PARTICIPATIVE EDUCATION FOR CHILDREN: AN EFFECTIVE APPROACH TO INCREASE SAFETY BELT USE

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Vehicle license plate numbers and the shoulder belt use of front-seat occupants were recorded unobtrusively when parents delivered and picked up their children at a Montessori school during 5-day baseline, intervention, and follow-up phases. Practicing and presenting a 15-min safety belt skit increased the safety belt use of those 6 kindergarten children who were not consistent belt users 82% above their preintervention baseline belt use mean of 47%. The belt use of these children's parents (who watched the skit) increased to 56% above their baseline mean of 36%. Also, mean safety belt use of 11 primary school children who watched the skit increased to 70% above their baseline of 28%. Mean safety belt use of the older children's parents (who didn't watch the skit) remained at approximately 31% for each phase, regardless of whether children were vehicle occupants. The follow-up observations, taken 3 months after the intervention, revealed 60% belt use for the kindergartners, 48% for the primary school children, and 71% for the kindergartners' parents when the children were vehicle occupants but only 30% when the parents were driving alone.

DESCRIPTORS: children, safety, education, safety belts, school

Consistent use of shoulder and lap belts during vehicle travel is the most protective and convenient response that can be made to reduce the risk of death or injury in a vehicle crash. It is estimated that 55% of all fatalities and 65% of all injuries from vehicle crashes would be prevented if safety belts were used (*Federal Register*, 1984). The average hospital cost for treating injuries from vehicle crashes is twice as high for unbelted vehicle occupants as for occupants using safety belts (Sleet, 1987). Indeed, a nationwide increase in safety belt

use of only 10% would prevent 30,000 injuries and save 1,500 lives and \$800 million in direct costs (Sleet, 1987).

At the time of this writing, 31 states have passed laws requiring safety belt use by front-seat vehicle occupants (Steed, 1988), and safety belt use has increased dramatically in virtually every state that has passed a mandatory belt use law (BUL). During the last 6 months of 1985, for example, observations of safety belt use by front-seat occupants in 17 states without a BUL revealed 21.6% buckled up (Ziegler, 1986), whereas mean post-BUL belt use across 27 states with BULs was 48% (Campbell, Stewart, & Campbell, 1987). Unfortunately, safety belt use following a BUL has declined markedly after the initial media attention waned and has rarely stabilized above 50%.

All of the published reports of successful safety belt programs for children included an extrinsic reward procedure in their intervention package. For example, Roberts and Turner (1986) rewarded parents with lottery tickets redeemable for prizes if their children were buckled up when arriving at

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day-care centers; Roberts and Layfield (1987) directly rewarded preschool children with colorful stickers when they were buckled up correctly upon arrival at day-care centers; Roberts and Fanurik (1986) and Roberts, Fanurik, and Wilson (1988) taught PTA volunteers to reward elementary school children with lapel stickers, lottery tickets for pizzas, bumper stickers, and coloring books if all vehicle occupants were buckled up when arriving at school; and Sowers-Hoag, Thyer, and Bailey (1987) combined education, assertiveness training, behavioral rehearsal, and a prize lottery to increase the safety belt use of 16 children in a private elementary school.

The present study evaluated the behavioral impact of a participative educational approach to increasing children's use of safety belts that did not include extrinsic rewards. The intervention required substantially less monetary and response cost than previous incentive-based interventions, and it is readily applicable to numerous day-care and school settings. Also, we studied parents' safety belt use as a function of their children being vehicle occupants. We hypothesized that parents would be more apt to buckle up when their children were vehicle occupants, especially after the children participated in the intervention activities, which included numerous scenarios depicting how a child can influence an adult family member to use a safety belt.

METHOD

Subjects and Setting

The subjects were children attending a private, nonprofit Montessori school located in Blacksburg, Virginia. A total of 65 students attended the school (33 in half-day prekindergarten, 14 in kindergarten, and 18 in Grades 1 through 5). All of the children rode to the school in their parents' cars. During this study, there was a child safety seat law in Virginia (for children 4 years and younger), but there was no BUL for adults.

Undergraduate and graduate students, who had two or more years of experience collecting safety belt use data in various community settings, observed and recorded the shoulder belt use of drivers

and front-seat passengers in vehicles arriving and leaving the school parking lot. The observers were positioned unobtrusively in a parked vehicle at the end of the parking lot near the only entrance/exit. The record for each vehicle included license plate number, driver's gender and belt use when arriving, and child's belt use (if in the front passenger seat). If the driver got out of the vehicle (as was usually the case), the driver's shoulder belt use was also recorded during departure from the parking lot. If the driver remained in the vehicle, only arrival data were recorded. Observations were made each morning from 8:30 to 9:15 a.m. and each afternoon from 2:45 to 3:30 p.m.

Experimental Conditions

Baseline. Permission was obtained from the head teacher of the school to collect safety belt data in the school parking lot. Shoulder belt observations occurred for five consecutive weekdays according to the procedure described above. During this period, the other teachers were told not to discuss safety belt use in their classrooms, but they were not told any specifics of this study.

Intervention. Data collection was stopped for 2 weeks while the kindergarten teacher introduced the "Buckie Buckle" story to her pupils and had them practice this story as a skit to be presented to their parents. The researchers were not involved in planning the implementation or presentation of the skit. The teacher assigned a part in the play to each child in the class, conducted the practice, and worked with the children to create props (e.g., a cardboard box painted to look like the front of a car, name tags for the characters, and audience cue cards). The class participated in activities related to the skit for approximately 30 min a day over the 2-week period.

The hero of the 15-min skit was a young child named Buckie Buckle who always used his safety belt. Buckie Buckle rode in a car at different times with his father, mother, grandpa, grandma, and cousin. With each of these drivers, a scenario was given whereby Buckie buckled up and affirmed (along with the other children and the audience), "I love my buckle buckled." Each driver gave one

of the standard excuses for not using a safety belt and was subsequently injured when the vehicle crashed. The children and audience were cued with large signs to repeat aloud key phrases in the skit, such as "I love my buckle buckled" every time Buckie Buckle buckled up. (At the completion of this study, the Buckie Buckle story, written by the first author, was printed in a coloring book format for children. A copy is available upon request to either author.)

The parents of the kindergarten children were invited to come early one afternoon (i.e., 2:30 p.m. instead of 3:00 p.m.), and watch the "Buckie Buckle Show." On the next day, the kindergarten children performed the "Buckie Buckle Show" during school hours for the children in the primary classes. No parents were present for the second show. Safety belt use was observed on the day of the play and the following 4 days. The Christmas break began the following week.

Follow-up. Three months after the intervention, safety belt use was observed for five consecutive weekdays according to the procedure discussed above. The teachers were not told when follow-up data were to be collected. Again, the observers were positioned unobtrusively in a parked vehicle at the end of the parking lot.

The observers were never told which children were targeted for the intervention. In fact, the head teacher gave the researchers the license plate numbers of the vehicles belonging to the parents of children who participated in the play only after all data collection had been completed.

RESULTS

Interobserver Reliability

Two independent data recordings were made for all shoulder belt observations. Reliability was calculated by dividing the total number of agreements by the sum of agreements plus disagreements and multiplying by 100. The agreement percentages were 94.1% for observing shoulder belt use of drivers and front-seat passengers (i.e., the children) and 92.5% for observations of no shoulder belt use by drivers and children. The license plate numbers

were not recorded independently; instead, the observers worked together to identify each license plate number correctly.

Shoulder Belt Use

Because license numbers were recorded, it was possible to track the safety belt use of single vehicles and occupants across the experimental phases, thus enabling a classification of the children according to those who participated actively in the skit (i.e., kindergarten) or only observed (i.e., the primary school children). License plate numbers and driver gender were also used to categorize parents as observers or nonobservers of the skit. Data are presented for 6 of the 14 kindergarten children who participated actively in the skit. Data are not available for 4 of the participants due to attrition (i.e., one family moved before the follow-up data were collected; 1 child transferred from the school; and fewer than two observations were obtained for 2 children). In addition, the data for 4 children were dropped from the analysis because these children were already 100% safety belt users. Of the 18 primary school children, data are presented for 11 participants. One child was absent for the skit, 2 children were observed on fewer than two occasions per condition, and 4 children were 100% safety belt users.

Figure 1 depicts the mean safety belt use of matched child-parent pairs who were observed on at least two occasions per experimental phase (baseline, intervention, and follow-up) and who were not already 100% safety belt users. During baseline, the kindergarten children were observed buckled up most often (44.4% of 18 observations), perhaps as a residual or recency effect of mandatory child safety seat use for children aged 4 years and younger. Each of these children increased his or her safety belt use from baseline to intervention, resulting in mean belt use after the intervention that nearly doubled the baseline rate of belt use for these active participants (i.e., to 81.0% of 21 observations). During follow-up, 3 of these children decreased their belt use from their intervention levels, 2 showed no change, and 1 child increased his belt use. The mean follow-up belt use of 60.0% for 25 obser-

Figure 1. Percentage of children and their parents buckled up while entering or departing the parking lot of a Montessori school as a function of their presenting, observing, or not observing the "Buckie Buckle" skit.

variations was much higher than the baseline belt use for this kindergarten group.

Observing the skit resulted in similar increases in belt use for both the primary school children and the parents of the kindergartners, and these increases were maintained during follow-up. More specifically, mean belt use was 36.0% of 61 observations during baseline for the parents of the kindergartners, rose to 56.0% ($n = 50$ observations) during the intervention week, and remained at 56.0% ($n = 50$) during follow-up. For the primary school children, mean safety belt use was 28.0% ($n = 50$ observations) during baseline, 47.6% ($n = 21$ observations) during the intervention week, and 48.0% ($n = 25$ observations) during the follow-up period.

From an individual subject perspective, 4 parents of the kindergartners increased their belt use from baseline to intervention, 1 parent remained at 0% belt use throughout the study, and the fifth parent was always buckled up. From intervention to fol-

low-up, one parent decreased her belt use to 0%, whereas all others maintained ($n = 4$) or increased slightly ($n = 1$) their belt use percentages observed during the intervention phase. It is noteworthy that the only 2 children who markedly decreased their safety belt use from intervention to follow-up had the 2 parents who were never observed buckled up during follow-up. Of the 11 primary school children, 7 increased their safety belt use from baseline to intervention, 3 showed no change, and 1 decreased his belt use. From intervention to follow-up, 9 of these children's belt use did not change; the belt use of 1 child increased slightly; and for the remaining child, belt use decreased.

The parents of the older children served as a no-intervention control and indeed remained at their mean baseline safety belt use of 31.3% ($n = 102$ observations) during both the intervention (31.5%, $n = 57$) and follow-up periods (31.7%, $n = 60$). Only 3 of these 11 parents showed any change in belt use (i.e., an increase) from baseline to inter-

Figure 2. Percentage of parents (i.e., vehicle drivers) using shoulder belts per experimental phase as a function of their observing or not observing the "Buckie Buckle" skit and whether or not a child (i.e., a student at the school) was a passenger in the vehicle.

vention, and each of these parents had children (i.e., observers of the skit) who also increased their safety belt use. None of the observed belt use percentages of these 11 parents changed appreciably from intervention to follow-up.

Figure 2 depicts the mean shoulder belt use per experimental phase of the same parents graphed in Figure 1, except the percentages are separated according to whether or not a child was in the vehicle. Thus, the "out" observations occurred typically after the parents dropped off their children in the morning (i.e., if the parent left the vehicle at this point) and when the parents arrived in the afternoon to pick up their children. The number of observations per bar in Figure 2 ranged from 17 to 55, with an average of 31.6 observations each.

The primary school children's parents (who did not watch the Buckie Buckle play) showed very little change in belt use as a function of their children's presence in the vehicle. In contrast, the shoulder belt use for the parents of the kindergarten

children was prominently higher when their children were vehicle occupants than when they were not, especially after these parents had watched their children perform in the Buckie Buckle play. The follow-up data are especially noteworthy, because these kindergartners' parents were observed buckled up on only 31.6% of the observations ($n = 19$) after dropping off their children (in the morning) or before picking them up (in the afternoon), but they were using shoulder belts on 71% of the observations ($n = 22$) that occurred before dropping off their children in the morning or after picking up their children in the afternoon.

DISCUSSION

Practicing and presenting a skit about safety belt use appeared to nearly double the rate of belt use among the 6 kindergarten participants who were inconsistent belt users or never used a safety belt during baseline observations. Those who watched

the play (i.e., the 11 older children and 6 parents of the kindergartners) also increased their safety belt use and maintained their increased belt use rates 3 months later. These intervention effects were achieved without the use of extrinsic rewards, and the gains were similar to increases in safety belt use following incentive/reward programs for adults (see reviews by Geller, 1984, 1988; Geller, Rudd, Kalsher, Streff, & Lehman, 1987) and for children (Roberts & Fanurik, 1986; Roberts & Layfield, 1987).

Sowers-Hoag et al. (1987) showed greater gains in safety belt use with their intervention package, which included education, assertiveness training, behavioral rehearsal, and a prize lottery. However, these investigators only examined the program impact for children ($n = 16$) who never used a safety belt during a "five-day pre-experimental observation period" (p. 134). We omitted the 100% belt users from our analyses, but we included intermittent belt users. Our results suggest that a special educational procedure with no extrinsic rewards can be substantially effective in increasing children's use of vehicle safety belts.

Research is needed to compare the relative effects (over both the short and long term) of using extrinsic rewards versus no rewards to increase safety belt use among children and adults. A reasonable hypothesis (that needs testing) is that a substantial number of individuals will buckle up after a participative educational program (because the target behavior is quite low in response cost and is intuitively appealing), but that those individuals who are not influenced by the relatively inexpensive no-reward strategies will require extrinsic response consequences (positive or negative reinforcers) to increase their safety belt use. Safety belt use mandates may be needed for individuals not influenced by educational appeals to buckle up. Likewise, significant gains in belt use beyond those found from state belt use mandates (cf. Wagenaar, Maybee, & Sullivan, 1988) may require extrinsic motivators.

Not only was the present study the first to demonstrate substantial increases in children's safety belt use without the use of rewards, it also dem-

onstrated beneficial effects on the target children's parents. Incentive/reward programs that targeted children's safety belt use have shown dramatic increases in the safety belt use of adult vehicle occupants (Roberts & Fanurik, 1986; Roberts et al., 1988; Roberts & Layfield, 1987); however, these investigators did not categorize their observations into the same parent-child pairs before, during, and after the intervention. The recording of license plate numbers in the present study permitted single-case comparisons of safety belt use by parents and their children. For example, in two cases of parent-child pairs who never used safety belts during baseline (both from the kindergarten class), the children were observed to buckle up for the first time immediately after the intervention and their parents didn't buckle up until the next day. This suggests an influence from the children to the parents. More evidence for children's influence on parents' safety belt use is illustrated in Figure 2, when parents' belt use percentages were studied as a function of a child's presence in the observed vehicle. After parents watched their children perform in the Buckle Buckle skit, they were much more likely to buckle up when their children were in their vehicles than when they were not, especially at the 3-month follow-up. The potential benefits to the safety and health of adults through children and grandchildren are obvious and should be the target of additional intervention research.

Finally, our finding that a simple participative education strategy had remarkable behavior change effects is certainly promising and demands further evaluative research, perhaps in other domains for behavior change (e.g., environmental preservation, alcohol consumption, cigarette smoking). It actually seems too good to be true that 2 weeks of rehearsal and a single performance of a skit that illustrates the need to emit a certain desirable behavior could result in beneficial behavior change. However, the potential of such an approach seems reasonable when considering that role playing is a common activity in preschool or kindergarten and is a critical component of numerous clinical therapies.

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