# Drivers' perception of two seatbelt wearing advertisements with different emotional appeals and cultural settings

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## Abstract

In this study, a convenient sample of drivers provided their opinions and perceptions of two seatbelt wearing advertisements with different emotional appeals. One advertisement had a more negative emotional appeal (fear) while the other had more a positive emotional appeal (humour). More importantly, they were both produced overseas and one of them was from a very different culture from the viewers. However, both advertisements appeared to possess several of the key message characteristics prescribed by established scientific models. Results revealed that both advertisements were successful in increasing viewers' intention to wear a seatbelt and obey the seatbelt law. In addition, significant correlations were found between these adaptive intentions and several key message characteristics. Results attested to the importance of using established theoretical models when developing a road safety message.

## Keywords

Advertisements, Fear appeal, Humour, Road safety, Seatbelt wearing

## Introduction

Road crashes are a major cause of deaths and serious injuries in many countries. Around the world, about 1.2 million people are killed each year on the roads [1]. In the United States, for example, there are more than 42,000 traffic fatalities a year and the annual social cost is estimated at over $230 billion [1]. Similarly, about 3000 road users are killed each year on Canadian roads, resulting in an estimated social cost of about $25 billion [2]. Among the various factors contributing to traffic fatalities, not wearing a seatbelt is widely considered as a major fatality risk factor in the event of a crash [3-4], although the overall safety effects of mandatory seatbelt wearing laws have been widely debated [5-15].

One obvious way to encourage vehicle occupants to wear their seatbelts voluntarily is through persuasive communications. Road safety messages have been widely used around the world to modify a variety of driver behaviour, including seatbelt wearing [16-20], drink driving [21-29], speeding [30-38], fatigue [39-40] and red light running [41-45]. It should be noted that while television advertisements remain the most debated and studied, road safety messages have been communicated via many other channels as well, including printed brochures [43-45], billboards [43,45], electronic message boards [37,46-48] and even roadside memorials [42,49]. Also, communications using negative appeal, mostly fear-based, remain the most common [50-53] although positive appeals, like humour, have been used occasionally [54-55].

### Objective and significance of study

The purpose of this study is to examine the effectiveness of two seatbelt wearing advertisements that utilise two different emotional appeals: humour and fear. It will extend our knowledge in several important aspects. First, it analyses seatbelt wearing instead of drink driving, and thus will enable us to check the robustness of previous results [55] with respect to different risky behaviours. Second, it includes a sample of taxi drivers in addition to the usual sample of university students used in most studies.

Third, it utilises two advertisements that are both made overseas from the viewers' perspective. One video is made in the United Kingdom (UK) which has a similar culture to Canada but drives on the other side of the road and the characters in the video have a very distinctive UK accent. It is clear to the viewers that the advertisement is made in the UK. The other video is made in Malaysia and in the Malay language although English subtitles are added for the critical messages. The characters in the video are Asians and the driver is also driving on the other side of the road. The important question that can be examined indirectly is whether these communication messages are universally effective, when examined within a scientific conceptual framework, or whether they are ineffective because of the lack of local context and relevance.

Last but not least, this study examines the relationship between adaptive intention and the key message characteristics derived from relevant behavioural change and communication theories. The importance of utilising established scientific theories in the evaluation of road safety countermeasures cannot be overstated. First, it advances our understanding of how or why the measures implemented are effective or not. Second, it provides a scientific basis for the selection of variables and statistical methods. Third, it allows us to generalise the findings within the conceptual framework used. Finally, it provides theory and evidence-based recommendations to develop more effective road safety messages in the future.

### Conceptual framework

A review of the literature found many behavioural change models that can be used to assist in the development of a successful communication message and/or education campaign [43]. These models include the Functional Theory of Behaviour, the Theory of Planned Behaviour, the Persuasive Communications and the Elaboration Likelihood Model, Kotler's 4 Ps of Marketing, the Trans-Theoretical Model of Change, the Health Belief Model, Fear Appeals, the Social Cognition Model and the Economic Model of Consumer Choice. Note that some of these models can be used to guide the development and implementation of the campaign or program while others can be used to guide the design of the message itself [43].Since this study examines the efficacies of two seatbelt wearing videos and not the entire campaign, several of the more relevant models that are used to guide the questionnaire design will be summarised.

The Elaboration Likelihood Model (ELM), for example, hypothesises that persuasive communication should comprise two routes: a central route that focuses on the logical or rational motivation for change and a peripheral route that focuses more on the extrinsic qualities of the argument such as credibility and other source characteristics.

In the Health Belief model (HBM), the likelihood of the individual taking the recommended preventive health action is assumed to be dependent on the perceived benefits of taking the preventive action minus the perceived barriers to taking the preventive action. In effect, this assumption is similar to the economic theory of consumer choice or the utility maximisation theory. This net benefit of the preventive action is then weighed against the perceived threat of not taking preventive action or the perceived cost of not taking the preventive action. The perceived cost of not taking action is in turn derived from the perceived susceptibility or the likelihood of a crash and the severity of the crash. Educational and publicity campaigns, therefore, should aim to increase this perceived threat. According to this model, road safety campaigns act as a cue to action and should highlight the likelihood and severity of a crash.

Many theoretical models have been developed that utilise fear as an appeal or motivation to behaviour change including the protection motivation model, the parallel response model and the extended parallel process model. The key constructs in the Extended Parallel Process Model (EPPM) are fear (driving force or motivation for change), response efficacy (coping strategies shown) and self-efficacy (perceived personal control over behaviour). Essentially, the model hypothesises that if the level of fear arousal and message efficacy are both high, then the individual will engage in adaptive behaviour (adopt recommended behaviour) to deal with the health threat portrayed; whereas, if the level of fear is high but the message efficacy is low, then the individual will engage in maladaptive behaviour (defensive avoidance mechanisms) to reduce the fear.

In summary, most of the theoretical models target two things at varying degrees: threat associated with the risky behaviour and the benefits associated with adopting the safe driving behaviour. These constructs have to be clearly perceived by the audience as they form the central route of persuasion, which is the basic logical or rational motivation for change. The behaviour targeted should be very specific and clearly illustrated in the message, and the logic and arguments (actions and consequences) shown have to be realistic and convincing.

In addition to the central route, the peripheral route of persuasive communication stresses the need for the message to be delivered in a credible manner and the use of an independent and trustworthy source will enhance the likelihood of the message being accepted. Finally, the use of emotions such as fear, shame or guilt, to increase the drive for behaviour change should also be considered.

## Method

The simplest and most widely used approach to examine the audience's perception of an advertisement was to conduct a questionnaire survey. The survey was approved by the Conjoint Faculty Research Ethics Committee of the University of Calgary. During the recruitment, participants were informed that the aim of the project was to examine drivers' perceptions of two road safety advertisements and no other information about the nature of the advertisements or focus of the study were provided. The two advertisements to be evaluated were shown to the participants and the participants were then asked to provide their opinions of the advertisements. The two videos were shown in random order to different participants to reduce any potential order effects.

### Participants

A total of 212 drivers from the city of Calgary in Canada participated in the survey. The participants were recruited from two convenient locations: a local university and the taxi holding area (designated car parks where taxis wait before proceeding to the passenger pick up areas) at the Calgary airport. University students represented the young driver population who were over-represented in traffic collisions, while the taxi driver population was explicitly targeted because a large percentage of these professional drivers would not wear seatbelts regularly. Hence, these two sub-populations formed a significant portion of the target population for any seatbelt wearing advertisements.

Of the 212 drivers, 59% were university students, 28.3% were taxi drivers while the remaining12.7% consisted mostly of staff working at these locations. In terms of demography, 35% of the sample were female while the remaining 65% were male as compared to the 41.7% of female and and 52.9%of male drivers in the province of Alberta [56]. The age distribution of the respondents was: under 30 years (54.7%), 30-49 (33.5%), and 50 and above (11.8%). Hence, this sample was younger

than the driving population in Alberta [56] due largely to the over-representation of university students. The slight differences in the participants profile were expected since sampling was focused on two targeted sub-populations. Nevertheless, care should be exercised when interpreting the results of this exploratory study since the sample might not be representative of the general driving population.

## Materials

Two videos were used in this study. One video was produced in Malaysia by the vehicle manufacturer Proton Saga as a community message and available at several YouTube sites (e.g., http://www.youtube.com/watch?v=niCX8e0YglE). The advertisement showed a young female driving in the evening on a deserted road; the driver sneezed and a ghost in the backseat handed her a tissue; the driver screamed and jammed on her brakes; the ghost was flung out of the vehicle as the vehicle came to an abrupt stop; another ghost approached the ejected ghost and slapped her on her head and said, 'Next time, wear your seatbelt in the backseat'. This advertisement utilised mostly humour as an emotional appeal although there might be some fear incorporated as well. More importantly, this video was selected as a humour-based advertisement because many of the comments posted on the website described it as humorous (e.g., 'hilarious!!!', 'can still make me laugh after all these years', 'lol', 'hahaha' etc).

The second video was produced in the United Kingdom and also readily available on the internet and several YouTube sites (e.g., http://www.youtube.com/watch?v=-Kv2SULi-wg). It showed four young adults in a vehicle that was involved in a collision. The one unbelted passenger was hurled around in the vehicle, killing the other three occupants as well as seriously injuring himself. The crash scenes were quite graphic and bloody, thus focusing on fear as an appeal. The advertisement continued with an emergency worker saying, 'Three dead and one seriously injured; the one without the seatbelt did the damage' and then ended with the caption 'No Seatbelt, No Excuse'.

To validate assumptions on the different emotional appeals, participants were asked if they agreed or disagreed that the advertisements shown were frightening and/or humorous using the standard 5-point Likert scale. For ease of statistical analysis, the following coding scheme was used: 'Strongly Disagree'=1; 'Disagree'=2; 'Neutral'=3; 'Agree'=4; 'Strongly Agree'=5. The distribution (%) of the responses were tabulated and reported in Table 1.

**Table 1. Emotional appeals assumed and perceived in videos**

| Item | SD | D | N | A | SA | Mean |
|---|---|---|---|---|---|---|
| *Humour-based video* | | | | | | |
| The advertisement shown is frightening | 26.8 | 26.9 | 20.8 | 19.3 | 6.1 | $\mu_f^h$ =2.51 |
| The advertisement shown is humorous | 13.2 | 9.0 | 19.8 | 44.3 | 13.7 | $\mu_h^h$ =3.36 |
| *Fear-based video* | | | | | | |
| The advertisement shown is frightening | 2.4 | 3.8 | 18.4 | 49.5 | 25.9 | $\mu_f^f$ =3.93 |
| The advertisement shown is humorous | 54.7 | 23.1 | 9.0 | 9.4 | 3.8 | $\mu_h^f$ =1.84 |

Note: Mean calculated using: Strongly Disagree (SD) = 1; Disagree (D) = 2; Neutral (N) = 3; Agree (A) = 4; and Strongly Agree (SA) = 5.

**Table 2. Test of emotional appeals in videos**

| Test No. | Null Hypothesis | Alternate Hypothesis | t-statistic | p-value | Degrees of Freedom |
|---|---|---|---|---|---|
| | | *Humour-based video is humorous* | | | |
| 1 | $\mu_h^h = 3$ | $\mu_h^h > 3$ | 4.34 | < 0.01 | 211 |
| 2 | $\mu_f^h = 3$ | $\mu_f^h < 3$ | -5.74 | < 0.01 | 211 |
| 3 | $\mu_h^h = \mu_f^h$ | $\mu_h^h > \mu_f^h$ | 6.24 | < 0.01 | 211 |
| | | *Fear-based video is frightening* | | | |
| 4 | $\mu_f^f = 3$ | $\mu_f^f > 3$ | 15.01 | < 0.01 | 211 |
| 5 | $\mu_h^f = 3$ | $\mu_h^f < 3$ | -14.56 | < 0.01 | 211 |
| 6 | $\mu_f^f = \mu_h^f$ | $\mu_f^f > \mu_h^f$ | 20.33 | < 0.01 | 211 |
| | | *Comparison of the two videos* | | | |
| 7 | $\mu_h^h = \mu_h^f$ | $\mu_h^h > \mu_h^f$ | 13.35 | < 0.01 | 211 |
| 8 | $\mu_f^f = \mu_f^h$ | $\mu_f^f > \mu_f^h$ | 14.07 | < 0.01 | 211 |

**Table 3. Summary statistics of message characteristics and driver intentions for humour -based and fear-based videos**

| Item No. | Statements | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Mean |
|---|---|---|---|---|---|---|---|
| **Humour-based video** | | | | | | | |
| 1 | This video shows me that the threat associated with not wearing a seatbelt is very severe | 5.7 | 16.0 | 19.3 | 42.0 | 17.0 | $\mu_1^h$ =3.49 |
| 2 | This video shows me that the threat associated with not wearing a seatbelt is likely to happen to me | 9.9 | 25.5 | 23.6 | 33.0 | 8.0 | $\mu_2^h$ =3.04 |
| 3 | This video provides a clear strategy to cope with the danger of not wearing a seatbelt | 9.0 | 25.9 | 25.9 | 26.4 | 12.7 | $\mu_3^h$ =3.08 |
| 4 | This video shows me a way to cope with the dangers of not wearing a seat belt that is effective | 7.1 | 24.5 | 34.9 | 25.9 | 7.5 | $\mu_4^h$ =3.02 |
| 5 | This video shows me a way to cope with the dangers of not wearing a seatbelt that I am willing to do | 9.0 | 17.0 | 36.8 | 31.6 | 5.7 | $\mu_5^h$ =3.08 |
| 6 | The benefits of adopting the strategy shown to avoid the danger are very clear to me | 6.6 | 12.7 | 30.2 | 40.1 | 10.4 | $\mu_6^h$ =3.35 |
| 7 | The cost of not adopting the strategy shown to avoid the danger is very clear to me | 4.7 | 16.5 | 29.7 | 38.7 | 10.4 | $\mu_7^h$ =3.33 |
| 8 | The driving situation and message in video shown are realistic and credible | 21.7 | 18.9 | 24.5 | 25.5 | 9.4 | $\mu_8^h$ =2.82 |
| 9 | The video increases my intention to wear a seatbelt while driving | 6.6 | 19.0 | 33.2 | 28.0 | 13.3 | $\mu_9^h$ =3.22 |
| 10 | The video increases my intention to obey the 'seatbelt law' | 7.5 | 17.0 | 31.6 | 31.6 | 12.3 | $\mu_{10}^h$ =3.24 |
| **Fear-based video** | | | | | | | |
| 1 | This video shows me that the threat associated with not wearing a seatbelt is very severe | 0.9 | 0.5 | 2.8 | 44.8 | 50.9 | $\mu_1^f$ =4.44 |
| 2 | This video shows me that the threat associated with not wearing a seatbelt is likely to happen to me | 2.4 | 5.7 | 18.9 | 42.9 | 30.2 | $\mu_2^f$ =3.93 |
| 3 | This video provides a clear strategy to cope with the danger of not wearing aseatbelt | 0.9 | 5.7 | 21.2 | 43.9 | 28.3 | $\mu_3^f$ =3.93 |
| 4 | This video shows me a way to cope with the dangers of not wearing a seatbeltthat is effective | 1.9 | 9.4 | 21.2 | 42.0 | 25.5 | $\mu_4^f$ =3.80 |
| 5 | This video shows me a way to cope with the dangers of not wearing a seatbelt that I am willing to do | 1.9 | 8.0 | 16.5 | 45.8 | 27.8 | $\mu_5^f$ =3.90 |
| 6 | The benefits of adopting the strategy shown to avoid the danger are very clear to me | 0.9 | 5.2 | 11.3 | 46.2 | 36.3 | $\mu_6^f$ =4.12 |
| 7 | The cost of not adopting the strategy shown to avoid the danger is very clear to me | 0.5 | 1.4 | 9.4 | 47.6 | 41.0 | $\mu_7^f$ =4.27 |
| 8 | The driving situation and message in video shown are realistic and credible | 0.5 | 3.8 | 14.6 | 43.9 | 37.3 | $\mu_8^f$ =4.14 |
| 9 | The video increases my intention to wear a seatbelt while driving | 0.0 | 4.7 | 12.7 | 43.9 | 38.7 | $\mu_9^f$ =4.17 |
| 10 | The video increases my intention to obey the 'seatbelt law' | 0.5 | 3.3 | 17.9 | 42.0 | 36.3 | $\mu_{10}^f$ =4.10 |

Note: Mean calculated using 'Strongly Disagree'=1; 'Disagree'=2; 'Neutral'=3; 'Agree'=4; 'Strongly Agree'=5.

Several t-tests were then conducted to check these assumptions and the results were reported in Table 2. Results showed that viewers perceived the humour-based video to be quite humorous (test 1) but not very frightening (test 2). Also, more viewers perceived the humour-based video to be humorous than frightening (test 3). Hence, it was possible to conclude that the humour-based video was perceived by viewers as a humorous video.

Second, viewers perceived the fear-based video to be quite frightening (test 4) but not very humorous (test 5). Also, more viewers perceived the fear-based video to be frightening than humorous (test 6). Hence, it was possible to conclude that the fear-based video was perceived by viewers to be frightening.

Finally, viewers perceived the humour-based video to be more humorous than the fear-based video (test 7). Moreover, they perceived the fear-based video to be more frightening than the humor-based video. Hence, it could be concluded that the two videos were clearly differentiated in terms of emotional appeal and our assumptions regarding their respective emotional appeals were valid.

### Variables and Analysis

The main part of the questionnaire consisted of ten items measuring the respondents' perceptions of the advertisements (Table 3). The items were adapted from similar questionnaires used in previous studies [23, 34, 37, 39, 53-56]. The first two items measured the perceived severity and likelihood of threat (HBM). Item 3 measured the perceived message efficacy (EPPM) while the next two items measured self-efficacy (EPPM). Items 6 and 7 measured the perceived cost of threat and benefits of adopting the coping strategy (HBM). Item 8 measured realism and credibility of the message (ELM). Finally, items 9 and 10 measured adaptive intentions (HBM, EPPM).

Participants' responses were measured using the standard 5-point Likert Scale. For ease of analysis, the following coding scheme was used: 'Strongly Disagree'=1; 'Disagree'=2; 'Neutral'=3; 'Agree'=4; 'Strongly Agree'=5. First, the distributions of the responses obtained for each item were tabulated to provide an overall picture of the participants' perceptions of the videos. Second, the mean responses were calculated and reported to provide a simple way to interpret and compare the different items. Of particular interest to this study were the mean responses of items 9 and 10 which measured the effectiveness of the videos in terms of the respondents' intention to wear a seatbelt and obey the seatbelt law.

Third, to check that the message had increased the viewers' adaptive intention, four t-tests were conducted to confirm that these mean scores were significantly higher than the neutral score of 3. Fourth, eight t-tests were conducted to check for differences in viewers' ratings of the key message characteristics in the two videos. Fifth, to compare the relative effectiveness of the two videos, two t-tests were also conducted to confirm that the differences in the mean scores for adaptive intentions were statistically significant.

Sixth, the correlations between the effectiveness of the videos and their message characteristics were computed to test the validity of the measures and the underlying models used. Finally, a series of t-tests were conducted to validate the statistical significance of the correlation coefficients.

## Results

The summary of the results from the survey are reported in Table 3. Overall, both videos performed relatively well, with the majority of the respondents perceiving the key message characteristics in the video. More importantly, a relatively large share of the respondents agreed or strongly agreed with the statements that the videos increased their intentions to wear a seatbelt (item 9) and to obey the seatbelt law (item 10).

### Effectiveness of videos

To test the hypotheses that the two videos were effective, several t-tests were conducted and their results are reported in Table 4. The mean scores for both adaptive intentions items for both videos were found to be significantly larger than the

**Table 4.Testing the effectiveness of the videos**

| Test No. | Null Hypothesis | Alternate Hypothesis | t-statistic | p-value | Degrees of Freedom |
|---|---|---|---|---|---|
| | | *Humour-based video is effective* | | | |
| 1 | $\mu_9^h = 3$ | $\mu_9^h > 3$ | 2.93 | < 0.01 | 211 |
| 2 | $\mu_{10}^h = 3$ | $\mu_{10}^h > 3$ | 3.16 | < 0.01 | 211 |
| | | *Fear-based video is effective* | | | |
| 3 | $\mu_9^f = 3$ | $\mu_9^f > 3$ | 20.59 | < 0.01 | 211 |
| 4 | $\mu_{10}^f = 3$ | $\mu_{10}^f > 3$ | 19.08 | < 0.01 | 211 |
| | | *Comparison of the two videos* | | | |
| 7 | $\mu_9^f = \mu_9^h$ | $\mu_9^f > \mu_9^h$ | 11.11 | < 0.01 | 211 |
| 8 | $\mu_{10}^f = \mu_{10}^h$ | $\mu_{10}^f > \mu_{10}^h$ | 10.78 | < 0.01 | 211 |

**Table 5. Correlations between message characteristics and driver intentions for humour -based and fear-based videos**

| Items | Wear Seatbelt | | Obey Law | |
|---|---|---|---|---|
| | Coefficient | p-value | Coefficient | p-value |
| *Humour-based video* | | | | |
| This video shows me that the threat associated with not wearing a seatbelt is very severe | $\rho^{h}_{1,9}=0.515$ | < 0.01 | $\rho^{h}_{1,10}=0.566$ | < 0.01 |
| This video shows me that the threat associated with not wearing a seatbelt is likely to happen to me | $\rho^{h}_{2,9}=0.441$ | < 0.01 | $\rho^{h}_{2,10}=0.487$ | < 0.01 |
| This video provides a clear strategy to cope with the danger of not wearing a seatbelt | $\rho^{h}_{3,9}=0.456$ | < 0.01 | $\rho^{h}_{3,10}=0.417$ | < 0.01 |
| This video shows me a way to cope with the dangers of not wearing a seatbelt that is effective | $\rho^{h}_{4,9}=0.476$ | < 0.01 | $\rho^{h}_{4,10}=0.449$ | < 0.01 |
| This video shows me a way to cope with the dangers of not wearing a seatbelt that I am willing to do | $\rho^{h}_{5,9}=0.360$ | < 0.01 | $\rho^{h}_{5,10}=0.397$ | < 0.01 |
| The benefits of adopting the strategy shown to avoid the danger are very clear to me | $\rho^{h}_{6,9}=0.364$ | < 0.01 | $\rho^{h}_{6,10}=0.361$ | < 0.01 |
| The cost of not adopting the strategy shown to avoid the danger is very clear to me | $\rho^{h}_{7,9}=0.401$ | < 0.01 | $\rho^{h}_{7,10}=0.372$ | < 0.01 |
| The driving situation and message in video shown are realistic and credible | $\rho^{h}_{8,9}=0.500$ | < 0.01 | $\rho^{h}_{8,10}=0.584$ | < 0.01 |
| *Fear-based video* | | | | |
| This video shows me that the threat associated with not wearing a seatbelt is very severe | $\rho^{f}_{1,9}=0.228$ | < 0.01 | $\rho^{f}_{1,10}=0.255$ | < 0.01 |
| This video shows me that the threat associated with not wearing a seatbelt is likely to happen to me | $\rho^{f}_{2,9}=0.325$ | < 0.01 | $\rho^{f}_{2,10}=0.319$ | < 0.01 |
| This video provides a clear strategy to cope with the danger of not wearing a seatbelt | $\rho^{f}_{3,9}=0.394$ | < 0.01 | $\rho^{f}_{3,10}=0.348$ | <0.01 |
| This video shows me a way to cope with the dangers of not wearing a seatbelt that is effective | $\rho^{f}_{4,9}=0.286$ | < 0.01 | $\rho^{f}_{4,10}=0.310$ | < 0.01 |
| This video shows me a way to cope with the dangers of not wearing a seatbelt that I am willing to do | $\rho^{f}_{5,9}=0.284$ | < 0.01 | $\rho^{f}_{5,10}=0.253$ | < 0.01 |
| The benefits of adopting the strategy shown to avoid the danger are very clear to me | $\rho^{f}_{6,9}=0.369$ | < 0.01 | $\rho^{f}_{6,10}=0.358$ | < 0.01 |
| The cost of not adopting the strategy shown to avoid the danger is very clear to me | $\rho^{f}_{7,9}=0.366$ | < 0.01 | $\rho^{f}_{7,10}=0.347$ | < 0.01 |
| The driving situation and message in video shown are realistic and credible | $\rho^{f}_{8,9}=0.374$ | < 0.01 | $\rho^{f}_{8,10}=0.337$ | < 0.01 |

neutral score of 3, indicating that the majority of the sample agreed or strongly agreed that the videos increased their intentions to wear a seatbelt and obey the seatbelt law. Hence, we could conclude that both these videos were effective in improving safe driving behaviours.

As shown in Table 4, the mean score for the two adaptive intentions items (items 9 and 10) were higher for the fear-based video than the humour-based videoand these differences were statistically significant. Hence, we could conclude that the fear-based video was more persuasive than the humour-based video although both messages were effective in changing drivers' adaptive intentions.

## Relationships between key message characteristics and effectiveness

To examine the effects of key message characteristics on adaptive intentions, the correlation coefficients between the two

items measuring adaptive intentions and the key message characteristics for the two videos were computed and are reported in Table 5. The correlation coefficients were fairly moderate and ranged from 0.228 to 0.584. The positive coefficients indicated that an increase in these key characteristics perceived in the messages was associated with an increase in the effectiveness of the messages. Moreover, all the estimated correlation coefficients were statistically significant, providing some support for the various theoretical models discussed in the conceptual framework used.

## Discussion and conclusion

Publicity campaigns and safety messages have been used in many areas to change viewers' behaviour, from risky driving to applying sunscreen, with varying degrees of success. In the road safety arena, one highly debated topic is the effectiveness of seatbelt wearing publicity campaigns [17-20]. From a scientific perspective, this confusion is not surprising because many of the road safety publicity campaigns and messages are not developed based on established theoretical models but on professional best practices in commercial advertising which often have a different focus or purpose.

This study reviewed some relevant behaviour change and persuasive communications models to identify eight key message characteristics that are significant determinants of the effectiveness of health and safety messages and can be used to design and evaluate typical road safety messages. In designing a road safety message, transportation authorities and other policy-makers should focus on ensuring that the message shows: the threat associated with the targeted behaviour is severe; the likelihood of a threat happening to the viewer is high; a coping strategy that is effective; a coping strategy that the viewer is willing to do; the benefits of adopting the coping strategy is clear; the cost of not adopting the coping strategy is clear ; and the driving situation and message are realistic and credible.

To test the validity of the conceptual frameworks used, two seatbelt wearing advertisements with these key characteristics were shown to a convenient sample consisting mainly of college students and taxi drivers. It was found that both advertisements were effective in changing viewers' intentions to wear a seatbelt and to obey the seatbelt law, despite having different emotional appeals and different cultural settings. These results attested to the importance of using a formal theoretical model or a conceptual framework based upon established scientific theory when developing road safety messages. The role of local context and relevance appeared to be of secondary importance and should be used mainly to enhance these key message characteristics.

It should be noted that the sample consisted of more male than female participants. In terms of message relevance, the humour-based video featured only female vehicle occupants while the fear-based video featured two male and two female occupants, although the unbelted occupant who killed the others was a male passenger. Hence, there might be some potential gender bias [52-55] in the responses. However, this was not expected to be significant because of the strength of the key message characteristics which formed the central route of persuasion and the clear cultural differences in the videos which should have dominated any gender bias due to message relevance.

Although the messages were evaluated for their emotional appeals and validated, a quarter of the participants considered the humour-based video to be frightening while an eighth of the respondents considered the fear-based video to be humorous. Nevertheless, the expected emotional appeals were found to be quite dominant in the videos shown and any potential confounding effects should be relatively small. It should also be stressed that the design and development of humour-based videos would not require the inclusion of any threat, especially physical threat, even though this characteristic would be somewhat difficult to avoid in most road safety advertisements.

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