Results from pre-test 1 and post-test 1 will not be reported in this paper.

Fisher's exact test was used to determine the effects of treatment 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 2).

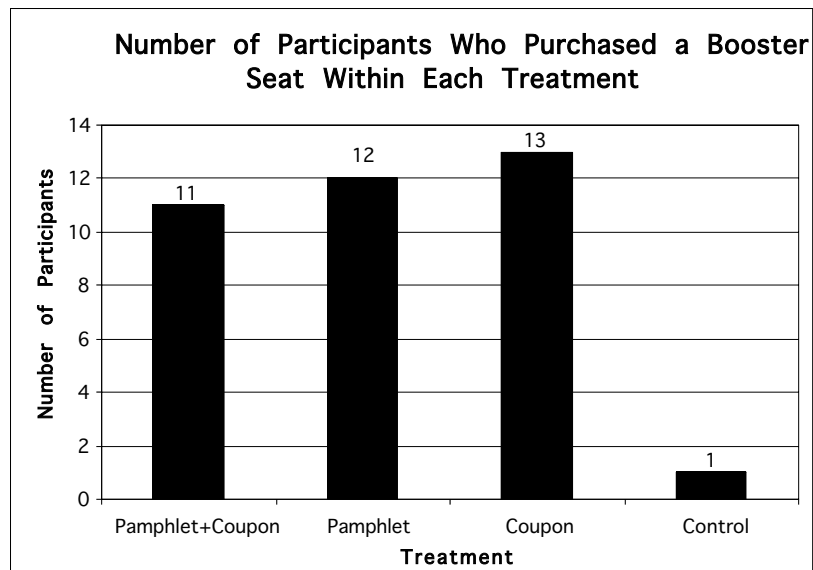


Figure 2. Number of participants who purchased a booster seat within each treatment.

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

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. 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).

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.(11) 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.

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 (12).

According to Geller (13) and Watson and Tharp (14), 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.

Conclusions

The present study sought to determine if the intervention of informational pamphlets and dollars-off coupons could influence purchase behavior. This study demonstrated that intervention as straightforward as a pamphlet and a coupon could induce the purchase of a booster seat.

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 et al.(15) 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 et al.(16), 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 et al.(17) found that educational intervention had a highly significant effect on the knowledge of contraception pill rules. The findings of McGuckin et al.(18) 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 et al.(19) found that carefully selected and presented information about back pain can have a positive effect on patients' beliefs.

Several researchers such as Wogalter et al.(20) 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 et al.(21) investigated. In addition, Young and Laughery (9), as well as Schacherer (10), 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.

References

1. Boyle, J. and Sharp, K., *1996 Motor Vehicle Occupant Safety Survey, Volume 5: Car Safety Seat Report*. 1997, National Highway Traffic Safety Administration: Washington, D.C. p. 57p.
2. National Highway Traffic Safety Administration, *National automotive sampling system: General estimates system NASS GES*. 1997, National Highway Traffic Safety Administration.

3. Decina, L.E. and Knoebel, K.Y., *Child safety seat misuse patterns in four states*. Accident, Analysis and Prevention, 1997. **29**(1): p. 125-132.
4. Klinich, K.D., Pritz, H.B., Beebe, M.S., Welty, K., and Burton, R.W., *Study of older child restraint/booster seat fit and NASS injury analysis*. 1994, National Highway Traffic Safety Administration: Washington, D.C. p. 89 pp.
5. Wogalter, M.S. and Dingus, T.A., *Methodological techniques for evaluating behavioral intentions and compliance*, in *Warnings and Risk Communication*, M.S. Wogalter, D.M. DeJoy, and K.R. Laughery, Editors. 1999, Taylor and Francis: Philadelphia, PA. p. 53-81.
6. DeJoy, D.M. *Consumer product warnings: review and analysis*. in *Proceedings of the Human Factors Society's 33rd Annual Meeting*. 1989. Santa Monica, CA: Human Factors Society.
7. Wogalter, M.S. *Warning compliance: Behavioral effects of cost and consensus*. in *Proceedings of the Human Factors Society's 32nd Annual Meeting*. 1988. Santa Monica, CA: Human Factors Society.
8. Conzola, V.C. and Wogalter, M.S. *Consumer product warnings: Effects of injury statistics on recall and subjective evaluations*. in *Proceedings of the Human Factors and Ergonomics Society's 42nd Annual Meeting*. 1998. Santa Monica, CA: Human Factors Society.
9. Young, S.L. and Laughery, K.R. *Components of perceived risk: A reconciliation of previous finding*. in *Proceedings of the Human Factors Society's 38th Annual Meeting*. 1994. Santa Monica, CA: Human Factors Society.
10. Schacherer, C.W. *Toward a general theory of risk perception*. in *Proceedings of the Human Factors Society's 37th Annual Meeting*. 1993. Santa Monica, CA: Human Factors Society.
11. Wogalter, M.S., DeJoy, D.M., and Laughery, K.R., eds. *Warnings and Risk Communication*. 1999, Taylor and Francis Inc.: Philadelphia, PA.
12. Taylor, S.E., Peplau, L.A., and Sears, D.O., *Social Psychology*. 1997, New Jersey: Prentice Hall.
13. Geller, E.S., *Behavior based safety: Confusion, controversy, and clarification*. Occupational Health & Safety, 1999: p. 40-43.
14. Watson, D.L. and Tharp, R.B., *Self-directed behavior: Self-modification for personal adjustment*. 6th ed. 1993, Pacific Grove, CA: Brooks/Cole Publishing Co.
15. Lagrecque, M., Dostaler, L.P., Houde, A., Boissonneault, J., Grimard, M., and Paradis, A., *Can physicians efficaciously promote the purchase of bicycle helmets?* Canadian Family Physician, 1994. **40**(6): p. 1132-1137.
16. Fischhoff, B., Bostrom, A., and Quadrel, M.J., *Risk perception and communication*, in *Judgement and decision making: An interdisciplinary reader*, T. Connolly and H.R. Arkes, Editors. 2000, Cambridge University Press: New York, NY. p. 479-499.
17. Little, P., Griffin, S., Kelly, J., Dickson, N., and Sadler, C., *Effect of educational leaflets and questions on knowledge of contraception in women taking the combined contraceptive pill: randomised controlled trial*. BMJ, 1998. **316**(7149): p. 1948-1952.
18. McGuckin, M., Waterman, R., Porten, L., Bello, S., Caruso, M., Juzaitis, B., Krug, E., Mazer, S., and Ostrawski, S., *Patient education model for increasing handwashing compliance*. American Journal of Infection Control, 1999. **27**(4): p. 309-314.
19. Burton, A.K., Waddell, G., Tillotson, K.M., and Summerton, N., *Information and advice to patients with back pain can have a positive effect: A randomized controlled trial of a novel educational booklet in primary care*. Spine, 1999. **24**(23): p. 2484-2491.
20. Wogalter, M.S., Desaulniers, D.R., and Brelsford, J.W. *Consumer products: How are the hazards perceived?* in *Proceedings of the Human Factors Society's 31st Annual Meeting*. 1987. Santa Monica, CA: Human Factors Society.
21. Young, S.L., Wogalter, M.S., and Brelsford, J.J.W. *Relative contribution of likelihood and severity of injury or risk perceptions*. in *Human Factors Society 36th Annual Meeting*. 1992. Santa Monica, CA: Human Factors Society.