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Published

2012

Journal Title

Journal of Risk Research

DOI

[10.1080/13669877.2011.601321](https://doi.org/10.1080/13669877.2011.601321)

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The role of affective processes on young drivers' risk perceptions: A dual process model approach

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Young adults continue to be over represented in injury and death statistics associated with transport related crashes. The current paper investigates the application of the dual process model of risk to the processing of transport related risky behaviours. One hundred Australian participants completed an online survey exploring four transport related risky situations. Participants were assessed on their cognitive and affective evaluations of the risky situations as well as their self reported likelihood of participation in them. The findings indicate that perceptions of risk for specific transport related behaviours are not processed in a consistent manner. Predictive factors, including gender, affective and cognitive processing, as well as the subsequent self reported likelihood of engaging in the behaviours, varied between situations. The research indicates that driver interventions may need to be individually targeted to specific transport related risky behaviours to compensate for the variation in predictive factors.

Keywords: Youth safety; risk perceptions; injury prevention

Introduction

Young drivers are consistently identified in the research literature as over represented in death and injury rates for transport related crashes in both Australia (Fernandes, Job, and Hatfield 2007; Palamara, Legge, and Stevenson 2001) and around the world (Blows et al. 2005; Zhang et al. 1998). In 2008, the 17-25 year old age group contributed 376 deaths to the Australian road toll, more than any other age group

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(Department of Infrastructure, Transport, Regional Development and Local Government [DITRDLG] 2009). Specifically, 1% of the total deaths of individuals over the age of 25 were identified as transport related compared to 31% of deaths for those under the age of 25 (Australian Bureau of Statistics [ABS] 2008).

Over the last few decades, various researchers have sought to understand and explain this alarming social trend, however statistics consistently reveal that the trend persists despite continuing interventions and road safety campaigns (ABS 2008; DITRDLG 2009, 2010, 2011). With young adults still at risk, research must continue to focus on understanding why this age group remains overrepresented in the annual road toll.

Current research considers speeding, distracted driving, driving whilst fatigued, and being a passenger to a drunk driver among the most prominent transport related risks posed to adolescents and young adults (DITRDLG 2009; Blows et al. 2005; Chisholm, Caird, and Lockhart 2008; Fernandes et al. 2007; Simons-Morton, Lerner, and Singer 2005; Smart et al. 2005; Zhang et al. 1998). In fact, Fergusson and colleagues (2003) reported that 90% of 907 young drivers (aged 18-21) reported engaging in some form of risky driving behaviour. Smart and colleagues (2005) also found that 80%, 64% and 14% of their sample of 1,135 Australian young drivers reported “Exceeding the speed limit by 10km/hr”, “Driving whilst very tired” and “Drink driving” in at least 1 of their last 10 trips, respectively.

Evidence suggests that increased crash risk coincides with reported transport related risky behaviours (Fergusson, Swain-Campbell, and Horwood 2003) and that, compared to older drivers, young drivers killed in transport related crashes are more likely to have been driving in a risky manner (Zhang et al. 1998). Recent research has found that young drivers continually rate transport related risky behaviours as highly

risky while still reporting high engagement in those same behaviours (Donald, Pointer, and Weekley 2006; Young and Lenne 2008). This indicates that young drivers who engage in these behaviours do so whilst aware of the elevated level of risk involved.

With this in mind, a study of driver distractions and the characteristics underlying drivers' risk perceptions (Titchener and Wong 2010) found evidence to suggest that significant variability exists in the mean risk rating for a variety of transport related distractions. This is in line with previous research indicating that factors for many transport related risky behaviours may not be generalisable, suggesting these behaviours should be explored individually (Fernandes et al. 2007; Glasman and Albarracin 2006; Titchener, White and Kaye 2009).

Harre (2000) suggested high crash rates among young adults are not necessarily a product of the driver's inexperience but perhaps a result of problematic judgements being made whilst driving. This is in line with previous research that found crash risk for young drivers is still higher than other drivers whilst accounting for the amount and type of driving exposure (Deery 1999; Jonah 1986; Maycock et al. 1991), suggesting that inexperience alone does not lead to increased crash-risk among young drivers (Catchpole 2005; Jonah 1986). However, research is tending towards an understanding that driver inexperience may be fundamentally linked to, or at least exacerbates, the flawed judgement of young drivers (Clarke, Ward, Bartle, & Truman 2006; Cooper, Pinili and Chen 1995; Ulmer, Williams and Preusser 1997). To aid understanding of why the 17-25 year old age group is a high risk group for participating in transport related risky behaviours, the processes behind their risky choices need to be better understood.

Risky choice: The dual process model of risky judgement

It has long been theorized that affective and cognitive processes are under the control of partially independent systems that influence each other in numerous ways (Zajonc 1980). These parallel, interacting modes of information processing (Epstein 1994) are thought to work together to guide reasoning and decision making (Loewenstein et al. 2001; Ness and Klaas 1994). The dual process model of risky judgement outlines these two categorically different modes of processing, fundamental to the comprehension of risk. The cognition based process is controlled, rational, deliberate, and analytical but is also slow and effortful, responding to normative rules of probability and logic, whereas the affect based process is automatic, experiential, and intuitive as well as fast, efficient, but less accurate, responding to images and associations, as well as the experience of emotion (Epstein 1994; Slovic et al. 2004; Slovic et al. 2005).

Formal risk analysis research has viewed affective responses to risk as irrational (see Slovic et al. 2005 for a review) and thus affective reactions have rarely been the focus of risk perception studies, notably the perception of traffic risks (Rundmo and Iversen 2004). Recent research, however, has indicated that the role of emotion, or affect, in decision making and risky choice is larger than original models of risk suggested (Finucane et al. 2000; Lerner and Keltner 2000, 2001; Loewenstein et al. 2001; Russell 2003; Schwarz and Clore 2003), and often more important than traditionally researched cognitive processes (Lawton, Conner, and McEachan 2009; Lawton, Conner, and Parker 2007; Peters et al. 2006; Trafimow et al. 2004).

Recent research has emphasised the direct role of both cognitive and affective processes on intentions and behaviour (Lawton et al. 2009), in particular transport related risky behaviours (Lawton et al. 2007). Research in this area emphasises that

neither cognitive nor affective processes work alone in risky choice; in fact the integration of both systems is suggested to result in rational decision making (Slovic et al., 2004).

Van Gelder, de Vries, and van der Pligt (2009) empirically investigated the effectiveness of the dual process model for predicting risky decision making. The process involved measuring both cognitive and affective evaluations of risks associated with various risky scenarios and measuring the relationships between those evaluations and self reported likelihood of participation in the risky behaviour. The researchers found that both affective processing and cognitive processing were significant predictors of risky decision making, supporting the application of the dual process model to risky choice.

Influenced by previous research, Slovic and colleagues (Finucane et al. 2000; Slovic et al. 2004; Slovic et al. 2005) have found evidence for the aptly named “Affect heuristic”. Through this, representations of objects and events are tagged in an individual’s mind with varying degrees of affect. The available affective impression is then used as a source of information when making decisions and is far more efficient when judgements are complex or mental resources are limited (Finucane et al.). However, the researchers explain that labelling this process as a heuristic suggests that not all available information is processed, thus faster responses are compensated with lessened accuracy. This supports similar research that, although stressing the role of affect as crucial to normal functioning, highlighted that affective processing may be a source of potential bias (Loewenstein et al. 2001; Loewenstein and Lerner 2003).

Affective processes are viewed as an adaptive and essential addition to cognition (Zajonc 1980), however affective processing and cognitive processing are believed to deviate in certain risky situations and when this occurs it is usually the

affective process that dominates (Lawton et al. 2009; Ness and Klaas 1994), overriding rational decision making (Loewenstein and Lerner 2003). This line of research suggests that when emotions are aroused by immediate sensory input from desired objects or feelings, individuals may become less responsive to risk information and decisions become more impulsive and driven by basic gratification impulses (Ditto et al. 2006; Loewenstein 1996).

Rundmo and Iversen (2004), noting the lack of research analysing the relative importance of affect and cognition in transport related risk judgements, found evidence to suggest that affective risk judgements, such as worry and other emotional reactions, significantly predicted transport related risk behaviour. Further evaluations that were cognitive in nature, such as assessments of the probability of traffic accidents and concern, were not significant predictors of self reported, transport related risk behaviour. However, specific transport related risky behaviours were not evaluated separately.

Research indicates that greater risk taking is not related to ignorance, irrationality or delusions of invulnerability (Reyna and Farley 2006; Steinberg 2007) but that biological and developmental factors are strongly related to increased risk taking and transport related crash risk in young drivers (Arnett 2002; Harre 2000). Steinberg and colleagues (Gardner and Steinberg 2005; Steinberg 2003, 2004, 2007, 2008; Steinberg et al. 2008) have found evidence that risk taking may be the consequence of the interaction between two distinct neurobiological systems, the biological origin for the processes described in the dual process model of risky judgement. While the socio-emotional system is believed to originate in the sub-cortical and meso-limbic areas of the brain, such as the amygdala, and is responsible for affective processes in risky choice, the cognitive-control system is thought to

originate in the lateral- and orbito-prefrontal cortices and is responsible for cognitive processes in risky choice (Steinberg, 2007).

Differences in the developmental timelines of the two systems are believed to result in a window of increased susceptibility to risk taking in adolescence and young adulthood (Steinberg, 2004). Whereas the socio-emotional system is believed to develop rapidly during puberty, becoming abruptly more assertive and easily aroused (Steinberg 2007), the cognitive-control system is not linked to hormonal changes at puberty, maturing gradually over young adulthood and leading to declines in risk taking in mid-adulthood (Steinberg 2004, 2008). This also has support from neurobiological research (Galvan et al. 2006, for a review see Spear 2000)

Despite theoretical evidence suggesting the existence of two underlying processes of risky choice, to date, only van Gelder and colleagues (2009) have empirically evaluated the effectiveness of the dual process model in predicting risky decision making. To extend research conducted by van Gelder and colleagues to a prevalent international problem, the current research endeavours to assess the practical application of their research to a transport related risk context. To expand on the work of Rundmo and Iversen (2004), the current research evaluates the predictive properties of the processes described in the dual process model of risky judgement separately for four examples of transport related risky behaviours.

Whilst acknowledging the well-established finding that gender is a significant predictor of risky choice (Bina et al. 2006; Oltedal and Rundmo 2006), it was anticipated that in a sample of 17-25 year olds, both cognitive and affective processing would predict transport related risky choice. In addition, recognising that young adults are prone to using affective processes over cognitive processes (Boyer

2006; Galvan et al. 2006; Steinberg 2008), affective processing was expected to have more influence in transport related risky choice compared to cognitive processing.

Method

Participants

One hundred first year undergraduate psychology students from an Australian University participated in the current study on a voluntary basis. Participant ages ranged from 17- 25, with a mean age of 19.91 (SD = 2.28). The sample consisted of 64 females. Participants reported years of driving experience, ranging from 1- 10 years with a mean of 3.08 years (SD = 2.01). Participants varied on type of licence held, based on the Queensland Transport graduated licensing system, with 16, 24, 27, and 33 participants reporting having a learner, P1 provisional, P2 provisional, or an open licence, respectively.

Materials and Procedure

The current study employed a survey design starting with demographic questions to assess age, driving experience and frequency of access to a car. The main section comprised four vignettes describing transport related risk situations. Eight questions, based on those by van Gelder and colleagues (2009), followed each vignette to measure cognitive and affective evaluations of risk and likelihood of participating in the risky driving scenarios presented. The survey was hosted online and participation was by invitation code only.

Topics for the vignettes included speeding, being a passenger to a drunk driver, driving whilst fatigued, and driving whilst distracted. Each topic was selected

to be both personally and socially relevant to the sample. The following is an example of a vignette:

Imagine the following: You are driving down the motorway and it is peak hour traffic. The radio loses reception so you decide to plug in your iPod.

Your iPod and the cable are spread across the passenger seat, but you cannot pull over because you are in the middle of the motorway.

Participants were required to read the descriptions of risky situations and answer the eight subsequent questions for each. The first two questions related to the participant's cognitive processing of risk, based on questions developed by van Gelder and colleagues (2009). The first measured the perception of likelihood of potential negative consequences (e.g. *"How large is the likelihood of having an accident if you drive home whilst extremely tired?"*) and the second measured the perception of the severity of the potential consequences (e.g. *"How serious are the possible consequences of driving home whilst extremely tired?"*). Responses were in the form of bipolar 9-point scales, from 1 (*"Very Small"* and *"Not Serious at All"*) to 9 (*"Very Large"* and *"Very Serious"*). To obtain a measure of the predictor variable cognitively perceived risk, the scores for these questions were multiplied using the same procedure as van Gelder and colleagues (2009).

The next four questions (*"Would you be worried in this situation?"*, *"Does the situation make you feel uncertain?"*, *"Does the situation evoke feelings of fear?"*, *"Does the situation evoke negative feelings in general?"*) formed a scale for negative affect, an example of affective processing generated by van Gelder and colleagues (2009), employed as the predictor variable affectively perceived risk. Responses were in the form of bipolar 9-point scales, from 1 (*"Not At All"*) to 9 (*"Very Much"*).

Internal consistency of the scale was high for all vignettes, Cronbach's alpha ranging between .90 and .97.

Finally, two questions based on those used by van Gelder and colleagues (2009) assessed overall likelihood of participating in transport related risky behaviour. One question measured the participant's likelihood to engage in the risky behaviour presented (e.g. "How likely is it that you would drive home whilst extremely tired?") and the other measured the certainty of their choice (e.g. "How certain are you about this?"). Responses were in the form of bipolar 9-point scales, from 1 ("Very Unlikely" and "Not At All") to 9 ("Very Likely" and "Completely"). Scores for these questions were multiplied, as per the procedures used by van Gelder and colleagues (2009), to obtain a measure of the criterion variable risky choice.

Results

Measures of central tendency, as well as the bivariate correlations, for the variables of cognitively and affectively perceived risk, gender and risky choice related to each of the vignette scenarios can be viewed in Table 1. Preliminary analyses revealed significant differences between vignette scenarios on measures of cognitively perceived risk, $F(3, 279) = 80.41, p < .001, p\eta^2 = .45$, affectively perceived risk, $F(3, 297) = 154.84, p < .001, p\eta^2 = .61$, as well as risky choice, $F(3, 278) = 94.37, p < .001, p\eta^2 = .49$. Therefore, as anticipated, further analyses combining data from all scenarios may be misleading and analyses were conducted separately for each scenario.

Hierarchical multiple regression analyses were conducted in order to evaluate the hypothesis that both cognitive and affective processing would be significant predictors of transport related risky choice of 17-25 year olds. The analyses would

Table 1.

Bivariate Correlations and Descriptive Statistics for Variables of Cognitively and Affectively Perceived Risk, Gender and Risky Choice.

Vignette	Speeding			Passenger to a Drunk Driver			Fatigued Driving			Distracted Driving		
Variable	CPR	APR	Risky Choice	CPR	APR	Risky Choice	CPR	APR	Risky Choice	CPR	APR	Risky Choice
APR	-	-	.008	-	-	-.49*	-	-	-.41*	-	-	-.56*
CPR	-	.46*	.002	-	.61*	-.55*	-	.67*	-.20*	-	.79*	-.49*
Gender	.27*	.42*	.24*	.21*	.36*	-.20*	.11	.18*	-.15	.12	.16	-.07
Mean	58.41	6.23	-6.82	65.33	7.88	-19.68	43.44	5.24	13.82	35.99	4.19	13.90
SD	17.55	1.83	17.02	17.46	1.20	16.46	21.90	1.80	14.91	22.35	1.97	17.50

Note. * $p < .05$, CPR = Cognitively Perceived Risk, APR = Affectively Perceived Risk

also determine if affective processing explained more variance in transport related risky choice in comparison to cognitive processing. Gender was included as the sole predictor variable in the first model with the addition of affectively and cognitively perceived risk in the second model.

Regression coefficients from each of the four hierarchical multiple regressions can be viewed in Table 2. Analyses revealed that gender was a significant predictor of risky choice in the speeding scenario (First model: $\beta = .24, p < .05$, Second model: $\beta = .29, p < .05$), explaining 5.76% of the variance attributed to risky choice in the first model, increasing to 6.76% of the variance in the second model. Also, cognitively and affectively perceived risk in the speeding scenario did not explain any additional variance attributed to risky choice.

For the passenger to a drunk driver scenario, gender was again found to be a significant predictor of risky choice. (First model only: $\beta = -.20, p < .05$), explaining 4% of the variance attributed to risky choice in the first model only, with cognitively and affectively perceived risk explaining an additional 30.1% of the variance attributed to risky choice in the passenger to a drunk driver scenario. Specifically, both cognitively ($\beta = -.40, p < .05$) and affectively perceived risk ($\beta = -.24, p < .05$) were found to be significant predictors of risky choice in the passenger to a drunk driver scenario, explaining a further 10.24% and 3.24% of the variance in risky choice, whilst controlling for gender, respectively.

For the driving whilst fatigued and the distracted driving scenarios, gender was not a significant predictor of risky choice. Cognitively and affectively perceived risk explained an additional 16 %, and 31.7% of the variance attributed to risky choice in the fatigued and the distracted driving scenarios, respectively. Affectively perceived risk was found to be the only significant predictor of the fatigued ($\beta = -.48$,

Table 2.
Summary of Regression Coefficients for each Hierarchical Multiple Regression Analysis

Vignette	Variable	R ² (R ² _{chg})	β	Sr	B	SE B
Speeding	Gender ^a		.24*	.24	8.46	5.99
	Gender ^b		.29*	.26	10.18	3.87
	CPR		-.04	-.03	-.03	.11
	APR		-.10	-.08	-.88	1.10
	Model 1	.06*				
	Model 2	.01				
Passenger to a Drunk Driver	Gender ^a		-.20*	-.20	-6.88	3.43
	Gender ^b		-.03	-.03	-1.06	3.08
	CPR		-.40*	-.32	-.38	.10
	APR		-.24*	-.18	-3.26	1.53
	Model 1	.04*				
	Model 2	.30*				
Fatigued Driving	Gender ^a		-.15	-.15	-4.52	3.12
	Gender ^b		-.08	-.08	-2.36	2.92
	CPR		.13	.1	.09	.09
	APR		-.48**	-.35	-3.97	1.04
	Model 1	.02				
	Model 2	.16*				
Distracted Driving	Gender ^a		-.07	-.07	-2.56	3.70
	Gender ^b		.02	.02	.77	3.13
	CPR		-.11	-.07	-.09	.11
	APR		-.48**	-.29	-4.25	1.24
	Model 1	.01				
	Model 2	.32*				

Note. * $p < .05$, ** $p < .01$

^a First model, ^b Second model

CPR = Cognitively Perceived Risk, APR = Affectively Perceived Risk

$p < .01$) and the distracted driving ($\beta = -.48, p < .01$) scenarios, explaining 12.53% and 8.41% of the variance attributed in risky choice, whilst controlling for gender, in each scenario respectively.

Discussion

The results suggest that, of the variables measured, gender was the sole significant predictor of risky choice associated with speeding. The results also suggest that gender was a significant predictor of the choice to be a passenger to a drunk driver until the inclusion of cognitive and affective perceived risk. Finally, gender was not a significant predictor for the fatigued or the distracted driving scenarios, with affective perceived risk identified as the sole significant predictor for both scenarios. These findings provide partial support for the hypothesis that both cognitive and affective processing, whilst controlling for gender, would be significant predictors for transport related risky choice, with affective processing explaining more variance in risky choice than cognitive processing in 17-25 year olds.

The results support previous research that found differences in the mean risk ratings for transport related risky behaviours, further supporting the idea that the predictive factors of these behaviours may be behaviour specific (Fernandes et al. 2007; Titchener and Wong 2010). Specifically, likelihood of participating in different behaviours within the transport related subset of risky behaviours, varies with respect to the influence of predictive factors of gender, cognitive and affective processing. For example, based on the direction of the standardised regression coefficients, males in this study indicated higher likelihood of participating in speeding behaviour whereas females indicated higher likelihood to choose to be a passenger to a drunk driver. Therefore, not only did gender differ in its predictive ability of the likelihood

of participating in certain transport related risky behaviours, gender also had differing influences on the risky choices for these two behaviours. These findings further emphasise the need to investigate transport related risky behaviours separately in research. The current findings are inconsistent with previous research finding gender to be a reliable predictor of transport related risky choice, suggesting that males take more risks than females (Bina et al. 2006; Oltedal and Rundmo 2006). In fact, the current findings suggest the possibility of a differential influence of gender on the risky choices made in relation to specific transport related risky behaviours.

Findings from the current study partially support the dual process model of risky judgement (see van Gelder et al. 2009). The dual process model posits that both cognitive and affective processing are significant predictors of risky choice. The current results suggest that affective processing, as measured by affectively perceived risk, is an important, predictive factor in transport related risky choices among 17-25 year old age group. This supports previous research suggesting that affective processing is dominant in risky decision making in young adults (Galvan et al. 2006; Spear 2000; Steinberg 2004, 2007, 2008). However, the results do not suggest that cognitive processing, as measured by cognitively perceived risk, is a reliably important factor in transport related risky choice in 17-25 year olds.

An alternative explanation is that the items that were used to measure cognitive processing, based on the format used by van Gelder and colleagues (2009), did not measure the entire scope of the construct. A limitation of using two items for the measurement of cognitively perceived risk is that the breadth of the construct measurement may be restricted. This in turn constrains the ability to properly examine internal consistency. Future research may attempt to modify the methods of van

Gelder and colleagues (2009) in order to provide a more encompassing measurement of cognitively perceived risk.

The results parallel previous findings advocating the relative importance of affective evaluations related to traffic hazards and the relative unimportance of more cognitive evaluations, such as the probability of traffic accidents, in a risky driving context (Rundmo and Iversen 2004). This previous research, however, did not separate data from multiple behaviours from within the transport related subset of risky behaviour, an important distinction made by this research. This may have led to variability between behaviours in the ability of both cognitive and affective processing to predict risky choice.

Overall, 17-25 year olds indicated their likelihood of participating in both fatigued and distracted driving as likely. Interestingly, the sole predictor of risky choice for both of these risky driving behaviours was affective processing. Overall, 17-25 year olds indicated their likelihood of participating in speeding behaviour as slightly unlikely. For this scenario, neither cognitive nor affective processing were significant predictors of risky choice. Lastly, being a passenger to a drunk driver was the behaviour that 17-25 year olds indicated the lowest likelihood of participation. In this scenario, both cognitive and affective processing were significant predictors of risky choice. For all behaviours studied, both cognitive and affective processing were negatively associated to risky choice, indicating that higher cognitive or affective perceived risk was related to lower self reported likelihood of participation in transport related risky behaviours.

These findings provide evidence to suggest that a relationship exists between the reliance on specific processes in making risky choices and self reported likelihood of participation in transport related risky behaviours. Specifically, the findings suggest

that when affective processing has a distinct significant influence on risky choice, the likelihood to participate in risky driving behaviours is higher than when both cognitive and affective processing have a significant influence on risky choice. This supports research concluding that using affective evaluations as a means of information input may be a source of potential bias (Loewenstein & Lerner 2003) and that dominant affective processing leads to maladaptive decision making (Ditto et al. 2006; Loewenstein et al. 2001). The findings also support previous research that suggests both cognitive and affective processing must work together to guide reasoning and decision making (Loewenstein et al. 2001; Ness and Klaas 1994) and considers the integration of both systems to result in rational decision making (Slovic et al. 2004).

Future research is needed to further explore the relationship between affective processing and participation in risky behaviour. If affectively processing risky situations shows a clear relationship with engagement in risky behaviour then the next step for research could be to identify which risky behaviours are more likely to be evaluated affectively, informing the focus of road safety education and campaign designers toward these behaviours. However, research should endeavour to identify the possibility that higher engagement in risky behaviour increases the affective qualities attributed to those behaviours through experience (Russell 2003) and influences an individual to rely on affective processing when evaluating risk. This could possibly explain how low exposure to risks is related to higher, albeit more cognitive, risk perceptions (Titchener, White and Kaye 2009).

However, the current findings should be interpreted with caution regarding the sample and the use of vignettes. Research has found that factors contributing to transport related risky choice from a sample of university students are not necessarily

generalisable to a sample of similar aged community members (Fernandes et al. 2007). In order to overcome the limitations of this preliminary study into the dual process model's application to transport related risky choice, future research should endeavour to collect more community based samples. The use of hypothetical scenarios in the current study has the possible limitation of not fully engaging the participants which in turn may restrict the validity of the risk evaluations to some degree. Recently, research has successfully utilised audio-visual methods to investigate the influence of affect on risk perceptions (Haase & Silberiesen, 2010). A potential application of this research could be to strengthen the methodology of the current study to increase the external validity of its findings.

The current study does not suggest a definitive explanation for why young adults are so at risk on the road. Nonetheless it pursues a potential avenue to increase knowledge and understanding of the processes leading to transport related risk taking. The present research was designed as a preliminary investigation into the usefulness of the dual process model and suggests it may contribute to better identification and understanding of relatively important predictive factors in the context of risky decision making, with a focus on transport related risky behaviours. This line of research aims to effectively use the knowledge of previous and future research in the construction and validation of mass intervention strategies and health campaigns. Successful targeting of specific at-risk populations should improve the effectiveness of interventions developed to reduce the level of participation in risky behaviours.

Acknowledgements

The Authors would like to acknowledge that this research was supported by a full scholarship provided by the Queensland Injury Prevention Council.

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