

SIGNS AS DETERRENTS OF ILLEGAL PARKING IN SPACES DESIGNATED FOR INDIVIDUALS WITH PHYSICAL DISABILITIES

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The percentage of illegal parking in spaces reserved for the physically disabled was monitored under three sign conditions: ground markings, ground markings plus vertical signs, and vertical signs containing a message that concerned citizens were watching the spaces. Illegal parking dropped from 69.3% of 102 vehicles during the initial ground-sign condition to 57.3% of 36 vehicles in the first vertical-sign condition. Following removal of the vertical signs, illegal parking increased to 68.7% of 43 vehicles. During the second vertical-sign condition, illegal parking dropped to 53.7% of 32 vehicles, followed by an increase to 69.5% of 68 vehicles after the vertical signs were removed. The lowest rate of illegal parking (27.1% of 78 vehicles) occurred in the vertical-sign-plus-message condition. Illegal parking subsequently increased to 34.6% (of 94 vehicles) when the message sign was removed, followed by an increase to 65.2% (of 105 vehicles) when the vertical signs were removed.

DESCRIPTORS: handicapped parking, sign prompts, environmental design

Illegal parking in spaces reserved for the physically disabled denies them the full mobility granted under the Architectural Barriers Act of 1968. Unfortunately, the high level of convenience built into these spaces (e.g., size, proximity, and availability) may foster high rates of misuse by the nondisabled community. In fact, baseline violation rates as high as 76.1% have been reported (Matthews, 1981). In a more recent study, 72.0% of 246 subjects responded "No" when asked if they had ever parked illegally in a parking space reserved for the physically disabled; yet, actual observations of parking behavior at nearby supermarkets showed baseline violation rates as high as 73.7% (Cope & Allred, 1991).

Illegal parking in spaces reserved for individuals with physical disabilities has received limited attention in the behavioral science literature (as reviewed in Cope & Allred, 1991). Most studies have involved the use of contingent punishment (e.g., police enforcement) or antecedent strategies

(e.g., signs). For example, Suarez de Balcazar, Fawcett, and Balcazar (1988) demonstrated that a large-scale police enforcement program was effective in decreasing the frequency of cars parking illegally in spaces reserved for physically disabled individuals. However, citywide police crackdowns require substantial time and effort and may be difficult to sustain over long time periods, given the other problems that compete for close police scrutiny.

The effectiveness of signs to decrease illegal behavior has been examined in other areas (Geller, Koltuniak, & Shilling, 1983; McNees, Egli, Marshall, Schnelle, & Risley, 1976) as well as with illegal parking in spaces reserved for the physically disabled (Jason & Jung, 1984; Suarez de Balcazar et al., 1988). The latter studies demonstrated that vertical signs using the universal handicapped symbol were more effective than ground markings in reducing illegal parking. The addition of a warning message to the vertical sign (stating that fines of \$250 were possible) was also effective in reducing the frequency of illegal parking at two grocery stores (White, Jones, Ulicny, Powell, & Mathews, 1988). However, many cities do not set high traffic fines for parking violations. Parking fines may not be effective if individuals in a hurry are willing to risk a low level of punishment (e.g., \$25) in exchange for a high level of reward (e.g., a quick turnaround

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time in the store). The present study attempted to examine the effectiveness of a message implying social rather than police involvement.

METHOD

Subjects and Setting

The drivers of 558 vehicles (cars or trucks) who parked in the four parking spaces reserved for the physically disabled at a large supermarket served as subjects. The surrounding shopping center was located in a well developed commercial area in Greenville, North Carolina (population 50,000), serving a mix of college students and local families. The target spaces were across a traffic lane, within easy sight of the front entrance to the store. Each space was originally identified by a fading yellow ground painting of the international handicapped access symbol.

The site was identified in a previous study (Cope & Allred, 1991) as having a high violation rate and low police enforcement. In fact, no observations of enforcement were reported across the 26 days of the earlier study.

Observation, Record Keeping, and Interobserver Agreement

Observations were made on 106 weekdays between September 1989 and April 1990 from 4:00 to 6:00 p.m. or 4:30 to 6:30 p.m., depending on the onset of nightfall. Target spaces were monitored by an observer standing in the front of the building about 10 to 15 m from the spaces. When possible, a second observer (separated by a distance of about 2 m) was present to assess reliability (observers were instructed not to confer). The data collectors were able to walk out to the lot and check for proper parking authorization, but did so only after the driver had entered the store. Due to bag boys loading cars and general pedestrian traffic in and out of the store, the purpose of data collection was probably not readily apparent to those using the handicapped spaces. All data collectors were undergraduate college students trained on site, and each was provided with supervised practice and

feedback until approved by one of the authors (who also made random spot checks throughout the study to ensure consistent performance).

An illegal parking event was recorded only when the driver actually got out of the vehicle and went inside the store. Each observer recorded the presence or absence of a legal handicapped display. (A special plate located on the driver's side of the dashboard is standard in North Carolina, although a license plate bearing the handicapped symbol may also be used.) A violation was recorded if no official handicapped designation was found on the vehicle, even if the driver was obviously disabled. The use of the legal standard avoided interpretive problems inherent in more precise recording formats (e.g., Matthews, 1981) in which all observation combinations (legal or illegal and visibly disabled or nondisabled) were recorded.

Measures of reliability were obtained for 247 (44.3%) of the 558 observations. Interobserver agreement was determined by examining the data taken independently by two different observers for each vehicle in the chosen observation period (all data were sorted and matched by vehicle license plate number). Estimates of agreement were formed by calculating the percentage of times two observers agreed on a particular response category (agreements divided by agreements plus disagreements times 100). The following percentages were obtained: 98.8% overall agreement, with 99.3% agreement for observations of legal parkers and 98.2% agreement for observations of illegal parkers.

Experimental Conditions

A modified reversal (ABABACBA) design was used, in which two sign conditions (a ground sign and a ground sign combined with a portable vertical sign) were alternated. A second message sign was added to the signpost during the third ground-plus-vertical-sign condition and then removed.

Ground sign. During baseline conditions a standard yellow ground painting (1.1 m by 0.9 m) of the handicapped access symbol was displayed at each space. No vertical signpost was present during this condition.

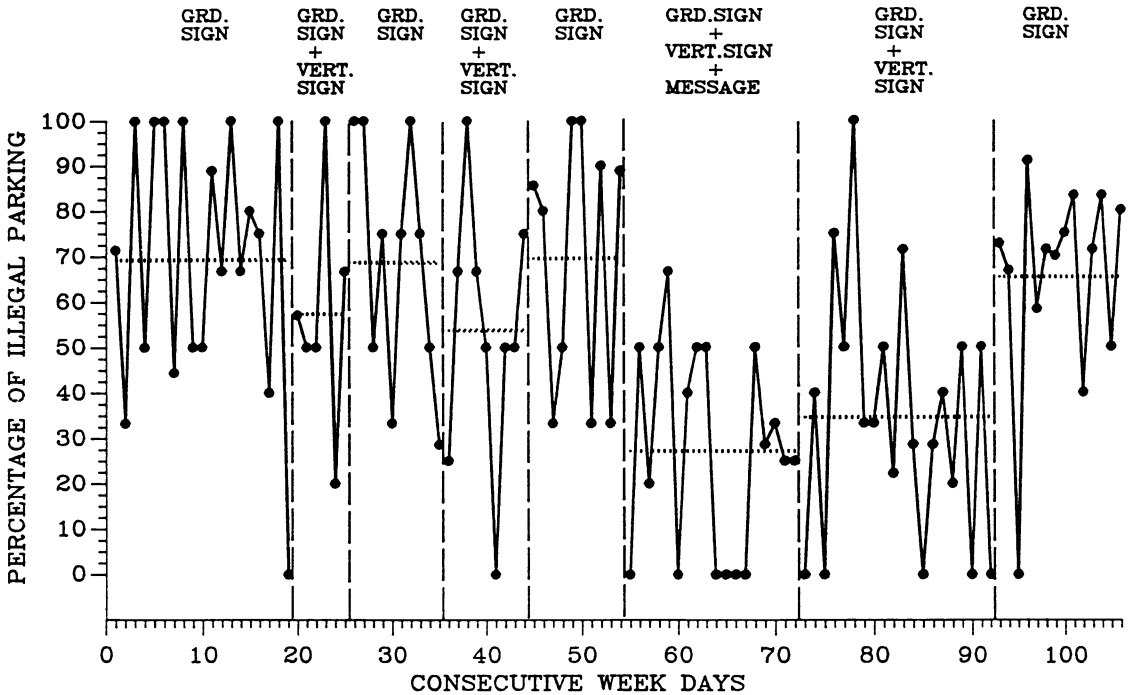


Figure 1. Percentage of illegal parking across experimental phases. The mean of each phase is indicated by a dotted horizontal line.

Vertical sign. A signpost mounted into an automobile tire filled with cement was used to display a blue sign (30 cm by 46 cm, at a height of about 1.4 m) containing a white handicapped access symbol. A signpost unit was placed at the head (and in the center) of each of the four spaces.

Message sign. During this condition, a bright yellow sign (30 cm by 46 cm) containing the message (in black letters, 2.5 cm high), "WARNING: THIS SPACE WATCHED BY CONCERNED CITIZENS," was placed immediately below the handicapped sign (at a height of about 0.9 m). Store personnel were instructed to watch the spaces on an informal basis but did not record their observations or intervene.

RESULTS

Figure 1 shows the percentages of illegal parking in the four target spaces (i.e., the number of illegal vehicles divided by the number of illegal plus legal vehicles divided by 100). Because the data at each space did not differ (all four spaces were close to-

gether), the data were combined across spaces. The high variability present within and across experimental conditions was due partially to the low numbers of cars per space occurring periodically throughout the study. The number of vehicles parked illegally each day ranged between 0 and 11, with a mean of 3.1, for a total of 323 vehicles.

The pattern of illegal parking with and without a vertical sign in place was quite stable. The average percentage of illegal parking decreased from an initial rate of 69.3% of 102 vehicles (with ground sign only) to 57.3% of 36 vehicles during the first introduction of the vertical signs, followed by an increase to 68.7% of 43 vehicles after their removal. During the second introduction of the vertical signs, illegal parking dropped to an average of 53.7% of 32 vehicles and was again followed by an increase to 69.5% of 68 vehicles after the signs were removed.

When the message sign was added to the signposts during the third vertical-sign phase, the average rate of illegal parking dropped to the lowest level in the study (27.1% of 78 vehicles). When

the message was removed from the vertical signs, the level of illegal parking increased to an average of 34.6% of 94 vehicles, followed by a further increase to 65.2% of 105 vehicles in the last phase when the vertical signs were removed.

DISCUSSION

The current findings provide additional support for the work of Jason and Jung (1984) and Suarez de Balcazar *et al.* (1988), who showed vertical signs to be more effective than ground signs in preventing illegal parking in spaces reserved for persons with physical disabilities. The addition of a message implying contingent social rather than legal sanctions appeared to have the greatest impact on illegal parking behavior compared to the vertical- or ground-sign conditions. These results should be interpreted with some caution, however, because of design limitations that did not permit a true reversal (*i.e.*, a return to the ground-sign condition) following the message condition. The dramatic effect of the special message seemed to generalize to the final vertical-sign condition. This generalization may have been enhanced by the similarity of the two conditions and because they were administered consecutively. Individuals reading the message in the preceding phase may have attributed more salience to the international symbol immediately following the message condition than when it had been presented alone prior to the message. Additional research is needed to determine whether this generalization effect will also occur if the two conditions are experimentally isolated by a return to baseline, and if the effect of the message will also enhance the effect of the ground signs used alone.

Although the costs associated with this project were somewhat higher than expected (because the store was not already using vertical signs), the overall cost was relatively small when compared to the expense of increasing police enforcement. Each of the vertical signpost units cost about \$33, and the message signs cost about \$15 each.

According to Geller, Winett, and Everett (1982), prompts can announce a behavioral consequence (pleasant or unpleasant) or provide information

about the impending onset of a consequence. The problem with using a sign stating a contingent fine is that the probability of receiving that fine may be small. Statements of a fine do not directly signal the onset of enforcement, which would not be a problem if an enforcement symbol (such as a police car or an officer in uniform) were visible. In the absence of such a discriminative stimulus, most potential violators may simply weigh the odds of being caught and having to pay the fine with the odds of being undetected and gaining the use of a highly convenient parking space. In a citywide police crackdown on parking violators, the probability of actually getting the advertised fine might carry more subjective weight than it would in situations in which individuals have less experience getting or seeing others get citations for illegal use of parking spaces for the physically disabled. Although the idea is far from new and has been delineated in other problem areas (*e.g.*, reducing alcohol-impaired driving; Ross, 1982), any message tied to legal sanctions may be effective only as long as enforcement is viewed as highly probable.

The current strategy involved a message (similar to Neighborhood Watch campaigns) that attempted to facilitate the transfer of responsibility for enforcement to the community. The goal was to increase the probability of public attention from more immediate sources, thus making the decision to park illegally more difficult. Store personnel and other shoppers (both disabled and nondisabled) are usually present in parking lots (whereas police officials typically are not) and might serve as a source of social control, given the increased expectation of public intervention. Many individuals illegally using spaces reserved for the physically disabled are aware of their nonsanctioned behavior (Matthews, 1981) and might reasonably be expected to consider being seen and publicly admonished as a punishing consequence.

People with physical disabilities frequently report the lack of accessible parking because of illegal use of these designated spaces to be a major concern. Given the high violation rates that occur with current methods of marking the spaces, other methods should be considered. The effectiveness of the

neighborhood watch message in the present study suggests that implementation of actual neighborhood watch strategies might be as effective as police enforcement in reducing violation rates. Future research should focus on the effectiveness of the message over time and in different environmental settings. In addition, the long-term effects of actual implementation of a community-wide action strategy should be investigated.

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