



## Public attitudes towards motorcyclists' safety: A qualitative study from the United Kingdom

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### ABSTRACT

The aim of the reported research was to examine the perceptions of road user safety amongst different road users and examine the link between attitudes, empathy and skill in motorcycle safety behaviour. Motorcyclists were perceived by the study participants, members of the public at four different locations at the UK (including motorcyclists and non-motorcyclists), as a group be at a high risk of accidents on the road. This was due to perceived behavioural characteristics of motorcyclists – who were viewed as ‘thrill seekers’ – as well as observed behaviours on the road. This, coupled with the physical vulnerability and excessive speeds, meant that motorbike driving was considered by the study participants as the least safe form of road use. There was broad agreement that motorcycling was dangerous as a whole, but not all motorcyclists were necessarily risky riders. The issue of ‘competitive space’ emerged between car drivers and motorcyclists in particular and it was suggested that there was a lack of mutual awareness and considerations between the two groups. Generally, greatest empathy comes from drivers who are motorcyclists themselves. Engineering, education, enforcement interventions were investigated. These were aimed at two main areas: normalising safer driving behaviours for motorcyclists and increasing awareness of bikes for motorists—particularly in relation to reducing speed limits at urban junctions. Finally, the idea of risk mapping and reduced speed limits on rural roads was seen as potentially effective—particularly as certain motorcyclists highlighted that they changed their riding behaviours by increasing speed and taking greater risks on these roads.

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### 1. Introduction

There is a growing realisation in road user safety research, policy and practice that social aspects of road use, including attitudes, values, beliefs, pro-social behaviour and social norms, are important in understanding how people perceive and accept levels of risk on the road and hence their road user safety behaviour (Haglund and Åberg, 2000; Musselwhite et al., 2009, 2010; O'Connell, 2002). In addition, a growing body of research suggests that people's attitudes towards road user safety interventions, such as traffic calming and road user safety educational campaigns, and whether people accept them are key to their success (Musselwhite et al.,

2009; Musselwhite, 2004; Webster, 1998). Attitudes can broadly be defined as “... a positive, negative, or mixed reaction to a person, object, or idea” (Brehm et al., 2002, p. 179) and “a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour” (Eagly and Chaiken, 1993, p. 1). Hence, attitudes can be seen to be an evaluative reaction to a concept, such as road user safety. To date there has been little understanding of the attitudes towards (and of) motorcyclists with regard to accepted levels of risk and safety on the road. This paper will draw on the concept of attitude, but also associated psychological attributes including the role of perceptions of risk and safety, the role of experience, empathy and in-group out-group distinctions and the resulting implications this has for policy and practice.

In the 2005 Office for National Statistics (ONS) Omnibus Survey, 70% of the public in the United Kingdom (UK) rated motorcycles as the least safe mode of transport (DfT, 2008). Statistics from the UK suggest such attitudes have some basis; motorcyclists are over represented in accident statistics compared to their exposure on the road. For example, motorcyclists make up 1% of road users, yet account for 19% of fatalities, 21% of total serious injuries and 8% of

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slight injuries on the road (DfT, 2010). Per vehicle km, motorcyclists have the highest fatality rate of any type of road user, around 30 times that for car occupants and 3 times the rate for pedal cyclists (DfT, 2010; Lin and Krauss, 2008, 2009). Such statistics do not describe the whole road user safety picture, as near misses, perceptions and feelings of safety and danger all influence behaviour and are largely unreported, along with many non-injury accidents (Lin and Krauss, 2008).

Casualty statistics from the UK suggest that other road users play a large contributory factor in motorcycle accidents and the majority of road collisions that kill or seriously injure motorcyclists involve another vehicle (usually a car), with 76% of deaths and 75% of killed or seriously injured accidents involving multi-vehicle accidents (hence single vehicle accidents accounted for only 24% of motorcyclist fatalities and 25% of Killed and Seriously Injured casualties in 2008) (DfT, 2010). Especially noteworthy is that 39% of motorcycle rider deaths and 51% of motorcyclists killed or seriously injured are at junctions (DfT, 2010). In particular, car drivers failing to look properly and spot motorcyclists at junctions is a key contributory factor to motorcycle accidents in the UK (DfT, 2010) and recent campaigns in the UK have tried to educate drivers to be more aware of motorcyclists with many regional and national Think! Bike posters, billboards and television adverts.

Motorcyclists tend to have positive attitudes to road safety and riding safely is held in high regard amongst the most dedicated riders (Fuller et al., 2008b). Nevertheless, the enjoyment of taking risks and the enjoyment of speed, in particular, are higher for motorcyclists than they are for car drivers who in general are more risk averse (Broughton, 2007; Broughton et al., 2009; Fuller et al., 2008b; Watson et al., 2007). Drivers tend to drive slower as the road environment becomes more risky, which is not the case for motorcyclists (Broughton, 2007; Broughton et al., 2009). Increased risk of riding a motorbike is accepted as a rider, yet a good rider, it is believed, can manage this risk (Watson et al., 2007). Indeed risk and enjoyment of riding are not always correlated and too much risk can reduce enjoyment; riders accept the additional risk of riding because of their enjoyment of riding (Broughton, 2007). In addition, what constitutes safe riding is often a contradiction, for example, safe riding is often viewed as staying within the riders own limits, yet to become a competent rider it was stated that limits need to be pushed and tested (Watson et al., 2007). It is also not uncommon for riders to think that most if not all accidents are avoidable if the rider is skilful enough (Bellaby and Lawrenson, 2001; Natalier, 2001; Trimpop, 1994).

It is suggested that motorcyclists have differing motivations and relationships with risk. Affective motivations for riding at speed, for example, are only evident in those who can be classified as high sensation seekers (Chen, 2009; Chen and Chen, 2011). Broughton (2007), suggests riders can be divided into three categories based on their acceptance of risk: 'Risk Averse' (42% of all riders who try to minimise risky situations); 'Risk Acceptors' (48% of riders accept a certain level of risk in riding in order not to compromise their enjoyment); and 'Risk Seekers' (8% of the population of riders who actively seek risk). Christmas et al. (2009) suggest seven segments of rider based on their attitudes towards riding specifically their attitudes towards performance and passion (labelled as riding hobbyists, performance disciples, performance hobbyists, look-at-me enthusiasts, riding disciples, car aspirants and car rejecters). Each group has a differing perception of risk and therefore have different levels of acceptability of road safety interventions. Nevertheless, how stable such segments are and the exact nature of the interventions have not been developed or tested to date.

Research suggests that attitudes of drivers towards motorcyclists may be important in how such interactions are treated on the

road and hence has implications for road user safety. Crundall et al. (2008) suggest the most negative attitudes towards motorcyclists on the road tend to come from the least experienced drivers and this group in turn also has poorer skills in dealing with motorcyclists on the road. They suggest greatest empathy towards motorcyclists comes from drivers who are motorcyclists themselves. Empathy tends to be brought about by a perception of attachment (kinship, friendship, familiarity, similarity) to others and is displayed by a deliberate attempt to take the other's perspective (Batson and Shaw, 1991). It can be encouraged through training and in experimental studies at least can be displayed equally by males and females (Cross and Madson, 1997). However, social context affects the role of attachment and ability to understand other people's perspectives (Cialdini et al., 1997). Research suggests empathy is important in a motorcycle safety context. Car drivers who are also motorcyclists have fewer accidents with motorcyclists when driving than drivers with little or no motorcycling experience (Magazzu et al., 2006). Furthermore, Brooks and Guppy (1990) have found that drivers who have family members or close friends who ride motorcycles are less likely to collide with motorcycles, and showed better observation of motorcycles than drivers who did not. It is suggested that they are mentally prepared for motorcyclists and this is as a result of empathy rather than just experience alone (Fylan et al., 2006).

Motorcyclists have a strong social identity which creates a strong need to conform to perceived norms of behaviour stemming comes from being both a minority and a vulnerable road user (Jderu, 2011). Such a strong identity creates an in-group versus out-group distinction. Hence, motorcyclists view people like themselves to be more similar and positive and groups distinct to themselves as more dissimilar and negative, exonerating blame of the in-group at the expense of that in the out-group (for further details of the theory see Pettigrew, 1979). Out-groups are found within the motorcycling population and older more experienced motorcyclists, for example, believe younger inexperienced motorcyclists are far more dangerous (Jderu, 2011). In addition, out-groups are found outside of the motorcycling population, especially authority figures, such as the police and the government (Natalier, 2001; Bellaby and Lawrenson, 2001). Another typical out-group for motorcyclists is other road users, especially car drivers (Musselwhite et al., 2009). Hence, danger and taking risk is externalised to other groups and this may have the effect of distancing messages provided by campaigns attempting to improve rider safety which suffers the same externalisation labelling. In-group versus out-group behaviour is typical in transport and has been found in driver-cyclist attitudes, for example, where motorists hold negative views of cyclists and classify them as an out-group with significantly different characteristics from themselves (Basford et al., 2002). It is closely linked with other similar theory. For example, O'Connell (2002) suggests that a 'fundamental attribution error' leads people to overestimate the impact of factors in the environment or situational influence on one's own behaviour, while underestimating the impacts of the same factors on the behaviour of others. 'Actor-observer differences' might explain why an individual's own bad behaviour is perceived as a result of situational factors leading to it, whereas another's behaviour, no matter how similar, is more likely to be attributable to personal factors or characteristics.

Hence, a variety of psychosocial factors have the potential to affect motorcyclist behaviour. This paper aims to explore in-depth perceptions of motorcyclists as road users. It uses wholly qualitative data to examine complex relationships between differing road users. Specifically it addresses how motorcyclists and non-motorcyclists perceive the risk of riding a motorcycle, the attitudes they have towards motorcycling and how they believe this affects their behaviour. In addition, attitudes of motorcyclists

and non-motorcyclists towards interventions aimed at improving motorcycle rider safety are also examined.

## 2. Methodology

There are many possible psychosocial factors influencing perceptions of motorcycling. In order to further understand the relationship amongst such factors a wholly qualitative approach is adopted. It is felt a quantitative approach is unhelpful and unnecessarily reductive at this stage. It was not the intention to pick one variable, but to examine a wide variety of psychological variables and their effect in a social context. Building on a discursive approach to understanding the meaning of risk and transport safety (see Dorn and Brown, 2003; Musselwhite, 2004; Musselwhite and Haddad, 2010a; Natalier, 2001; Rolls and Ingham, 1992) this study adopts a deliberative research approach in order to enable participants to discuss road safety issues in depth and engage in an informed discussion. Deliberative research concentrates on specific topics and typically involves large numbers of participants selected to represent different groups of people. The emphasis is on creating a purposeful selection of the population, not a representative sample *per se*. Specifically, 240 participants were recruited in groups of ten participants, of which 228 eventually took part. Participants took part in three re-convened workshops, each in turn exploring views on risk; the relationships between different road users; and policy interventions to promote road safety. The project investigated a wide set of road user topics not confined to motorcycling alone (see Musselwhite et al., 2010), but findings presented here are those just in relation to motorcycling.

### 2.1. Sample

The research engaged 228 members of the public across the four locations in the UK: London, Bradford, Glasgow and North-West Wales (Llandudno and Wrexham). The areas were chosen to reflect a range of socio-economic variables and well as a mix of urban (London, Glasgow and Bradford) and rural (North-West Wales) environments. Within each area an attempt was made to recruit 60 participants into one of six groups, with ten participants in each group, selected in response to include different road user groups, life-stages and attitudes to risk. This was a deliberate attempt to engage a diverse range of participants known to have differing views on road user safety as had been found in the extensive literature review (Musselwhite et al., 2009). Participants represented many different groups that are likely to increase the diversity in findings but are not representative of the population as a whole. Recruitment was undertaken through 'free find' techniques, where members of the public were approached face-to-face and asked to undertake a screening questionnaire (based on demography and attitudes to risk) to assess eligibility and ensure that designated quotas were accurately filled. The number of people recruited and their background profiles are shown in Table 1.

Specifically, in each of the four locations, the groups were comprised as follows:

- Group 1: Young male drivers (17–21 years).
- Group 2: Those who drive to work (aged 21–54).
- Group 3: Those with children under the age of 16 (aged between 21 and 54).
- Group 4: Older people (both drivers and non-drivers aged 55+).
- Group 5: Younger working people with no children yet (aged 21–34).
- Group 6: Individuals with different attitudes to risk. These were: People who predominantly take risks (continuous risk takers) (Bradford); People who predominately

**Table 1**  
Participants recruited for the research by group, location and background characteristics.

Group	Study location				Gender		Respondents' age group				With children <sup>a</sup>	Exclusive motorcyclists/ total current motorcyclists <sup>b</sup>	Previous motorcycle experience <sup>c</sup>	Car driver <sup>d</sup>	Total
	London	Bradford	N. Wales	Glasgow	Male	Female	17–20	21–34	35–54	55+					
1	7	9	8	10	34	0	34	0	0	0	0	0/4	4	34	34
2	11	9	10	10	19	21	0	17	15	8	23	1/4	7	39	40
3	8	9	11	10	18	20	0	16	22	0	38	3/7	7	32	38
4	10	10	9	10	19	20	0	0	2	37	0	1/2	10	26	39
5	9	11	9	10	20	19	0	38	1	0	0	2/8	4	29	39
6 React.	8	0	0	0	4	4	0	3	4	1	3	0/1	0	8	8
6 Cont.	0	10	0	0	5	5	1	1	4	4	2	0/1	2	10	10
6 Unint.	0	0	10	0	3	7	3	2	2	3	3	0/1	0	9	10
6 Calcul.	0	0	0	10	4	6	0	2	4	4	3	0/7	0	10	10
Total	53 (23.3%)	58 (25.4%)	57 (25%)	60 (23.32%)	126 (55.3%)	102 (44.7%)	38 (16.7%)	79 (34.6%)	54 (23.7%)	57 (25%)	72 (31.6%)	7 (3.07%)	34 (14.91%)	207 (90.8%)	228

<sup>a</sup> Number of participants who have at least one child under the age of 10 living with them.

<sup>b</sup> Number of participants who are self-defined as 'regular' motorcyclists; first who do not use any other motorised transport, then as a total.

<sup>c</sup> Have ridden a motorcycle regularly for over a year in duration but over a year ago.

<sup>d</sup> Have driven a car at least once a month over the last year.

do not take risks (unintentional risk takers) (North-West Wales); People who take risks when under stress (late for work, etc.) (reactive risk takers) (London); People who take risks when they think it is safe to do so (driving fast late at night, etc.) (calculated risk takers) (Glasgow). People were assigned to this group based on a screening questionnaire involving the use of questions that place people into the four categories from previous research in the area (Musselwhite, 2006). A variety of questions were selected from Musselwhite (2006) to incorporate whether they took risks on the road in differing modes (such as driving fast, driving close to other vehicles, riding a bike fast, weaving in and out of traffic on a bicycle or dodging traffic when crossing the road on foot) when using the road most of the time (continuous risk takers), only when they are late (reactive risk takers), only when they feel it is safe to do so (calculated risk takers) or hardly ever (unintentional risk takers). With the final category it is assumed that all people using the road will engage in some level of risk (after all the road is a risky environment), but that they do not deliberately create a more risky situation, whereas the other three categories do.

It is recognised that this structure confounds location with risk taking type. However, the focus group methodology allows this to be untied through the conversations that took place, where participants were asked directly, “is that because of the location or is that because of the kind of risks you usually take?” In addition, the relationship between location and risk taking is further examined during analysis when comparing discussion threads within groups (to ascertain the origin of the answers) and between groups (for example to compare to other answers which contained location-based reasons).

Within each group, participants were also recruited to comprise a mix of car drivers, motorcycle riders, cyclists and non drivers. Table 1 shows that 55.3% of the sample were male and 44.7% female and that 31.6% of the sample had a child living with them under the age of 10 years. At least one self-defined “regular” motorcyclist was deliberately recruited for each group to introduce a varied discussion, with a total of 35 across the sample (15.4%) of these 7 (3.07% of total; 20% of the motorcyclists) were exclusive motorcycle riders in that they did not drive (defined as they had not driven in the last year prior to the research). The 35 motorcyclists ages ranged from 17 to 60 with an average age of 32.4 years, 30 were male and 5 female. In addition a further 34 (27 male; 7 female) participants had once ridden a motorcycle regularly but no longer would classify themselves as being a regular motorcyclist (and had not ridden within the last year).

## 2.2. Procedure

Each group met on three occasions and hence participants were engaged in three reconvened workshops across the four areas. Workshops were held approximately three weeks apart. The first workshops were held during the evening and lasted for 2.5 h. The final workshop was held over the course of a Saturday and lasted 7 h. Each workshop focused on a different road safety issue. The first workshop explored risk taking on the road in the context of wider risk taking and norm guiding behaviours. The second workshop explored the relationship between different road user groups, including car drivers, motorcyclists, cyclists and pedestrians. The third workshop explored participants' views on potential road safety interventions, in terms of perceived effectiveness and fairness.

## 2.3. Analysis

All small group discussion sessions were digitally recorded and transcribed verbatim. Transcripts were then analysed through a thematic analysis approach adopted by the British Market Research Bureau known as ‘Matrix Mapping’. Matrix mapping is a version of thematic analysis that involves assigning categories to the data a priori, but leaving scope for additional categories to be formed *post hoc*. Hence, based on the topic guide (which in turn was based on learning from previous research), experiences of conducting the fieldwork and a preliminary review of the data a thematic framework was constructed. The analysis then proceeded by summarising and synthesising the data according to this thematic framework and placing data into the relevant categories. This data was further reduced through comparison between cases and similarities and differences are presented under key themes outlined in the findings below. Themes are recorded that are pervasive and have created passion, debate and contention amongst the members of the focus groups. When all the data had been sifted, it was mapped to identify features: defining concepts such as road user identity, finding associations such as attitudes to risk and road user behaviour, and providing explanations as to why views on certain interventions were likely to be held. The following findings and discussion relate to data relevant to discussions on motorcycle safety.

## 3. Findings

As is the nature of qualitative research, some of the findings emerged as a result of deliberate discussion on the topic started by the researcher (top-down), other areas emerged during conversation (bottom-up); hence, there is a distinction between top-down and bottom-up themes. These are brought out in the findings below which incorporate the top-down discussion on motorcycle safety, identity and interventions with the bottom-up emerging concept of the road as competitive rather than shared space.

### 3.1. Perception of motorcycle safety: the road as a competitive rather than a shared space

There was broad agreement amongst the study participants that motorcycling was dangerous to both motorcyclists and other road users. On a task involving a discussion on relative levels of risk, participants frequently agreed that riding a motorcycle was a high risk activity and generally placed it as the most risky mode of transport to use. This was due to perceived behavioural characteristics of motorcyclists – who were viewed on the whole as ‘thrill seekers’ – as well as observed behaviours on the road, such as weaving between cars or riding in ‘gangs’ on country roads. This, coupled with the physical vulnerability and excessive speeds, meant that motorbike riding was considered one of the least safe forms of road use. However, there was agreement that not all motorcyclists were necessarily risky riders. Rather the vulnerable nature of the motorbike compared to cars was noted, together with car drivers not having the skills, especially perceptual skills, to deal with motorbikes.

The participants tended to speak about road safety from the point of view of being a car driver and roads were generally seen as a space for cars predominantly. Importantly this space was viewed as competitive, particularly in urban areas where a ‘survival of the fittest’ mindset prevailed. Other road users were viewed as encroaching on the space of the car. There were many examples of this—from motorcycles speeding past cars and overtaking in blindspots; pedestrians stepping onto a road without due care and attention; cyclists jumping lights and pulling out into traffic. These



were not just viewed as unsafe behaviours in themselves, but as exploiting and misusing space—breaking rules and norms on the use of the road,

“it’s just so rude. You wouldn’t behave like that on foot, so why in a car or on a bike?” (Male, North West Wales, group 5, non-motorcycle rider)

On the other, car drivers that did not ride tended to mention that motorcyclists often drove too fast around cars, undertook cars in nearside lanes and did not consider the blind spots of drivers,

“They weave in and out without a care for the rules or others. It’s frightening” (female, Bradford, group 5, non-motorcycle rider)

When motorcyclists in the groups protested at this, it was generally agreed that not all motorcyclists did this but nevertheless it was a significant concern. Car drivers did tend to recognise that there were at least two types of motorcycle rider, those motorcyclists who ride regularly and those who ride for leisure. Those who rode regularly it was felt would be under risk of collision with other motorists, but were largely experienced enough to reduce such risks. However, those who rode for leisure were more likely to deliberately be testing their skills, riding recklessly, aggressively and at high speed.

On the other hand, car drivers often neglected to either give space to or look out for motorbikes—this was a particular concern when cars suddenly switched lanes in slow moving traffic or turned right at junctions. This was stated almost exclusively by motorcyclists,

“It happens so many times. Cars just don’t notice you are there. I’ve been knocked off; my mates have all been knocked off, all because the drivers don’t look properly” (male, London, group 5, motorcycle rider)

There was general agreement amongst motorcyclists themselves that a distinction between experienced and safe riders and inexperienced hobby riders was probably evident. Importantly, car drivers would suggest that around half the motorcyclists seen on the road were deliberate violators, whereas motorcycle riders would suggest it was far less frequent, perhaps representing around 10% of the motorcycle community. There was general resentment about such a group from drivers but also from motorcycle riders themselves. Such a group was stereotyped to be irresponsible, reckless and non-caring,

“They are crazy. They will have it coming to them. I just hope they don’t hurt other people”

“But they will won’t they. Those who attend the accident, the police, the ambulance crew not to mention their own family. Selfish – that’s what it is” (discussion between two non-motorcycling males, group 5, North West Wales)

The car drivers were more likely to describe motorcyclists as consisting of younger males who could use fast and expensive racing bikes. Motorcycle riders would counteract that describing the group as less homogenous and discussing how they knew older riders who could be described in such a way and how it was impossible to create such broad stereotypes. It was felt by the majority of participants that young, fast speeding group of motorcyclists would be more likely to cause the greatest harm to themselves through getting into single-vehicle accidents and there was a certain feeling that it may well “serve them right” amongst some individuals. However, there were individuals who described that such irresponsible drivers may cause harm to others, from simply creating stress and tension on the road, through to actual accidents. Overall, such an out-group was despised and no one readily admitted to belonging to such a group. However, four individuals did admit to

once having ridden recklessly in their younger days. All were male and two currently still rode motorcycles, but stated they were now much safer riders and very rarely took deliberate risks. The other two no longer rode. Interestingly, three of the four were identified by the researchers as ‘continuous risk taker’ and the other one as a ‘calculated risk taker’, showing that such individuals still report that they are taking deliberate risks. A small amount of defence was posed by a limited number of motorcyclists suggesting such aggressive or risky riding occurred as result of being forced into riding in aggressive ways so as to get noticed by irresponsible car drivers,

“It’s the only way we get seen. We put ourselves about, you know. Otherwise we are invisible to the driver. We don’t get noticed and wham we are knocked off” (male, Bradford, group 3, motorcycle rider).

Experience was also a key issue and this was cited in relation to ‘hobby riders’ who go out on weekends and may own a bike that is too powerful for their level of experience. It was also noted in relation to younger motorbike riders, particularly riders of scooters who were viewed as driving in a reckless fashion, often not wearing helmets and driving dangerously on residential roads, particularly housing estates.

### 3.2. Motorcyclists’ attitudes towards their own safety

The motorcyclists themselves tended to admit that motorcycling was a risky activity. However, they were inclined to state that they had acquired skills to be able to deal with the risk and felt it was largely both a calculated risk and risk in which they felt in control of. Most admitted there would be little point in riding if there was no risk, stating the emotive part of engaging in the thrill and risk is part of the motivation to ride, but they felt their experience, skill and control meant the thrill and risk was an acceptable balance.

Riding a motorcycle was often part of an overall identity for the individuals involved. So, they tended to want to be seen as a motorcyclist and portray this identity to others. It was sometimes linked to other aspects of their lifestyle, for example being linked to enjoying rock music and motorsport. That said, there was not much admittance of taking risks in other parts of life; the motorcyclists did not seem to be part of a group that took more risks either socially acceptable or otherwise, for example, when asked, they were no more likely than non-motorcycling participants to admit to smoking, engaging in drug taking, driving cars fast or taking part in risky sports.

Practical elements of motorcycling were noted as important, but not to the same extent as the affective and emotive content. For example, discussions from motorcyclists themselves noted how riding a bike made parking easier and cheaper and that you could get to places relatively quickly, with reduced inconvenience of traffic queuing at peak times. However, overall, it seemed these were usually additional benefits rather than triggers for riding in the first place. Triggers for riding a motorcycle were far more likely to directly be linked to the ride itself, which involved elements such as the thrill of riding and taking some (albeit calculated) risks and to identify formation and being part of a group.

Motorcyclists tended to note that safety was a high priority and this was part of their identity. That said, taking risks while using a motorbike as admitted to by motorcyclists typically involved speeding, overtaking and undertaking at inappropriate times. Car drivers mentioned how external elements often forced them into deliberate dangerous driving behaviour such as being distracted, becoming late for an appointment, feeling stressed and annoyed. Motorcyclists described their risk far more in terms of a mental or cognitive map, hence they knew where they were able to speed or

not and planned their riding style prior to riding. For example, they would plan ahead as to where and when they were able to show risks.

"I know where I can throttle and where I have to be more careful." (female, North West Wales, group 3, motorcycle rider)

Definitions of safe riding varied but largely centred on being able to skillfully handle the bike, involving descriptions of appropriate speed and handling. In addition, showing calculated risk taking behaviour in that they like to take risks, but that they feel in control of the risk,

"OK, yes, I do ride fairly fast and aggressively at times, but I know my limits and that of the bike. I don't want to die!" (male, Bradford, group 5, motorcycle rider)

"I think I'm a pretty skilled rider, I know when to open up and go fast and when not to" (male, North West Wales, group 5, motorcycle rider)

### 3.3. Empathy towards motorcyclists

Non-motorcyclists in the calculated risk taking group showed considerable empathy towards motorcycle riders. In particular the stated they understood why motorcyclists show the risks they do,

"You can see why they weave in and out of queues and cut corners though can't you. It helps them doesn't it . . . get home quicker" (male, Glasgow, group 6, calculated risk taker, non-motorcycle rider)

And in particular understood that motorcyclists have great skill and ability and are using their motorcycle and hence could drive in a such a manner,

"Well they can can't they. A rider with experience he knows how to handle the bike" (male, Glasgow, group 6, calculated risk taker, non-motorcycle rider)

However, non-motorcyclists were in the minority within this group and answers may have been more to agree with majority viewpoint of the motorcyclists.

Other groups emphasised the dangers of motorcycling, citing overconfidence in taking such risks,

"They think they can do it. That fast and powerful machine makes them feel like they can. But they'll come a cropper. They all will at one time or other" (male, Glasgow, group 2, non-motorcycle rider)

Although, there was more empathy from those that had previously ridden,

"Well, I can understand their behaviour. I used to ride myself, so it's not surprising to see bikes weaving in or out of traffic and speeding past you. I mean that's the point of a bike isn't it. Otherwise you'd drive!" (male, North West Wales, group 4, non-motorcyclist)

And empathy from those with family or friends who rode,

"My mate rides a 500cc (motorbike). He's very careful but he still rides fast and gets ahead of the traffic. But he's dead safe" (male, Bradford, group 5, non-motorcyclist)

Least empathy came especially from females, especially those who had never ridden a motorcycle,

"I just don't know why they do it. They're all crazy them motorcyclists. Why'd you want to ride like that?" (female, Bradford, group 3, non-motorcyclist)

In general terms it was females who found the concept of a mode of transport being linked to affect and emotion more difficult to understand,

"It's just all a big noise. Why would anyone put themselves or put their lives at risk just to show off like that. I'll never understand it. And they are the same for any transport. Always foot to the floor, cars, bikes, even bicycles. Everything's got to be fast" (female, Bradford, group 3, non-motorcyclist)

They viewed transport, in general, including motorbikes, as being something to get from A to B,

"It is just something to get from home to work to shops to home. Not something to get excited about really. That's where it goes wrong for men I reckon" (female, North West Wales, group 3)

Males were more likely to understand the affective side of motorcycling even if they did not motorcycle themselves,

"Course I can understand the thrill of it. Speed, being out there, unprotected and that . . . I can see why they do it. It just isn't for me" (male, North West Wales, group 4, non-motorcyclist)

### 3.4. Motorcycle riding in rural and urban areas

Motorbike riders stated that due to their vulnerability they have to always remain vigilant and alert. Hence, they were likely to note that they broadly pay the same level of attention in familiar and unfamiliar areas as they always have to expect the unexpected. Motorcyclists noted how they would adapt their style of riding for the road and conditions, with certain respondents noting that they enjoyed being able to ride fast particularly on country and rural roads due to the excitement and sense of freedom that it gave them. They also stated that they generally rode safer and with more awareness in city conditions.

Car drivers tended to note that areas of extreme vulnerability for motorcyclists were rural areas, where motorcyclists drove fast, often round tight bends and with little acceptance of the dangers. Motorcyclists did admit that national speed limit rural roads posed a particular danger for themselves but also noted that they really enjoyed riding on such roads and saw it as a challenge to conquer and overcome. They also noted it as a chance to go full throttle and get some speed up on their journey. Those from rural areas were far more wary of the dangers, than motorcyclists from urban and suburban areas.

### 3.5. Public attitudes to reducing motorcycle fatalities

Though anticipating traffic accident rates to be high, all participants, including motorcyclists, were generally shocked at the levels of fatalities in the UK, relative to total volume of bike traffic. The predominant interventions for motorcyclists focused on engineering solutions (changes and improvement to the infrastructure, vehicles, and the physical environment)—mainly because they were perceived to offer greater support for such a dangerous mode of transport. In addition, education, enforcement and risk mapping were also highlighted.

#### 3.5.1. Engineering

There were three main types of engineering solutions that were seen to be important by the participants for motorcyclists: (1) road conditions: this ranged from the maintenance of road surfaces by removing potholes through to the potential use of high friction surfaces in areas where accidents were more likely to occur—such as at junctions; (2) performance: potentially limiting the top speed of bikes and increasing the protection that bikes could afford in an accident and; (3) space: demarking a clear dedicated lane on

dangerous roads (such as is the case on certain roads in China, for example).

There was general agreement amongst the motorcyclists for these kinds of interventions, though they did believe it may curtail the excitement and thrill of riding for other motorcyclists. Certain motorcyclists re-emphasised here that the key problem was with poor car drivers rather than with their own riding skill.

### 3.5.2. Education and enforcement

Education and enforcement interventions were also deemed important by all participants. These were aimed at two main areas: normalising safer driving behaviours for motorcyclists and increasing awareness of bikes for motorists—particularly in relation to reducing speed limits at urban junctions. It was noted that while campaigns to increase awareness of motorbikes had been memorable, particularly the UK's recent THINK! Bike campaign, there were still considerable concerns as to the visibility of bikes on the road. Motorcyclists believed drivers need to have more training on looking out for motorcyclists. However, drivers, on the other hand, passed some of the responsibility onto the riders, for example suggesting compulsory daytime running lights or wearing bright clothing,

"I don't know why, if we're concerned about safety and visibility, why they don't make it a law to have to ride with lights on or with luminous clothing?" (male, group 5, Glasgow, non-motorcyclist).

In addition, training was supported for motorcyclists, by both non-motorcyclists and motorcyclist alike. BikeSafe, a non-compulsory training programme in the UK run by police authorities, was largely seen positively by riders. It was felt in particular that the mix of practical skills and attitudinal components on offer was highly beneficial. Almost all regular riders had been on the course and those who had not were intending to attend a course soon. The compulsory basic training was viewed as being less useful by many motorcyclists, though they did acknowledge that for novice riders, such training can be valuable if not essential. It was agreed that riders should be made to use L plates for at least 2 years after they complete their compulsory basic training (CBT).

With regard to enforcement, tougher speed limits and penalties for dangerous riding, such as weaving in and out of traffic, were suggested. It was generally felt that such measures would be effective, but they were unpopular with bike riders as they would limit the perceived convenience and freedom of owning a motorbike. On the whole such behaviours were more negatively received by non-motorcyclists. Indeed riding at speed and weaving in and out of traffic were viewed as the norm for some motorcyclists, especially those in urban areas. One rider in London described such behaviour as 'the bikers' code'.

With regard to the greater use of speed cameras to enforce vehicle speeds, this was especially welcomed in known dangerous locations but was felt to be a money making exercise if placed in other safer locations. Motorcyclists especially advocated it at certain junctions, for example. In addition, if money from the speed cameras was used to promote other engineering improvements such as improved road surfacing, then this increased popularity.

### 3.5.3. Risk mapping

A topic exploring risk mapping (mapping the riskiest roads in the country and presenting the findings to the public) was introduced for discussion in the focus groups by the researcher. The idea of risk mapping was seen as potentially effective for motorcyclists. In particular it was felt to help assess dangers on rural roads where riders wanted to be able to manage the potential to ride at faster speeds along with assessing risk safely. However, there were concerns as to whether general publication of high risk routes would

be effective, after all it was stated that some road users and motorcyclists in particular would actively seek out the most dangerous roads to drive on. However, it was concluded that the majority of people would probably not alter their route or indeed change their driver or rider behaviour if they knew they were on a risky road. This was especially true for motorcycle riders, who again felt they were able to control the risk,

"Won't make any difference to me. I'm well aware – if not hyper aware – of the risks when I'm riding. So statistics won't help. I know what roads are safe and what I can do on them" (male, group 5, Glasgow, motorcyclist).

Participants felt that the presentation of the map itself needed close scrutiny. It was felt that mapping may have more impact if dangerous roads were highlighted as riders rode through the location itself, for example by static message board or variable message sign. In addition, using GPS and SatNav equipment were discussed as potentially how information may be realised in this manner.

## 4. Discussion

Riding a motorcycle is perceived by the public as a dangerous activity. This is as would be expected given the statistics which suggest per mile travelled, motorcycle riders are at around 30 times greater risk of death in a crash than people driving other types of motor vehicles (DfT, 2010; Lin and Krauss, 2008, 2009). Motorcyclists themselves tend to note that the vulnerability of being on a bike creates the danger, which is largely overcome by experience and skill of the rider, while losing none of the thrill. Riding safely is something that is largely championed amongst the motorcyclists; however, this is more debatable amongst non-motorcyclists. Motorcyclists tend to view safety in terms of being able to handle the bike, knowing its limitations and capabilities, whereas car drivers are less likely to view this as skill and could view this instead as resulting in reckless behaviour. It could be argued that motorcyclists' description of skills, such as handling ability, road positioning and speed selection being used in relation to safety could place them into a calculated risk taker category. Hence, it could be argued that more motorcyclists could be described as calculated risk takers than would be found amongst car drivers (see Fuller et al., 2008a,b; Musselwhite, 2006). Musselwhite (2006) found that 22.7% of car drivers could be classified as calculated risk takers, yet it would appear this percentage could indeed be higher for motorcycle riders. This was not tested in the current study as the sample was not representative of the population as a whole. The group is, however, broadly comparable with Broughton's risk acceptance group which was found to represent 48% of riders (Broughton, 2007). Interestingly, the motorcycle riders thought very deliberate risk taking riders constituted around 10% of the riding population and this is similar in number to Broughton's risk seeking group consisting of 8% (Broughton, 2007). Car drivers thought this group was much higher in number, perhaps showing an actor–observer bias, over attributing the number of riders who ride with deliberate risk.

In addition, it appears that those who classify themselves as calculated risk takers on the road (on any mode) show more empathy and understanding to motorcycle riders, which may create additional mediating factors to explore in research carried out by Crundall et al. (2008). Hence, there appears to be a relationship between how risks on the road are conceptualised and empathy towards motorcycle users and it is suggested that research by Crundall et al. (2008) could be examined in light of different conceptualisation of risk that drivers and riders may have building on work by Musselwhite (2006).

Female car drivers were far more negative towards motorcyclists. In previous studies, females tend to show greater empathy

towards other road users (Fuller et al., 2008a; Musselwhite et al., 2009) but it is interesting to explore why this does not extend to motorcyclists. They were far more likely to view motorcyclist behaviour as not just dangerous but also discourteous and law-breaking. In addition, they could not empathise with the affective nature of riding, viewing all modes of transport as well as motorcycling far more in terms of practical elements. In addition it is interesting to note that these findings are not in-line with experimental studies that suggested empathy can be shown equally by males and females (Cross and Madson, 1997), so it is suggested that further research into how the social context affects empathetic attitudes in transport is needed.

The affective and emotive side of motorcycling was fully evident amongst the riders themselves. The “thrill” and “excitement” of riding, coupled with the raw experience that motorcycles provide tends to be a key motivation for riding. Practical elements, in particular reduced queuing in traffic jams and reduced parking costs, are noted as advantages but these were not on the whole primary motivations or triggers for riding. Hence, riding a motorcycle for the participants is largely an emotive affective experience. This differs greatly from how the majority of people view car driving, which although has affective components is largely linked to practical elements (Musselwhite and Haddad, 2010b; Musselwhite et al., 2010; Owen et al., 2008). This emphasises previous research which suggests motorcycle riding is motivated by passion and performance (Christmas et al., 2009; Jderu, 2011) and that enjoyment supersedes risks involved (Broughton, 2007).

Significantly, motorcycle riding identity is strongly linked with the need to ride safely. However, the perception of what is safe riding varies between motorcyclists and is largely based on a calculated risk perception. Training, such as BikeSafe in the UK, is taken up by motorcyclists and tends to be seen positively, particularly when carried out by experienced and professional riders. It is also clear that motorcycling has a strong social identity and affiliation that mean social norms are easily transmitted amongst the groups, meaning training amongst groups could be easily assembled. However, it is noted that there is little evidence to suggest training creates better riders perhaps because of over confidence or risk homeostasis (see Lin and Krauss, 2009 for a review). In addition, riding represents an outlet for an expression of independence, or a means of impressing other people (Hodgdon et al., 1981; Lin and Krauss, 2009) which means skill-based training may not be that effective if it does not take into account the wider social and affective context. As well as rider skill, training needs to also address more attitudinal and emotional aspects of riding including how to control impulses to speed and how to resist the adrenaline rush and take fewer risks. Finally, it is vital that more evaluation of training takes place to mitigate risks of over-confidence that may arise from training and maximise good practice (Lin and Krauss, 2009).

Producing maps of roads indicating their relative risk received little support from motorcyclists who already felt they knew themselves where the risks on the roads were. There was some support for use of maps to help participants identify where they need to be more concerned about speed and risk taking, especially in rural areas. However, there is a slight concern here that this could cause additional risk taking in areas viewed as less dangerous. Maps already exist with accident black-spots located for motorcyclists and they sell well (for example [www.mapsman.com](http://www.mapsman.com)) so perhaps there is a market for such information that might well be utilised more in actuality than would be reported in a study such as this. That said, more specific use of such information tied to an area would be of greater benefit, so that signs produced in the environment itself might be more useful than maps to study prior to a journey. This could be realised using add-ons to GPS or SatNav systems rather than additional signs in the infrastructure.

There is a strong belief amongst the public that car drivers are as much to blame for motorcycle accidents on the road, in particular through failing to look properly. Since the majority of accidents occur at junctions and with other vehicles (DfT, 2010) it is suggested that the current educational campaigns such as the UK Department for Transport's Think! Bike are to be continued, although a word of caution is added. The competitive nature of the road space and the resulting in-group out-group focus means some riders may feel that the responsibility for safety lies in the hands of the car drivers rather than themselves. This creates a further divide between road users, meaning a reduction in the need for riders to take care and responsibility for themselves. Hence, it is suggested that campaigns aimed at encouraging drivers to take extra care, also encourage riders to ride responsibly, perhaps simultaneously to enhance the shared nature of the road space. In addition, training for both drivers and riders needs to cover the shared responsibility all road users have for road safety and that the road is shared rather than competitive space.

The in-group out-group mentality is also seen in that older riders tend to think younger riders are more dangerous. There is some evidence to suggest this is the case; they are more likely to have accidents than their older counterparts (DfT, 2010) and ride more dangerously, deliberately showing more violations (Lin and Krauss, 2009). However, this may also distort the view that older riders and more experienced riders still need to take care while riding.

No doubt many engineering solutions, such as speed limiters fitted to bikes and extra speed cameras, for example, may have some effect on reducing rider accidents, but these are likely to be met with some resistance from riders. The idea of shared space for riders is met with a mixed response from riders themselves, but largely reduces the concept of the road as being shared space and rather reflects the dominant car drivers perception that the road is for them and them alone. It is advocated that this is refuted unless exceptional circumstances suggest otherwise, for example an area of heavy motorcycle and car use or an area with high motorcycle rider fatalities.

In line with previous research (Crundall et al., 2008), more empathy and indeed positive attitudes are shown towards motorcyclists by those who are motorcyclists, or have previous ridden a motorcyclist or have motorcyclists in their immediate family and friend networks. Not only is there a greater understanding of the dangers and vulnerability of motorcyclists which encourages better interactive behaviour around them, but also more positive feelings towards them sharing the road space. A recent TV educational campaign in the UK has revealed motorcyclists as human beings, with names, jobs, roles and family status. This goes some way to encouraging empathy, but needs to be adapted in two ways. First, to be truly shared other road users also need to be “revealed” with their personalities, status and roles and secondly, for closer empathy this needs to happen in real life as well as being broadcast on the television. Hence, it is suggested that perhaps shared training between riders and drivers would help create better empathy.

Finally, these results show the importance of the social nature of traffic and transport and perceptions of road user safety do not sit within a vacuum. It is therefore suggested that the culture will influence the way individuals perceive motorcycling and how they approach risk. The findings are based in four areas of Great Britain and it is not really known how transferable such findings are especially to other countries. In many countries motorcyclists comprise of only a small percentage of the road users, however the level of interactions with other road users (which is associated with empathy towards motorcyclists) could be very different between countries and cultures. It is therefore suggested that further international research must take place to address the perceptions of motorcycling and road user risk in other countries, perhaps using this research as a starting place.



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## References

- Basford, L., Reid, S., Lester, T., Thomson, J., Tolmie, A., 2002. Drivers' Perception of Cyclists. TRL Report TRL549. Transport Research Laboratory, Crowthorne.
- Batson, C.D., Shaw, L.L., 1991. Encouraging words concerning the evidence for altruism. *Psychological Inquiry* 2, 159–168.
- Bellaby, P., Lawrenson, D., 2001. Approaches to the risk of riding motorcycles: reflections on the problem of reconciling statistical risk assessment and motorcyclists own reasons for riding. *Sociological Review* 49 (3), 368–388.
- Brehm, S.S., Kassir, S.M., Fine, S., 2002. *Social Psychology* Boston: Houghton Mifflin Company.
- Brooks, P., Guppy, A., 1990. Driver awareness and motorcycle accidents. In: *Proceedings of the International Motorcycle Safety Conference*, vol. 2(10), pp. 27–56.
- Broughton, P.S., 2007. Risk and enjoyment in powered two wheeler use. Ph.D. Thesis. Transport Research Institute, Napier University.
- Broughton, P.S., Fuller, R., Stradling, S., Gormley, M., Kinnear, N., O'Dolan, C., Hannigan, B., 2009. Conditions for speeding behaviour: a comparison of car drivers and powered two wheeled riders. *Transportation Research Part F: Traffic Psychology and Behavior* 12 (5), 417–427.
- Chen, C.F., 2009. Personality, safety attitudes and risky driving behaviors-evidence from young Taiwanese motorcyclists. *Accident Analysis and Prevention* 41, 963–968.
- Chen, C.F., Chen, C.W., 2011. Speeding for fun? Exploring the speeding behavior of riders of heavy motorcycles using the theory of planned behavior and psychological flow theory. *Accident Analysis and Prevention* 43, 983–990.
- Christmas, S., Young, D., Cookson, R., Cuerden, R., 2009. *Passion, Performance Practicality: Motorcyclists' Motivations and Attitudes to Safety*. Transportation Research Laboratory Report (PPR442). TRL, Crowthorne, England.
- Cialdini, R.B., Brown, S.L., Lewis, B.P., Luce, C., Neuberg, S.L., 1997. Reinterpreting the empathy–altruism relationship: when one into one equals oneness. *Journal of Personality and Social Psychology* 73, 481–494.
- Cross, S.E., Madson, L., 1997. Models of the self: self-construals and gender. *Psychological Bulletin* 122 (1), 5–37.
- Crundall, D., Bibby, P., Clarke, D., Ward, P., Bartle, C., 2008. Car drivers' attitudes towards motorcyclists: a survey. *Accident Analysis and Prevention* 40 (3), 983–993.
- DfT (Department for Transport), 2008. *Public Attitudes Towards Road Safety Issues*. Report taken from the British Attitudes Survey 2007. Department for Transport, London.
- DfT (Department for Transport), 2010. *Motorcycle Casualties in Reported Road Accidents: GB 2008 Road Accident Statistics Factsheet No. 7*. Department for Transport, London.
- Dorn, L., Brown, B., 2003. Making sense of invulnerability in a qualitative study of police drivers. *Safety Science* 41 (10), 837–859.
- Eagly, A.H., Chaiken, S., 1993. *The Psychology of Attitudes*. Harcourt Brace, San Diego.
- Fuller, R., Bates, H., Gormley, M., Hannigan, B., 2008. The conditions for inappropriate speed: a review of the literature 1995–2006. Unpublished Report for the Department for Transport.
- Fuller, R., Hannigan, B., Bates, H., Gormley, M., Stradling, S., Broughton, P., Kinnear, N., O'Dolan, C., 2008b. *Understanding Inappropriate High Speed: A Qualitative Analysis Road Safety Research Report No. 94*. Department for Transport, London.
- Fylan, F., Hempel, S., Grunfeld, B., Conner, M., Lawton, R., 2006. *Effective Interventions for Speeding Motorists*. Road Safety Research Report No. 66. Department for Transport, London.
- Haglund, M., Åberg, L., 2000. Speed choice in relation to speed limit and influences from other drivers. *Transportation Research Part F* 3, 39–51.
- Hodgdon, J.D., Bragg, B.W.E., Finn, P., 1981. *Young Driver Risk-Taking Research: The State of the Art*. National Highway Traffic Safety Administration, Washington, DC, US DOT HS 805 967.
- Jderu, G., Motorcycles, body and emotions: the motorcyclist's social career, 2011. In: Pirani, B.M. (Ed.), *Learning from Memory: Body, Memory and Technology in a Globalizing World*. Cambridge Scholars Publishing, Newcastle, UK, pp. 61–76.
- Lin, M.-R., Krauss, J.F., 2008. Methodological issues in motorcycle injury epidemiology. *Accident Analysis and Prevention* 40, 1653–1660.
- Lin, M.-R., Krauss, J.F., 2009. A review of risk factors and patterns of motorcycle injuries. *Accident Analysis and Prevention* 41 (4), 710–722.
- Magazzu, D., Comelli, M., Marinoni, A., 2006. Are car drivers holding a motorcycle licence less responsible for motorcycle–car crash occurrence? A nonparametric approach. *Accident Analysis and Prevention* 38, 365–370.
- Musselwhite, C.B.A., 2004. Technological humps and having the hump with technology. In: *Paper presented at the International Conference on Traffic & Transport Psychology*, Albert Hall, Nottingham, UK, 5th–9th September.
- Musselwhite, C.B.A., 2006. Attitudes towards car driving behaviour: categorising and contextualising risk. *Accident Analysis and Prevention* 38 (4), 324–333.
- Musselwhite, C.B.A., Avineri, E., Fulcher, E., Goodwin, P., Susilo, Y., 2009. Understanding the public attitudes to road safety. A review of the literature 2000–2009. In: *Proceedings of the 19th Behavioural Studies Seminar*, Horsley Park, East Horsley, Leatherhead 30 March–1 April.
- Musselwhite, C., Avineri, A., Susilo, Y., Fulcher, E., Hunter, A., Bhattachary, D., 2010. *Understanding Public Attitudes to Road User Safety*. Report for the Department for Transport, London.
- Musselwhite, C., Haddad, H., 2010a. Exploring older drivers' perceptions of driving. *European Journal of Ageing* 7 (3), 181–188.
- Musselwhite, C., Haddad, H., 2010b. Mobility, accessibility and quality of later life. *Quality in Ageing and Older Adults* 11 (1), 25–37, 1471–17794.
- Natalier, K., 2001. Motorcyclists' interpretations of risk and hazard'. *Journal of Sociology* 37, 65–80.
- O'Connell, M., 2002. Social psychological principles: 'the group inside the person'. In: Fuller, R., Santos, J.A. (Eds.), *Human Factors for Highway Engineers*. Pergamon, Amsterdam, pp. 201–215.
- Owen, R., Sweeting, A., Clegg, S., Musselwhite, C., Lyons, G., 2008. *Public Acceptability of Road Pricing*. Final Report. Department for Transport, London.
- Pettigrew, T.F., 1979. The ultimate attribution error: extending Allport's cognitive analysis of prejudice. *Personality and Social Psychology Bulletin* 5, 461–476.
- Rolls, G., Ingham, R., 1992. 'Safe' and 'unsafe'—A Comparative Study of Younger Male Drivers. AA Foundation for Road Safety Research Basingstoke, Hampshire, UK.
- Trimpop, R.M., 1994. *The Psychology of Risk Taking Behavior*. Amsterdam, North Holland.
- Watson, B., Tunnicliffe, D., White, K., Schonfeld, C., Wishart, D., 2007. *The Psychological and Social Factors Influencing Motorcycle Rider Intentions and Behaviour*. Australian Transport Safety Bureau (ATSB), Canberra.
- Webster, D.C., 1998. *Traffic Calming—Public Attitudes Studies: A Literature Review*. TRL Report No. 311. Transport Research Laboratory, Crowthorne.