Ludwig, T.D., & Geller, E.S. (1999). Behavior change among agents of a community safety program: Pizza deliverers advocate community safety belt use. ***Journal of Organizational Behavior Management***, 19 (2), 3-24. Version of record published by Taylor & Francis and is available online at: http://www.informaworld.com/ (ISSN: 0160-8061) DOI: 10.1300/J075v19n02_02

Behavior Change Among Agents of a Community Safety Program: Pizza Deliverers Advocate Community Safety Belt Use

Timothy D. Ludwig & E. Scott Geller

ABSTRACT

Discusses the pizza deliverers' role as intervention agents for a community safety belt campaign sponsored by their stores. Evaluation on the behavior change of the intervention agents; Profiles of the intervention agents; Procedures in data collection and behavioral observations; Total number of vehicular observations administered.

ARTICLE

Research in behavior change often makes a clear distinction between the target of an intervention and the agent of change. The target individual is the recipient of a tailored intervention whose behavior is the target of change. Agents of change are responsible for conducting the intervention. When implementing a particular program, these individuals become advocates of specific behavior change. Too often the agents in a community intervention project are the researchers conducting empirical studies (Geller, Johnson, & Pelton, 1982; Thyer, Geller, Williams, & Purcell, 1987; Geller, 1996). However, there are numerous examples of successful community behavior change projects in which the police (Rudd & Geller, 1985), industry (Johnson & Geller, 1984), supermarkets (Winett et al., 1991), and fast food restaurants (Cope & Geller, 1984) were enlisted as agents to advocate change.

Individuals targeted by an intervention are often passive recipients of prompts, incentives, or disincentives. Geller, Ludwig, Gilmore, and Berry (1990; see also Geller & Ludwig, 1991) devised a Multiple

Intervention Level (MIL) model to predict the impact of various intervention strategies on target individuals over the short and long term. Large-scale interventions target the maximum number of people possible in a given population. Often these interventions are designed for minimum cost per person. As a result, most large-scale interventions allow only minimal contact between the target individuals and intervention agents. These community-based interventions are not very intrusive and, although they impact the greatest number of people, the amount of long-term behavior change per individual is, at times, limited. Many individuals require the more intrusive intervention offered by greater contact between individual and agent. This often requires targeting a smaller number of individuals.

THE INTERVENTION AGENT

Individuals influenced by a more intrusive intervention may become intervention agents themselves (cf. Katz & Lazarfeld, 1955). Thus, when individuals adopt a particular target behavior, they become eligible to promote the behavior among others. Large-scale behavior change can be increased dramatically with the enrollment of intervention agents. This results in more intrusive intervention per individual, due to an increase in the agent-to-target ratio. According to the MIL model, this leads to more effective intervention while reaching increasing numbers of people in the community.

Enlisting people as intervention agents may be very effective in getting these individuals to change their own behavior. Indeed, Geller et al. (1990) proposed that enrolling individuals as intervention agents is, in fact, one of the most effective behavior change interventions among a list of 24 behavior change strategies distilled from a review of the behavioral community psychology literature. This proposal was tested in the present field study.

An intervention agent might be included in a social network of other agents. In this case, it is reasonable to assume social reinforcers will help to maintain the target behavior. These social reinforcers may come not only from other agents involved in the intervention effort but also from individuals who have changed their behavior in response to the intervention. Finally, many intervention agents realize the value of setting the right example. We must ‘‘practice what we preach.’’

PIZZA DELIVERERS AS INTERVENTION AGENTS

The present research enrolled pizza deliverers to promote a safe-driving practice (i.e., the use of vehicle safety belts). For many reasons, it is advantageous for the employees of pizza delivery businesses to promote safe driving behaviors. Pizza deliverers are prominent on our nation's roads. On a typical weekend night more than 100,000 easily identified pizza deliverers from just one national chain are on US roads (Meagher, 1989). These deliverers are part-time drivers categorized by insurance companies as the highest-risk for vehicle collisions (i.e., mostly males between the ages of 16-25) who are driving during the riskiest time periods (i.e., 5:00 pm-2:00 am) of the day (Baker, O'Neill, & Karpf, 1984; Simpson & Mayhew, 1987). In addition, pizza deliverers are compensated per miles traveled and paid on commission. In other words, their pay is contingent on frequent deliveries which likely discourages various safe driving practices which are likely to increase driving time. Thus, it's not surprising the vehicle crash rate among pizza deliverers is three times the national average (Meagher, 1989).

Relative to the general driving population, the driving practices of pizza deliverers are more likely to result in vehicle collisions (Ludwig & Geller, 1991, 1997). However, the driving behavior of pizza deliverers can be dramatically improved. For example, Ludwig and Geller (1991) conducted a simple driving safety awareness program consisting of a meeting at which employees discussed the value of safety belts, received feedback regarding their low safety belt use, offered suggestions for increasing their belt use, and made a personal commitment to buckle up by signing buckle-up promise cards. Over the next month the deliverers showed a 143% improvement over baseline in their safety belt use.

Similarly, Ludwig and Geller (1997) reported a 66% improvement over baseline in complete intersection stops among pizza deliverers engaged in a goal-setting process. Pizza deliverers at two stores participated in different goal-setting procedures during an employee meeting. Over the next four consecutive weeks, each store's weekly percentages of complete intersection stopping were posted in a prominent store location.

RESPONSE GENERALIZATION

Most studies evaluating intervention impact assess observed changes in only the targeted behavior. However, when a community based intervention operates on one behavior, it is possible that behaviors similar to the target behaviors will be affected. If the frequency of a *nontargeted* behavior changes in desirable directions during an intervention targeting another behavior, *response generalization* has presumably occurred (Carr, 1988; Ludwig & Geller, 1991, 1997).

There is some evidence that response generalization may be a special benefit of intervention programs that promote participant involvement. Ludwig and Geller (1991) found that after an intervention targeted only safety belt use among pizza deliverers, the use of turn signals increased 25%. Similarly, participants who participated in setting goals for complete stops at an intersection showed significant increases in both turn signal and safety belt use (non-targeted behaviors) concurrent with their increases in intersection stopping (Ludwig & Geller, 1997). In addition, during an industry-based intervention to increase the use of safety glasses, employees improved their safety belts use by 174% over baseline (Streff, Kalsher, & Geller, 1993).

IN SUMMARY

In the present study, pizza deliverers served as intervention agents for a community safety belt campaign sponsored by their store. Although increasing community safety belt use was the ostensive focus of the intervention, our evaluation focused on the behavior change of the intervention agents. According to the MIL model (Geller et al., 1990; Geller & Ludwig, 1991) those pizza deliverers acting as agents of the community program should increase their personal use of vehicle safety belts. And given the notion of response generalization and the research reviewed above (Ludwig & Geller, 1991, 1997; Streff et al., 1993), the intervention agents should also increase their use of turn signals.

METHOD

Participants and Setting

Pizza deliverers in two pizza stores, Store A (n = 51, mean age = 23.8, age range = 19-33, mean education = 3.1 years of college) and Store B (n = 37, mean age = 24.9, age range = 19-42, mean education = 2.6 years of college), were observed departing for and arriving from their deliveries. All vehicles used for deliveries were owned by the employees and were equipped with a shoulder belt. Both stores had employee parking lot areas whose entrances/exits were connected to four-lane two-way streets in city limits with a speed limit of 35 mph. The parking lots of each store were also connected to side streets, which also fed into the main four-lane street.

Both pizza stores were located in a town of 35,000 in southwest Virginia. This town contained a state land-grant university whose enrollment at the time of the study was 23,000 students. Therefore, most citizens of this town were associated with the university and there were an inordinate number of young drivers (i.e., 19-25) on the town’s roads. At the time of the study, Virginia had a safety belt use law, based on secondary enforcement with a $25.00 fine for convicted violators.

Observation Procedure

Behavioral observations took place during peak business hours (i.e., 5:00-8:00 pm). The use of safety belts and turn signals by the deliverers

were unobtrusively recorded from an automobile parked at a hidden position overlooking the parking area of each pizza store while deliverers departed to and arrived from their deliveries. Approximately 1/3 of the observations were recorded independently by two research assistants, thus enabling assessment of interobserver reliability.
Data collectors were trained extensively at conducting field observations, and were blind to the scheduling and assignment of the intervention conditions. After recording safety belt use and turn signal use on standardized coding sheets, the observer(s) recorded the time of the observation, the license plate number of the vehicle observed, and whether the driver was departing or returning from a delivery (drivers had to get out of their vehicle to deliver the pizza and therefore had to re-engage their safety belt upon return). In every case the pizza deliverer was the driver and the only vehicle occupant.

Experimental Design

A time series ABA design with a non-equivalent control group was employed to evaluate the impact of an intervention program. Two stores were used. All pizza deliverers for Store A were enlisted as agents of a communitywide safety belt program in the target town. Store B was owned by a separate franchise in the same town as Store A. Store B did not participate in the community program. Long term follow-up data were not collected at Store B.
After ten weeks of baseline observations, a communitywide safety belt program was implemented at Store A for six weeks. After the intervention, six weeks elapsed before follow-up observations were taken for six consecutive weeks. This was followed by an additional five week break and another seven weeks of follow-up observations.

Community-Based Intervention

The communitywide safety belt program administered by the employees at Store A consisted of:

1. Local radio (seven times a day) and newspaper promotions (two papers two times a week) describing the program and stating that ‘‘(Store A’s) deliverers want to see you buckled-up on (target town’s) streets.’’ These promotions were provided free by the radio station as public service announcements.

2. Safety belt reminder cards were pasted to the boxtops of each pizza sold. These reminder cards were designed with a hang tab so customers could hang the cards on their vehicles’ inside rearview mirrors. If a pizza deliverer spotted a customer with the reminder card, they would note the customer’s license number and turn it in to the radio station. Local police officers also participated in collecting these license numbers. At the time of the regularly scheduled service announcement, the disc jockey read the

current list of license numbers representing customers displaying the reminder cards. Customers whose license numbers were announced could come by the radio station, present identification, and receive a voucher for a free pizza.

3. Included in the newspaper adds and boxtop promotions were coupons which informed customers they would receive $1US off the price of their pizza if, while ordering their pizza, they asked the dispatcher to remind the deliverer to buckle up when the driver left for the delivery. When a patron took advantage of this offer, the dispatchers would print a large ‘‘BU’’ on the receipt attached to the pizza box. Deliverers refer to this receipt for the address of the customer. Therefore, the deliverers saw the customer’s buckle up request before delivering the pizza. When the pizza was delivered, the customer would then redeem the coupon and receive a dollar reduction in the total cost.

Social Validity

Wolf (1978) and others (Geller, 1987, 1991; Schwartz & Baer, 1991) have suggested using questionnaires or interviews to assess the social validity of intervention research. Random phone interviews were conducted with the residents of the target town in order to assess their awareness of the community intervention, their intentions to use their safety belt because of it, and their attitudes toward the driving practices of pizza deliverers. The phone interviewers asked respondents to compare their own safety belt use (i.e., ‘‘How many times out of the last ten trips did you wear your safety belt?’’) with their estimate of safety belt use among deliverers working for Store A. Respondents were then asked to rate Store A’s deliverers on (a) safety in the vehicle, (b) courtesy on the road, and (c) obeying traffic laws. Additionally, respondents were asked their age, gender, if they were students, if they bought pizza frequently, and if they were aware of the program. Those respondents who were aware of the program were asked if they believe it had increased their safety belt use.

RESULTS

There were 7,843 total vehicular observations conducted over the course of this study. Individual deliverers were observed getting in or out of their vehicles 1-17 times per observation session, resulting in a mean of 7.3 observations per individual each evening at Store A, and 7.5 at Store B. At Store A, an average of 68.7 vehicle observations occurred in a single observation session, whereas at Store B this average was 40.2.

Manipulation Checks

At the beginning of the intervention program, the mean percentage of all pizza orders in which the customers asked their deliverers to ‘‘buckle up’’ was only 3.2%. After the first ten days, however, the mean percent of ‘‘buckle up’’ calls increased to 5.6%. A total of 495 calls asking the deliverer to buckle up were recorded during the four week community program. No calls were made during Baseline or Follow-Up phases. This represented a mean of 12.6 buckle-up reminders per day with a range of 0 to 39. An average of 1.2 reminder cards and associated license plate numbers were turned into the radio station each day of the program. From these, nine free pizzas were given to customers displaying the reminder cards.

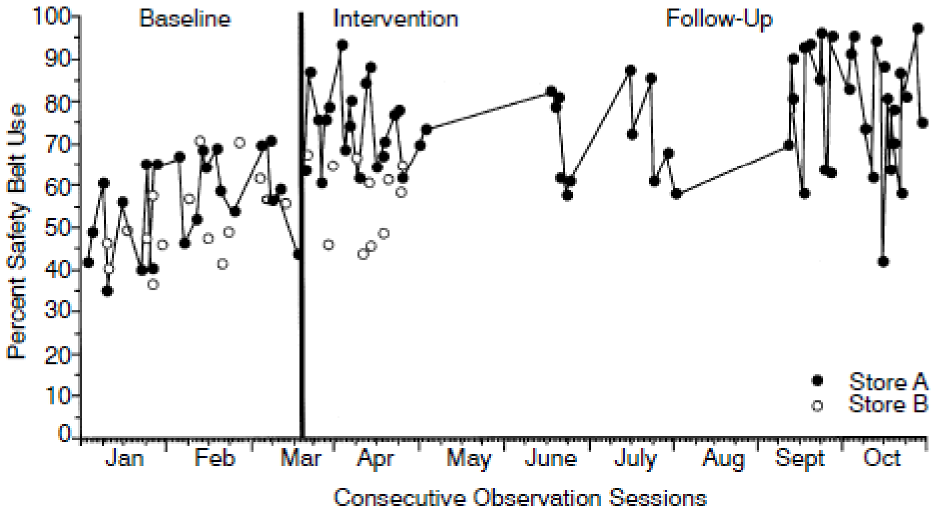
Interobserver Reliability

Of 7,843 total vehicle observations, 34% were recorded independently by two observers. Interobserver agreement percentages were defined separately for occurrences and nonoccurrence of the target behaviors (i.e., shoulder belt and turn signal use) and were calculated by dividing the total number of observations agreed upon for a particular data category by the total number of agreements and disagreements, and multiplying the result by 100. Interobserver agreement averaged 92.5% for belt use (ranging from 79.7% to 98.6%), 92.1% for belt nonuse (ranging from 82.0% to 94.4%), 93.4% for turn signal use (ranging from 78.1% to 100%), and 87.6% for turn signal nonuse (ranging from 77.0% to 100%).

Safety Belt Use

Figure 1 shows the observed safety belt use for Store A and Store B over the course of the study. Follow-up observations were not conducted at Store B. Safety belt use was calculated by dividing the total number of observations of deliverers at each store by the number of observations when the deliverers were observed to have their shoulder belt engaged. At least 9 safety belt observations were required per day for inclusion into the figure. Based on this criterion 5 days of Baseline (2 at Store A and 3 at Store B), 2 days of Intervention (both at Store B), and 6 days of Follow-Up (all Store A) observations were removed from data analysis. Deliverers at Store A showed a baseline mean of 57% safety belt use (n = 2253 total observations). During the intervention belt use rose 32% over baseline to a mean of 75% (n = 2076 total observations). Follow-up observations showed that Store A maintained a mean of 74% safety belt use (n = 2440 total observations).

FIGURE 1. Percentage of safety belt use across three experimental phases. Hash marks on the x-axis represent daily intervals. Filled circles represent the store which conducted the community safety belt intervention (i.e., Store A), open circles (not connected with lines) represent the control group (i.e., Store B).

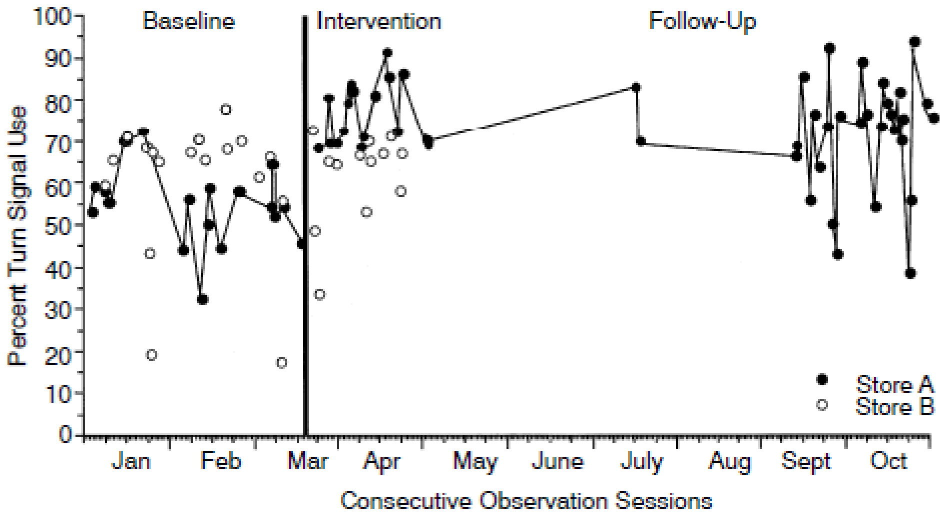


Pizza deliverers at the control location (Store B) showed a mean belt use of 53% during the baseline period (*n* = 992 total observations) and 58% during the intervention period (*n* = 570 total observations) implemented at Store A. There were no differences in safety belt use in observations of the deliverer leaving from the store or returning to it.

Turn Signal Use

Figure 2 shows turn signal use of the pizza deliverers for Stores A and B. Data collectors had more opportunities to observe turn signal use (e.g., multiple turns made during an observation) than safety belt use (i.e., only one occurrence per observation). Therefore, the average number of turn signal observations are higher than safety belt observations. Turn signal use was calculated by dividing the total number of observations of deliverers at each store by the number of observations when the deliverers were observed to have their turn signal engaged. At least 9 turn signal observations were required per day for inclusion into the figure. Based on this criterion 7 days of Baseline (3 at Store A and 4 at Store B), 4 days of Intervention (1 at StoreAand 3 at StoreB),

FIGURE 2. Percentage of turn signal use across three experimental phases. Hash marks on the x-axis represent daily intervals. Filled circles represent the store which conducted the community safety belt intervention (i.e., Store A), open circles (not connected with lines) represent the control group (i.e., Store B).



and 11 days of Follow-Up (all Store A) observations were removed from data analysis.

Deliverers at Store A showed a baseline mean of 54% turn signal use (n = 1875 total observations). During the intervention, the use of turn signals increased 41% over baseline to a mean of 76% (n = 7966 total observations). Follow-up observations showed that Store A maintained a mean of 73% turn signal use (n = 2855 total observations). Pizza deliverers at the control location (Store B) showed a mean turn signal use of 68% during the baseline period (n = 1953 total observations) and 64% during the intervention period (n = 1213 total observations) implemented at Store A. There were no differences in turn signal use in observations of the deliverer leaving from the store or returning to it.

Social Validity

Of the 210 phone interviews attempted, 145 individuals were contacted and agreed to be interviewed. Most respondents reported having pizzas delivered to them more than once a month (please note that 62% of the respondents were university students thus accounting for the high frequency of pizza consumption). Of the respondents, 58% indicated they would be more likely to use their safety belt if/when they participated in the community program; 25% said it would not influence their safety belt use; 17% reported they already consistently use their safety belt. Sixty-eight respondents (40%) reported they would be more likely to use the pizza franchise's product because of the community safety belt program they sponsored. When asked to estimate their own percentage safety belt use and compare that to their estimate of the percentage safety belt use of pizza deliverers, respondents reported their safety belt use was, on average, 44% higher than what they estimated pizza deliverers safety belt use rate to be. This discrepancy was lower (i.e., 32%) among respondents who were aware of the program.

DISCUSSION

Pizza deliverers who were agents in a community-based safety belt program increased their own safety belt use 32% over baseline and maintained that increase over five months after the end of the program. Such long-term change is one that is generally not seen in this type of intervention research. Instead, target driving behaviors usually regress back close to baseline levels (cf. Ludwig & Geller, 1991, 1997). However, the intervention-agent approach in the present study seemed to create some lasting change among many deliverers and within the culture of the store itself. Only about 25% (n = 12) of the drivers who participated in the four-week intervention were still employed during the follow-up observations in week 30 and beyond.

The maintenance of the 75% safety belt use after week 30 suggests the store's culture had incorporated some indigenous prompts and reinforcers separate from the overt intervention implemented in this study. This could be due to the development of cultural practices created by the intervention that were maintained by social contingencies after the intervention was terminated. Only more direct observations of these contingencies in future studies will permit us to draw more definitive conclusions about these maintenance effects.

In addition to the increase in safety belt use, an increase in turn signal use was also observed at Store A. This increase occurred concurrent with the community safety belt intervention, where at no time was turn signal use included in any of the intervention materials or messages. Therefore, this change in a non-targeted behavior concurrent with changes in the target behavior represents response generalization. In this study, turn signal use was the only non-targeted behavior observed. It is possible other non-targeted driving behaviors such as complete intersection stopping, following distance, and speed also changed in desired directions.

The change in safety belt and turn signal use was specific, however, to the store that sponsored the program (Store A). The control store (Store B) was a competitor of Store A in the same town that experienced the safety belt program. We had presumed the second store would also show some increase in their safety belt use as well. However, other than a general seasonal (i.e., winter turning to spring) trend in safety belt use seen in both stores over the first six weeks of the ten-week baseline, there was no appreciable change in safety belt use at the competitor store.

The behavior improvement seen among the agents of the community safety belt program is consistent with predictions from the MIL model (Geller et al., 1990; Geller & Ludwig, 1991). What this study did not uncover, however, was exactly why the agents showed such behavior change. Three possible explanations are suggested: (1) the deliverers reacted to the intervention by behaving in conformity with their group verbal behavior that was promoting safety belt use (2) the deliverers were more aware of the public's scrutiny of professional drivers and felt increased public pressures to buckle up and signal turns, and (3) deliverers were surrounded by prompts that activated their behavior. The deliverers were exposed to: (a) ''BU'' signatures on numerous receipts, (b) safety belt program information on the boxtops of every pizza they delivered, (c) newspaper and radio advertisements, and (d) their own buckle-up reminder card (from the boxtops) hanging in their cars.

Cultural Impact

Regardless of particular reasons for individual behavior change, it was likely the work culture of the pizza store was impacted, as evidenced by the long term maintenance of the increases in deliverer belt use. Actively Caring is a construct that is helpful in describing the type of culture created in part by the safety belt community program (Geller, 1991, 1996). The community program directly prompted and reinforced safety belt use among the pizza deliverers. And response generalization occurred when turn signal use also increased. In addition, the program promoted deliverers' active participation in helping others drive more safely. It is possible some deliverers internalized their role of ''change agent for community safety'' and encouraging others to buckle up. Within the pizza store this could result in deliverers and managers experienced with being intervention agents prompting each other and new deliverers to drive safely. Thus, the long-term maintenance of the community program could be a result of an increase in actively caring among some pizza deliverers and other store personnel.

Cost-Benefit

It is noteworthy that this type of program can be very cost efficient. The radio station and the local newspaper donated advertisements as public service announcements co-sponsored by the pizza store. Although the pizza store purchased the boxtop reminder cards at a cost of $300, these boxtops could carry logos from other businesses in the community who donate financial support in order to be associated with the program. A total of 495 callers reminded their deliverer to buckle up and got a $1 discount on their pizza. However, the pizza store already offered $1-off coupons weekly in area newspapers. In this program, they leveraged their normal discount coupons to reflect their community safety message. Finally, the pizza store gave away a retail value of $25 worth of pizza to town citizens displaying their reminder card, hardly a major corporate expense that additionally was tax-deductible.

The benefit from the small financial investment in a community-based safety belt campaign was substantial. First, 89% of those interviewed reported they would choose a pizza store over another if they could participate in the community program and get $1 off their pizza. Second, 40% of these respondents stated they would solely choose a pizza store based on its community service and driving reputation. An additional 42% stated they would be ‘‘more inclined’’ to choose that store. Third and most importantly, the added safety of several deliverers and community participants has its own value beyond potential discounts in insurance rates and avoidance of legal sanctions.

Response Generalization

Response generalization seems to be a special benefit of programs that use a large amount of employee participation in the design, development, and implementation of the intervention (Ludwig & Geller, 1997). Employees in the present study were very much involved in the implementation of the community safety belt program.

Much has yet to be learned about the concept of response generalization. Several researchers referred to response generalization analogous to its use in the present study and in Ludwig and Geller’s (1991, 1997) findings (e.g., Burleigh & Marholin, 1977; Coleman, 1974; McLeskey, Rieth, & Polsgrove, 1980; Warren, Baer, & Rogers-Warren, 1979; Winkel, 1987). Stokes and Baer (1977) themselves seemed to avoid the ‘‘controversy concerning terminology’’ (p. 350) and asked the reader to consider a temporary definition of generalization. Indeed, response generalization is one of many descriptions for the co-occurrence of behavior.

One prominent example from our rich history in behavior analysis is induction. The initial effect of reinforcement, before differentiation takes place, is an increase in responding in many behaviors, some not directly associated with the reinforcer. This spread to other topographically similar responses is called induction. As induction is discussed in learning texts (Catania, 1979) the generality of the phenomena is rarely considered past of topographical similarity, temporal similarity, or a comparison of effort across responses. Examples of behaviors in dogs, lifting legs not conditioned to a buzzer-shock (Kellogg, 1939, as cited in Catania, 1979), and rats, poking their noses through non-reinforced positions of a wall of horizontal slots (Catania, 1979) are similar in form (topography) to the targeted responses (i.e., the dog lifting its right hind leg or the rat poking its nose through slots 9-12, respectively). Induction is an important contribution to our understanding of response generalization where we expand the concept to explain changes in topographically dissimilar behaviors that may be functionally related.

Other instances of the co-occurrence of behavior include countercontrol (Skinner, 1953; Miller, 1991; see Ludwig & Geller, 1997, under review, or Geller, Casali, & Johnson, 1980, for possible applied examples), superstitious responding (Skinner, 1948; see Van-Raalte, Brewer, Nemeroff, & Linder, 1991, or Lobmeyer & Wasserman, 1986, for possible applied examples), and adjunctive behaviors (Falk, 1961a, b, 1966; see Cantor, 1981, and Cantor & Wilson, 1984, for possible applied examples). We feel that the concept of response generalization is informed by these research definitions yet is somewhat distinct because the phenomena occurs in topographically dissimilar but functionally related behaviors. The turn signal use in this study can be considered in the same response class as safety belt use as they are related functionally to an overall outcome of safe driving (e.g., avoiding injury due to a vehicle wreck). We also feel response generalization is distinct from other types of generalization of behaviors summarized by Stokes and Baer (1977) such as the transfer of trained behaviors across settings, time, or stimuli. Response generalization refers to the spread of effect to other topographically-distinct behaviors not included in the reinforced class. Much more discussion is needed to clarify the definition of response generalization and its use in applied research.

SUMMARY

The major contribution of this research was to show that behavior change occurs in agents of interventions as well as targets of interventions. A limitation of this study is that it did not attempt to measure the impact of the safety belt intervention on the community targeted by the pizza deliverer agents. The impact on the overall townspeople's driving behavior was probably small. This would be predicted by the MIL Model (Geller et al., 1990; Geller & Ludwig, 1991). However, the impact could have been more pronounced among individuals who were customers of the pizza restaurant during the intervention. There was an opportunity to observe customers picking up their pizzas in their personal vehicles while observations were conducted on the pizza deliverers themselves. Unfortunately this study did not take advantage of this opportunity.

Future research in this area should make efforts to study the targeted population as well as the agents involved in the study. Additionally, more control sites should be used in future research to avoid potential organization-specific events that may effect the data. Finally, future research should continue to investigate response generalization and attempt to design interventions to take advantage of these desirable side-effects.

REFERENCES

Baker, S. P., O'Neill, B., & Karpt, R. S. (1984). *The injury fact book*. New York: Lexington Books.

Burleigh, R.A., & Marholin, D. (1977). Don't shoot until you see the whites of his eyes: An analysis of the adverse side effects of verbal prompts. *Behavior Modification*, 1, 109-122.

Cantor, M. B. (1981). Bad habits: Models of induced ingestion in satiated rats and people. In S. Miller (Ed.), *Behavior and Nutrition*. Philadelphia: Franklin Institute Press.

Cantor, M. B., & Wilson, J. F. (1984). Feeding the face: New direction in adjunctive behavior research. In F. R. Brush & J. B. Overmier (Eds.), *Affect, conditioning, and cognition*. Hillsdale, NJ: Erlbaum.

Carr, E. G. (1988). Functional equivalence as a mechanism of response generalization. In R. H. Horner, G. Dunlap, & R. L. Koegel (Eds.), *Generalization and maintenance: Life-style changes in applied settings* (pp. 221-241). Baltimore: Paul H. Brookes.

Catinia, A. C. (1979). *Learning*. Englewood Cliffs, NJ: Prentice-Hall.

Coleman, R. (1974). Response generalization in two categories of classroom behavior. *Psychological Reports*, 34, 1167-1173.

Cope, J. G., & Geller, E. S. (1984). Community-based interventions to increase the use of automobile litter bags. *Journal of Resource Management and Technology*, 13, 127-132.

Falk, J. L. (1961a). Production of polydipsia in normal rats by an intermittent food schedule. *Science*, 133, 195-196.

Falk, J. L. (1961b). The behavioral regulation of water-electrolyte balance. In M.R. Jones (Ed.), *Nebraska Symposium on Motivation*. Lincoln: University of Nebraska Press.

Geller, E. S. (1987). Environmental psychology and applied behavior analysis: From strange bedfellows to a productive marriage. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology, Vol. 1* (pp. 361-388). New York: John Wiley & Sons.

Geller, E. S. (1991a). Where is the validity in social validity? *Journal of Applied Behavior Analysis*, *24*, 179-184.

Geller, E. S. (1991b). If only more would actively care. *Journal of Applied Behavior Analysis*, *24*, 763-764.

Geller, E. S. (1996a). Managing the human element of occupational health and safety. In R. W. Lack (Ed.), *Essentials of safety and health management* (pp. 479-510). New York: Lewis Publications.

Geller, E. S. (1996b). *The psychology of safety*. Boca Raton, FL: CRC Press.

Geller, E. S., Casali, J. G., & Johnson, R. P. (1980). Seat belt usage: A potential target for applied behavior analysts. *Journal of Applied Behavior Analysis, 13*, 669-675.

Geller, E. S., Johnson, R. P., & Pelton, S. L. (1982). Community-based interventions for encouraging safety belt use. *American Journal of Community Psychology*, *10*, 183-195.

Geller, E. S., & Ludwig, T. D. (1991). A Behavior Change Taxonomy for Improving Road Safety. In *Proceedings of the OECD International Road Safety Symposium*, September 19-21,1990, Copenhagen, Denmark.

Geller, E. S., Ludwig, T. D., Gilmore, M. R., & Berry, T. D. (1990). A taxonomy of behavior change: Techniques for community intervention. *The Community Psychologist*, *23* (2), 4-6.

Johnson, R. P., & Geller, E. S. (1984). Contingent versus noncontingent rewards for promoting seat belt usage. *Journal of Community Psychology*, *12*, 113-122.

Katz, E., & Lazarfeld, P. E. (1955). *Personal influence: The part played by people in the flow of mass communication*. Glencoe, IL: Free Press.

Lobmeyer, D. L. & Wasserman, E. A. (1986). Preliminaries to free throw shooting: Superstitious Behavior? *Journal of Sport Behavior, 9*, 70-78.

Ludwig, T. D., & Geller, E. S. (under review). Paradoxical effects of repeated turn signal policy memos: Evidence of countercontrol behaviors. *Journal of Organizational Behavior Management*.

Ludwig, T. D., & Geller, E. S. (1991). Improving the driving practices of pizza deliverers: Potential moderating effects of age and driving record. *Journal of Applied Behavior Analysis*, *24*, 31-44.

Ludwig, T. D., & Geller, E. S. (1997). Assigned versus participatory goal setting and response generalization: Managing injury control among professional pizza deliverers. *Journal of Applied Psychology*, *82*, 253-261.

McLeskey, J., Rieth, H. J., & Polsgrove, L. (1980). The implications of response generalization for improving the effectiveness of programs for learning disabled children. *Journal of Learning Disabilities, 13*, 287-290.

Meagher, M. (1989, February). Death in the delivery zone (television segment). *Inside Edition*, American Broadcasting Company.

Miller, L. K. (1991). Avoiding the countercontrol of applied behavior analysis. *Journal* *of Applied Behavior Analysis*, 24, 645-647.

Rudd, J. R., & Geller, E. S. (1985). A university-based incentive program to increase safety belt use: Toward cost effective institutionalization. *Journal of Applied Behavior Analysis*, *18*, 215-226.

Schwartz, I. S., & Baer, D. M. (1991). Social validity assessments: Is current practice state of the art? *Journal of Applied Behavior Analysis*, *24*, 189-204.

Simpson, H. M, & Mayhew, D. R. (1987). Demographic trends and traffic causalities among growth. *Alcohol, Drugs and Driving*, *3*(3-4), 45-62.

Skinner, B. F. (1948). Superstition in the pigeon. Journal of Experimental Psychology, 38, 168-172.

Skinner, B. F. (1953). *Science and human behavior.* New York: Macmillan.

Stokes, T. F. & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior Analysis*, 10(2), 349-367.

Streff, F. M., Kalsher, M. J., & Geller, E. S. (1993). Developing efficient workplace safety programs: Observations of response covariation. *Journal of Organizational Behavior Management*, *13*, 3-14.

Thyer, B. A., Geller, E. S., Williams, M., & Purcell, E. (1987). Community-based ‘‘flashing’’ to increase safety belt use. *The Journal of Experimental Education*, *53*, 155-159.

Van-Raalte, J.L., Brewer, B. W., Nemeroff, C. J., & Linder, D. E. (1991). Chance orientation and superstitious behavior on the putting green. *Journal of Sport Behavior, 14*, 41-50.

Warren, S.F., Baer, D.M., & Rogers-Warren, A. (1979). Teaching children to praise: A problem in stimulus and response generalization. Child Behavior Therapy, 1, 123-137.

Winett, R. A., Moore, J. F., Wagner, J. L., Hite, L. A., Leahy, M., Neubauer, T. E.,

Walberg, J. L., Walker, W. B., Lombard, D., Geller, E. S., & Mundy, L. L. (1991). Altering shoppers’ supermarket purchases to fit nutritional guidelines: Interactive information system. *Journal of Applied Behavior Analysis*, *24*, 95-106.

Winkel, F.W. (1987). Response generalization in crime prevention campaigns: An experiment. *British Journal of Criminology*, *27*, 155-173.

Wolf, M. M. (1978). Social validity: The case for subjective measurement, or how behavior analysis is finding its heart. *Journal of Applied Behavior Analysis*, *11*, 203-214.

APPENDIX. Behavioral Data Points by Date for Each Group in Figure 1 and Figure 2.

Date	Store A Safety Belts	Store B Safety Belts	Store A Turn Signals	Store B Turn Signals
Jan 3	41		53	
Jan 5	48		59	
Jan 9	60	40	58	59
Jan 11	34	45	55	65
Jan 15	55	49	70	70
Jan 24	40	47	72	68
Jan 26		36		44
Jan 27	64	57		19
Jan 28	40			67
Jan 29	64			
Jan 30		45		65
Feb 6	66		44	
Feb 8	46	56	56	67
Feb 11	52	70	32	70
Feb 15	68	47	50	65
Feb 16	63		59	
Feb 20	68		44	
Feb 23	58	41		78
Feb 24		48		68
Feb 27	53		58	
Feb 28		70		70
Mar 3		61		61
Mar 6	69		54	
Mar 7		56		66
Mar 8	70		64	
Mar 9	56		53	
Mar 11	58		54	17
Mar 12		55		55
Mar 18				
Mar 20	42		45	
Mar 22	64			
Mar 24	86	72	68	72
Mar 25				48
Mar 26				33
Mar 28	74			

APPENDIX (continued)

Date	Store A Safety Belts	Store B Safety Belts	Store A Turn Signals	Store B Turn Signals
Mar 29	60		69	
Mar 30	75	45	81	65
Mar 31	78	64	69	64
Apr 3	92		72	
Apr 4	73		84	
Apr 5	68		79	
Apr 6	79		82	
Apr 7		66		66
Apr 10	61		68	
Apr 11		43		53
Apr 12		60		70
Apr 13	84	45	70	65
Apr 14	87		81	
Apr 17	64			
Apr 18		47		67
Apr 19	67	73	91	79
Apr 20	69		85	
Apr 24	76		72	
Apr 25	77	58	86	58
Apr 26		64		67
Apr 27	61			
May 1	69		70	
May 2	73		70	
Jun 20	82			
Jun 21	78			
Jun 23	81			
Jun 24	61			
Jun 25	58			
Jun 26	60			
Jul 17	87		83	
Jul 18	72		69	
Jul 25	85			
Jul 26	60			
Jul 31	67			

Date	Store A Safety Belts	Store B Safety Belts	Store A Turn Signals	Store B Turn Signals
Aug 1	57			
Aug 13	69		66	
Aug 14	89		68	
Aug 15	77		86	
Aug 18	57		55	
Aug 19	92		75	
Aug 21	92		64	
Aug 25	85		73	
Aug 26	95		92	
Aug 27	64		50	
Aug 28	63		43	
Aug 29	94		75	
Sept 3	82		74	
Sept 4	91		74	
Sept 5	94		88	
Sept 10	72		54	
Sept 12	62		74	
Sept 13	93		83	
Sept 16	87		77	
Sept 17	42		76	
Sept 18	79		72	
Sept 19	63		80	
Sept 20	78		70	
Sept 21	69		74	
Sept 23	58		38	
Sept 24	85		55	
Sept 25	81		92	
Sept 30	96		78	
Oct 1	74		76	
Oct 3	77		88	
Oct 4	75		78	
Oct 7	70		79	
Oct 8	76		77	
Oct 9	58		67	
Oct 10	62		60	
Oct 13	65		76	
Oct 14	63		81	

APPENDIX (continued)

Date	Store A Safety Belts	Store B Safety Belts	Store A Turn Signals	Store B Turn Signals
Oct 15	50		78	
Oct 16	50		68	
Oct 22	97		92	
Oct 27	60		82	
Oct 28	88		89	