



The effect of positive and negative emotions on young drivers: A simulator study



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ABSTRACT

The study examined the influence of affect induction on actual risk-taking behavior in a driving simulator, as well as the links between personal variables (relevance of driving to self-esteem, sensation seeking) and the level of risky driving. Eighty young drivers aged 18–21 ($M = 19.24$, $SD = 0.75$) were randomly divided into four induction groups: relaxing positive affect; arousing positive affect; negative affect; and neutral affect. The participants drove on a simulator, with various parameters of risky driving measured before and after emotion priming.

As predicted, arousing positive affect and negative affect led to increased risky driving, whereas relaxing positive affect moderated risk-taking. In addition, the results confirm previous findings regarding the personal variables, revealing that higher levels of relevance of driving to self-esteem and sensation seeking are associated with higher levels of risk-taking in the simulated driving.

The findings indicate that the driver's emotional state has a significant effect on risk-taking on the road. Moreover, they show that the conventional use of negative affect in safe driving campaigns is liable to heighten the tendency for risky driving rather than reduce it. In contrast, relaxing positive affect was found to lead to lower risk-taking. The study is unique in revealing a correlation between results previously obtained for the willingness to drive recklessly and actual risky driving behavior observed on a driving simulator. By expanding the understanding of the motivations for youngsters' risky driving, the study may aid in designing effective, theoretically sound, interventions aimed at reducing the tendency for dangerous driving among young drivers.

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1. Introduction

Considerable efforts have been invested by researchers and practitioners alike in the attempt to reduce reckless driving among young drivers, the population at greatest risk of involvement in car crashes all over the world (Williams, 2003). As part of these efforts, various factors that may help explain youngsters' risk-taking on the road have been identified, including driving patterns, personal traits, emotional state, and motivations, as well as situational, environmental, and social factors (Shope & Bingham, 2008).

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Although safe driving campaigns commonly make use of negative affect, especially fear appeals, research casts doubt on this approach, indicating that it may actually achieve the opposite result (Tay, 2005). On the other hand, it has been found that positive emotions are associated with increased sensitivity to loss, and consequently a tendency to avoid risks and opt for safer alternatives (Isen, 2000). Messages employing positive affect have been shown to lead to adaptive behavioral change in a variety of contexts, including driving (Lewis, Watson, & White, 2008; Sibley & Harre, 2009; Whittam, Dwyer, Simpson, & Leeming, 2006). Moreover, while studies show that various negative emotions differentially affect judgment and behavior (Maheswaran & Chen, 2006), much less attention has been paid to the differential effects of specific positive emotions (Cavanaugh, Bettman, Luce, & Payne, 2007).

In a recent series of studies examining the effect of positive emotions on self-reported intentions for risky driving, it was found that relaxing positive affect priming led youngsters to express a lower level of willingness to drive recklessly than inductions priming negative, arousing, positive, or neutral (control group) affect. In addition, negative and stimulating positive affect inductions led to a higher willingness for risky driving than those priming relaxing positive and neutral affect. The studies also showed that high relevance of driving to self-esteem and high sensation seeking are associated with a greater willingness to take risks behind the wheel (Ehrenfreund-Hager & Taubman-Ben-Ari, in preparation; Taubman-Ben-Ari, 2012). The current study continues this avenue of investigation. However, rather than relying on the self-report questionnaires employed in previous studies, which tapped the willingness for reckless driving, it examines the effect of emotion priming and personal variables on actual driving behavior as observed on a simulator. Two personal variables were examined: relevance of driving to self-esteem and sensation seeking.

Relevance of driving to self-esteem – For some people, driving plays a major role in defining self-esteem. Thus, among many young drivers who use a vehicle to enhance their self-esteem, reckless driving may offer a range of potential benefits (Taubman-Ben-Ari, Florian, & Mikulincer, 1999). Indeed, it has been found that youngsters who perceive driving as highly relevant to self-esteem are characterized by a higher willingness to take risks on the road (Ehrenfreund-Hager & Taubman-Ben-Ari, in preparation; Taubman-Ben-Ari et al., 1999).

Sensation seeking – Sensation seeking refers to the tendency to seek out experiences that are “varied, novel, complex and intense,” and the readiness to take risks to do so, and reflects individual differences in the optimal level of arousal and stimulation (Zuckerman, 1990). People high on sensation seeking have been found to engage in more risky driving and to be involved in more traffic accidents than those low on this trait (Jonah, 1997; McKenna & Horswill, 2006).

1.1. The current study

Previous studies examining the influence of positive affect on risky driving have relied on self-report questionnaires to assess the willingness to take risks on the road. The current study goes one step further, observing actual driving behavior on a simulator. In order to examine the effect of positive affect priming and the contribution of the personal variables, the participants were randomly divided into four experimental groups: relaxing positive affect; arousing positive affect; negative affect; and neutral affect (control group). During their time on the simulator, they were exposed to a pair of emotionally charged words in accordance with the study condition to which they were assigned. Various parameters indicative of reckless driving were measured, including speed, headway, and lane changes. The participants also completed questionnaires relating to relevance of driving to self-esteem, sensation seeking, and demographic characteristics in order to examine the role of these personal factors in their driving behavior.

The following hypotheses were formulated:

1. The group exposed to relaxing positive affect priming will display less risky driving on the simulator than the other three groups. The group exposed to negative affect or to aroused positive affect priming will display more risky driving than the other groups.
2. The higher the relevance of driving to self-esteem and the higher the tendency for sensation seeking, the more risky driving will be observed on the simulator.

2. Method

2.1. Participants

The sample consisted of 80 young drivers (40 males and 40 females) aged 18–21 ($M = 19.24$, $SD = 0.75$), who were randomly assigned to one of the four induction groups (each consisting of 20 participants, 10 males and 10 females). Each of the participants was paid 50 Israeli shekels (around \$13) for their part in the study, and was reimbursed for travel expenses.

2.2. Instruments

Driving Simulator STISIM Drive (Rosenthal, 1999), a fixed-base interactive driving simulator which was set on automatic control conditions. It has a 60° wide and 40° high field of view. The simulator updates the images at a rate of 30 frames/s. A pre-determined driving scenario was screened on a laptop computer, and the participant drove by means of a steering wheel and pedals connected to the computer. Data was collected every tenth of a second according to pre-set parameters. The sce-

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