

THE EFFECTS OF PROMPTS, FEEDBACK AND AN ADVERTISING CAMPAIGN ON THE USE OF SAFETY BELTS BY AUTOMOBILE DRIVERS IN NOVA SCOTIA*

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ABSTRACT

An experiment was conducted to test the influence of a standard safety belt reminder sign and a sign reporting feedback about the percentage of drivers wearing safety belts during the preceding week on the use of safety belts by drivers in Nova Scotia. Following baseline periods of varying length, signs were erected on four different highways. Each type of sign was erected on two different types of highway: one type a four-lane highway leading out of the city and into high speed zones and the other type a two-lane highway leading through mixed residential and business areas. Only when a feedback sign was erected along a highway conducting traffic into high speed zones leading out of the city did the percentage of drivers wearing safety belts show a marginal increase. The feedback sign proved to be ineffective in increasing safety belt use when erected along a highway conducting urban traffic and the standard reminder sign proved to be ineffective in both cases. In addition, measures obtained during these conditions were compared with measures obtained one year later, following a year-long safety belt advertising campaign. Results indicated that the campaign was ineffective in increasing safety belt use.

Increasing the use of safety belts by automobile drivers is a major concern of most governmental highway departments. One reason for this concern is the high cost to society that results from the failure to use safety belts. For example, this failure has been estimated to increase the risk of death or severe injury by 100 per cent and to increase the risk of non-trivial injury by 70 per cent [1].

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Clearly, an increase in the rate of safety belt use would be expected to reduce substantially the severe demands that automobile accidents make on governmentally-supported medical and social service institutions.

To date, legislation has proven to be the most effective means of increasing the frequency of safety belt use. In Australia, institution of a law requiring the wearing of safety belts increased safety belt use from 25 per cent of the population to approximately 75 per cent of the population during the first year alone [2]. However, governments are often hesitant to pass such laws, since many members of the public view these laws as threats to their personal rights. Consequently, there remains a considerable interest in the use of more benign alternative methods for increasing safety belt use. Unfortunately, despite the large sums of money that are sometimes spent on increasing safety belt use, there does not yet exist an effective behaviorally based procedure [3].

One simple and relatively inexpensive method for controlling behavior is the use of prompts. For example, the presentation of prompts on signs or handbills has been shown to be effective in reducing littering [4–6], increasing energy conservation [7], and increasing recycling [8]. The behavior of drivers is also subject to influence by prompts. For example, the posting of speed limit signs has been shown to reduce the proportion of drivers travelling at very excessive speeds (32 km/h or more above the speed limit) by as much as 85 per cent [9]. Not surprisingly, signs intended to prompt safety belt use have been erected by a number of highway departments in North America. However, no systematic study of the effectiveness of these signs has been reported.

Recent research has also demonstrated that highway signs providing behavioral feedback can be used to influence the behavior of drivers. Van Houten, Nau and Marini have shown that a large highway sign displaying the percentage of drivers not speeding during the preceding week, along with the best record to date, was effective in reducing the percentage of speeding drivers by as much as two-thirds [10]. It is possible that a similar sign could be used to increase the percentage of drivers wearing safety belts.

Therefore, the purpose of the present study was to determine if either of these methods – the use of a simple prompt or the use of posted feedback – would increase the use of safety belts by automobile drivers. In the present study each type of sign was tested on two different types of highway. Highways of the first type were composed of four traffic lanes, with two of these lanes leading out of the city and into high speed areas. Highways of the second type were composed of only two lanes and passed through mixed residential and business areas. This comparison was made in order to determine whether the signs would be effective only when used along certain types of highway.

An additional purpose of this study was to assess the effectiveness of a year-long publicity campaign designed to increase safety belt use by Nova Scotian drivers. Despite the repeated failure to find support for the effectiveness of such methods [1, 11, 12], advertising campaigns making extensive use of print and

electronic media and costing large sums of money continue to be the major means by which governments attempt to influence the behavior of drivers.

Shortly before the beginning of the present study, the government of Nova Scotia began a year-long campaign to increase safety belt use through advertising in newspapers, radio and television. In order to assess the effectiveness of this campaign, the present study compared the proportion of drivers wearing safety belts at the beginning of the advertising campaign with the proportion of drivers wearing safety belts after the campaign had been in effect for a full year.

METHOD

Subjects and Setting

Subjects of the study were automobile drivers on four frequently travelled roads in metropolitan Halifax and Dartmouth, Nova Scotia. Two were four-lane highways leading out of the metropolitan area and the remaining two were two-lane highways passing through mixed residential and business areas.

Highway 102 – This was a four-lane divided highway leading out of the city of Halifax. The sign was erected 2.5 m from the ground on the right hand side of the highway at the first entrance ramp leading out of the city. The percentage of drivers wearing safety belts was measured 0.8 km further from the city at the second entrance ramp. Consequently all traffic passing the recording point also passed the sign. The speed limit along this section of highway was 70 km/hr, but this limit increased to 90 km/hr immediately beyond the measurement point.

Trunk #7 – This was a four-lane undivided highway passing through an industrial park and leading out of the city of Dartmouth. The sign was erected 2.5 m above the ground near an intersection controlled by a traffic light. The percentage of drivers wearing safety belts was measured 0.72 km further down the road at another controlled intersection. No other city streets intersected Trunk #7 between these two points, although there were a number of entrances to businesses and warehouses along this section of highway. Consequently, most vehicles passing the measurement point also passed the sign.

The speed limit along this section of highway was 60 km/hr. However, once past the measurement point, the speed limit increased to 90 km/hr. Thus, drivers passing the sign and measurement point eventually left the city and travelled at high speeds.

Trunk #2 – This was a two-lane highway passing through a mixed residential and business area of Halifax. The sign was erected 2.5 m above the ground on the right hand side of the highway. Measurement was made 0.72 km away from the sign. Only one residential street intersected the highway between the sign

and the measurement point, and the amount of traffic using this street was minimal. Thus, virtually all cars passing the measurement point also passed the sign. The speed limit along this section of highway was 70 km/hr.

Highway 349 – This was also a two-lane highway similar to Trunk #2. The sign was erected 2.5 m above the ground and the percentage of drivers wearing safety belts was measured 0.64 km further down the highway. Only two residential streets intersected the highway between the sign and the measurement point, and relatively few cars used these streets. Thus, as was the case on Trunk #2, virtually all cars passing the measurement point also passed the sign. The speed limit along this section of road was 50 km/hr.

Highway Signs

Two types of highway signs were employed. The feedback sign measured 1.52 m X 3.04 m and was painted reflective white with black lettering and read “Drivers wearing safety belts yesterday ____%.” Below this was printed “Best Record ____%.” All letters were 21 cm high. In order to allow daily changes, feedback numbers were bolted to the sign by means of white rectangular wooden panels. Daily numbers were 25 cm high and “Best Record” numbers were 21 cm high.

The standard reminder sign was copied from the type currently in use in the province of New Brunswick and read “Are Your Safety Belts Fastened?” The sign measured 1.22 m X 0.91 m and letters were 15 cm high.

Both signs were constructed by the Nova Scotia Department of Highways, and were designed to be read easily under all weather conditions, both during the day and at night.

Measures

The percentage of drivers wearing safety belts was measured by a single observer standing on the side of the highway at each measurement point. The observer carried a clip-board and score sheet and, as each auto passed, noted whether or not the driver was wearing a shoulder harness. Other passengers in the car were ignored. Commercial vehicles, trucks, vans and buses were omitted from the tabulation. Also omitted were vehicles that had not passed the feedback sign and vehicles that had passed the measurement point previously during the session. Vehicles in which no shoulder harness was seen hanging loosely from the ceiling or from the doorpost were classified as “not containing usable shoulder harness,” were tabulated separately and did not enter into the calculation of percentages. Such vehicles usually constituted only 1 to 2 per cent of the total.

Two daily measures of 100 automobiles each were made along each highway, one measure in the morning between 9:30 A.M. and 11:00 A.M. and one measure in the afternoon between 2:00 P.M. and 3:30 P.M.

Inter-Observer Agreement

On at least two occasions during each experimental condition a second observer accompanied the primary observer to each measurement point and made an independent tabulation of the number of drivers wearing safety belts. Inter-observer agreement on the occurrence of safety belt use was calculated by dividing the number of agreements on the occurrence of safety belt use by the number of agreements plus the number of disagreements. Inter-observer agreement on the occurrence of safety belt use averaged 94.9 per cent, ranging from 86 to 100 per cent. Inter-observer agreement on the non-occurrence of safety belt use was calculated by dividing the number of agreements on the non-occurrence of safety belt use by the number of agreements plus the number of disagreements. Inter-observer agreement on the non-occurrence of safety belt use averaged 99.1 per cent, ranging from 97 to 100 per cent.

Experimental Design

The experiment employed a multiple baseline design [13]. The effectiveness of the feedback sign was assessed on two of the highways (Highway 349 and Highway 102) and the effectiveness of the standard reminder sign was assessed on the remaining two highways (Trunk #7 and Trunk #2). Thus, each type of sign was tested on one four-lane highway leading out of the city, and on one two-lane highway where a preponderance of drivers remained within the city limits.

Standard Reminder Sign (Trunk #7 and Trunk #2) – During initial baseline conditions the standard reminder sign was absent from both highways, while the percentage of drivers wearing safety belts was measured daily. After seven baseline sessions, the reminder sign was erected along Trunk #7 while Trunk #2 remained in baseline conditions. This continued for an additional fifteen sessions, after which the standard reminder sign was also erected along Trunk #2. Standard reminder signs remained in place along both highways for sixteen more sessions, whereupon the experiment was terminated.

Feedback Sign (Highway 349 and Highway 102) – During initial baseline conditions the feedback sign was absent from both highways, while the percentage of drivers wearing safety belts was measured daily. After fifteen baseline sessions the feedback sign was erected along Highway 349 while Highway 102 remained in baseline conditions. Following each afternoon measurement made during this condition, the daily percentage of drivers wearing safety belts along that highway was posted on the feedback sign.

These conditions remained in effect for twelve sessions, after which the feedback sign was also erected along Highway 102. Daily feedback was posted on this sign in the same manner as along Highway 349.

After seven sessions during which the feedback signs remained in effect along both highways, the feedback sign along Highway 102 was covered with a large orange tarpaulin. This was done in order to reinstate baseline conditions along this highway. The feedback sign remained in use along Highway 349 during this time. These conditions remained in effect for three sessions, whereupon the experiment was terminated.

Advertising Campaign

In April 1979, three months before the beginning of the present study, the Province of Nova Scotia began a year-long effort to increase safety belt use through public advertising. The total safety advertising budget for the Province was more than doubled from \$130,000 during the preceding year to \$250,000 during 1979. Moreover, a greater emphasis was placed on safety belt education during 1979, to the extent that the budget for advertising safety belt use was increased from \$16,250 to \$68,750, a more than three-fold increase. In addition, radio and television advertising received greater emphasis during this year, increasing their share of the budget from 54 per cent during 1978 to 80 per cent during 1979. Funding for safety advertising was maintained at an even higher level from April 1980 through July 1980, when the present one-year follow-up was conducted.

In order to assess the effectiveness of this campaign, additional measures of safety belt use were obtained in July 1980, one year after the termination of the preceding experimental conditions, and fifteen months after the commencement of the safety belt advertising campaign. Measures were obtained at all four locations in the same manner and by the same observers as during the previous year. Neither the feedback signs nor the reminder signs were present on any of the highways.

RESULTS

The results of the experiment are illustrated in Figure 1.

Standard Reminder Sign

The erection of the standard reminder sign produced no consistent changes in the percentage of drivers wearing safety belts along either Trunk #7 or Trunk #2. The mean percentage of drivers wearing safety belts on Trunk #7 was 12.1 per cent during baseline and 12.9 per cent following erection of the sign. The mean percentage of drivers wearing safety belts on Trunk #2 was 13.7 per cent during baseline and 15.6 per cent following erection of the sign. Figure 1 shows that there was a considerable amount of overlap between results obtained during baseline and reminder sign conditions.

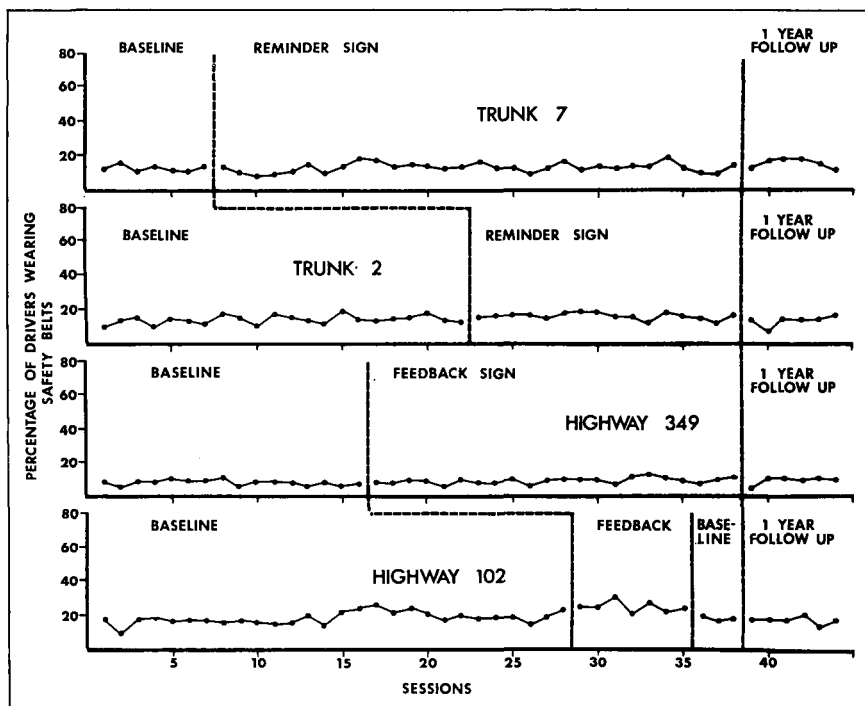


Figure 1. The percentage of drivers wearing safety belts along Trunk #7, Trunk #2, Highway 349, and Highway 102 as a function of successive days.

Feedback Sign

Erection of the feedback sign along Highway 349 had no effect on the percentage of drivers wearing safety belts. Percentages were unchanged and stable throughout the experiment, averaging 7.8 per cent during baseline and 8.3 per cent during the feedback condition. There was considerable overlap between results obtained during the baseline and feedback conditions.

However, erection of the feedback sign did produce a small increase in the percentage of drivers wearing safety belts on Highway 102. The percentage of drivers wearing safety belts averaged 19.4 per cent during the initial baseline condition and 24 per cent during the feedback condition, and although there was some overlap between results obtained during the two conditions, percentages obtained during the feedback condition were, for the most part, higher. Reinstatement of baseline conditions resulted in a decrease in the mean percentage of drivers wearing safety belts to 18 per cent. Moreover, there was no overlap between percentages obtained during the second baseline condition and the preceding feedback condition although, at their closest, results from the two conditions differed by only 1 per cent.

Advertising Campaign: 1 Year Later

Figure 1 shows that, despite a year-long advertising campaign costing more than \$68,750, the percentage of drivers wearing safety belts was no greater during follow-up than during the same period one year earlier. Results obtained during follow-up on all four highways were quite stable, and well within the range of values obtained during baseline in the preceding year.

DISCUSSION

The results of this study demonstrate that, in general, standard reminder signs and signs providing drivers with performance feedback were both ineffective as means of increasing the percentage of drivers using safety belts.

The standard reminder sign proved to be ineffective when employed along a busy two-lane highway that conducted urban traffic and along a four-lane highway conducting traffic that was leaving the city and entering a high speed zone. This failure is consistent with results reported by Galizio, Jackson and Steele [14], who found that the erection of a similar sign warning drivers that the speed limit was radar-enforced was ineffective in reducing drivers' speeds. However, these results are inconsistent with others reporting the successful use of prompts [4, 8]. One reason for this differential success may be that these studies employed direct requests or instructions whereas, in the present study, the prompt was an inquiry [15].

The erection and maintenance of a feedback sign also proved to be ineffective in increasing the percentage of drivers using safety belts along a section of busy two-lane highway where urban traffic predominated. In contrast, when erected along a section of four-lane highway leading out of the city, the feedback sign did produce a small increase in the percentage of drivers wearing safety belts. The differential effectiveness of the feedback sign along these two different types of highway may reflect a belief on the part of drivers that the protection offered by safety belts is only necessary when travelling at highway speeds. However, the increase in safety belt use following erection of the feedback sign along Highway 102 was quite small. At best, the sign employed in the present experiment produced an average increase of only six percentage points. Indeed, the feedback sign was totally ineffective when erected along a highway conducting primarily urban traffic. Thus, it is unlikely that this approach represents a practical method for increasing safety belt use.

The ineffectiveness of the feedback sign employed in the present study stands in marked contrast to the effect of similar signs in reducing urban speeding [10, 16]. There are several possible reasons for this difference. One possibility is that, although it may be relatively easy for a driver to reduce vehicle speed in immediate response to a feedback sign, the immediate buckling of a safety belt may be more difficult. Many drivers may find it inconvenient or dangerous to

buckle their safety belts while still driving and pulling over to the side of the road while in heavy traffic in order to “buckle-up” is probably even more troublesome.

Another possible reason for this difference may be the differing extent to which the behavior of individual drivers may influence the behavior of others. Van Houten et al. have suggested that part of the effectiveness of the feedback sign in reducing drivers' speeds may derive from the fact that when one driver slows down other drivers nearby may be forced to slow down as well [10]. Thus, although a feedback sign may have a direct effect on only a few drivers, it may influence many others indirectly. A similar effect would not be expected in the case of safety belt use since drivers probably find it difficult to determine whether the other drivers ahead or along-side of them are wearing safety belts. Likewise, the fastening of a safety belt in one car does not have the same direct consequences for the behavior of drivers of surrounding vehicles that the sudden slowing down of one vehicle may have for the behavior of vehicles surrounding it.

One final reason for the differential effectiveness of the feedback sign in these two situations may be that, although legal penalties exist for drivers exceeding the speed limit, such penalties do not exist in Nova Scotia for drivers failing to wear safety belts. Thus, it may be the case that the speeding feedback sign derives some of its effectiveness from the threat of police surveillance and enforcement that it implies.

Finally, the results of the present study suggest that a year-long advertising campaign making use of newspapers, television, and radio was ineffective in increasing safety belt use. This is consistent with the results of several previous studies that have also reported the failure or relative ineffectiveness of safety belt advertising campaigns [1, 11, 12]. It is possible that the advertising campaign employed here enjoyed its greatest effectiveness during its initial three months, and before the baseline measurements of the present study were obtained. This is unlikely, especially since the baseline results obtained here are quite consistent with baseline measures reported by other researchers. For example, observations in Canada indicate the rate of safety belt use to be between 6 and 17 per cent [1], and observations in the U.S. indicate rates of safety belt use of 10.6 and 18.5 per cent [17, 18]. At the very least, however, the present results argue that public advertising loses its effectiveness very quickly, perhaps within the first two to three months.

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