Attitudes, perceptions, fatalism and behaviours: some early findings

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ABSTRACT

Road transport represents the 12th leading cause of death in the UK, and things are not improving. This research focuses on one of the factors behind the statistics; human behaviour. Specifically, the aim of this study was to investigate the relationships between self-reported involvement in accidents on the road, self-reported pedestrian behaviours, and three social cognitive constructs; road safety attitudes, on-road risk perceptions, and fatalistic beliefs. In a survey of 695 respondents, it was found that attitudes relate strongly to self-reported behaviours, and to some of the constructs measured by the fatalistic beliefs scale used here. Risk perceptions were not found to correlate strongly with any other variable, and splitting the sample by self-reported involvement in accidents resulted in few group differences. Results are discussed in terms of the need for road safety interventions to consider the determinants of behaviour.

KEYWORDS

Attitudes, Risk Perceptions, Beliefs, Pedestrian Behaviour

Introduction

Road traffic incidents represent the UK's 12th leading cause of death (ONS, 2017), with raw casualty and fatality numbers having changed little since 2010 (DfT, 2017). The reasons behind this are many and complex; however, this research focusses on just one aspect - behaviour.

The determinants of behaviour can be even more varied than the behaviours themselves, yet there are two underlying factors in particular that have attracted particular attention in the road safety literature over the past 40 years; attitudes and risk perceptions. It has been shown many times, across a wide variety of cultures and contexts, that drivers with safer attitudes to driving tend to report performing safer driver behaviours (e.g. Iversen & Rundmo, 2004; Poulter et al. 2008; Yao & Wu, 2012; Mirzaei et al. 2014). Conversely, those with less safe attitudes tend to report performing riskier driving behaviours (e.g. Åberg 1993; Parker & Manstead, 1996; Assum, 1997; West & Hall, 1997). Risk perception is the subjective assessment of the probability of experiencing a negative event, and of the severity of the consequences of that event (e.g. Näätänen & Summala, 1976; Sabey & Taylor, 1980; Sivak et al. 1989; Rundmo, 1999). Generally speaking, it has been found that a higher perception of risk results in a lower probability of engaging in the related behaviour (e.g. Lund & Rundmo, 2009; Nordfjærn et al. 2012; Şimşekoğlu et al. 2012). Together, attitudes and risk perceptions have been shown to account for a considerable amount of variation in behaviour; however, results are not always consistent (see, e.g., Nordfjærn et al. 2011; Nordfjærn et al. 2014).

When thinking about differences in road safety attitudes and risk perceptions, a number of researchers have looked to underlying beliefs in factors such as luck, higher (divine) powers, and fatalism. Kouabenan (1998) reported one of the first studies to link fatalism with driver behaviour, finding beliefs to influence a person's perception of risk, their explanations of an accident, and their uptake or neglect of safety measures (e.g. use of protective equipment, safer driving behaviours, etc.). Similar results have been found across studies; more fatalistic beliefs are linked with less safe attitudes and riskier driving behaviour (e.g. Dixey, 1999; Peltzer & Renner, 2003; Omari & Baron-Epel, 2013; Maghsoudi et al. 2017). The picture is complex, however; although religiosity is sometimes conflated with fatalism, Yıldırım (2007) found that religiousness had a positive effect on traffic behaviour (i.e., that behaviour was safer) in his Muslim, Turkish sample. To our knowledge, such concepts have not yet been investigated in a UK context.

It is important to understand exactly what is being measured when one talks of 'fatalism'. Of the studies conducted in the traffic safety domain, almost all use their own scale to measure the concept. In the wider literature, over 51 distinct scales linked with 'fatalism' were identified by Esparza (2005); these measured a variety of constructs, including coping, helplessness, belief in God, pessimism, luck, and locus of control. Esparza et al. (2015) subsequently condensed these into one, multi-dimensional scale, measuring five distinct factors to which they applied the following labels; divine control, luck, helplessness, internality (or locus of control), and general fatalism. It is this scale that we have used in the current research; as such, this is the first study to use a pre-validated, multi-dimensional measure of fatalistic beliefs in the context of road user behaviour.

Finally, the overwhelming majority of research into road user behaviour focuses on car drivers. The Driver Behaviour Questionnaire (DBQ; Reason et al. 1990) has seen considerable use since its creation, splitting unsafe or risky driver behaviours into three categories; violations, where a risky behaviour is intentionally performed (e.g. speeding); lapses, where the correct action was chosen, but was unintentionally performed unsuccessfully (i.e., correct intention, failure in execution); and errors, where the intended action was performed successfully, but was not the right action for that situation (i.e., correct execution, failure in intention). Although it has as yet seen limited use in the extant literature, the Pedestrian Behaviour Questionnaire (PBQ; Granié et al. 2013; Deb et al. 2017). was built on the DBQ, and separates pedestrian behaviours into six categories; aggressive behaviour, positive behaviour, errors, lapses, and violations. It is this measure that we have used in the current study.

This research therefore presents the first, initial attempt to investigate the relationships between attitudes, risk perceptions, fatalistic beliefs, and pedestrian behaviours in a UK context. We also looked at how these relate to a person's self-reported involvement in past accidents.

Questionnaire Items

This research used a questionnaire compiled predominately from existing measures, comprising five sections. The demographics section garnered information regarding age, gender, religion, income, education, travel habits, and crash involvement. The crash involvement item asked respondents to indicate the number of accidents they had ever been involved in, in any capacity (pedestrian, cyclist, driver, etc.), that resulted in hospitalisation (of the respondent or anyone else), with three possible responses; never, once, and more than once (adapted from Iversen & Rundmo, 2004).

Section two measured respondents' attitudes to road safety; 19 items were taken from Iversen and Rundmo (2004) and Peltzer and Renner (2003), and three were created for this study. All gave

statements of behaviours that violate rules or could be considered as risky (e.g. “many traffic rules must be ignored to ensure flow”), and asked the respondent to rate (on a five-point Likert scale) how much they agree with each (from ‘strongly agree’ to ‘strongly disagree’).

Section three measured respondents’ beliefs. This section was taken directly from Esparza et al. (2015), and (as aforementioned) comprised five sub-scales; divine control, luck, helplessness, locus of control, and general fatalism. Each dimension is measured with six items, and all items were measured on a five-point Likert scale, from ‘strongly agree’ to ‘strongly disagree’.

Section four measured respondents risk perceptions using 15 items taken from Nordfjærn & Rundmo (2009). Eight of the questions asked respondents’ to indicate what they thought was the likelihood that a given incident occur on the roads in a serious enough way as to result in serious or fatal injury, with responses measured on a five-point Likert scale (from extremely unlikely to extremely likely). The remaining seven question asked respondents about what they considered was the general likelihood of a person being seriously or fatally injured on their country’s roads when using the road system as a pedestrian, bicycle or motorcycle rider, car driver, or as a passenger of a motorcycle or motorised three-wheeler, a car, or a bus or coach. Responses were measured using the same five-point scale.

Section five measured self-reported pedestrian behaviour by using the Pedestrian Behaviour Questionnaire described by Deb et al. (2017). The short version of the questionnaire, containing 20 items, uses four questions to measure each of five factors (violations, errors, lapses, aggressive behaviours, and positive behaviours) and is partly based on Reason et al.’s (1990) Driver Behaviour Questionnaire. In Deb et al.’s use of terminology, ‘violations’ referred to intentional rule breaking, ‘errors’ to unintentional mistakes arising from a deficiency in knowledge of rules, ‘lapses’ to mistakes arising from forgetfulness or a lack of concentration, ‘aggressive behaviours’ to behaviours intending to annoy or endanger, and ‘positive behaviours’ to behaviours that seek to support others’ ease of road us and ensure traffic rules compliance. It is these definitions that we have used throughout this article. Questions ask respondents to indicate how often they would perform a given behaviour (e.g. “I cross diagonally to save time”) on a six point Likert scale, from ‘extremely infrequently or never’ to ‘extremely frequently or always’.

Participants

The survey was administered both on paper and online (to capture the largest and widest response possible), over a four month period. For paper based completion, questionnaires were handed to passers-by in busy, commercial areas in and around the city of Southampton, UK, and were given to local shops and businesses for employees to complete. In total, 223 respondents completed the questionnaire. For the online version, it was made clear that only UK residents were being sought. A link was distributed via various social media platforms, with a request to pass on to other friends and family (i.e., snowball sampling). The link was also promoted in survey hosting websites, and various road user websites, forums, and online communities; 472 completed questionnaires were gathered this way. Of the 695 respondents in total, 673 responded to both age and gender questions; these data are summarised in Table 1. Although gender split was relatively equal, the sample was weighted towards the younger groups.

Table 1. Gender and age summary

	Age						
	18-24	*25-34*	*35-44*	*45-54*	*55-64*	*Over 64*	**Total**

Male	64	55	45	54	53	32	**303**
Female	103	116	47	45	40	13	**364**
Other	0	2	0	0	0	0	**2**
Prefer not to say	1	0	1	1	1	0	**4**
Total	**168**	**173**	**93**	**100**	**94**	**45**	**673**

Data Reduction

For the attitudes section, no factor structure was assumed. As such, a Principal Component Analysis was performed. This indicated that all items except three loaded significantly onto a single underlying factor. Those three items were removed, resulting in a 19-item scale that was subsequently shown to have good internal reliability ($\alpha = .86$). Scores were therefore averaged to arrive at one score that reflected the respondent's attitude to road safety (higher scores signifying a safer attitude).

As aforementioned, the fatalistic beliefs section was comprised of five sub-sections, all of which had acceptable or high internal reliability; General fatalism, $\alpha = 0.80$; Locus of control, $\alpha = 0.68$; Divine control, $\alpha = 0.96$; Luck, $\alpha = 0.73$; Helplessness $\alpha = 0.81$. Although the very high alpha value for Divine Control suggests redundancy in the sub-scale, this was not considered problematic for the current study; this is not a test of Esparza et al.'s (2015) measure, but an investigation of the relationships between various social cognitive constructs with respect to road safety.

Risk perception was split into two sections; perception of the risk of specific events occurring, and perception of the general risk experienced by particular road users. Both event risk perception and road user risk perception showed high internal consistency ($\alpha = 0.82$ and $\alpha = 0.91$, respectively).

As aforementioned, the PBQ uses four questions to measure each of five classes of behaviours. The Errors, Aggressions, and Lapses sub-scales all showed acceptable or high internal reliability, at $\alpha = 0.64$, $\alpha = 0.77$, and $\alpha = 0.87$, respectively. Internal reliability of the violations sub-scale was lower, at $\alpha = 0.59$; however, given that this was the first use of the questionnaire in this cultural context (i.e., the UK; see Nunally, 1978), this was accepted, and the sub-scale included in the analyses. At $\alpha = 0.52$, the Positive Behaviour sub-scale was deemed insufficiently reliable, and not included in analyses.

Results

Correlation analyses were performed for all factors described in the data reduction section (above). Results are shown in Table 2; notes explain what higher scores signify for each measure.

Table 2. Correlation analysis results (Spearman's *rho*)

	Attitude	*Risk Event*	*Risk User*	*Fatal*	*Locus*	*Div Con*	*Luck*	*Helpless*	*Errors*	*Viol*	*Aggress*
Lapses	-.349**	-.077*	.098**	.152**	.134**	.239**	.172**	.252**	.586**	.433**	.407**
Aggressions	-.222**	-.002	.128**	.169**	.069	.073	.157**	.271**	.404**	.300**	
Violations	-.351**	-.071	.028	.000	.066	.091*	.113**	.151**	.646**		
Errors	-.377**	-.124**	.049	.134**	.028	.208**	.104**	.191**			
Helplessness	-.255**	.038	.191**	.434**	.287**	.287**	.456**				
Luck	-.308**	-.015	.060	.388**	.219**	.234**					
Divine Control	-.243**	-.029	.155**	.498**	.099**						
Locus of Control	-.067	-.109**	-.097*	.036							
General Fatalism	-.336**	.036	.183**								
Risk User	.035	.393**									
Risk Event	.196**										

Notes: ** significant at 0.01 level; * significant at .05 level; Attitude high score = safer attitudes; Risk Event and Risk User high score = high risk; General Fatalism high score = more fatalistic; Locus of Control high score = external locus of control; Divine Control high score = stronger belief in divine control; Luck high score = strong belief in luck; Helplessness high score = higher feeling of helplessness; Errors high score = more errors; Violations high score = more violations; Aggressions high score = more aggressive behaviours.

All PBQ measures correlated highly with each other, as did most Fatalistic Belief Scale measures (except Locus of Control/General Fatalism, and Locus of Control/Divine Control). More interesting for this study, however, was that Attitudes were highly correlated with all PBQ measures (the lowest *r* value being -.268, for the Aggressions/Attitude relationship), and with Helplessness, Luck, and General Fatalism. Those reporting safer attitudes also reported performing safer pedestrian behaviours, and they reported lower feelings of helplessness, a lower belief in luck, and lower fatalistic beliefs. Additionally, those reporting stronger feelings of helplessness also reported performing more aggressive pedestrian behaviours and more lapses. Respondents perceptions of the general risk experienced by road users correlated most strongly with Helplessness, Divine Control, and General Fatalism, though relationships were not strong (at $r = .191$, .155, and .183 respectively). Perceptions of the risk of particular events occurring correlated most closely with Errors, but again the relationship was not a strong one (at $r = -.124$).

To assess how the factors above were related to crash involvement, variables were included in either a MANOVA or a series of Kruskall Wallis tests, depending on violations of homogeneity assumptions (using Levene's test). The MANOVA revealed no significant differences between those had never been involved in an accident, had been so once, or had been so more than once, in the following variables: risk event perception, belief in divine control, and belief in luck (Pillai's Trace = 1.64 $_{(6,928)}$, $p = .13$). Kruskal-Wallis tests were performed on the remaining variables; the only significant differences were found for violations ($\chi^2 = 9.45$, $p = .009$) and aggressions ($\chi^2 = 14.08$, $p = .001$). Subsequent pairwise analyses (using Mann-Whitney U tests) revealed that those who had been involved in at least one crash in the past reported performing significantly more violations and aggressions than those that had never been in an accident (Figures 1 and 2). Starred lines above box plots indicate significant pairwise comparisons at the 5% alpha level (with Bonferroni correction applied).

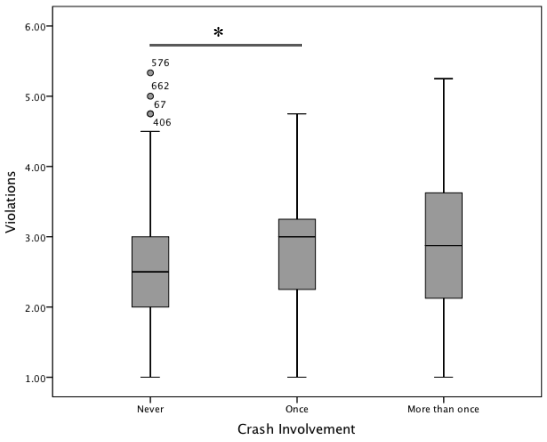

Figure 1. Self-reported violations by crash involvement group

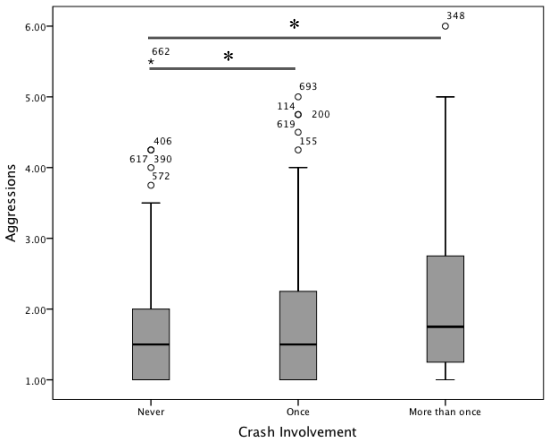

Figure 2. Self-reported aggressive behaviours by crash involvement group

Discussion

Results from this questionnaire highlight some interesting relationships between the social cognitive constructs measured and self-reported pedestrian behaviours. In line with previous literature, road safety attitudes were shown to be highly correlated with self-reported behaviour. Just as previous literature has shown that those with safer attitudes to road safety report performing safer driving behaviours (e.g. Åberg 1993; Parker & Manstead, 1996; Assum, 1997; West & Hall, 1997; Iversen & Rundmo, 2004; Poulter et al. 2008; Yao & Wu, 2012; Mirzaei et al. 2014), we have seen here that those who report safer traffic-related attitudes also report safe *pedestrian* behaviours. This was true for all sub-sections of the questionnaire; those with safer attitudes to traffic behaviour report performing fewer aggressive pedestrian behaviours, fewer intentional violations of road regulations (e.g. crossing where one is not supposed to), and fewer unintentional risky behaviours (e.g. becoming distracted by conversation and not looking before crossing the road).

Regarding risk perceptions, we found fewer notable relationships. Although previous research would suggest that those with higher risk perceptions perform fewer risky behaviours (e.g. Lund & Rundmo, 2009; Nordfjærn et al. 2012; Şimşekoğlu et al. 2012), this was not borne out in results from the self-reported pedestrian behaviour measure used in this study. The only link was with the performance of errors (i.e., those perceiving greater risk reported performing fewer errors); however, although the relationship was statistically significant, at $r = -.124$ it was relatively weak. Those who perceived a higher risk of particular events occurring (e.g. head on collision, vehicle running off the road, etc.) did also reported safer attitudes to road use; however, this relationship was also not particularly strong (at $r = .196$). Finally, those who perceived greater general risk for road users also reported greater feelings of helplessness, stronger beliefs in divine control, and more general fatalistic beliefs. This is in contrast to previous work that found more fatalistic individuals tended to perceive lower on-road risk (e.g. Peltzer & Renner, 2003; Omari & Baron-Epel, 2013; Ngueutsa & Kouabenan 2017); however, relationships were again weak, so results should be taken with caution.

These findings might suggest that intervention designers would do well to consider factors *other* than risk when choosing the focus of a future advertising or training campaign; however, the relationships are likely to be more complex than the simple correlational analyses presented above are able to reveal. Moreover, the relationships between these factors and behaviour can differ across cultures (e.g. Nordfjærn et al. 2014). To our knowledge, this kind of work has yet to be undertaken using UK data; as such, this kind of deeper analysis, with more complex statistical analyses, is what is intended as a continuation of this work.

Regarding the fatalistic beliefs scale, the most notable correlations were found to be with the attitudes measure. Those with lower feelings of helplessness, lower beliefs in luck or divine control, and lower general fatalistic tendencies reported safer attitudes to on-road behaviours. This is largely in support of previous work in the field suggesting that higher degrees of fatalism are linked with higher neglect for safety measures (e.g. Dixey, 1999; Peltzer & Renner, 2003; Omari & Baron-Epel, 2013; Maghsoudi et al. 2017), at least in terms of people's *attitudes* towards safety measures.

Relationships were seen to a much lesser extent with self-reported behaviour. The only notable correlations found involved lapses, with items such as "I forget to look before crossing because I am thinking about something else", and aggressions, with items such as "I cross very slowly to annoy a driver". Respondents reporting stronger feelings of helplessness (with items such as "I feel nothing I can do will change things") also reported a higher tendency to perform these types of

behaviours. Helplessness "reflects a pervasive pessimistic outlook" (Esparza et al. 2015; p.605), and is strongly linked to depression. One characteristic of depression is that the sufferer can be "confused, preoccupied, or distracted" (Beck, 1979; p. 7). Therefore the self-reported performance of lapses and the reported feelings of helplessness could both arise from a greater tendency to experience symptoms of depression. This could also explain the relationship with aggressive behaviours, given the long-standing association between aggression and depression (e.g. Kendell, 1970). Such relationships and associations would require further research to clarify.

Continuing with the fatalistic beliefs scale, it was also found that those with stronger beliefs in divine control (with items such as "everything that happens is part of God's plan") also reported higher tendency to perform lapses. In our sample, however, responses to the divine control measure were very heavily skewed towards the non-belief end of the scale. Skewness was pronounced to such an extent that it could not be rectified with standard data transformations, hence findings should perhaps be taken with caution. Looking at the demographics results, over 57% of respondents indicated having no religion. As such, using this data we can say little of the potential relationships between religiosity and road safety attitudes or behaviour, other than that both Yıldırım (2007) and Esparza et al. (2015) were right in urging caution when conflating concepts; similarities and relationships between religiosity and fatalism do not mean they affect attitudes and behaviour in the same ways. We would also suggest general caution when developing and applying scales to measure 'fatalism' in road safety research. As Esparza et al. (2015) demonstrated, there are a number of inter-related yet non-identical concepts that can fall under this umbrella term; our data suggests that these sub-factors may have unique relationships with attitudes and behaviours.

It is important to take care when moving from discussing self-reported behaviour to a discussion of observed or past behaviour. The Theory of Planned Behaviour (TPB; Ajzen & Fishbein, 1980), on which much of the work on driver behaviour and attitudes cited in the introduction was based, describes a number of behavioural determinants, with behavioural intentions representing only one them. When splitting our sample into groups based on their past involvement in accidents, the only differences found were in the extent to which they reported intentional unsafe or aggressive behaviours. Although this appeals to common sense (i.e., that more aggressive road users who have a higher tendency to violate the rules also tend to get into more accidents), more work is necessary if we are to pick apart the complex relationships between fatalistic beliefs and risk perceptions (both of which are linked to attitudes), attitudes (which are linked to self-reported behaviour), and self-reported behaviour (which is linked to observed or past behaviour).

In terms of intervention design, our results highlight the importance of targeted campaigns that address people's road safety attitudes and, given the association with fatalism, people's perceived ability to change or affect outcomes. Although previous research suggests that risk perceptions should be targeted alongside fatalism with respect to traffic safety, our results do not offer additional clarity on this point, hence we can only recommend additional research. Importantly, it is clear that social cognitive constructs have a role to play in road safety, be that for driver behaviour or for pedestrian behaviour, and that belief systems, which are strongly linked to culture, need also to be considered when thinking about how to overcome the ever-increasing road safety challenge. Road safety strategies must consider the wider society in which the transport system resides, and we must see an integrated approach if we are drive the necessary cultural change (e.g. Johnston, 2010).

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