

“It won’t happen to me.” Optimism, biases, and recall of road-risk information

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Abstract

Previous research has demonstrated that dispositional optimism is adaptive in terms of facilitating the processing of health risk information (e.g. Aspinwall & Brunhart, 1996). In contrast, optimism bias appears to impede the processing of health risk information (Radcliffe & Klein, 2002). However, until now there has been no examination of whether both factors impact upon the processing of road risk information. The aim of the reported study was to address this gap. On the basis of past research findings it was hypothesised that participants high on dispositional optimism would have greatest recall for road risk information. It was further hypothesised that optimistically biased participants would have poorer recall for risk information. A community sample of 325 licensed drivers was recruited from the Townsville region. Results indicated the hypotheses were not supported. Participants high on optimism tended to remember more neutral information than risk information. In addition, there were no significant effects of optimism bias on recall. It seems that information about road risks is qualitatively different to information about health risks. That is, recall for road related risk information can not be predicted by optimism and optimism bias as it can be with health behaviours. Results are discussed in light of the differences in perceived controllability of health behaviours and road related behaviours. The implications of these results for road safety campaigns will be explored.

Keywords: *Optimism, optimism bias, risk information, road safety*

Introduction

Optimism and health protective behaviours

Dispositional optimism has consistently been demonstrated to be positively associated with the performance of health protective behaviours (e.g., Armor & Taylor, 1998; Scheier & Carver, 1992). In addition optimism has been demonstrated to influence the way individuals process health related information, in particular negative or risk information.

For example, Aspinwall and Brunhart (1996) aimed to determine whether optimistic beliefs function like denial or whether they are adaptive in confronting threats to well being. These researchers examined whether dispositional and health related optimism inhibited or facilitated the direction of attention to threatening information. It was hypothesised that if optimism is adaptive in confronting threats to wellbeing optimistic individuals should attend more to risk information than individuals who scored low on optimism. Results indicated that this was the case. Participants high in health related optimism spent significantly more time reading risk information than they did reading neutral or benefit information. These results are consistent with the idea that optimistic beliefs are associated with greater active coping and lower levels of denial. In addition, it seems that optimists' attention appears to be selective. Aspinwall and Brunhart (1996) found that optimists paid greater attention to risk information for a behaviour they practised compared to participants low in optimism. In summary these findings indicate that optimism may facilitate processing of negative or threatening health information, especially when the information is perceived by an individual as relevant to them.

Optimism bias and processing of risk information

Although the above examples and numerous other studies indicate strong support for optimism and positive health related behaviours, some researchers have cautioned that optimism may at times be unrealistic and prevent people from taking precautionary and proactive measures (Schwarzer, 1994; Weinstein, 1989). Optimism bias (or unrealistic optimism) refers to an individuals' mistaken belief that negative events are less likely and positive events more likely, to happen to them than they are to their peers.

Optimism bias is synonymous to the popular belief of invulnerability and the idea that 'it won't happen to me.' It differs from dispositional optimism in terms of specificity, social comparison and most importantly accuracy. Concerning specificity, dispositional optimism can be defined in terms of expectancies about specific events (Armor & Taylor, 1998). In contrast, the assessment of optimism bias asks an individual to estimate the chances of experiencing an event relative to the chances of their average peer. Hence, the judgments are social comparisons rather than absolute judgements. In terms of accuracy, dispositional optimism is an orientation that is neither accurate nor inaccurate whereas unrealistic optimism is a bias (Radcliffe & Klein, 2002).

Research regarding optimism bias and the processing of risk information is limited. However, available evidence suggests that unrealistic optimists are more likely to avoid exposure to information about risk. Wiebe & Black (1997) asked never married, heterosexual students about their risk of becoming pregnant or contracting an STD. It was hypothesised that compared to realistic high risk participants, optimistically biased participants would be less distressed when confronted with risk information, protect their illusions by avoiding exposure to risk information and deny the relevance of the material. Results supported the hypotheses and it was suggested that biased responses such as these may contribute to the ineffectiveness of some sex education interventions.

Within study investigations of optimism and optimism bias

Research that examines optimism bias and health risk information sometimes incorporates optimism as a dispositional trait. Research by Radcliffe and Klein (2002) provides a good example. In this study middle aged adults were asked to report on their heart attack related knowledge, beliefs and behaviours and then completed a computerised Health Risk Appraisal. Radcliffe and Klein (2002) hypothesised that participants high in dispositional optimism and low on optimism bias would reveal the best profile. Results demonstrated the positive outcomes of dispositional optimism displayed in previous research. For example, participants high in dispositional optimism had lower blood pressure, were more satisfied with life and had a lower risk of heart attack. In contrast, optimistically biased participants were generally at a higher risk of heart attack, less worried about their risk levels, had less prior knowledge of risk factors and retained less knowledge after reading an essay about risk factors. Interestingly, Radcliffe and Klein (2002) found no relationship between dispositional optimism and optimism bias.

Overall, the majority of the examined literature regarding the processing of health related information supports the hypothesis that dispositional optimism facilitates processing of threatening information especially when the risk is high or the information is self relevant (Aspinwall & Brunhart, 1996; Radcliffe & Klein, 2002). In contrast, optimism bias inhibits the processing of relevant risk information (Radcliffe & Klein, 2002; Wiebe & Black, 1997). It is clear that the effects of different conceptualisations of optimism, including the illusion of invulnerability specific to optimism bias, have been demonstrated for some prominent health risks. However, an important public health issue that has been almost entirely overlooked in this research is the area of road safety.

Road behaviours

Providing a rationale for studying road safety is not difficult as road crashes are a major cause of death in Australia and consequently they are a significant public health and economic issue. In 2007 over 1600 people died on Australian roads while the social and economic cost of crashes is estimated at billions of dollars per annum (Australian Transport Safety Bureau, 2007). As a result, a large amount of money and resources are invested into public health campaigns aimed at reducing road crashes. The efficacy of these campaigns depends upon whether or not people attend to them. The conditions under which people will ignore or attend to road safety information should be examined as this information can have a profound effect on the way campaigns are tailored and disseminated.

Furthermore, it appears that driving behaviours, like health behaviours, are not immune to optimism bias as such a bias has been demonstrated in relation to many aspects of road use. For example, it has been found that individuals believe that compared to the average driver they are more skillful drivers (Horswill, Waylen & Tofield, 2004) and less likely to be involved in a crash (Harre, Foster & O'Neil, 2005). These findings are usually emphasised by the disproportionate number of respondents that declare themselves more skilled than the average driver. Research by Svenson (1981) found that up to 88% of respondents perceived themselves to be safer and more skilled than the average driver. Similar findings have been demonstrated over a wide range of conditions. It should also be noted that it is impossible, given some basic assumptions of a normal distribution, for most people to be better than the average driver (Walton & McKeown, 2001).

The present research aims to fill a gap in the literature by examining the way in which road related risk information is processed by dispositionally optimistic and optimistically biased participants. It is hypothesised that if the processing of road related risk information is influenced by factors similar to those involved in the processing of health related risk information, participants high in dispositional optimism will pay the most attention to risk information of high relevance and this will be evidenced by their higher scores on a recall task. In contrast, optimistically biased participants will have poorer recall for risk information and greater recall for neutral information. These research outcomes are particularly important as it will give some much needed insight into the receptiveness and effectiveness of the road safety campaigns endorsed by the government. In particular, is it worth telling people the risk and spending millions of dollars on campaigns if they are not adequately processed by the public? If, in fact, this deficit in processing is related to unrealistic optimism it may be instead worth investing resources into campaigns aimed at reducing this bias.

Method

Design and statistical analyses

The study was a 2 x 2 factorial design; type of information (risk vs. neutral) x relevance of information (high vs. low). There were 82 participants in Condition 1 and 81 participants in each of the remaining three conditions. Data was analyzed using SPSS Version 16. When Levene's test of homogeneity was violated adjusted t values and degrees of freedom are reported. Categorical data was analyzed using chi-square tests.

Participants

A community sample of 325 licensed drivers was recruited from the Townsville region. People were excluded if they were not licensed drivers. Sample size was calculated on the basis of sample sizes used in past attitudinal research. Recruitment sites included the university (32% of sample), popular community areas (40%), weekend markets (7%), community centers (18%) and car parks surrounding automobile stores (3%). Participation was anonymous. The final sample consisted of 164 males and 158 females ranging in age from 18 to 85 years ($M = 34.5$, $SD = 16.0$). Table 1 indicates the number of males and females in each condition. The distribution of gender did not differ between groups ($\chi^2(3, N = 322) = 6.95, p = .073$). Due to the nature of the data collection process (e.g. passerby traffic) accurate refusal rates could not be recorded.

Table 1. *Number of males and females in each condition*

Information Condition	Males	Females
Condition 1 (Risk, High relevance)	35	46
Condition 2 (Risk, Low relevance)	39	40
Condition 3 (Neutral, High relevance)	39	42
Condition 4 (Neutral, Low relevance)	51	30

Materials

The entire questionnaire consisted of 80 questions. Participants were asked to indicate their age and gender. No other demographic information was collected. The remaining questions were from the following components.

Measurement of optimism bias

As per Hatfield and Job (2001) participants were presented with a list of 22 positive and negative events and asked to indicate the likelihood that each of the events would happen to them in the future. Participants were also asked to estimate the likelihood that the same events would happen to the average person of their age and gender. Specifically, 11 questions regarded negative road related events. For example, ‘Please indicate the likelihood that you will be booked for speeding.’ Another 5 questions regarded positive road related events such as ‘Please indicate the likelihood that you will have 3 consecutive years of crash free driving.’ The remaining 6 questions concerned the likelihood of non road related negative and positive events. For example, ‘Please indicate the likelihood you will have pneumonia.’ Participants responded using a 7 point Likert scale (1 = extremely unlikely, 7 = extremely likely).

Participant ratings regarding the likelihood that positive and negative road events would happen to them were computed into two separate indices. Each index was composed of either positive or negative event likelihood ratings. Positive and negative indices were also calculated for scores regarding the likelihood the same events would happen to their average peer. This was done by simply summing the corresponding positive and negative ratings and taking the average.

Optimism Bias indices were created for both road related and road unrelated events. These indices were created by firstly calculating scores for each of the 22 items in the Optimism Bias questionnaire. For negative events, self ratings were subtracted from peer ratings. These difference scores were then averaged. For positive events, peer ratings were subtracted from self ratings. Once again, the difference scores were averaged. A higher score on either index indicates an individual rates themselves as better off than their peers (Hatfield & Job, 2001). Scores above zero represent the presence of optimism bias. Optimism bias for negative road related events (OB-) was chosen over the positive events index as it was the more appropriate independent variable. This variable is a measure of participants’ unrealistically low estimates of vulnerability. High and low OB- was operationalised by including only individuals who scored in the top and bottom 30% of the distribution.

Dispositional optimism

The *Life Orientation Test* (LOT) (Scheier, Carver & Bridges, 1994) was incorporated as a measure of dispositional optimism. The LOT consists of 10 items (4 items are filler items) scored so that higher scores indicate greater dispositional optimism. Once again, high and low dispositional optimism was operationalised by including only those individuals who scored within the top and bottom 30% of the distribution.

Information condition

Participants read one of four brief essays which represented the different conditions of the experiment. This was type of information (risk, neutral) x relevance of information (high, low). The four conditions are demonstrated in Table 2.

Table 2. *Experimental conditions*

Type of Information	Relevance of Information	
	High	Low
Risk	Risk x High Condition 1	Risk x Low Condition 2
Neutral	Neutral x High Condition 3	Neutral x Low Condition 4

Neutral information was purely descriptive information about roads and road practices. For example, 'Queensland Department of Main Roads carries 70% of the state's traffic'. In contrast, risk information described the consequences of unsafe driving practices. 'Speeding is no accident – you kill, you maim, you disable, you disfigure'. Relevance was operationalised using different geographical regions. As participants were recruited from North Queensland, information pertaining to the area is highly relevant to them. In contrast, information about Western Australia is of low relevance. The number of facts was kept consistent across the four conditions and most information was taken from either the Queensland Transport website or the Western Australia Office of Road Safety website. If equivalent facts or data could not be found they were estimated as the precise accuracy of the information was not crucial, the nature of it was.

Filler Task

Participants were asked six questions about their fuel consumption habits in order to distract them from the information they had just read.

Recall Test

Participants were given a surprise recall test consisting of 14 multiple choice questions pertaining to the specific essay information read in each condition. There were four choices of answer to each question and participants were asked to circle the answer they believed was correct based on the essay they had read.

Procedure

Ethics approval was obtained through the James Cook University Ethics committee. A random sequence of the numbers one through four was generated with the restriction that one could not occur more than three times consecutively. Questionnaires were rearranged and handed out in that order. Participants were approached individually or in small groups and asked if they would like to be involved in research involving road beliefs and behaviours. Questionnaires were self administered but completed in the presence of the principal investigator. Participants completed the measures of optimism bias and dispositional optimism and then read the essay. After completing the filler task they were then asked to complete the recall test. Most participants took between 20 and 30 minutes to complete both parts and all participants were debriefed and thanked for their time. Data collection took place over a period of six weeks.

Results

Sample characteristics

Sample characteristics are described for the four conditions in Table 3. The differences in average age between groups were not significant ($F_{(3,320)} = .74, p = .53$). Average years licenced ($F_{(3,317)} = 1.08, p = .36$) or hours driven each week ($F_{(3,312)} = .20, p = .89$) also did not differ significantly between groups. There were no significant differences on LOT scores between groups ($F_{(3,312)} = .21, p = .89$).

Almost the entire sample (98%) had access to a vehicle (car, motorbike or scooter) for their own use. Around 56% of participants had been involved in an accident as a driver. This percentage did not differ significantly between groups ($\chi^2(3, N = 325) = 1.77, p = .62$).

Table 3.
Sample characteristics by condition

Characteristics	Condition 1 Risk x High relevance <i>n</i> = 82	Condition 2 Risk x Low relevance <i>n</i> = 81	Condition 3 Neutral x High Relevance <i>n</i> = 81	Condition 4 Neutral x Low Relevance <i>n</i> = 81
Age (years)				
<i>M</i>	34.41	34.60	32.75	36.49
<i>SD</i>	16.03	17.34	14.34	16.11
Years licenced				
<i>M</i>	16.62	16.96	15.00	19.45
<i>SD</i>	15.60	17.17	14.08	16.01
Hours spent driving/week				
<i>M</i>	11.94	11.86	13.24	11.52
<i>SD</i>	11.32	16.12	15.46	16.51
LOT score				
<i>M</i>	20.41	20.14	20.55	20.54
<i>SD</i>	3.61	4.15	3.95	3.40

Beliefs about future road related events

Participants rated positive road events as more likely to happen to them than the average person ($t_{(307)} = 9.96, p = .00$). Conversely participants believed that negative road events were less likely to happen to them than their average peer ($t_{(321)} = -20.55, p = .00$). The means and standard deviations are presented in Table 4.

Table 4.
Estimates of road related events for self and peers

Type of event	Estimate for self <i>M (SD)</i>	Estimate for peer <i>M (SD)</i>
Positive road related	4.82 (.82)	4.26 (.78)
Negative road related	3.31 (.81)	4.31 (.87)

Based on total sample size N = 325

Optimism bias

Table 5 presents the Optimism Bias Indices for both road related and road unrelated events. Optimism bias was assessed by comparing relative index and event scores to the score of zero. Optimism bias indices were significantly greater than zero for the road related negative ($t_{(321)} = 20.55, p = 0.00$) and positive indices ($t_{(307)} = 9.96, p = .00$). As a comparison this was also the case for the non road related negative index ($t_{(304)} = 16.21, p = .00$) and non road related positive index ($t_{(309)} = 5.35, p = .00$). In other words, participants rated negative events as significantly more likely to happen to others and positive events as significantly more likely to happen to themselves.

Table 5.

Optimism bias indices for road related and road unrelated events

Index	<i>M</i>	<i>SD</i>
Road related negative	1.00	.87
Road related positive	.56	.98
Non road related negative	.85	.91
Non road related positive	.45	1.47

Based on total sample size $N = 325$

Optimism, optimism bias and recall of information

Scores on recall for each condition are demonstrated in Table 6. Data was analyzed with a $2 \times 2 \times 2 \times 2$ between subjects factorial ANOVA. The four independent variables were type of information, relevance of information, optimism and OB-. It was hypothesized that different levels of optimism and optimism bias would have differential scores regarding the recall of information.

Table 6.

Average recall scores for each condition

	Condition			
	Condition 1 Risk x high relevance $n = 82$	Condition 2 Risk x low relevance $n = 81$	Condition 3 Neutral x high relevance $n = 81$	Condition 4 Neutral x low relevance $n = 81$
<i>M</i>	6.97	7.15	8.31	7.45
<i>SD</i>	2.31	3.21	2.54	2.92

There were no significant main effects for type of information ($F_{(1,102)} = 1.70, p = .196, \eta^2 = .016$), or relevance of information ($F_{(1,102)} = 3.14, p = .079, \eta^2 = .030$). There were also no significant main effects for optimism ($F_{(1,102)} = 1.66, p = .20, \eta^2 = .016$) or OB- ($F_{(1,102)} = 1.18, p = .28, \eta^2 = .011$). There was one significant interaction between type of information and optimism ($F_{(1,102)} = 4.04, p = .047, \eta^2 = .038$) on recall. The means and standard deviations for this interaction are given in Table 7.

Table 7.

Means, SD and number of participants for Type of information x optimism

Optimism	Type of Information	
	Neutral	Risk
Low		
<i>M</i>	6.82	6.76
<i>SD</i>	2.98	3.04
<i>n</i>	39	49
High		
<i>M</i>	8.11	7.15
<i>SD</i>	2.82	2.81
<i>n</i>	56	59

This interaction indicates the effect of information type differs between the different levels of optimism. For participants low on optimism, recall for neutral information is similar to their recall of risk information. For participants high on optimism there is greater recall of neutral information than risk information.

Discussion

The results demonstrate that individuals generally display optimism bias regarding road related events. Specifically, participants reported that positive road related events were more likely to happen to them compared to the average person of their age and gender. Conversely, participants reported that negative road related events were less likely to happen to them than to the average person of their age and gender. It seems therefore that people have a high estimate of their driving ability and a low estimate of their driving vulnerability. Considering participants were also optimistically biased regarding non road related events, it is highly likely the results are the product of a general response bias. This result is not unexpected. A general bias in likelihood estimates was initially demonstrated by Weinstein (1980) and thus also appears to extend to road related events as evidenced by the current research.

The major focus of this research was to examine the way road related risk information is processed by dispositionally optimistic and optimistically biased participants. It was hypothesized that participants high in optimism would have greater recall for risk information. It was further hypothesized that optimists' attention would be selective therefore participants high in optimism would also remember more risk information of high relevance. In addition it was predicted that optimistically biased participants would have poorer recall for risk information and greater recall for neutral information.

Results indicated the hypotheses were not supported. Specifically, there were no main effects for type of information or relevance of information. There were also no main effects for optimism or optimism bias for negative road related events. The interaction between type of information and optimism suggested that the effect of information type is different depending upon levels of dispositional optimism. For those participants low on optimism, recall scores for neutral information were relatively similar to recall scores for risk information. However, for participants high on optimism there was greater recall of neutral information in comparison to risk information. This is opposite to the predicted hypothesis. Research regarding health behaviours and the processing of risk information has demonstrated that individuals high in optimism have greater recall for risk information over neutral information (e.g. Radcliffe & Klein, 2002). Reasons for this include the suggestion that optimism is protective with regard to health (Scheier & Carver, 1992). Attending to risk information is an extension of this in that optimists attend to this information and use it to protect themselves. In other words, optimism is adaptive regarding attention to risk information (Aspinwall & Brunhart, 1996).

Additionally, it has been demonstrated that recall for health risk information is significantly greater for participants high on optimism in comparison to individuals low on optimism (e.g. Aspinwall & Brunhart, 1996). Specifically if optimists view good health and positive outcomes as a desirable goal they should engage in more health promoting behaviour than people low on this dimension (Davidson & Prkachin, 1997). The current findings do not support this hypothesis. Recall for risk information was relatively similar for participants high and low on optimism.

In comparing road related behaviours with health behaviours there is one thing that differs greatly. Namely, the perceived controllability over the situation. The outcomes of road behaviours are qualitatively different to the outcomes of health behaviours. Exposure to negative road outcomes is not always under the control of the individual and not always a consequence of their own behaviour. This is different to health behaviours where people can, in fact, eliminate or decrease their exposure to a risk factor and thus have a big influence over their own health outcomes. Therefore, while attending to risk information is adaptive in relation to health risk information this may not be the case for road related risk information. Risk on the road can be perceived as a function of other peoples behaviour, not just your own. So due to the lower levels of controllability over road situations attending to risk information may not be useful after a point. In fact, attention to such information may be distressing if the individual perceives that they are already doing all they can to protect themselves. Other data from this investigation indicate that as optimism scores increased, precaution taking tended to increase as well. (Pedruzzi & Swinbourne, unpublished data). Perhaps, optimists feel that they are doing all they can and so further risk information is not only redundant for them but also potentially distressing.

Conclusion

In conclusion, the current findings suggest that the processing of road risk information by optimistic and optimistically biased participants is quite different to previous research findings dealing with health risk information. In particular, optimism and optimism bias did not, respectively, facilitate or impede the processing of road risk information. It is hypothesized that the differences in the current findings are due to the inherent differences between health behaviours and road behaviours. That is, with regard to road behaviours individuals do not have a basis for estimating their risk as they do with health behaviours. Therefore, due to the lower levels of controllability over the situation attending to risk information may not be adaptive.

Recommendations

While this conclusion is entirely plausible, it would be hasty to infer at this stage without empirical evidence. Considering there have been no studies similar to the current research there will be methodological issues that need to be ironed out. For example, future research should aim to achieve reliable and validated measures of optimism bias both domain general and domain specific. In addition, when designing future research, estimates of controllability should be included in order to examine the relationship between perceived control and estimations regarding the likelihood of positive and negative road events. The design of the current experiment may also be better suited to a laboratory setting. The current experiment was made portable in order to recruit a large heterogeneous community sample. There may be disadvantages to this in that the environmental conditions were not kept consistent. However, if this experiment was replicated and conducted in a laboratory setting, the variability and representativeness of the sample could be lost. Therefore, it is a negotiation between a large and heterogeneous sample and more controlled conditions. Lastly, future research should aim to pilot test essay information. This is a limitation of the current study as the nature of the essay information may have been compromised. It could be argued that risk information was too benign making it feasible that the distinction between categories was not salient enough.

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