iAM
RoadSmart

Evaluation of Advanced Motorcycling

Agilysis

How does the IAM RoadSmart advanced motorcycle test affect safe riding attitudes and behaviour?

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About IAM RoadSmart

Founded in 1956, IAM RoadSmart has an ongoing mission to make better drivers and riders in order to improve road safety, inspire confidence and make driving and riding enjoyable. It does this through a range of courses for all road users, from e-learning to on-road modules and the well-known advanced driving and riding tests. The organisation has more than 85,000 members and campaigns on road safety on their behalf. At any one time there are almost 6,000 drivers and riders actively engaged with IAM RoadSmart's courses, while our Driver Retraining Academy helps over 5,000 drink-drivers a year shorten their bans through education and support programmes.

Executive Summary

For 60 years, IAM RoadSmart has had a very clear focus to improve the standards of driving and riding on the road. In support of this mission they commissioned Agilysis to undertake a piece of research to determine the road safety attitudes and behaviours of IAM RoadSmart motorcycle members. The research would also seek to explore whether there are differences between the types of people who become IAM RoadSmart motorcycle members compared to the general driving population and if this affects attitudes to safety (regardless of training).

The research would explore four key areas to determine the differences between IAM RoadSmart motorcycle members and the wider riding population based on attitudes, self-reported collision involvement, self-reported speed choice and demographic profile.

Research Approach

An in-depth online questionnaire was used to gather information to explore the key topics, with the questionnaire disseminated through IAM RoadSmart to its motorcycling members and through a research partner, DJS Research (DJS Research, 2019), to motorcyclists amongst the general population (comparison).

The questionnaire was designed to answer the research questions and was compiled in consultation with IAM RoadSmart. It incorporated questions on demographics, riding and training history, attitudes and behaviours, a hazard perception and speed choice test and collision involvement.

Quotas were used for both the IAM RoadSmart membership and comparison samples, in order to reflect the IAM RoadSmart motorcycling membership as much as possible.

It was equally important that the general population sample reflected the characteristics of the IAM RoadSmart sample, where possible. Motorcyclists are not homogeneous – they have different motivations for riding, which subsequently lead to different attitudes and behaviours. To attempt to account for these differences, the questionnaire was first sent to IAM RoadSmart motorcyclists (based on the quotas created to reflect the membership) so that some initial analysis could be undertaken to understand the motivations and preferences of the membership riders. A variety of key characteristics were reviewed, based on the wide range of questions asked. Amongst the IAM RoadSmart membership, there were high percentages of respondents with the following characteristics:

- Most frequently riding a motorcycle with a large engine size
- Holding a car licence
- Having over 20 years of motorcycle riding experience

To reflect this, extra quotas, alongside those for age and gender, were added to the general population sample so that it was completed by similar types of rider. The results would have been heavily skewed if the comparison respondents tended to ride small engine motorcycles, were novice riders and/or did not hold a car driving licence.

This report details the findings from analysis of responses from IAM RoadSmart motorcycle members and those of motorcyclists from the general population.

Aim and Objectives

There were four specific objectives of this research, the findings of which provide an interesting insight into the differences between IAM RoadSmart and comparison respondents.

The aims of the research are:

1. *To determine if IAM RoadSmart membership leads to safer attitudes and behaviours amongst motorcyclists*

The research objectives are:

1. *To determine if IAM RoadSmart members score lower on attitudinal scales associated with collision risk, than demographically similar motorcyclists*
2. *To determine if IAM RoadSmart members report fewer injury and damage only collisions than demographically similar motorcyclists*
3. *To determine if there are differences in self-reported speed choice between IAM RoadSmart members and demographically similar motorcyclists*
4. *To determine if, and how, IAM RoadSmart members differ to demographically similar motorcyclists in terms of general attitudes to safety*

Demographics

Whilst the age and gender composition of the two samples reflects the overall membership of IAM RoadSmart, some differences were observed between the two groups. There are more 51 to 70-year olds in the IAM RoadSmart sample, but this group does represent the largest age range for the comparison group. IAM RoadSmart members are less likely to be unemployed or work part-time and more likely to be retired or self-employed. It is not possible to determine how much these differences affect the subsequent conclusions.

There are some major differences in riding behaviour, training history and licensure. IAM RoadSmart respondents are more likely to hold different licence types, have held their motorcycle licence for longer and ride higher mileage. They are more positive about the benefits of training on their riding. They are more likely to ride for holidays and less likely to ride for errands. They are more likely to ride a motorcycle with a larger engine and are less likely to have taken a break from riding. They are more likely to ride all year round but less likely to ride five days a week. These differences could influence their likelihood to join IAM RoadSmart (by having a keener interest in motoring, having greater riding experience and/or higher self-confidence) and furthermore, these traits could affect their riding safety over and above training received via IAM RoadSmart.

Findings

IAM RoadSmart respondents seem to be more aware of the limitations of other road users and as such, are more likely to agree with statements about anticipating the actions of others. They are less likely to agree with statements about alcohol consumption and riding (that it is safe to drink and ride). The differences in attitudes are statistically significant. There are also differences in reported behaviour – IAM RoadSmart respondents report being less hostile to other road users, not speeding in limits under 40mph and not approaching bends too quickly. However, they are more likely to admit to exceeding higher speed limits and undertaking on the inside. The differences in behaviour are not statistically significant. There are also some big differences in general behaviour – IAM RoadSmart respondents are more likely to be involved in their local community and have strong views on roads policing.

These findings relate to objectives 1 and 4, showing that IAM RoadSmart members do score lower on attitudinal scales associated with collision risk and also differ in general attitudes to society.

The collision analysis is interesting. IAM RoadSmart respondents have similar proportions of collision-involvement as the comparison respondents, but they are less likely to think they were at fault. They have lower numbers of collisions per respondent in different age groups and they have a *lower* rate of collision involvement per mile of riding. They are also involved in different types of collision – they are more like to be involved in single vehicle collisions and those where they drop their bike. They are less likely to be involved in right-turn, shunts or loss of control collisions than the comparison respondents. The difference in miles travelled before a collision is statistically significant.

These findings relate to objective 2 and show that whilst IAM RoadSmart members do not report fewer injury and damage only collisions per respondent, they do have a <u>lower rate</u> of collision involvement once their higher mileage is accounted for.

IAM RoadSmart respondents selected higher speeds for both the hazard and control scenes. Both groups of respondents were sensitive to the presence of hazards and selected lower speeds.

These findings related to objective 3; this study found that IAM RoadSmart members tended to select higher speeds than other motorcyclists, and this difference is statistically significant.

Conclusions

This study therefore concludes that, compared to demographically similar motorcyclists, IAM RoadSmart respondents do demonstrate more positive attitudes towards behaviours related to collision risk and report fewer collisions, once mileage is accounted for. However, IAM RoadSmart respondents tend to select a higher speed choice than similar motorcyclists. This could be due to increased confidence amongst IAM RoadSmart members. Being a confident rider is not necessarily a bad thing, especially when taken in conjunction with the findings of a lower collision rate per miles ridden, the different types of collision experienced and the statistically significant better attitudes towards safety. IAM RoadSmart could explore ways to ensure that membership does not convert confidence into over-confidence.

There are some differences in attitudes and behaviour between those IAM RoadSmart respondents who completed their test more recently, compared to longer ago, and refresher training and a focus on bend approach speeds could be beneficial. However, these results are not statistically significant.

It should be remembered that it is not possible to determine if undertaking IAM RoadSmart training is responsible for these differences; characteristics which attracted these motorcyclists to join IAM RoadSmart could be influencing their attitudes to safety and riding in general. This could only be determined by comparing IAM RoadSmart members *before* they actually join the organisation to understand if they have a propensity to think and act in certain ways. In future research, to answer this question, a pre-and-post evaluation could be conducted, to understand the attitudes, behaviours and interests of IAM RoadSmart members before they have joined the organisation.

Chapter 1 Introduction

Agilysis was commissioned by IAM RoadSmart in June 2018 to undertake research, focused on providing an understanding of how IAM RoadSmart training might affect the attitudes, behaviour and knowledge of its motorcyclist members.

Motorcyclists have different motivations for riding, compared to car drivers' motivations for driving, and they also have different reasons for undertaking post-test training as well as holding different attitudes to safety and risk. This study was designed to unpick some of the motivations and attitudes of IAM RoadSmart motorcyclists, compared to similar motorcyclists from the general public.

The following sets out the aim and objectives of the research.

The stated aim of the IAM RoadSmart is: *To improve the standards of driving on the road*

The aims of the research are:

1. *To determine if IAM RoadSmart membership leads to safer attitudes and behaviours amongst motorcyclists*

The research objectives are:

1. *To determine if IAM RoadSmart members score lower on attitudinal scales associated with collision risk, than demographically similar motorcyclists*
2. *To determine if IAM RoadSmart members report fewer injury and damage only collisions than demographically similar motorcyclists*
3. *To determine if there are differences in self-reported speed choice between IAM RoadSmart members and demographically similar motorcyclists*
4. *To determine if, and how, IAM RoadSmart members differ to demographically similar motorcyclists in terms of general attitudes to safety*

An in-depth online questionnaire was used to gather information to meet these research objectives, with the questionnaire disseminated through IAM RoadSmart to its motorcycling members and through a research partner, DJS Research (DJS Research, 2019), to motorcyclists amongst the general population (comparison).

The questionnaire was designed to answer the research questions and was compiled in consultation with IAM RoadSmart. It incorporated the following:

- Demographic information (age, gender, employment status, licences held)
- Previous training and assessment questions (BikeSafe attendance, all post-test training undertaken, perceptions of effect on training on their riding and driving)
- Riding patterns and motivations (motorcycle ownership by size and type, frequency of different journey types, mileage, riding experience)
- Riding attitudes (established questionnaires on attitudes to protective equipment, awareness of their vulnerability and the behaviour of other road users (Fosdick, 2015))
- Riding behaviours (established questionnaires on self-reported behaviours (Elliott, Baughan, & Sexton, 2007))
- Hazard perception and speed choice test (based on similar hazard perception tests (Helman, Palmer, Delmonte, & Buttress, 2012) (McKenna, Horswill, & Alexander, 2006))

- Collision involvement (including details of collision circumstances to understand if types of collision differ between those have undertaken training and general riders)

Quotas were used for both the IAM RoadSmart membership and comparison samples, in order to reflect the IAM RoadSmart motorcycling membership as much as possible. It was important for the samples to match the IAM RoadSmart membership – 95% of IAM RoadSmart motorcyclists are male and 70% are aged between 51 and 70 years old so large deviations would make the results unrepresentative.

It was equally important that the general population sample reflected the characteristics of the IAM RoadSmart sample, where possible. Motorcyclists are not homogeneous – they have different motivations for riding, which subsequently lead to different attitudes and behaviours. In 2009, qualitative and quantitative research was conducted which culminated in the creation of seven 'segments' of motorcyclists, summarising their characteristics, motivations, attitudes and behaviours (Christmas, Young, Cookson, & Cuerden, 2009). These segments range from 'Riding Disciples' who are passionate riders, who find riding to be a way of life and have a strong relationship with both the bike and a wider group of riders; through to 'Car Rejectors' who don't have any great passion for motorcycling but are using motorcycles to avoid traffic jams, parking tickets and fuel costs (Christmas, Young, Cookson, & Cuerden, 2009). The frequency of riding, type of riding and type of motorcycle differ across the segments and such differences needed to be acknowledged in this research.

To attempt to account for this, the questionnaire was first sent to IAM RoadSmart motorcyclists (based on the quotas created to reflect the membership) so that some initial analysis could be undertaken to understand the motivations and preferences of the membership riders. A variety of key characteristics were reviewed, including employment status; types of licences held; motorcycle engine size; type of motorcycle; years of motorcycling experience; season of riding; number of days a week of riding; riding journey purpose; and motorcycle mileage. Amongst the IAM RoadSmart membership, there were high percentages of respondents with the following characteristics:

- Most frequently riding a motorcycle with a large engine size
- Holding a car licence
- Having over 20 years of motorcycle riding experience

To reflect this, extra quotas, alongside those for age and gender, were added to the general population sample so that it was completed by similar types of rider. The results would have been heavily skewed if the comparison respondents tended to ride small engine motorcycles, were novice riders and/or did not hold a car driving licence. Comparison riders were asked if they were a member of IAM RoadSmart, RoSPA or any other advanced motoring organisation and if they answered yes, the questionnaire was terminated.

719 IAM RoadSmart motorcyclists responded to the questionnaire before it was closed. The questionnaire was then disseminated to the general public, via our research partner DJS. This achieved responses from 664 motorcyclists who were not IAM RoadSmart members, using the additional quotas to reflect the types of respondents amongst the IAM RoadSmart membership. For this comparison group, there were some cohorts of respondents who were noticeably underrepresented, in particular those riding large engine motorcycles (over 700cc). Having similar proportions of large engine motorcycles in the two samples was important for this study as collision types and motivations differ by engine size. In one study of police-reported motorcycle collisions (Clarke, Ward, Bartle, & Truman, 2004), whilst there were similar proportions of right of way violation collisions for small and

large engine motorcycles, it was found that those on larger motorcycles were more likely to have collisions on bends or filtering or overtaking collisions. In the segmentation, 'Riding Hobbyists', 'Performance Disciples' and 'Riding Disciples' were more likely to have large engine motorcycles whilst 'Car Aspirants' and 'Car Rejectors' are more likely to have smaller machines (Christmas, Young, Cookson, & Cuerden, 2009). Having samples with different engine sizes might have affected results.

To account for this, the Synthetic Minority Over-Sampling Technique (SMOTE (Chawla, Bowyer, Hall, & Kegelmeyer, 2002)) algorithm was used to increase the sample size of respondents with large engine motorcycles. This is achieved by identifying pairs of questionnaire responses that are sufficiently similar, and interpolating a new, artificial response that is somewhere in between the two. This process is then repeated until the number of responses, real or artificial, exceeds the desired thresholds. SMOTE has been a widely used over-sampling technique for dealing with unbalanced datasets since 2002, providing an alternative to under-sampling or weighting outputs. The result is an additional sample of respondents that are representative of, but not identical to, those cohorts that are under-represented, helping to reduce the bias towards those cohorts that are over-represented. This resulted in a total comparison sample size of 1,228 respondents.

Chapter 2 In-depth questionnaire

This study is based on the results of an in-depth questionnaire, disseminated to IAM RoadSmart motorcycle members and to motorcyclists in the general public, who represent a comparison group.

As detailed in the Introduction, a proportionate stratified sampling technique was to ensure that the two sample groups (members and comparison) reflected the membership composition. The SMOTE technique was then used as an over-sampling technique to deal with the under-represented cohorts, especially related to engine size. This resulted in a much larger comparison sample.

There were some slight differences between the IAM RoadSmart motorcycle membership and the two sets of respondents, in terms of age and gender. There were lower percentages of male respondents aged between 31 and 50 years in two samples of respondents, compared to the IAM RoadSmart membership. There were also fewer males aged 51 to 70 years in the comparison sample. Conversely, there were slightly higher percentages of male respondents aged over 70 years in the two samples of respondents and amongst females aged 31 to 50 years and 51 to 70 years in the comparison sample. However, these percentage differences were quite small and overall, the two respondent samples are similar to the age and gender composition of the IAM RoadSmart motorcycle membership.

Table 1 - Sample quotas

Group	IAM Membership	IAM Sample		Comparison Sample	
		Number	Percentage	Number	Sample
Male 17 to 30 years	0.3%	1	0.1%	7	0.6%
Male 31 to 40 years	3.1%	14	1.9%	36	2.9%
Male 41 to 50 years	14.1%	75	10.4%	137	11.2%
Male 51 to 60 years	37.7%	244	33.9%	424	34.5%
Male 61 to 70 years	29.4%	268	37.3%	330	26.9%
Male Over 70 years	10.4%	84	11.7%	156	12.7%
Female 17 to 30 years	0.1%	0	0%	15	1.2%
Female 31 to 40 years	0.3%	1	0.1%	22	1.8%
Female 41 to 50 years	1.3%	9	1.3%	31	2.5%
Female 51 to 60 years	2.4%	16	2.2%	44	3.6%
Female 61 to 70 years	0.9%	5	0.7%	14	1.1%
Female Over 70 years	0.1%	2	0.3%	12	1%
Total		719		1,228	

Demographics

As described above, the age and gender composition of the IAM RoadSmart and comparison motorcyclist samples were based on quotas to reflect the overall motorcycling membership of IAM RoadSmart. As can be seen in Figure 1, the percentages of the two samples are very similar to the age and gender composition of IAM RoadSmart overall. This is important to reflect the views and behaviours of the wider membership and to ensure the samples are as similar to each other as possible. The main difference between the two samples is that there is a larger percentage of 51 to 70-year-old males amongst the IAM RoadSmart respondents, although this group also represents the majority of comparison respondents.
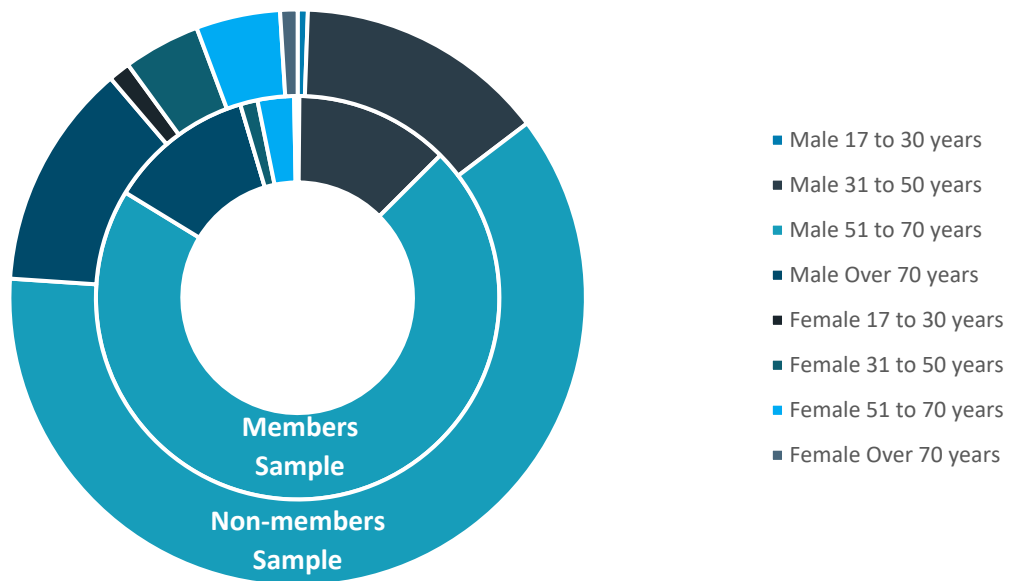
Figure 1 - Age and gender composition of sample

- Male 17 to 30 years
- Male 31 to 50 years
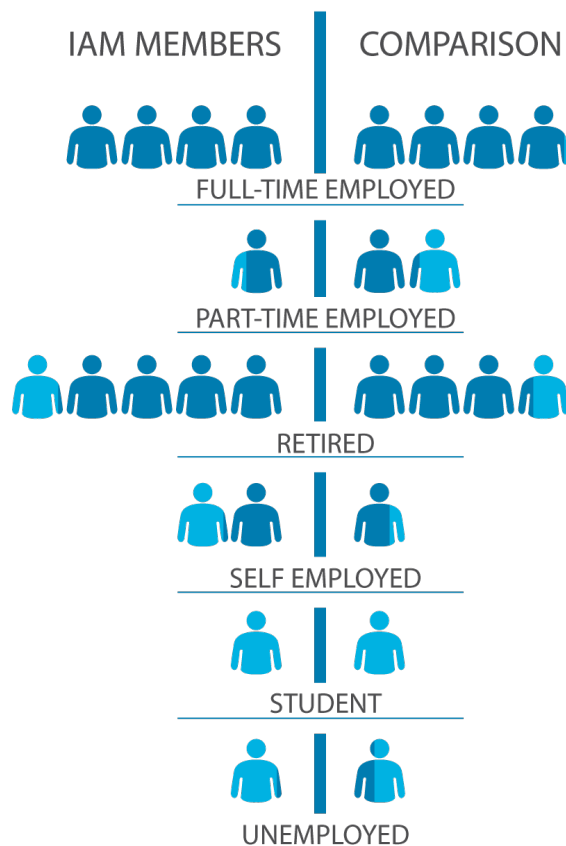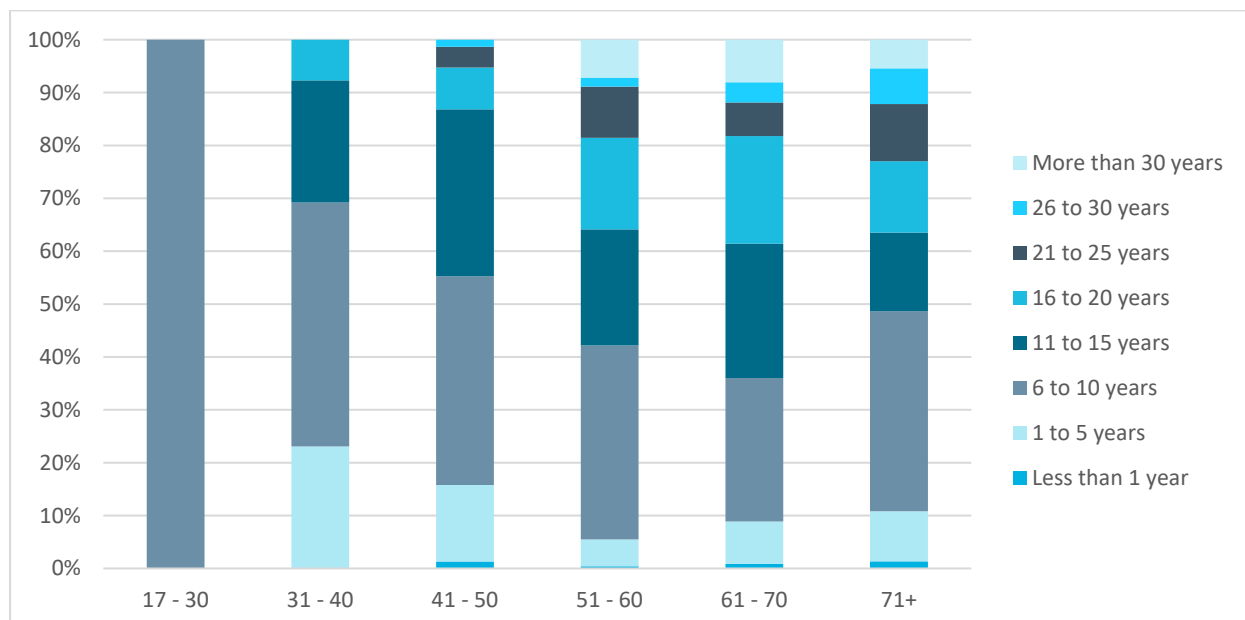- Male 51 to 70 years
- Male Over 70 years
- Female 17 to 30 years
- Female 31 to 50 years
- Female 51 to 70 years
- Female Over 70 years

Members Sample

Non-members Sample

Figure 2 - Employment status of respondents

IAM MEMBERS | COMPARISON

FULL-TIME EMPLOYED

PART-TIME EMPLOYED

RETIRED

SELF EMPLOYED

STUDENT

UNEMPLOYED

Figure 2 shows the employment statuses of the two samples of respondents, with one whole person representing 10%. There are similar percentages of respondents who are in full-time employment (about 40%). The differences lie with the other categories. The comparison sample contains more respondents who are part-time employed (12% for comparison and 7% for IAM RoadSmart) or unemployed (6% for comparison and 1% for IAM RoadSmart), whilst the IAM RoadSmart sample has higher percentages of respondents who are retired (41% for IAM RoadSmart and 37% for comparison) or self-employed (11% for IAM RoadSmart and 7% for comparison).

Figure 3 shows the time since the IAM RoadSmart respondents had undertaken their IAM RoadSmart motorcycle test. Regardless of age, the largest percentages of respondents had taken their test between six and 15 years ago. Unsurprisingly, the youngest respondents have passed their IAM RoadSmart test most recently, although all of them did so between six and ten years ago, so not in the immediate past. For those aged over 50 years old, the time since their motorcycle test was more distributed over the time bands.

Figure 3 - Time since passed IAM RoadSmart test

Whilst the age and gender composition of the two samples reflects the overall membership of IAM RoadSmart, some differences were observed between the two groups. There are more 51 to 70-year olds in the IAM RoadSmart sample, but this group does represent the largest age range for the comparison group. IAM RoadSmart members are less likely to be unemployed or work part-time and more likely to be retired or self-employed.


Driving and Riding information

Information about respondents' driving and riding experience was obtained from the questionnaire. Figure 4 provides the percentage of IAM RoadSmart motorcycle respondents holding each type of vehicle licence, indexed against the percentages of the comparison riders with each type of licence.

When the percentages are the same for both groups, an index of 100 would be displayed. Indices over 100 show that a higher proportion of IAM RoadSmart respondents hold that type of licence, compared to the comparison group.

The chart shows that the two samples had very similar proportions of respondents who hold car and goods vehicle (under 7.5 tonnes) licences. There are differences in other licence holding. Whilst small percentages of IAM RoadSmart motorcyclists hold these extra licences, they were over two times more likely to hold a heavy goods licence; more than two and half times more likely to have a bus licence; and one and a third times more likely to have a minibus licence. Being IAM RoadSmart members suggests an interest in driving and riding and so it is not surprising that a wider range of licences are held. However, the proportions holding these other licence types are relatively small, although they could influence their attitudes to safety and other road users.

Figure 4 - Licences held by IAM RoadSmart respondents, indexed against the comparison group
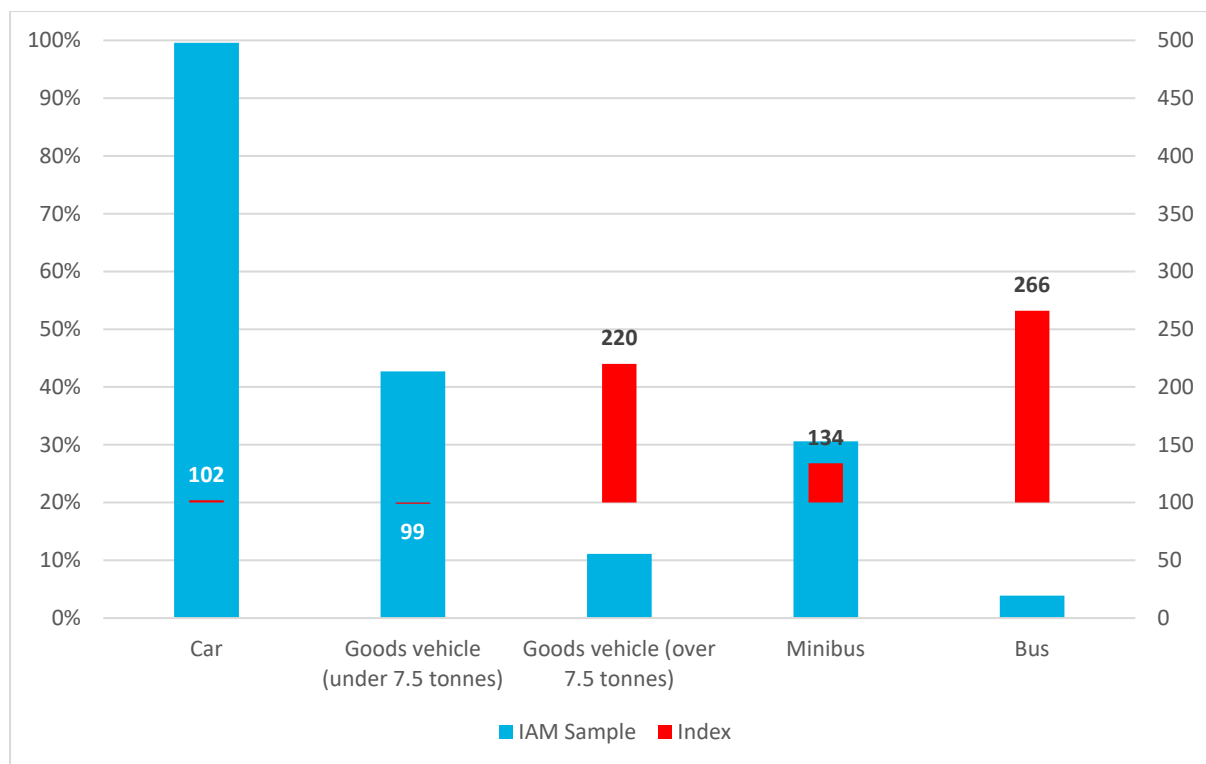
Respondents were asked which post-test assessments or training they have undertaken. Figure 5 shows the results for the IAM RoadSmart sample. In addition to the IAM RoadSmart motorcycle test, 26% had undertaken the IAM RoadSmart car test; 15% had completed RoSPA advanced motorcycle training; 37% had completed a BikeSafe assessment; and 33% had undertaken some other form of training, including police advanced training, DIA Diamond, i2i training and BMW off-road school.

Comparison respondents were asked the same question, but the survey was closed if they indicated that they had completed IAM RoadSmart or RoSPA car and motorcycle training. It means that comparison respondents were able to complete the Enhanced Rider Scheme (ERS), a BikeSafe assessment or other training but were not members of the two major advanced motoring organisations. Of the comparison respondents, 78% had not undertaken any advanced training or assessment; 6% of the comparison respondents had completed the ERS, 13% had done a BikeSafe assessment and 6% had done some other form of training.

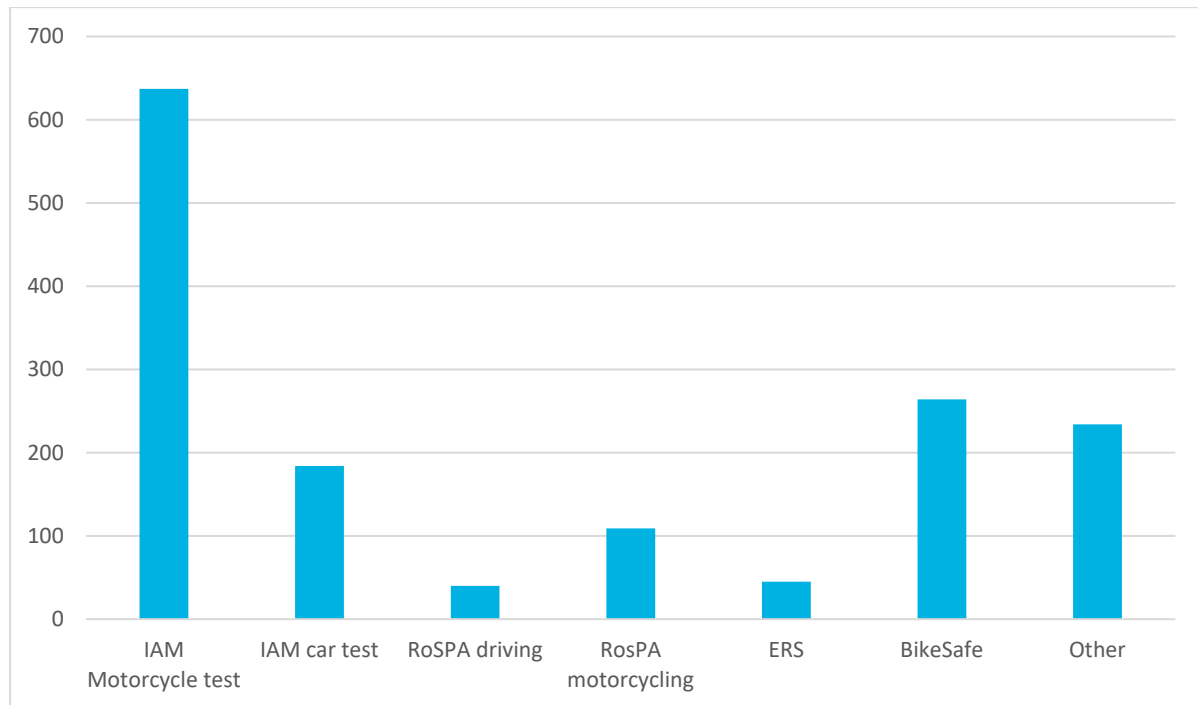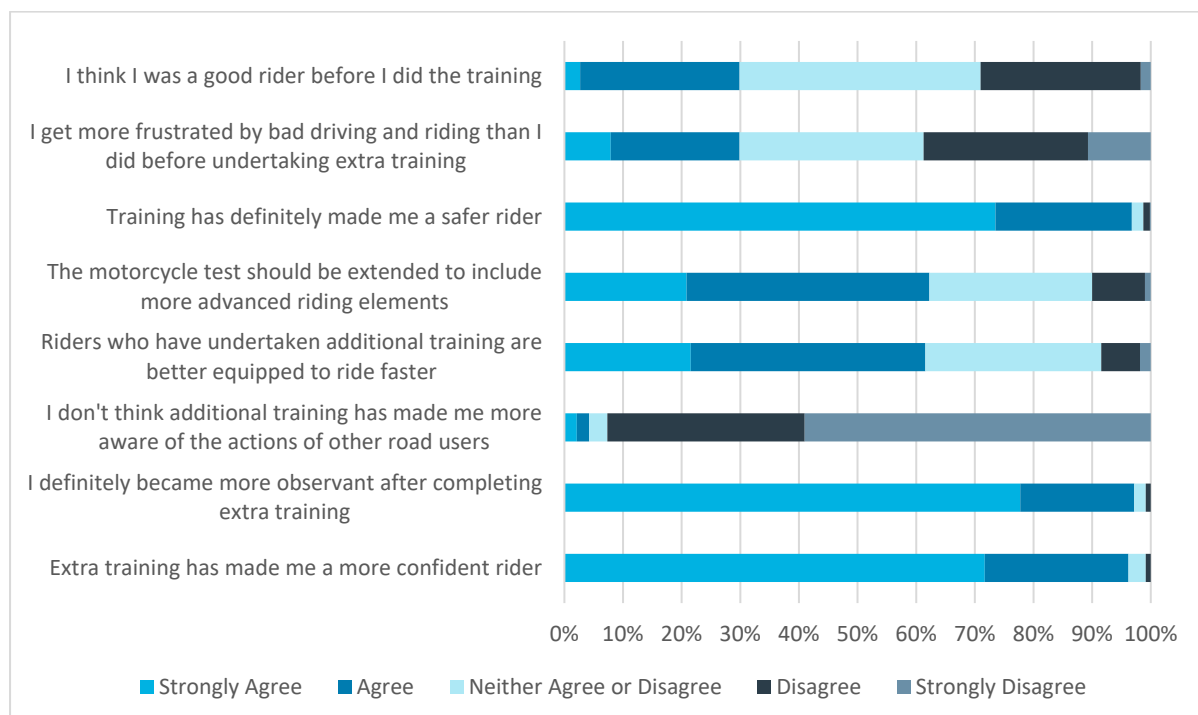*Figure 5 - Post-test assessments or training undertaken by IAM RoadSmart respondents*

Figure 6 - IAM RoadSmart respondents' agreement with statements about additional training

Those who had undertaken training were asked their levels of agreement with some statements about training. The responses are shown in Figure 6 for IAM RoadSmart respondents and Figure 7 for the comparison respondents.

There are some key differences in the levels of agreement between the IAM RoadSmart respondents and those who have completed ERS, BikeSafe or other training. Whilst overall there is high levels of

agreement from both groups about training, the IAM RoadSmart respondents are more positive. They are twice as likely to 'strongly agree' with the following statements than the comparison respondents:

- Extra training has made me a more confident rider
- I definitely became more observant after completing extra training
- Riders who have undertaken additional training are better equipped to ride faster
- Training has definitely made me a safer rider

There is very little difference in agreement between the two groups about extending the motorcycle test to include more advanced riding elements (21% of IAM RoadSmart and 20% of comparison respondents strongly agreeing).

IAM RoadSmart respondents were more than twice as likely to 'strongly disagree' with the statement "I don't think additional training has made me more aware of the actions of other road users" and were much less likely to agree with "I get more frustrated by bad driving and riding than I did before undertaking extra training" (8% of IAM RoadSmart and 20% of comparison respondents 'strongly agreeing'). Lastly, only 3% of IAM RoadSmart and 8% of comparison respondents thought that they were good riders before the training.

Figure 7 - Comparison respondents' agreement with statements about additional training
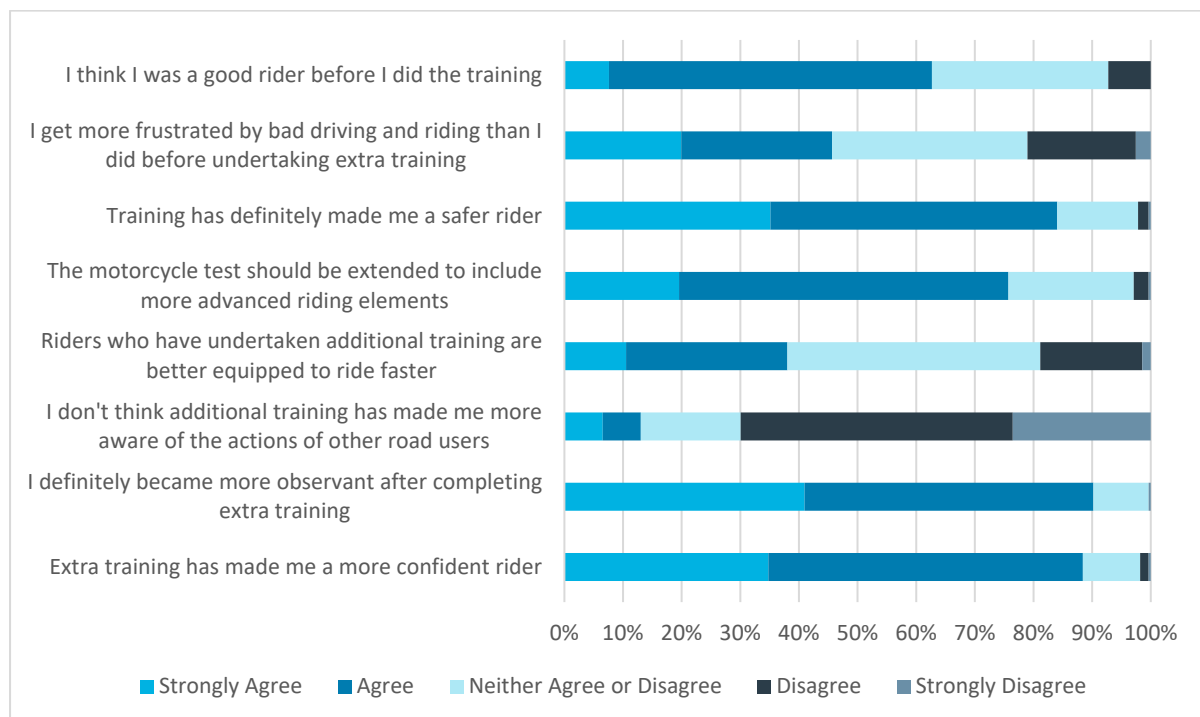

Figure 8 shows the number of years that the respondents have held their motorcycle licence. For both groups, the largest percentage of respondents were those that had held their licence for more than 30 years (40% of IAM RoadSmart and 49% of comparison respondents). There were larger percentages of IAM RoadSmart respondents who had held their licence for 21 to 30 years and 11 to 20 years, whilst there were more comparison respondents who had held their licence for 10 years or less.

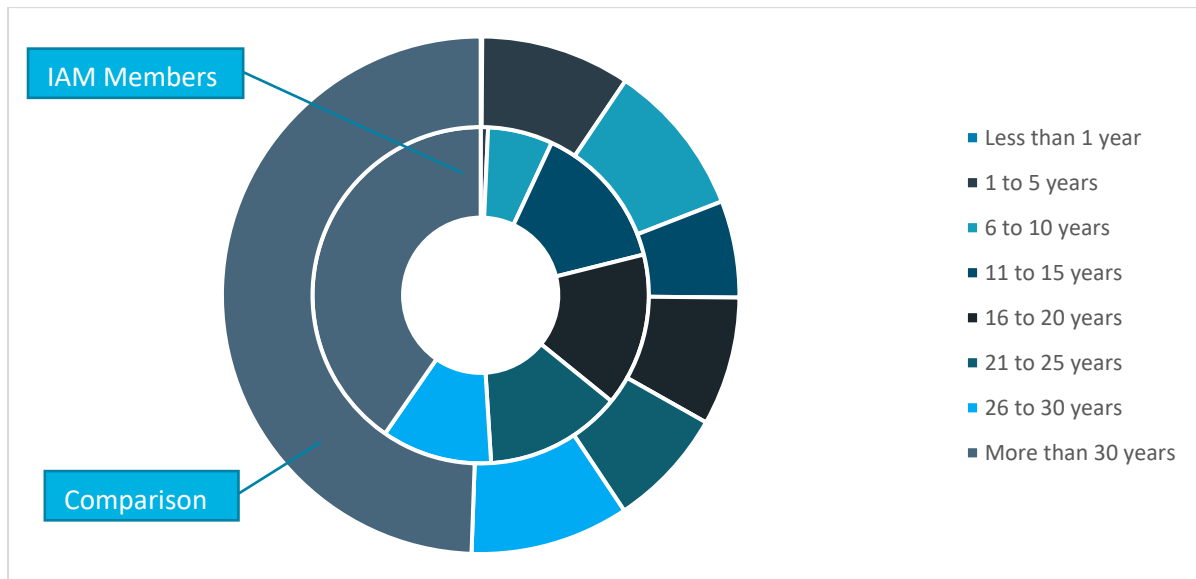*Figure 8 - Years of holding licence*

Figure 9 shows the average annual motorcycle mileage of the two groups of respondents. For the comparison respondents, 84% had annual average motorcycle mileage of less than 6,000 miles compared to 61% of IAM RoadSmart respondents. IAM RoadSmart respondents were more likely to report the highest mileage bands.

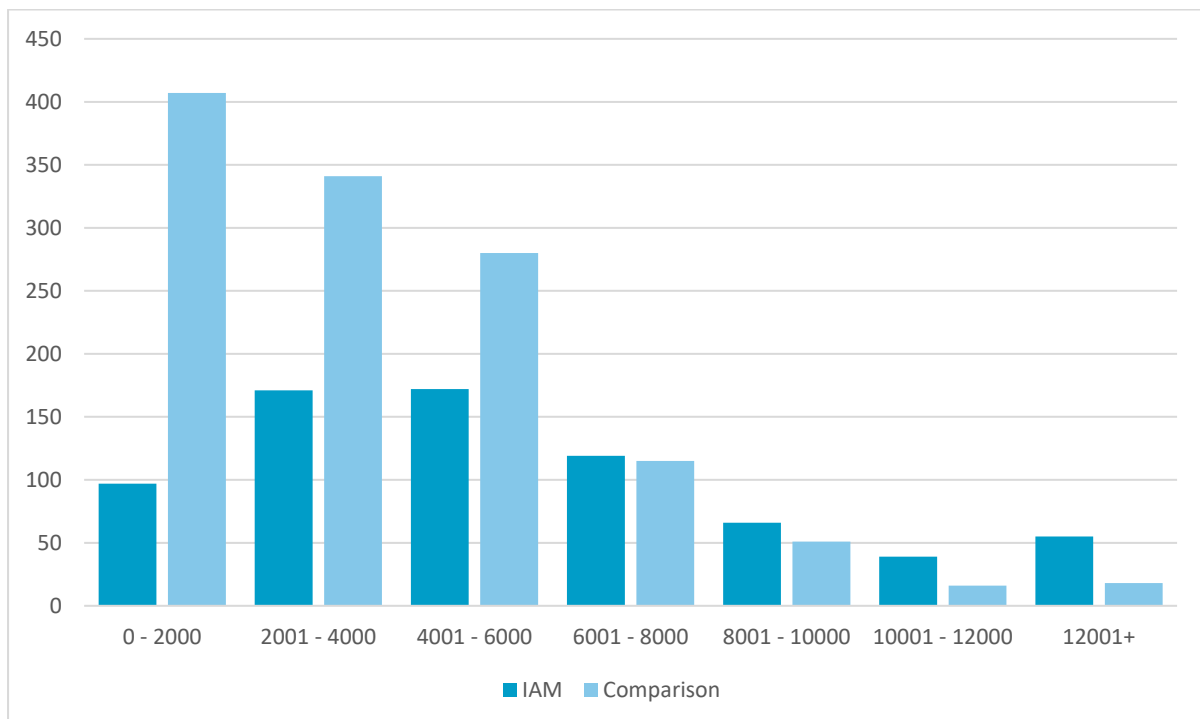*Figure 9 - Annual average mileage of respondents*

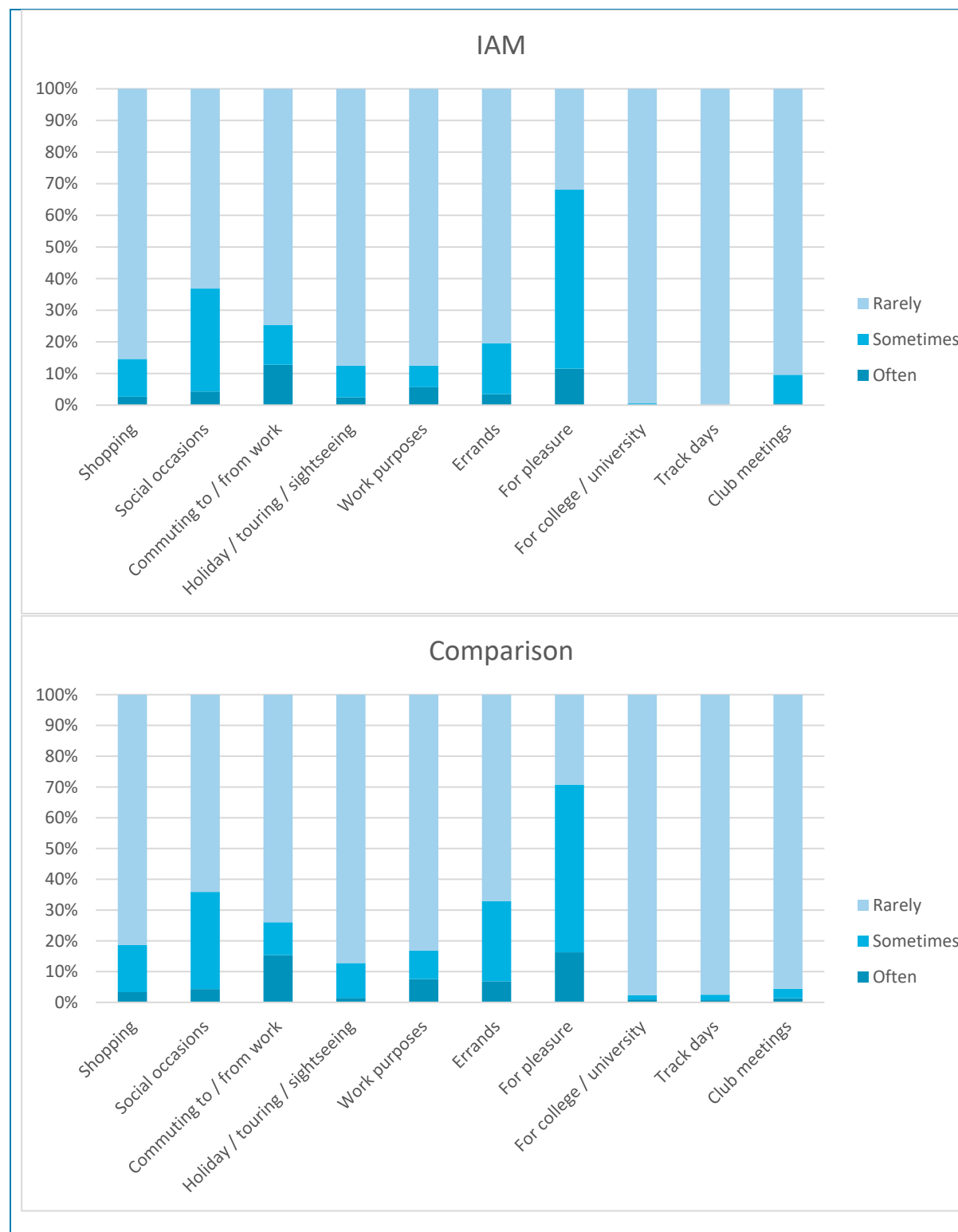*Figure 10 - Frequency of different journey purposes*

Figure 10 shows the frequency of different journey purposes for IAM RoadSmart and comparison respondents. 'Often' is where the respondent indicated that they engage in that activity when motorcycling 'every day', 'every weekday' or 'most days'. 'Sometimes' is where the respondents ride

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for that journey purpose '2 - 3 times a week', 'once a week' or 'weekends only'. 'Rarely' is when they ride for that purpose 'every couple of weeks', 'once a month', 'less often' or 'never'.

The journey purpose frequencies were relatively similar between the two groups of respondents. There were some differences with a higher percentage of IAM RoadSmart respondents more likely to indicate that they 'often' motorcycled for 'holidays/touring/sightseeing', whilst there were smaller percentages who 'often' motorcycled for 'errands' or for 'club meetings' (although only 1.4% of comparison respondents recorded often motorcycling for club meetings).

Figure 11 shows the engine sizes of the motorcycles ridden most often by the respondents. As detailed in the Introduction, the Synthetic Minority Over-Sampling Technique (SMOTE) was used to artificially increase the comparison sample to account for the lower numbers of respondents who rode a large engine motorcycle. As can be seen from the chart, even after this increase in the sample, there is a higher percentage of IAM RoadSmart respondents who ride larger motorcycles – 87% of them, compared to 57% of the comparison respondents.

Figure 11 - Engine sizes of motorcycles ridden most often
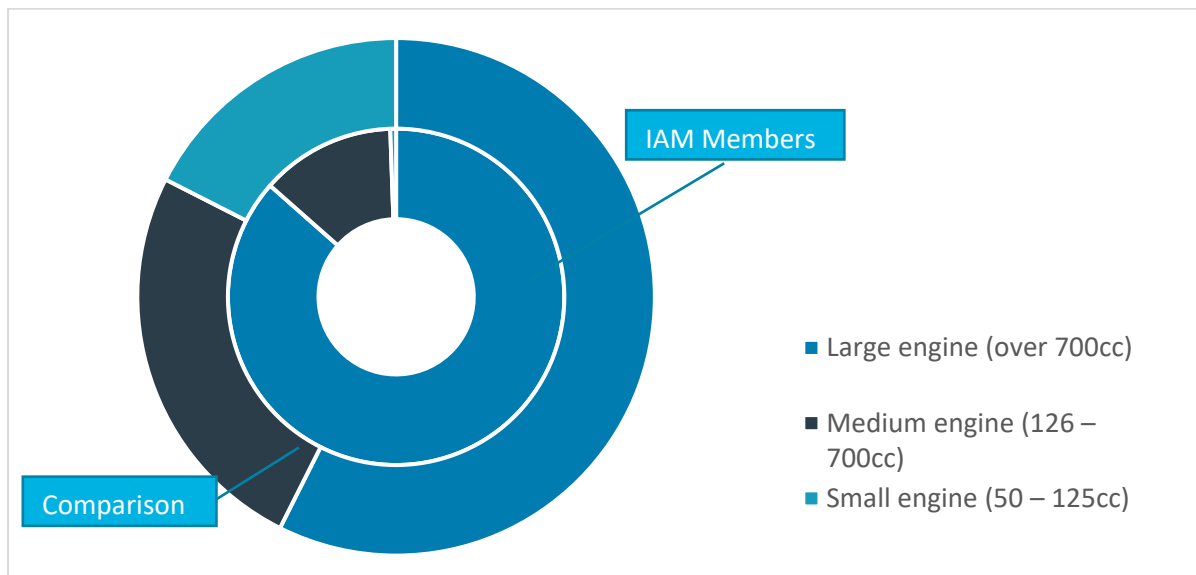

Figure 12 shows the types of motorcycle most often ridden. There are several differences between the two samples: IAM RoadSmart respondents are significantly more likely to ride an 'adventure' or 'sport/tour' motorcycle, whereas the comparison respondents have higher percentages of riders on 'custom', 'scooter', 'supersport' and 'moped' machines.

When asked if the respondent had ever taken a break from riding of more than one year, 50% of IAM RoadSmart respondents said 'yes', compared to 63% of comparison respondents.

Figure 12 - Types of motorcycle most often ridden
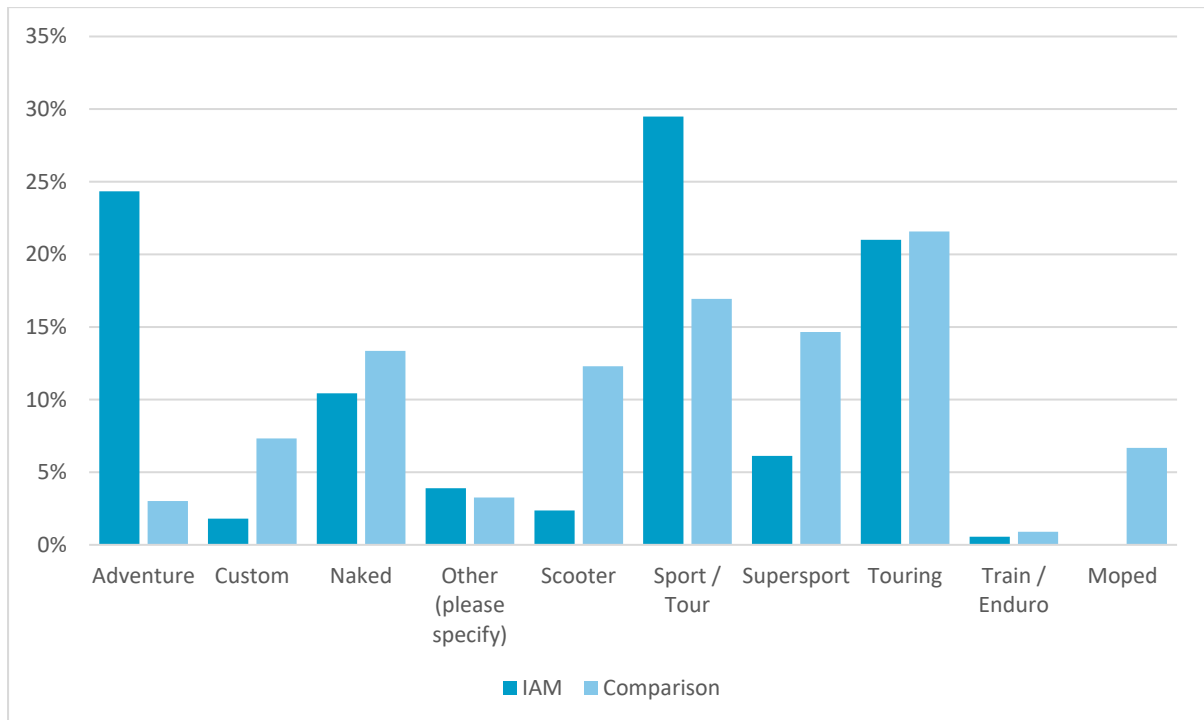
Two-thirds of IAM RoadSmart respondents ride all year round, as shown in Figure 13, whilst the comparison respondents are evenly split with a third riding all year round, a third riding in Spring, Summer and Autumn, and a further third only riding in the Summer.

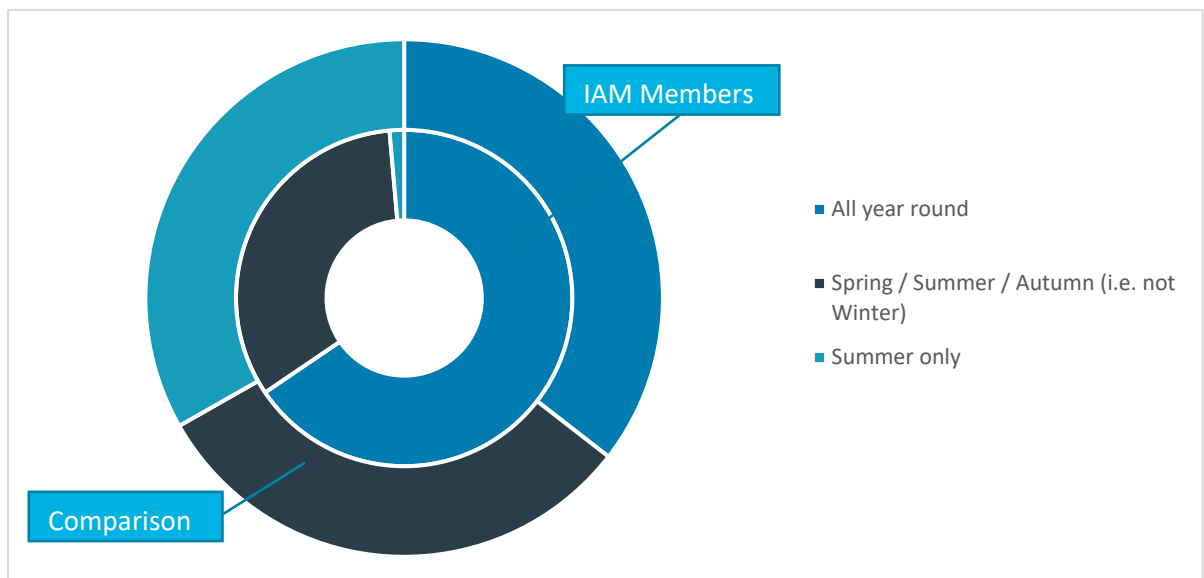*Figure 13 - Season most often ride in*

Figure 14 - Average number of days of riding per week in the season they most often ride in
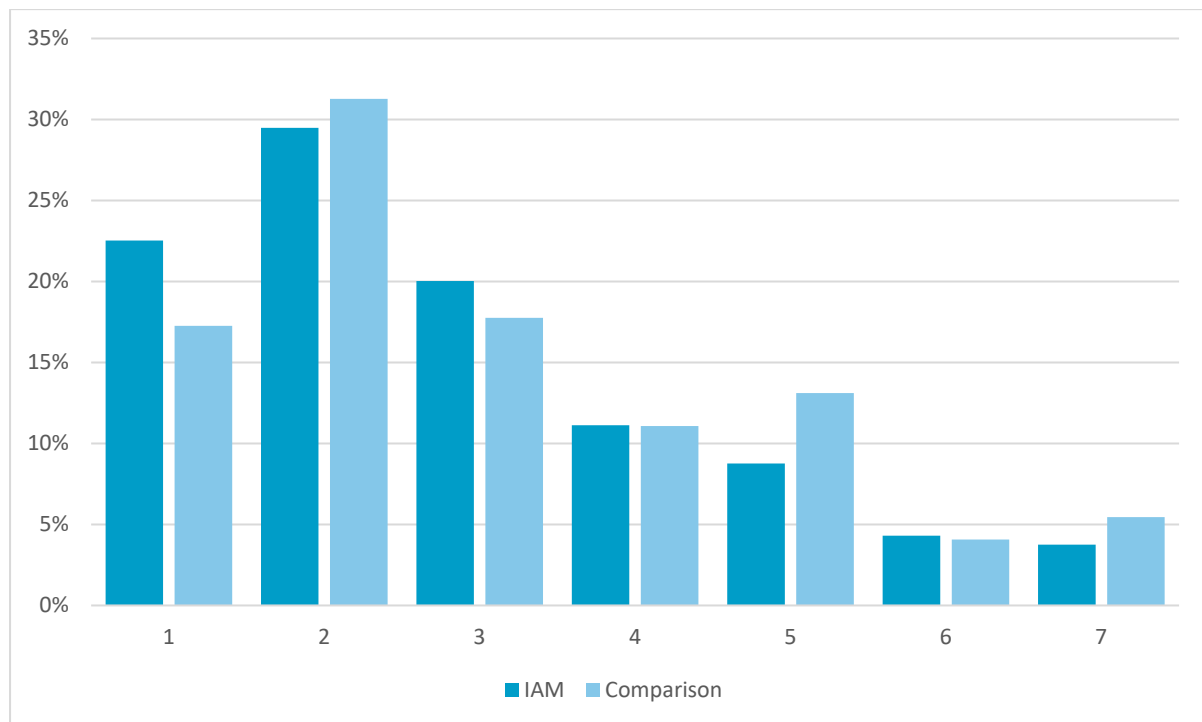

Figure 14 shows the average number of riding days per week in the season the respondents ride most often in. The percentages are similar, although there is a higher percentage of IAM RoadSmart respondents stating they ride one day a week in that season, and a lower percentage saying they ride five days a week. This could reflect the journey purpose findings, where higher percentages of the comparison respondents were riding on errands or for work purposes.

There are some major differences in riding behaviour, training history and licensure. IAM RoadSmart respondents are more likely to hold different licence types, have held their motorcycle licence for longer and ride higher mileage. They are more positive about the benefits of training on their riding. However, the two groups were comparing different types of course or assessment.

They are more likely to ride for holidays and less likely to ride for errands. They are more likely to ride a motorcycle with a larger engine and are less likely to have taken a break from riding. They are more likely to ride all year round but less likely to ride five days a week.

These differences could influence their likelihood to join IAM RoadSmart (by having a keener interest in motoring, having greater riding experience and/or higher self-confidence) and furthermore, these traits could affect their riding safety over and above training received via IAM RoadSmart.

Chapter 3 Attitudes and Behaviour

When designing campaigns to change behaviour to improve road safety, evidence (Helman, Ward, Christie, & McKenna, 2011) points to the need to focus on four key areas:

> • *Drivers' attitudes to risky driving behaviour i.e. whether they view it as positive or negative.*

> • *Drivers' attitudes towards the penalties and enforcement of risky behaviour i.e. whether they view it as positive or negative.*

> • *Propensity to violate driving regulations.*

> • *Perception of the risk of being caught or having an accident.*

Helman et al explain that attitudes represent whether a person 'favours or disfavours' something and may be able to predict the way that person will behave. If someone strongly disfavours a behaviour (such as drinking and driving) they are less likely to engage in drinking and driving.

> *There is some evidence of a relationship between attitudes, self-reported driving behaviour and collision involvement. For example, research among older drivers (Nabi et al.,2007) showed that attitudes to rule violations such as exceeding speed limits in rural roads, driving whilst tired, and risky use of mobile phones were predictors of road traffic collisions and significantly correlated with negative attitudes to speed limits, enforcement and alcohol restrictions.*

Attitudes

After understanding the demographic backgrounds and riding experience of respondents, the survey then explored the respondents' attitudes towards different riding behaviours. Table 2 shows the levels of agreement with a range of statements designed for other evaluations (Fosdick, 2015).

There are several statements where IAM RoadSmart respondents have higher levels of agreement than the comparison respondents. These are about being aware of the limitations of other motorists (such as blind spots) and anticipating their actions. The IAM RoadSmart respondents are also much less likely to agree that people can ride safely after drinking alcohol and that the alcohol limit is too high. These statements suggest that IAM RoadSmart respondents are focused on the skills of themselves and others and are aware of how impairments, such as alcohol, can affect their safety. Awareness of the actions of others indicate that IAM RoadSmart riders are aware of their vulnerability as motorcyclists and try to mitigate any risk by accounting for blind spots and driver perception.

There was one statement where IAM RoadSmart respondents held a view that was not as positive as the comparison respondents. IAm RoadSmart respondents were less likely to think that motorcyclists should slow down around junctions to help drivers judge their speed. It is not possible to determine why they do not hold this view: it could be that they feel that drivers should upskill themselves (as they have done as motorcyclists) or it might be that they are confident that they can avoid a risky situation at junctions, without needing to adapt their riding.

Statistical tests were applied to all responses (shown in Table 5) and it was found that the differences between the IAM RoadSmart and comparison respondents were statistically significant.

Table 2 - Agreement with various statements

	IAM	Comparison
I ride on the assumption that another road user hasn't seen me	96.9%	89.6%
Some motorcyclists do not always take account of the fact that drivers have blind spots	96.7%	92.9%
I feel that drivers find it hard to judge how fast a motorcycle is going	90.3%	88.8%
Some people can ride perfectly safely after drinking three or four pints	0.7%	3.5%
I am aware that drivers often find it hard to see motorcyclists	94.2%	88.9%
Motorcyclists should slow down around junctions to help drivers judge their speed	59.7%	82.8%
The amount of alcohol you're allowed to drink before riding is too high	48.5%	56.5%
I feel that drivers should be more aware of their blind spots	96%	94.2%
Some motorcyclists ride too fast on the road	92.5%	93.2%
Some motorcyclists take too many risks	94.6%	93.8%
I would still wear my helmet after dropping it on a hard surface	12.5%	18%
I try to anticipate the actions of other road users	99.4%	95.4%

Rider Behaviour

Respondents were also asked how frequently they engaged in different behaviours whilst motorcycling (based on the Rider Behaviour Questionnaire (Elliott, Baughan, & Sexton, 2007)). They were reminded that their answers were confidential and that individual responses would not be analysed. Table 3 shows the percentage of both groups of respondents who stated they never or hardly ever engaged in the behaviours. IAM RoadSmart respondents reported never or hardly ever riding above urban speed limits; approaching bends too fast; and behaving aggressively towards other road users by indicating hostility or giving chase. Comparison respondents were more likely than IAM RoadSmart to say that they never exceeded non-urban speed limits; ride when tired; or became impatient with a slow vehicle and overtake on the inside. Overall, aside from exceeding the 50, 60 or 70mph speed limits, there are high percentages of both groups of respondents who reported never or hardly ever engaging in the behaviours. However, there are some differences in the behaviours reported as engaged in, although statistical testing found that these differences were not statistically significant.

Table 3 - Rider Behaviour Questionnaire - 'Never/Hardly Ever'

How often do you do each of the following on a motorcycle?	IAM	Comparison
Ride above the limit in areas with speed limits of 20, 30 or 40mph	68.6%	59%
Ride above the limit in areas with speed limits of 50, 60 or 70mph	21.6%	50.7%
Approach bends too fast	73.6%	69.8%
Overtake on double white lines	94.9%	91.3%
Use the cycle area at traffic lights (Advanced stopping line)	78.3%	75.7%
Ride when tired	70.7%	76.5%
Ride especially close to the vehicle in front as a signal to its driver to go faster or get out of the way	93.5%	93.2%
Cross a junction knowing that the traffic lights have already changed to red	98.5%	95.8%
Disregard the speed limits very late at night or very early in the morning	74.7%	74.9%
Become impatient with a slow vehicle in the outer lane and overtake on the inside	64.8%	80.9%
Have an aversion to a particular class of road user and indicate your hostility by whatever means you can	97.8%	88.8%
Get involved in unofficial 'races' with other road users	99%	95.1%
Angered by another road users behaviour, you give chase with the intention of giving him / her a piece of your mind	98.2%	93.6%

The attitude and behaviour statements were analysed by how long ago the IAM RoadSmart respondents undertook their IAM training. There were some differences based on when they completed their IAM RoadSmart test. Agreement with the statement 'motorcyclists should slow down around junctions to help drivers judge their speed' was at 63% for those who had completed their test less than 10 years ago; however, this reduced to 56% for those who completed their test over 20 years ago. Similarly, 51% of those who had completed their IAM RoadSmart test less than 10 years ago agreed that 'the amount of alcohol you're allowed to drink before riding is too high', whilst only 46% of those who completed their test more than 20 years ago felt the same. There were also differences in agreement with 'some motorcyclists ride too fast on the road', with 95% agreement amongst those who completed their test less than 10 years ago, compared to 90% amongst those who had completed more than 20 years ago.

There are also some reported behavioural differences based on when the respondents did their IAM RoadSmart test. Sixty-four percent of those who did their test less than 10 years ago reported never or hardly ever approaching bends too fast compared with 79% of those who completed more than 20 years ago. Those who did their test more than 20 years ago were less likely to ride tired (75% never or hardly ever, compared to 70% who did their test less than 10 years ago). Lastly, 91% of those who did their test less than 10 years ago reported never or hardly ever riding 'especially close to the vehicle in

front as a signal to its driver to go faster or get out of the way', compared to 96% for those who did their test more than 20 years ago.

Age and experience levels could also be influencing these differences in attitudes and behaviours, and tests did not reveal statistically significant differences in the overall scores for attitudes and behaviours by time since their IAM RoadSmart test. However, refresher training for those who did their test some time ago could seek to address the differences in attitudes about junction vulnerability (which might reflect the training syllabus at the time) and previous social norms about drinking and riding. The syllabus may not be able to address the small percentage who took their test more recently are likely to close follow or those who ride tired, which could be features of their characters or circumstances. A focus on ensuring bends are not approached too quickly could be included in the syllabus.

Table 4 - Agreement with general attitude statements

	IAM	Comparison
Speed cameras are effective at catching dangerous drivers and riders	14.5%	44%
I would easily be able to navigate through an unfamiliar town and find a predefined location	60.9%	54.4%
I find riding quite demanding	37.6%	33.6%
I am more capable than the average person of managing my alcohol consumption on a night out with friends	28.1%	31.5%
In modern society, there is no need for unwritten rules like opening doors for ladies	8.5%	14.4%
It is important to give something back to society through getting involved in the local community	73.9%	52.8%
Laws should not be broken without question	48.1%	49.3%
If I needed to buy motorcycle parts online, I would be more capable of doing it than the average person	39.9%	55%
There are enough traffic police out there on the roads, dealing with poor driving and riding	6.3%	22.1%
I am actively involved in my community through participation in charities, volunteering or community groups (other than IAM RoadSmart)	46%	15.5%
Riding to the surrounding conditions is more important than complying with all speed limits	63%	49.2%

In addition to understanding respondents' attitudes towards riding and their self-reported behaviour, some questions were asked about their general attitudes. These statements were designed to determine their levels of agreement about their confidence, capability, contributions to society and attitudes towards roads policing. Table 4 shows that IAM RoadSmart respondents are much more likely to be actively involved in their community through charity or volunteering work and are more likely to think that it is important to give something back to society. They have different views to the comparison respondents with regards to roads policing: they are less likely to think speed cameras are effective at catching dangerous drivers and riders and don't think there are enough roads policing

officers. They are also more likely to agree that riding to the conditions is more important than complying with the speed limit.

Respondents' opinions of their own self-efficacy are interesting: they don't think they are more capable than the average person at buying motorcycle parts online or managing their alcohol consumption. They are also more likely to agree that they find riding quite demanding, although only 37.6% of IAM RoadSmart respondents believe this. Conversely, they are more likely to agree that they would be able to easily navigate through an unfamiliar town. They are less likely to agree that in a modern society there is no need for unwritten rules like opening doors for ladies. There was only one statement where both groups agreed in similar proportions: about 50% of both samples agreed that 'laws should not be broken without question'.

As detailed above, statistical testing was undertaken on the responses to the rider attitude and rider behaviours questions, the results of which are shown in Table 6 in Appendix B – Technical Table. These were independent-samples t-tests, on the combined responses for the behaviour and attitude statements for each group. It shows that the means of the attitude questions differed to a statistically significant amount, whilst the behaviour question means were not statistically different.

IAM RoadSmart respondents are more likely to report anticipating the actions of others, indicating that they are aware of the limitations of others on the roads and the vulnerabilities of motorcyclists. They are less likely to agree with statements about alcohol consumption and riding (that it is safe to drink and ride). The differences in attitudes are statistically significant.

There are also differences in reported behaviour – IAM RoadSmart respondents report several more positive behaviours, including not exceeding urban speed limits and being less hostile to other road users. However, they are more likely to admit to exceeding higher speed limits and undertaking on the inside. The differences in behaviour are not statistically significant.

There are some non-statistically significant differences in attitudes and behaviours between those who completed their IAM RoadSmart test recently and those who did it over 20 years ago. Refresher training and working on bend approach speeds might be beneficial.

There are also some big differences in general behaviour – IAM RoadSmart respondents are more likely to be involved in their local community and have strong views on roads policing.

Respondents were given a definition of what constitutes a road accident, based on the definitions used in the police reporting systems. It means that the collisions included in the responses had to have happened on a public road and involved the motorcycle making impact (with anything, including vehicles, the road surface, vegetation, street furniture and/or pedestrians). To classify as an injury collision, someone (not necessarily the respondent) had to have been injured, even if it was only cuts and bruises; whereas a damage only collision did not result in injuries, but damage to property, however minor, occurred.

The respondents were asked how many road collisions they had been involved in on their motorcycle in the last five years and if they had been involved in, how many were their fault. The results for the number of collisions are shown in Figure 15. It shows that very similar percentages of respondents had not been involved in a collision in the last five years: 89% of IAM RoadSmart and 88% of comparison respondents had not been involved in an injury collision, whilst 81% of IAM RoadSmart and 82% of comparison respondents had not had a damage only collision

Whilst a subjective question, it is interesting to note the percentages of those who were involved in collisions and thought they were at fault. For the comparison group, 19% of those in damage only and 27% of those in injury collisions did not think they were at fault, whereas the figures for IAM RoadSmart respondents were 49% of those in damage only and 67% of those in injury collisions.
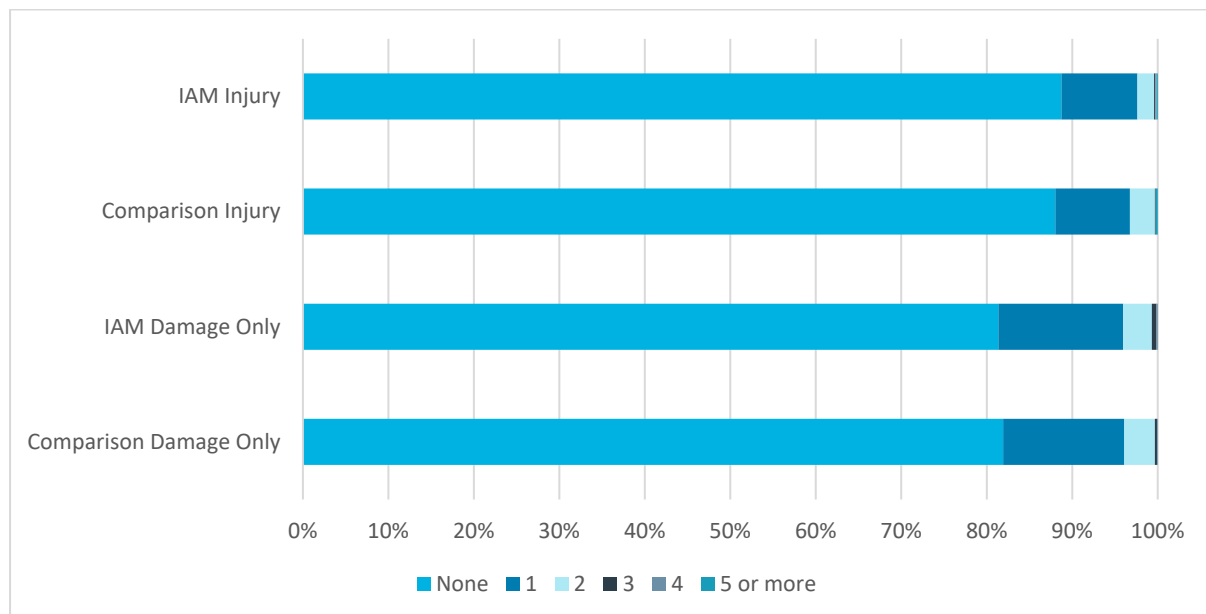
Figure 15 - Crash Involvement Levels

Figure 17 shows the number of crashes per respondent by age. It shows that for all age groups, the comparison group had higher numbers of damage only collisions per respondent. There were also higher numbers of injury collisions per comparison respondent for the 31 to 60 year age groups. There were similar numbers of injury collision per respondent for 61 to 70 year olds and those aged over 70 years.

The total number of collisions per respondents were similar between the two groups.

Figure 16 - Number of crashes per respondent

Figure 16 - Number of crashes per respondent
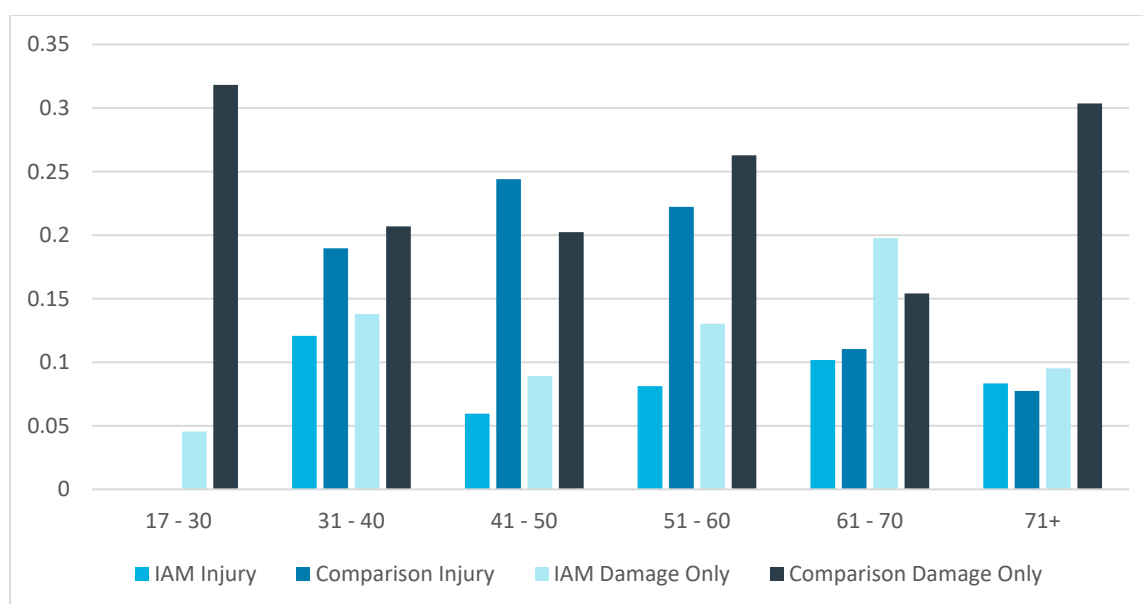
Earlier analysis showed that IAM RoadSmart respondents had higher average annual mileage. With similar percentages of collision involvement, mileage data needs to be used to put involvement into context. Using a median mileage figure for each mileage band and multiplying this by the number of respondents provides a total mileage of the sample. Taking the number of collisions per mileage band for each group of respondents, it is possible to determine the number of miles ridden before a collision (either damage only or injury) occurred. There were 0.38 collisions reported for each IAM RoadSmart respondent and 0.39 for each comparison respondent. However, once mileage is accounted for, the risk for IAM RoadSmart respondents reduces greatly. There was one collision every 15,004 miles ridden for IAM RoadSmart respondents compared to one every 9,421 miles ridden for comparison respondents. IAM RoadSmart respondents ride further before they are involved in a collision. Statistical tests were undertaken (independent t-test) and the difference in mileage before crash involvement is statistically significant.

Table 5 - Collision rates per respondent and by mileage

	Total Collisions per respondent	Miles ridden before a collision occurs
IAM RoadSmart	0.38	15,004
Comparison	0.39	9,421

Those involved in collisions were asked to select which circumstances were present in their collisions in the last five years. As multiple factors can lead to a collision occurring, they were able to select all that applied. The findings are shown in Figure 17. There are interesting differences in the types of collision which occurred. IAM RoadSmart respondents are much more likely to report dropping their motorcycle; that no other vehicles were involved and that other circumstances contributed. Conversely, IAM RoadSmart are less likely to report being involved in a collision where another vehicle rode or drove into the back of them; were travelling straight ahead and were hit by a vehicle entering or exiting a junction via a right turn; or lost control on diesel, mud, potholes or another slippery surface. These differences are interesting as anticipating the manoeuvres of other road users and riding to the conditions are skills developed in IAM RoadSmart training.
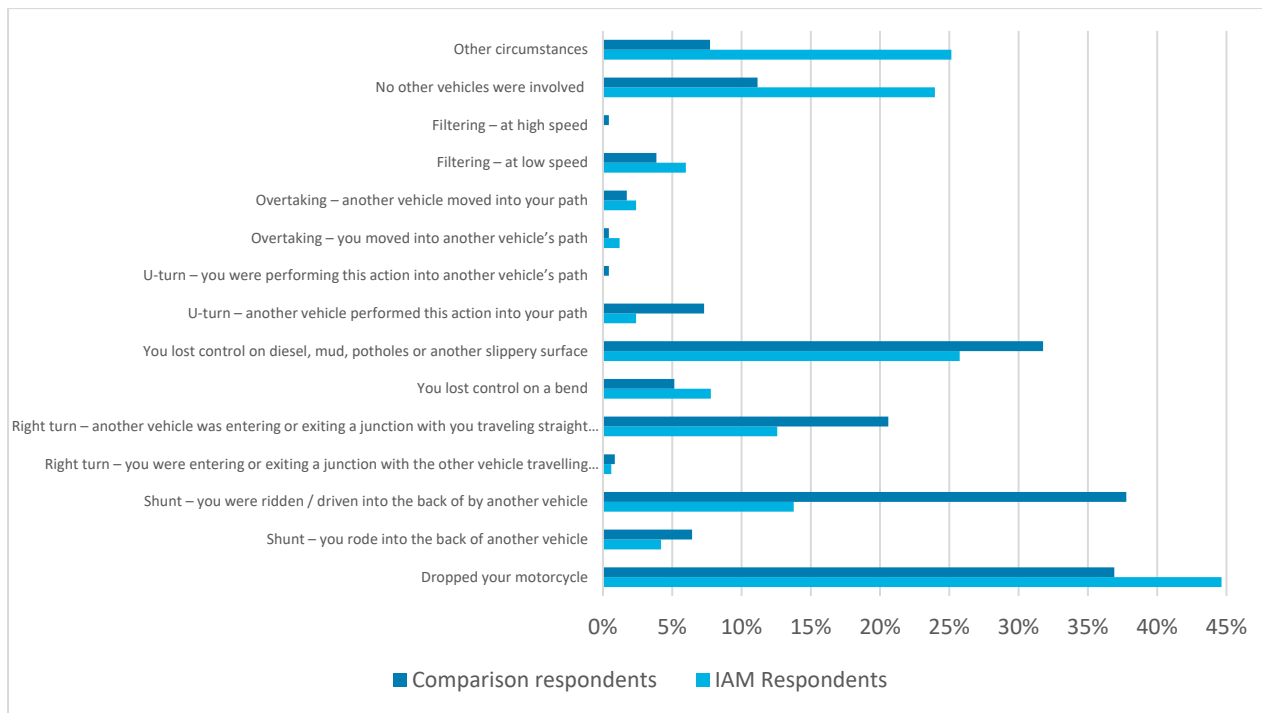
26

Figure 17 - Collision circumstances

Figure 17 - Collision circumstances

The collision analysis is interesting. IAM RoadSmart respondents have similar proportions of collision-involvement as the comparison respondents, but they are less likely to think they were at fault. They have lower numbers of collisions per respondent in different age groups and they ride more miles before a collision occurs. They are also involved in different types of collision – they are more like to be involved in single vehicle collisions and those where they drop their bike. They are less likely to be involved in right-turn, shunts or loss of control collisions than the comparison respondents.

perception

The final set of questions incorporated into the survey were designed to test hazard perception and speed choice (which are linked to confidence and attitudes to speed limit compliance). There were 20 photographs of road scenes (eight including a hazard, eight 'matched' control scenes and a further four 'fillers', showing a variety of road situations) were embedded into the survey and respondents were asked to provide the speed, in miles per hour, that they would choose to ride in that situation.

Previous studies have used video clips and photographs for motorcyclists and car drivers to test hazard perceptions (Helman, Palmer, Delmonte, & Buttress, 2012) (McKenna, Horswill, & Alexander, 2006). The test measures hazard perception (the skill of 'reading the road' and anticipating potential hazards) through the presentation of road traffic scenes, with and without hazards. Lower reported speeds in scenes with hazards suggest that the respondent is sensitive to the presence of hazards. Intended speeds may not map perfectly onto actual speeds driven at, however, intended speeds in tests such as these have been shown to be associated with speed-related collision involvement (Horswill & McKenna, 1999).

Appendix A – Speed Choice Scenes includes the photographs included in the survey and the order in which they were displayed. The order was determined by Dr Shaun Helman, Chief Scientist, of TRL, with half of the respondents seeing the first half of the photographs first and the other half seeing the second half first. The order was randomly assigned by the survey system. Permission was granted from TRL to use these resources in this evaluation.

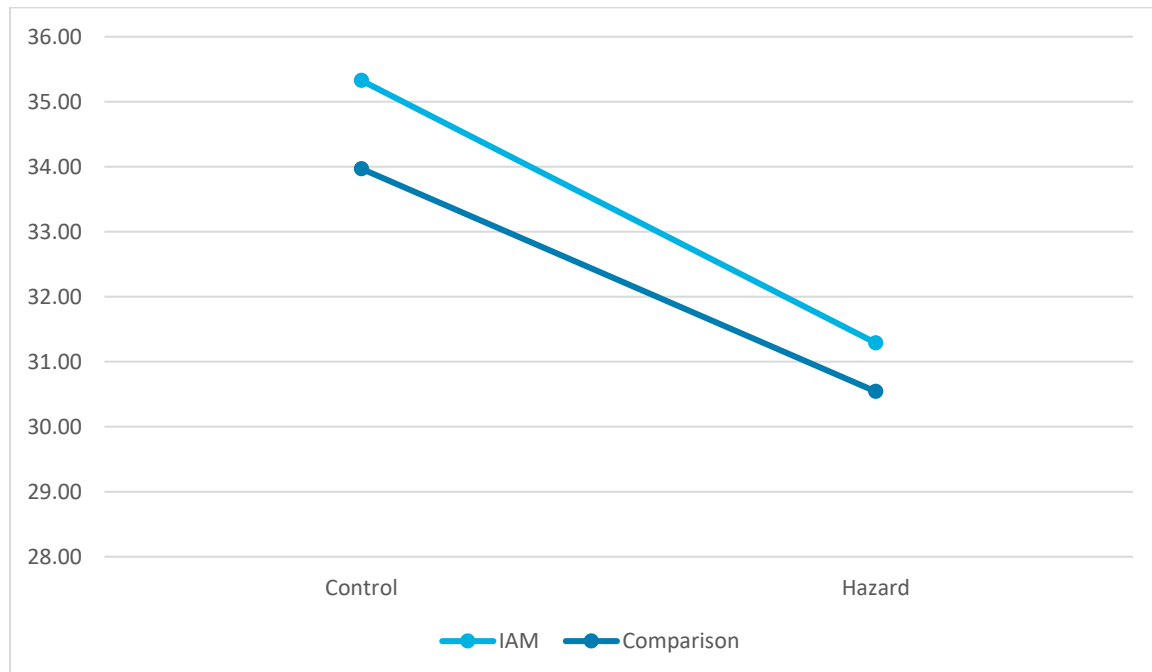*Figure 18 – Average speed (in Mph) for control and hazard images*

Figure 18 shows that the image type has a significant effect on average speed choice of the two groups of respondents. As would be expected if riders are sensitive to hazards, the control average speeds are higher than for those chosen for the hazard scenes. It is interesting to note that the IAM RoadSmart respondents selected higher speeds for both the hazard and the control scenes. Independent-samples

t-tests were conducted on these results, which showed that the differences for the two different scene types were both statistically significant.

This part of the survey shows that both groups of respondents were sensitive to hazards but that IAM RoadSmart respondents tend to choose higher speeds, for both hazard and control scenes. This could be related to their confidence levels.

IAM RoadSmart respondents selected higher speeds for both the hazard and control scenes. Both groups of respondents were sensitive to the presence of hazards and selected lower speeds.

This research set out to identify if membership of IAM RoadSmart leads to safer riding attitudes and behaviours. The research found that the types of people who join IAM RoadSmart could be a key factor in risk levels – there tends to be high levels of confidence and riding experience amongst the membership and it is not clear whether individuals join the organisation because they already hold these traits or that membership leads to them. This could be explored by collecting data from members at the time of joining IAM RoadSmart Despite the samples being demographically similar, there were key differences in terms of employment type, mileage levels, driving licences held, length of time holding a licence and journey purposes. These could all be key influences of risk levels and should be accounted for when assessing whether the objectives have been met.

The key findings in relation to each research objective are:

1. *To determine if IAM RoadSmart members score lower on attitudinal scales associated with collision risk, than demographically similar motorcyclists*

Using established riding questionnaires, IAM RoadSmart respondents reported more positive attitudes in relation to driving behaviours associated with collision risk. These attitudinal differences were statistically significant.

Using the Rider Behaviour Questionnaire, IAM RoadSmart respondents reported being less hostile to other road users, not speeding in speed limits lower than 40mph, and not approaching bends too fast. They did, however, report exceeding higher speed limits and undertaking on the inside when frustrated by other road users. However, the behavioural differences were not statistically significant.

2. *To determine if IAM RoadSmart members report fewer injury and damage only collisions than demographically similar motorcyclists*

There were similar percentages of collision involvement for both groups: however, IAM RoadSmart members were less likely to think that they were at fault.

For those involved in a collision (both injury and damage only), IAM RoadSmart respondents had a lower collision involvement rate per mile driven.

The two groups were involved in different types of collision. IAM RoadSmart respondents were more likely to be drop their motorcycle and be involved in single vehicle collisions. Conversely, they were less likely to be involved in right-turn, shunts or loss of control collisions. These collision differences could reflect skills differences, better observations and/or anticipation of other road users' actions, which in turn could be a product of training, demographics or both.

3. *To determine if there are differences in self-reported speed choice between IAM RoadSmart members and demographically similar motorcyclists*

There were differences in self-reported speed choice between the two groups, however, IAM RoadSmart members tended to select higher speeds, regardless of whether it was a hazard or control scene. Both groups of respondents were sensitive to the presence of hazards and this was statistically significant.

4. *To determine if, and how, IAM RoadSmart members differ to demographically similar motorcyclists in terms of general attitudes to safety*

Overall, the IAM respondents were more likely to have higher levels of community involvement; more positive attitudes towards the unwritten rules of society; and a desire for greater levels of roads policing enforcement. All these attitudes could be a consequence of IAM RoadSmart membership, which has helped to shape opinion, or it could be that like-minded individuals tend to join the organisation.

Order 1	Order 2
Pair 1 control	Filler 3
Pair 9 hazard	Pair 9 control
Pair 6 hazard	Pair 1 hazard
Pair 3 control	Pair 3 hazard
Filler 1	Pair 6 control
Pair 4 control	Filler 4
Pair 7 hazard	Pair 7 control
Pair 12 hazard	Pair 4 hazard
Pair 15 control	Pair 15 hazard
Filler 2	Pair 12 control
Filler 3	Pair 1 control
Pair 9 control	Pair 9 hazard
Pair 1 hazard	Pair 6 hazard
Pair 3 hazard	Pair 3 control
Pair 6 control	Filler 1
Filler 4	Pair 4 control
Pair 7 control	Pair 7 hazard
Pair 4 hazard	Pair 12 hazard
Pair 15 hazard	Pair 15 control
Pair 12 control	Filler 2

Figure 19 – Speed and hazard perception scenes

Pair 1 control
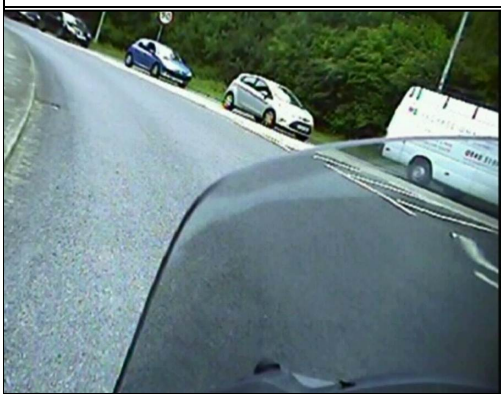
Pair 9 hazard

Pair 6 hazard

Pair 3 control

Filler 1

Pair 4 control

Pair 7 hazard

Pair 12 hazard

Pair 15 control

Filler 2

Filler 3

Pair 9 control

Pair 1 hazard

Pair 3 hazard

Pair 6 control

Filler 4

Pair 7 control

Pair 4 hazard

Pair 15 hazard

Pair 12 control

Table 6 - Test results on Behaviour and Attitude question totals

		IAM (n=719)	Comparison (n=1,228)	*t-value*	Sig (2-tailed)
Behaviour	M	22.51	22.02	1.77	0.08
	SD	5.41	5.79		
Attitude	M	46.22	47.30	-5.99	0.00*
	SD	3.58	4.25		

*Significant at <0.05

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