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EFFECT OF TWO WARNING SIGNS ON ADULT SUPERVISION AND RISKY ACTIVITIES BY CHILDREN IN GROCERY SHOPPING CARTS[1]

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Summary.—398 children, 1 to 6 years of age, and the adults accompanying them in two supermarkets were exposed to one of four treatments. Two experimental treatments featured variations on a warning sign, prompting adults to prevent their children from standing while in the cart seat and basket portions of shopping carts. The two control treatments exposed the adults to advertisements rather than warning signs. No effect was observed of either warning on standing while in cart seats, standing while in baskets, climbing on carts, or standing on the ends or sides of carts; nor was any effect noted on three measures of adult supervision. This lack of effect is attributed to adults' perceptions of the low risk of serious injury to children in carts, their familiarity with carts, the costliness of ensuring compliance with the warnings, and the lack of natural contingencies supporting the prompts. Risky activities by children were related to the child's location in the cart, child's sex, and adult supervision.

From 1985–1994, 11,400 injuries per year were incurred by children 5 years or younger falling from shopping carts, out of a total of 31,000 annual cart-related injuries (Adler, 1994). Fifty-one percent of the injuries were related to falls from the cart-seat area, and 49% were injuries from falls from the basket portion. Safety belts were not used in 80% of falls from the cart seat. Fifty percent of the parents of children falling from the seat reported seeing a safety warning in the cart (Adler, 1994), and 40% of parents of children falling from the basket reported seeing a warning. In a recent study (Smith, Dietrich, Garcia, & Shields, 1996) of 62 children who were treated in an emergency room for shopping cart-related injuries, a majority were standing either in the basket or cart seat at the time of the incident.

While 95% of parent respondents in Adler's survey reported being 6 feet or closer to the shopping cart at the time of the incident (Adler, 1994), Harrell (1994) reported much poorer supervision of children in supermarkets, with 80% of parents losing sight of their children at least once during an average shopping trip of 42 minutes, and 75% more than 10 feet away from their child at least once. Lax supervision was also identified as a critical factor in injuries to children while in the basket portion (Harrell, 1994).

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No study to date has assessed the effect of safety warning signs on parental supervision of children in shopping carts or on the effects of hazardous behaviors by children, e.g., standing in the cart or climbing out, although it has become commonplace for manufacturers to install plastic signs in the bottom of the cart seat with pictorials and verbal messages exhorting parents to act safely with respect to the transporting of children in shopping carts. Ferrari and Baldwin (1989a, 1989b) introduced a variety of prompts to parents using carts at two supermarkets, encouraging them to use safety belts. These prompts included a poster at entrances to the stores with a "Buckle Up Your Baby" slogan and a picture of a child buckled into the cart seat. Fliers with this message were handed to each shopper in the checkout line. Taped "Buckle Up" messages were broadcast throughout the stores every 20 min.; this broadcast encouraged parents not to let children ride, stand, or play in the cart. Increases in the use of belts, ranging from 13 to 20%, were noted.

The rather extensive literature on the use of prompts to assure compliance suggests limited success in the absence of incentives. For example, posters, warnings, or other reminders to adults to use safety belts in automobiles have been largely ineffective in altering or maintaining compliant behavior in the absence of incentives or enforcement of safety belt laws (Geller, Paterson, & Talbott, 1982; Cope, Moy, & Grossnickle, 1988).

The most similar situation to parental supervision of children while in shopping carts is the proper use of child safety seats when children ride in motor vehicles. Again, laws requiring the use of such devices have been ineffective unless these laws have been enforced by fines (Seekins, Fawcett, Cohen, Elder, Jason, Schnelle, & Winnett, 1988).

The present study examined the effects of two signs mounted in the basket portion of the shopping cart. The first sign prompted adults not to allow their children to stand in the cart seat or basket; as such, it was similar to the prompts used by Ferrari and Baldwin (1989a, 1989b). According to Geller, *et al.* (1982), effective prompts must refer to a specific proscribed behavior (e.g., permitting the child to stand in the cart), the desired behavior must be easy to emit (e.g., preventing the child from standing), and the prompt must be close to the target behavior (e.g., in the shopping cart).

There is evidence that warning posters which state a health hazard associated with a course of conduct, the consequences associated with the hazardous conduct, and specific behaviors which avoid these consequences, are effective in eliciting nonhazardous behavior (Wogalter, Godfrey, Fontenelle, Desaulniers, Rothstein, & Laughery, 1987). For example, safety posters with these features have been effective in reducing dangerously high volume settings in audio headsets (Ferrari & Chan, 1991), smoking in elevators (Jason, Clay, & Martin, 1979), and avoidance of contaminated water (Wogalter, De-

saulniers, & Brelsford, 1987). The presence of highly salient, negative consequences in safety posters for improper use of products has been critical in securing compliance with the warnings (Slovic, Fischoff, & Lichenstein, 1980; Friedmann, 1988; Ayres, Gross, Wood, Horst, Beyer, & Robinson, 1989).

The second sign in the present study, while also containing a prompt, informed parents of the risk of injury to a child in shopping carts. It was believed that informing adults about the likelihood of injury to their children would promote conscientious supervision and a lower incidence of risky activities, such as standing in or climbing from the cart.

Method

Subjects

Four hundred and three children, ages 1 to 6 years, were observed in two supermarkets. Three hundred ninety cases were retained in the analysis; 13 cases were excluded from analysis for disagreements between observers in recording data. Approximately 100 cases were obtained in each of the two baseline conditions and the two sign variations. Subjects were observed if they were accompanied by one adult caretaker and no other children.

The experimental manipulation in this study was the presence or absence of a warning sign. The first warning sign (8.5-in. by 11-in.) had the wording, "Do not allow your child to stand in the cart seat or basket!" The sign was printed in black block letters with a bright gold background. The second sign had the same message as the first, along with the comment, "More than 12,000 children are injured each year in grocery-cart accidents. Do not allow your child to stand in the cart seat or basket!" During the baseline week, a plastic holder at the front, inside the basket, visible to users of the cart, contained an advertisement for a dairy product. A week later this advertisement was replaced by one of the two warning signs. At the end of the seven-day experimental treatment, the warning sign was removed and replaced by the original advertisement.

Four risky activities were measured: standing while in the cart seat, standing while in the cart basket, climbing out of the cart seat or basket, and standing on the ends or sides of the cart. Standing while in the cart seat was recorded if the child came to a full stand on both feet while in the seat. Standing while in the basket also required being fully erect. Climbing out of the seat involved working oneself free of the seat, standing up, and either climbing or jumping from the seat. Climbing from the basket required that the child actually leave the basket.

Three measures of adult supervision were recorded. One index was whether the adult ever let the child out of sight for 10 sec. or more. A second index was whether or not the adult was 10 ft. or more away from the

child at any time during the 5 min. Both are highly reliable measures validly representing aspects of adult negligence in supervision since adults are less likely to be in a position to prevent a child from having an accident if they are more than 10 ft. away or out of sight (Harrell, 1994). A third measure was whether the adult attended to the child by speaking to him or touching him.

Other factors examined in this study were child's age (dichotomized into those age 3 years or less and those over 3), child's sex, and adult's estimated age and sex.

Procedure

Two supermarkets in Edmonton, Alberta, Canada were chosen for this field experiment. Both supermarkets were equal in size and layout and served a similar clientele in terms of income and ethnicity. Each supermarket maintained approximately 550 grocery carts. Observations took place seven days a week over a 2-wk. period from 10 a.m. to 8 p.m.

Five teams of two persons each carried out the data collection. Observers were experienced in structured observations involving other studies of accidental injuries and, in addition, received three hours of orientation and pilot testing for this study. Observers assumed the role of shoppers, selecting items for purchase and placing them in their own carts. Upon arriving at one of the locations, a team randomly selected an adult-child dyad for observation among those currently shopping. Upon selection, each team member independently recorded observations for a 5-min. period. Thereafter, another dyad was selected. Observers gathered data at both locations during a baseline week (warning sign absent) and a subsequent week (warning sign present).

Analyses

Observers were consistent in their rating of child's sex in all but 13 cases; these cases have been deleted from analysis. Observers agreed on all measures of adult's sex. There was also unanimity in observations of placement of the child in either the cart seat, basket, or outside the cart.

While interobserver ratings of both child's and adult's ages were highly correlated, they rarely agreed in terms of precise age, particularly in estimating adult's age. As a result, estimates of ages are based on an averaging of the two observers' ratings.

In estimating whether the child stood in the cart seat, there was disagreement in 4.3% ($n = 17$) of the cases. There was disagreement in 2.8% ($n = 11$) of the cases for standing while in the basket, and 2.8% ($n = 11$) of the cases for climbing from the cart. There was disagreement in only .3% ($n = 1$) of the cases concerning standing on the ends or sides of the carts. Observers disagreed in 2.5% ($n = 10$) of the cases as to judgments of wheth-

er an adult was ever out of sight, and in 6% ($n=24$) of the cases as to estimates of adult-child distance. The greatest disagreement concerned attending behavior, wherein there were differences in 10.6% ($n=43$) of the cases.

In those instances where there was a disagreement, the behavior in question was treated as if it had not occurred. For example, if one observer recorded a subject as climbing from the basket, and the other observer did not, then the child was treated as if he had not climbed out.

All of the measures of adult supervision and risky activities were binary in nature. An initial bivariate analysis based on a chi square test of significance was carried out, followed by a logistic regression.

Results

Sixty-seven percent ($n=261$) of children were 3 years or less; 32.8% ($n=129$) were older than 3. Fifty-four percent ($n=211$) were boys, and 45.8% ($n=179$) were girls. Estimated ages of accompanying adults ranged from 17 to 67 years, with 30 years as the median. Seventy-four percent ($n=289$) of adults were women and 25.6% ($n=101$) men.

Placement

In terms of placement, 17% ($n=68$) were outside the cart, 63.3% ($n=252$) in the cart seat, and 20% ($n=80$) in the basket. For children in the cart seat, 8.1% ($n=20$) stood up. Fifty-five percent in the basket ($n=43$) stood up. Seven percent of children climbed out ($n=21$). For those outside the cart, 66.1% ($n=43$) stood on the ends or sides.

Five percent of adults lost sight of children at least once ($n=18$), and 25% were 10 feet or more away ($n=95$). Thirty-six percent ($n=140$) attended to their children by talking to them or touching them.

Standing while in the cart seat.—In the bivariate analysis, only child's sex ($\chi^2=6.0$, $p<.05$) was significant, with girls (12.6%) more likely than boys (4%) to stand. A logistic regression including all of the predictors (child's and adult's ages, sex, adult supervision, warning signs) found a significant effect only for sex ($b=1.3$, Wald = 5.7, $p<.05$). Neither warning sign affected the likelihood of standing.

Standing while in the basket.—In the logistic regression, attending by adults was statistically significant ($b=1.3$, Wald = 3.8, $p<.05$), with 46.5% of children standing when the adult failed to attend to the child and 65.7% standing when attending did occur.

Climbing from the cart seat and basket.—Only the location that the child was placed in the cart was statistically significant in both the bivariate analysis ($\chi_1^2=4.3$, $p<.05$) and the logistic regression ($b=-0.5$, Wald = 4.1, $p<.05$). Children in the seat were less likely (4.9%) to climb out than children in the basket (11.5%).

Activities outside the cart.—Children accompanied by men (91.6%)

were more likely to stand on the ends or sides than children who were with women (60.4%; $\chi_1^2 = 4.3$, $p < .05$). In the logistic regression, however, only attending was significant ($b = -1.3$, Wald = 3.8, $p < .05$), with 74.9% of children not attended to standing on the ends or sides versus 53.9% of children who were attended to.

Adult supervision: out of sight.—Adults were more likely to lose sight of children who were outside the cart (7.7%) than if they were in the child seat (2%) or basket (6.4%) ($\chi^2 = 6.2$, $p < .05$). In the logistic regression, only placement in the cart was significant ($b = -1.0$, Wald = 5.6, $p < .05$).

Adult supervision: 10 feet away.—Adults were less proximate to older (30%) than younger (21.1%) children ($\chi^2 = 3.8$, $p < .05$). In the logistic regression, only adult's sex was significantly related to this measure of supervision ($b = 0.9$, Wald = 8.5, $p < .01$), with women more likely (27.4%) than men (12.8%) to be nonproximate.

Adult supervision: attending.—Placement of the child was significant ($\chi^2 = 6.0$, $p < .05$) with more attending to children in the basket (44.9%) than in the cart seat (30.8%) or outside the cart (40.0%). In the regression, placement was significant ($b = 0.5$, Wald = 8.9, $p < .05$) as was child's age ($b = -0.7$, Wald = 5.7, $p < .05$), with older children less likely to be attended to (30.8%) than younger children (38%).

Discussion

This experiment investigated the effects of two warning signs on adult supervision of children in grocery carts and on risky activities by children. Neither sign was significantly associated with these behaviors. Most likely, neither sign engaged an imminent sense of danger necessary to elicit caution by supervising adults. A mere statement of injury likelihood in a warning, as was the case in the shopping cart signs, is unlikely to increase perceptions of hazardousness and evoke compliance with the warning (Wogalter, Godfrey, Fontenelle, Desaulnieres, Rothstein, & Laughery, 1987; Young, Brelsford, & Wogalter, 1990), especially for hazards having a low probability of occurrence and relatively nonserious consequences when they do occur. Users of consumer products may be more affected by the perceived seriousness of injuries associated with a given product than with injury likelihood (Wogalter, Desaulniers, & Brelsford, 1987), so that a perception of hazardousness is associated more with products leading to disability or fatal injuries than with products producing less serious injuries. With shopping carts, the actual likelihood of injury is estimated at 1.1 per 1,000 children per year (Adler, 1994). While risk of "near" or minor shopping cart injuries may be as high as 4.3 injuries per 1,000 shopping visits (Harrell, 1994), only 5% of the most serious injuries requiring medical attention, including hospitalization (Adler, 1994). Fatalities from shopping cart incidents are even more rare (Smith, *et*

al., 1996; Harrell, 1997a). Perceptions of likelihood and severity are probably even lower than for other hazards to children because shopping cart incidents, in contrast to automobile injuries, drownings, and poisonings, are less publicized.

There is also a virtual absence of natural contingencies in shopping cart use that might discourage unsafe activities. For example, the typical parent will likely never experience or even see a shopping cart accident. Furthermore, the child directly experiences the physical consequences of an incident; the parent only vicariously experiences them. Finally, parents and children in supermarkets are bombarded with "unsafe" models. The typical parent leaves a child unattended at some point (Harrell, 1994), thereby modeling neglect for other parents. High percentages of children will stand while in the cart or cart seat (Harrell, 1997b) or climb out of carts (Harrell, 1994), presenting negative models to other children. Few children use safety belts in shopping carts (Ferrari & Baldwin, 1989a, 1989b; Harrell, 1997b).

A second factor is the familiarity of the product being used. Products, which are used on a daily basis and are highly familiar, are perceived as less dangerous (Wogalter, Desaulniers, & Brelsford, 1987). Consumers are less inclined to read warnings on familiar products as opposed to products seen for the first time (Donner & Brelsford, 1988; Friedmann, 1988; Ostubo, 1988; DeJoy, 1989; Johnson, 1992). Since parents report shopping at least once a week with their children (Harrell, 1996), shopping carts certainly qualify as a familiar and nonthreatening feature in one's environment.

A third factor is the cost of compliance to a warning. Even small costs, such as taking time to latch a safety belt, reduce compliance (Ayres, *et al.*, 1989; Dingus, Hathaway, & Hunn, 1991; Dingus, Hunn, & Wreggit, 1991). The costs of monitoring a child include dealing with the protests of a child who has stood or climbed out, taking time to reprimand a child, repositioning a child who has stood up or climbed out, and taking time from routine shopping activities. Indeed, the costs of continually reminding a child not to stand or climb may exceed the one-time costs of latching a child into the cart with a safety belt. This may explain the greater success in prompting parents to use the safety belts on carts (Ferrari & Baldwin, 1989a, 1989b).

Supermarkets are notorious as sites for troublesome and frustrating oppositional behavior by children (Bernal, 1969). Reduction of "product disturbance" by children in supermarkets as well as running from parents can be realized only when parents reinforce child proximity and noninterference with products (Barnard, Christophersen, & Wolf, 1977). The attractions of a supermarket, combined with the boring and uncomfortable prospect of sitting in a cart, are natural contingencies that evoke escape behaviors such as climbing and standing. Simple warning signs are not up to the task of altering such behaviors through mere exhortations for better adult supervision.

Radical solutions such as banning children from carts or redesigning carts have been suggested to reduce cart-related injuries (Smith, Dietrich, Garcia, & Shields, 1995, 1996; Harrell, 1997a). Alternatives include directly rewarding children for remaining seated or rewarding parents for assuring that their children avoid standing or climbing. These measures have been successful in increasing safety seat use in motor vehicles (Roberts & Turner, 1986; Roberts & Layfield, 1987).

Even though the warning signs in this field experiment had no effect on dangerous activities by children, many of the other variables significantly related to these behaviors are consistent with findings from other shopping cart research. Thus, standing was more likely to occur for children in the basket (55%) than in the cart seat (8.1%). The restraining design of most cart seats prevents standing for younger children (Harrell, 1994).

Adults attending to children in the shopping cart basket actually elicited more rather than less standing. Harrell and Reid (1990) noted a similar tendency for children to stand in the basket to interact better with their parents. Parental attention reinforced this standing. In another study of the unintended reinforcing effects of parental attention, children rode their "Big Wheel" trikes into a street after being told by their mothers not to (Embry & Malfetti, 1982).

Only placement of the child in the cart was significantly related to climbing out, with children in the basket (11.5%) more likely than children in the cart seat (4.9%) to climb out.

No previous study has examined the incidence of standing by children outside the cart on either the ends or sides. It was disconcerting that a majority of children outside the cart (66.1%) engaged in this risky activity. While such behavior is unlikely to result in a serious injury, there is still a risk of injury to the child from tipping over the cart, as well as injury to young children who may be confined in the cart (Smith, *et al.*, 1996). Adult attending, typically in the form of directions given to the child not to stand on the cart, proved critical in deterring this hazardous behavior.

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