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Measuring the Impact of Bicycle Marketing Messages

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Abstract

3,674 responses were received from a survey with several opinion questions on the four transportation modes: bicycle, car, bus and train. Seven different pictures representing marketing messages appeared in the survey. Each of the respondents saw only one picture. The picture was displayed twice on every page of the survey. Respondents were from major Danish cities.

Opinions were found to depend on the picture shown, and average opinion scores did in many cases depend on the picture shown in a statistical significant way.

A picture of a bicycle accident did increase the average opinion score of cyclists' general risk as well as the respondents' experienced self-risk when cycling. The average score of the experienced self-risk was notably lower than the average score of cyclists' general risk.

A picture of a smiling leisure cyclist did raise the average score of cycling experience (enjoyment) and did – to a greater extent – lower the average score of the experience (enjoyment) of the alternatives: car, bus and train. A picture of a bicycle accident and a picture of a cyclist wearing a helmet did raise the average opinion score of other transportation modes (car, bus, train) significantly. This indicates that typical bicycle safety messages has a negative marketing effect on cycling.

Opinions on appearance of users of different transportation modes and whether a given transportation mode strengthens or hurts one's image showed that cyclists are found to look better and that the bicycle gives a better image than any other transportation mode. Pictures also had an impact on opinions here, but the tendencies differed from the opinions on cycling experience, as a picture of a cyclist wearing a helmet did raise average opinion scores of appearance and image for cyclists.

A final part of the survey asked directly for opinions on values related to the different pictures. The helmet picture scored higher on all opinions, even on comfort, than a picture of the same cyclist without a helmet.

When asked directly respondents are thus in favor of bicycle helmets, but they seem to prefer not using helmets themselves. Further analysis of the data may give deeper insight into this paradox.

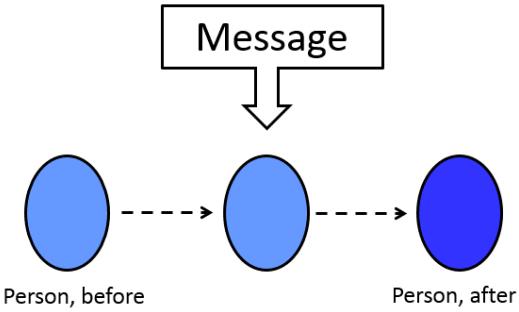
Background

A project on measuring messages' impact on bicycle marketing has been carried out with support from "Cykelpuljen" of the Danish Road Directorate[1].

The Basic Idea

The project's basic idea is to develop an "objective" method to measure the impact of bicycle marketing messages.

Marketing is a matter of changing peoples' mind in order to change their preferences. There is no principal difference between marketing a product and marketing bicycle traffic. In both cases, the aim is to make people change behavior, so they either buy a given product more or use the bicycle more.



A marketing message brings about a change in a person's mind. The project's challenge is to find out how to measure the change, ideally by comparing the person after with the person before.

State of the art

Carrying out and evaluating campaigns for behavior changes, among them campaigns for increased cycling, has become a well described discipline (Prochaska et al, 2008; P. Hyllenius et al, 2009; Merseyside LTP Support Unit, 2010).

Neuromarketing (neuroscience), as for example described by Lindstrøm (2008), offers a new way to find out what is going on in peoples' mind. Expensive MR brain imaging techniques have been used, but since then low cost methods have become available.

Key questions and challenges

An issue of debate is the question of to what extent cycling campaigns should include messages related to bicycle safety, as such messages may have an adverse effect to cycling (see for example Utility Cycling, 2013).

In principle, finding out which messages that work the best could be done by carrying out different campaigns using different messages and evaluating the campaigns afterwards to find which one may work better than the other.

[1] Project CP11I/11-164, Måling af budskabers effekt på markedsføring af cykeltrafik.

In practice, this would be a very time consuming and costly way to proceed. Moreover, other issues like a serious bicycle accident or an intensive car marketing campaign may attract public attention and influence the campaigns' outcome in an unpredictable way.

Neuroscience methods are appealing, as such methods can reveal to which extent a message induces arousal in a person. The methods can, however, not identify the nature (e.g. positive or negative) of the arousal.

What we did

To get inspiration, we set up an advisory board and held several meetings with fruitful discussions. We also collected and digested a lot of information: reports and articles on bicycle marketing campaigns; books, articles, expert interviews and demonstrations on neuroscience techniques; expert interviews on survey techniques as well as basic literature on statistical analysis.

It became clear that interviewing individuals would be the best way forward. It was however necessary to develop an interview technique, where the respondents were not directly asked on the marketing message, as this is known to produce misleading results (the respondents tend to say what they think the interviewer wants to hear, rather than what they actually think themselves).

We did a lot of pilot testing of what we thought were simple questions, and improved wording repeatedly. Opinions was collected using VAS (Visual Analogue Scale) scales, using the recommendations of Wewers (1990): For each opinion question a scale with statements indicated at the left and right end point was shown, and the respondent was asked to indicate his or her opinion by ticking the scale at the most appropriate position.

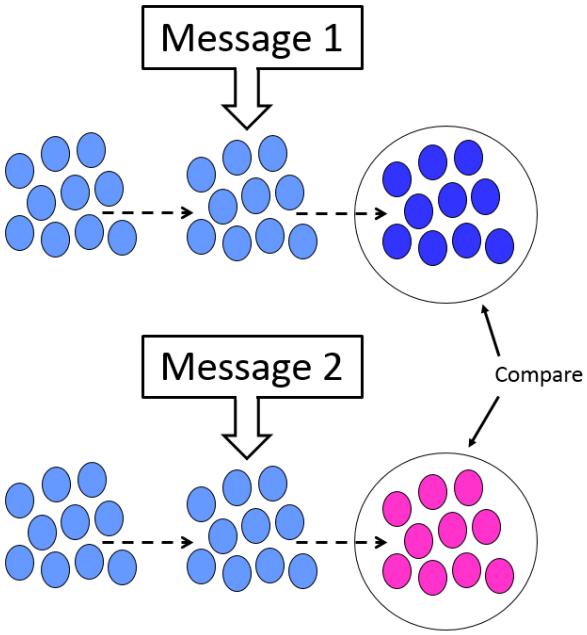
The technique

We decided to use a technique, where we combined several opinion-questions with pictures representing different marketing messages.

For pilot interviews, we selected two pictures representing two extremes: a nice photo of a leisure cyclist and a scary picture of a bicycle accident. We mounted the pictures over a paper-based questionnaire and interviewed people in shopping malls, so that each respondent saw only one of the pictures.

The two pictures – *Leisure* and *Accident* – used for pilot interviews and pilot survey.

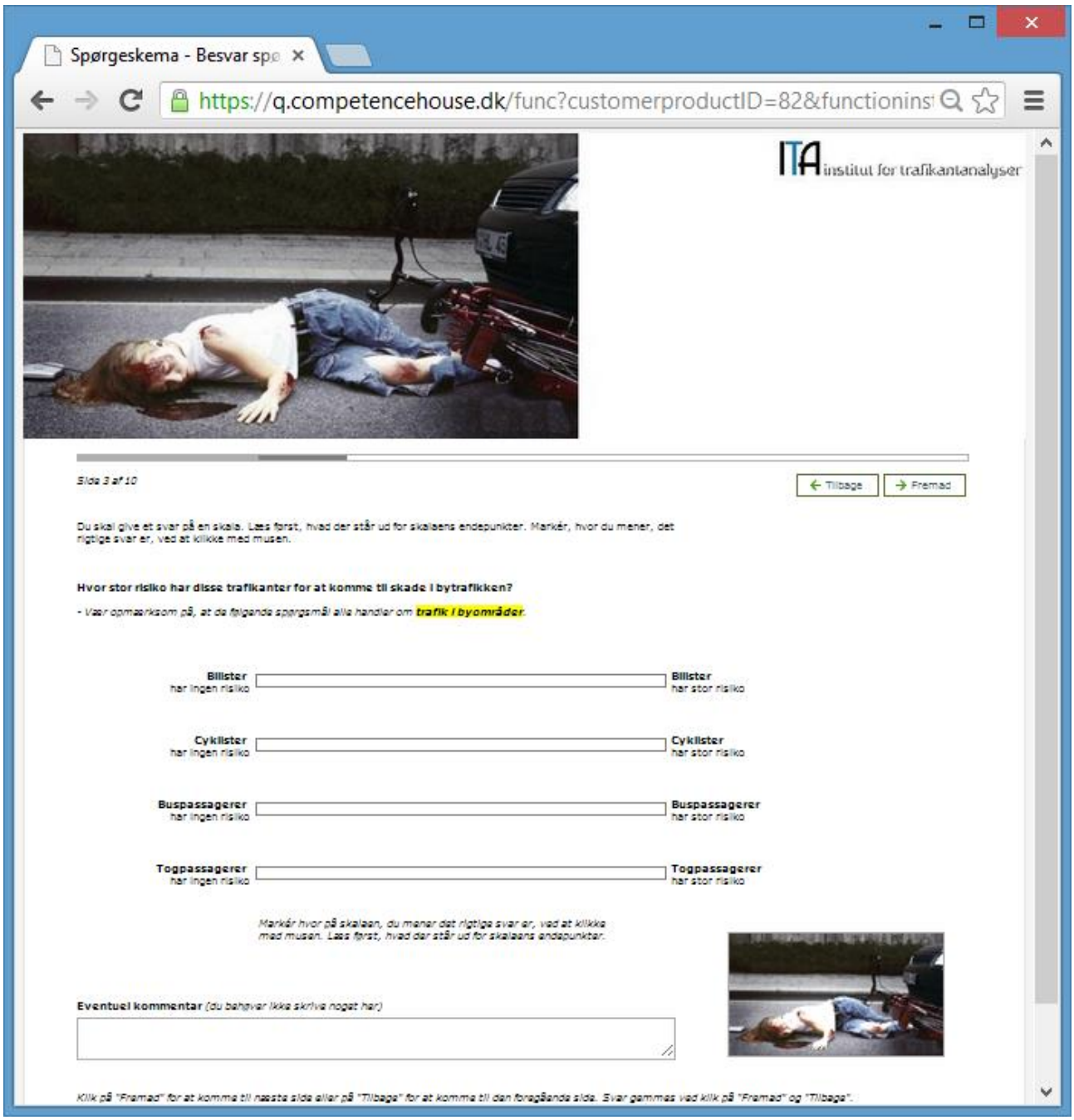
To our surprise, none of the respondents commented the pictures. We also learned that responses (opinions) varied considerably, and that we should carry out many interviews if we should identify a difference in the responses depending on the picture shown.



The chosen technique measures various messages' impact on different groups of people. The change of the individual is not measured, but differences in the messages' impact can be found by comparing groups, after the individuals of each of the groups have received a message.

We therefore made an electronic version of the questionnaire, which we – in two versions based on each of the two pictures - sent out via a market research agency (M3 Research) as a sample only test.

We received and analyzed 2.379 responses, half of them potentially influenced by the leisure picture and the other half by the accident picture. In the analysis, VAS scale opinion scores were represented by a decimal number in the interval 0 to 1, with 0 corresponding to the left hand end point of the scale, and 1 to the right hand end point. The analysis showed that the technique did make sense. Thus, for a number of opinion questions, the average opinion score was found to depend on the picture shown. The differences were not big, but several of them were statistically significant with a null hypothesis probability of 0.02 or less.



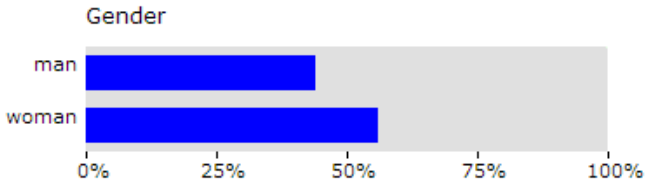
Example of a page with VAS scales from the electronic survey. The picture appeared on top as well on bottom of all pages.

The Seven Picture Survey

We made a second round of the electronic questionnaire using seven different pictures. In the following we will report the main findings of this survey.

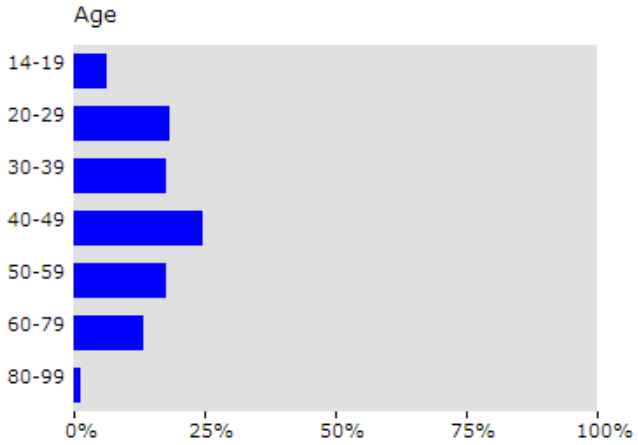
Basics on Respondents

3.674 responses were received in May 2013. Respondents were delivered by Epinion (Denmark). There was a certain overweight of females (56% women, 44% men) among the respondents.



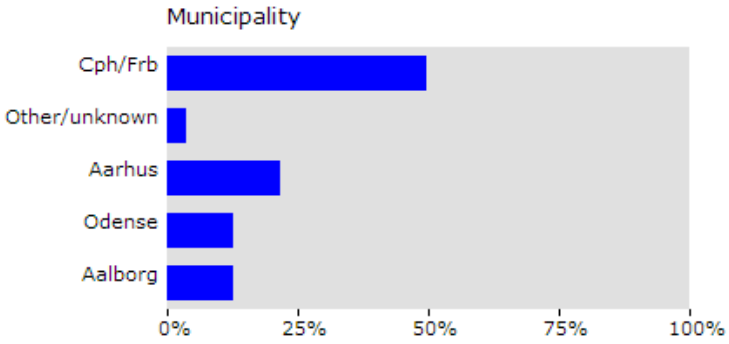
Gender distribution

Respondents of age from 14 were included, with some over-representation of the 40-49 years old and fewer from 60 years and up.



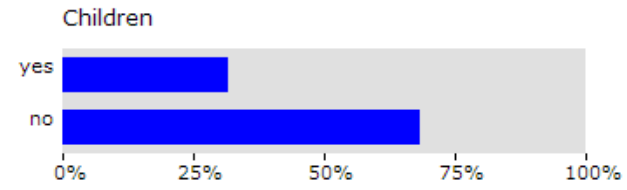
Age distribution

Respondents were selected from major urban areas. About half were from the municipalities of Copenhagen and Frederiksberg.



Distribution by municipality

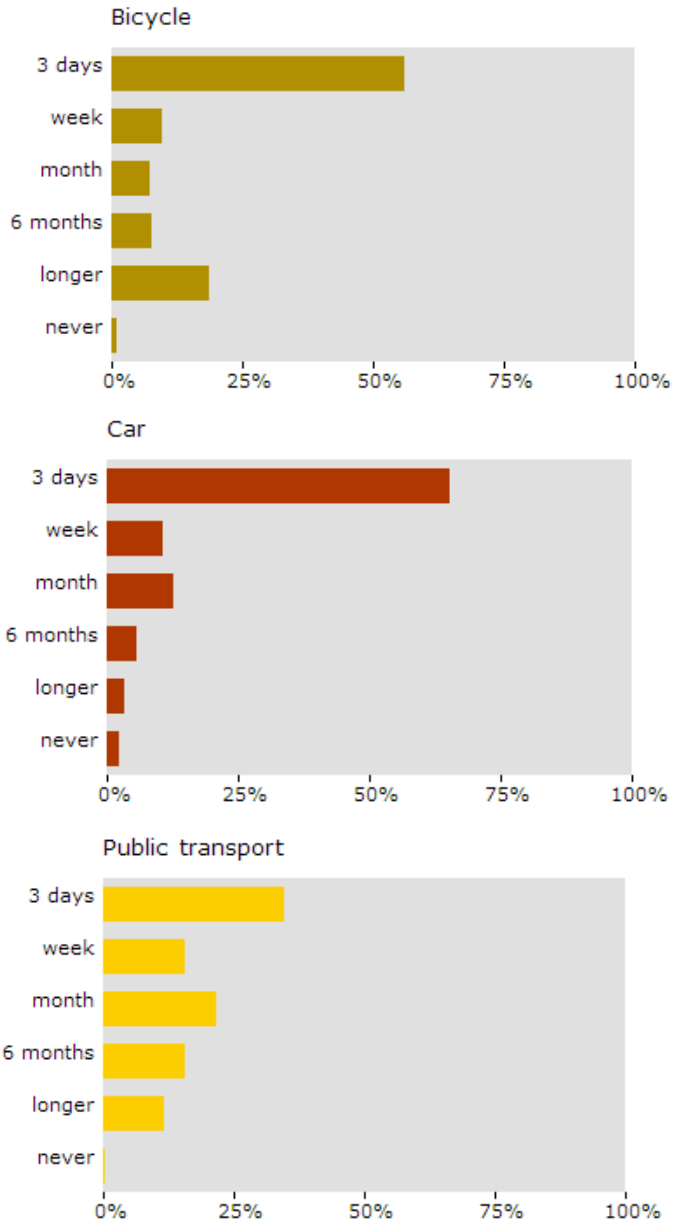
A little less than one-third (32%) of the respondents reported to have children living at home.



Distribution of respondents with children living at home

Travel Habits

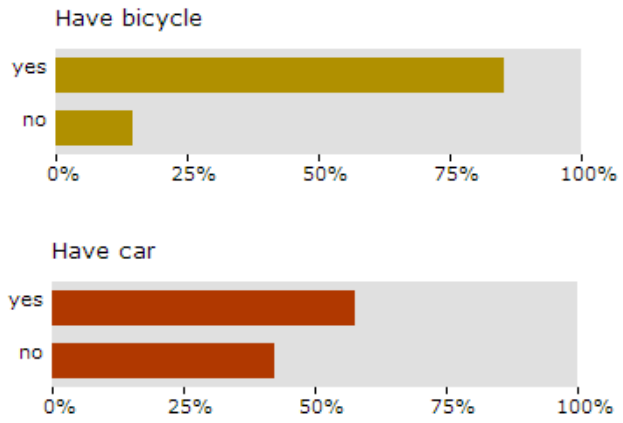
Respondents were asked to report when they latest used bicycle, car or public transport. Response options were *Within the last 3 days*, *Within the last week*, *Within the last month*, *Within the last 6 months*, *Longer than 6 months ago*, *Never.*



Responses to *When is the last time you travelled by…*

The bicycle is used almost as often as the car. The most striking difference between car and bicycle is that 20% very rarely use the bicycle, while the same figure is only 6% for the car.

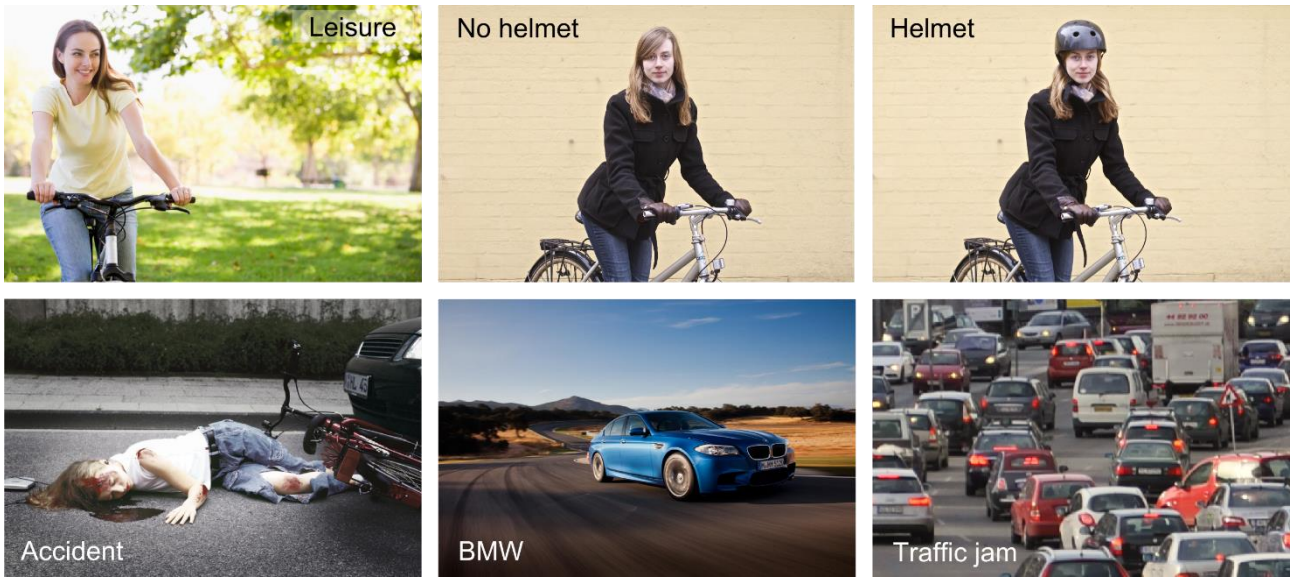
Respondents were also asked whether they had access to a car or a bicycle in their everyday life. 85% reported to have access to a bicycle while the same figure was 58% for a car.



Responses to *Do you have access to a [bicycle, car] in your everyday life?*

Pictures in the Survey

Six pictures were used, as well as a neutral blank picture for reference. Two of the pictures were the same that were already used in the pilot survey.



Seven pictures, *Leisure*, *No helmet*, *Helmet*, *Accident*, *BMW*, *Traffic Jam* and *Neutral*, were used in the survey. Except for Neutral – a blank picture – the pictures are shown.

Questions on four Transportation Modes

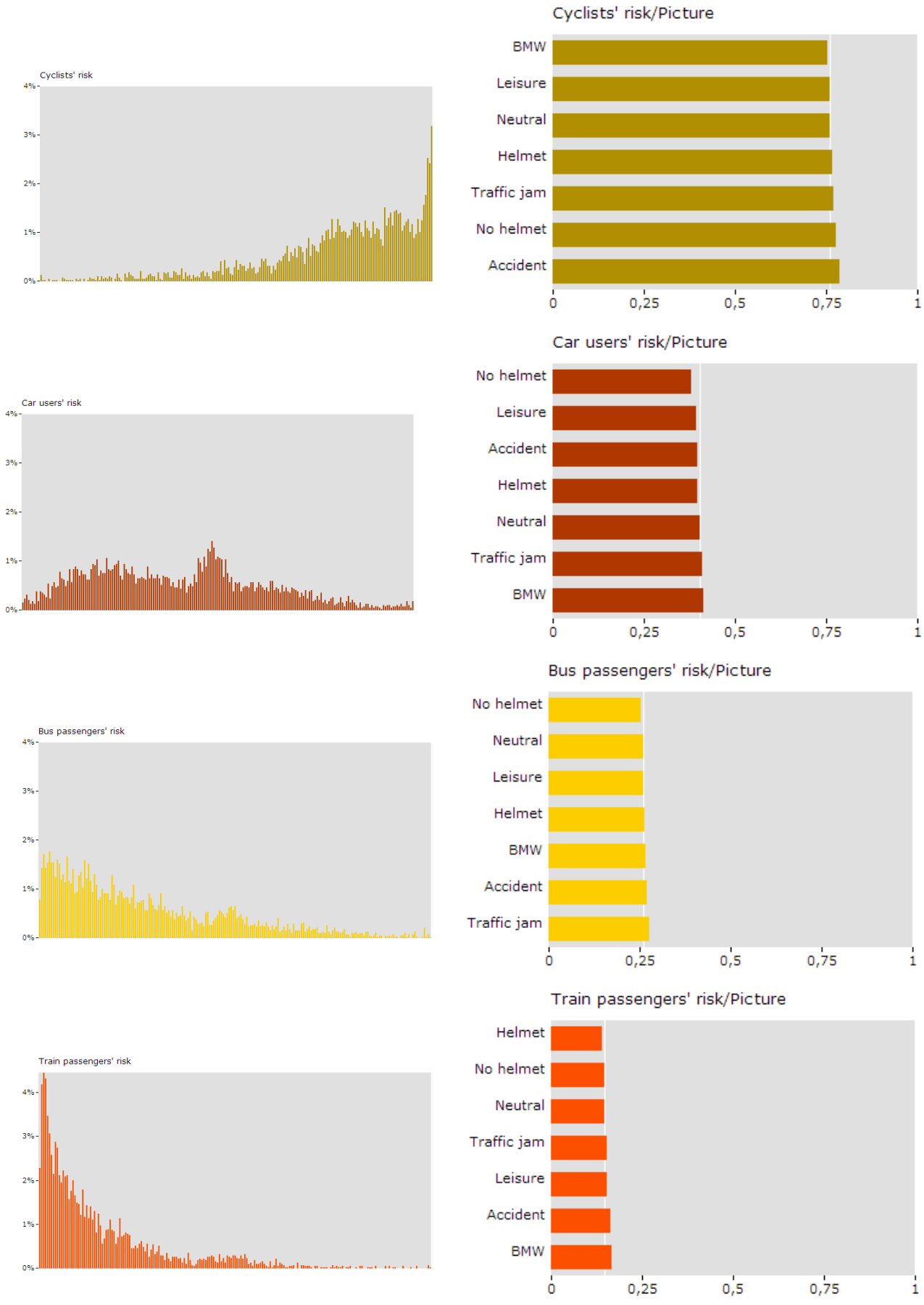
For five different issues (risk, experienced self-risk, experience, appearance and image) respondents were asked to indicate their opinion concerning users of the four transportation modes bicycle, car, bus and train. In all cases, VAS (Visual Analogue Scale) scales with statements indicated at the end points were used to collect the opinions. The opinion scores fell in the interval 0 to 1, with 0 corresponding to the left end point and 1 corresponding to the right end point.

In the following, graphs with distributions of scores as well as the average score versus picture are shown. Distributions can be regarded as a "fingerprint" of the public opinion. For the distribution graphs, the share of the respondents who indicated a specific score are shown. The left side of the graph corresponds to the score 0 and the right hand side to the score 1. For average score versus picture graphs, scores are sorted, and a line indicating the average score for the *Neutral* picture is shown for reference. P-values related to the probability of the null hypothesis for the lowest and the highest average score are indicated.

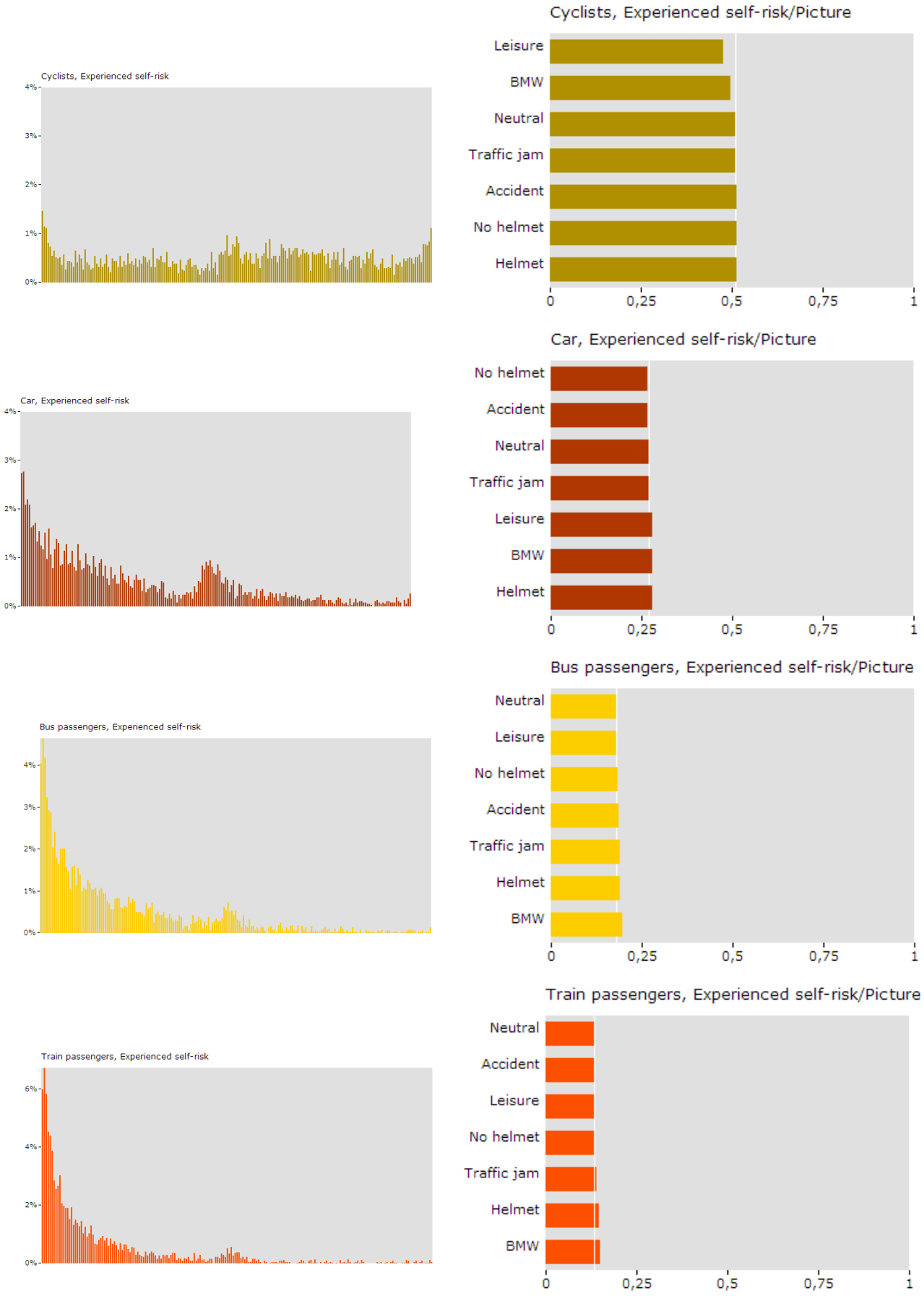
General Risk and Experienced Self-risk

The general risk question *In city traffic, how high a risk do you consider the following road users have of getting hurt?* was asked, with the end point statements *[…] have no risk* and *[…] have a high risk* (*[…]* being *Cyclists*, *Car users*, *Bus passengers* and *Train passengers*, respectively).

Another risk-related question on experienced self-risk was *When using the following modes of transportation in the city, how afraid are you of getting hurt?* with end point statements *Travelling by […] I am not afraid of getting hurt* and *Travelling by […] I am very afraid of getting hurt* (*[…]* being *bicycle*, *car*, *bus* and *train* respectively).



General risk – distributions (fingerprints) and average opinion score versus picture for four transportation modes. Null hypothesis P-values for average opinion score versus picture: bicycle 0.01, car 0.02, bus 0.2, train 0.02.



Experienced self-risk – distributions (fingerprints) and average opinion score versus picture for four transportation modes. Null hypothesis P-values for average opinion score versus picture: bicycle 0.04, car 0.4, bus 0.2, train 0.2.

Opinions on general risk have a very high score for cycling, indicating that cyclists are seen to ride with a high risk. The distribution of scores confirms this, when compared to distributions for the other modes. The accident picture makes the average score even higher, while the leisure picture lowers the average score. Quite surprising, the BMW picture also lovers the average score for cyclists' general risk. Most of the pictures, by the way, tend to raise the average risk score.

Opinions differs considerably so far as the experience self-risk is concerned. Not only has the distribution of scores a fundamentally different shape, the average score is also much lower. The impact of pictures are similar, except that the overall effect of the pictures is to lower the score.

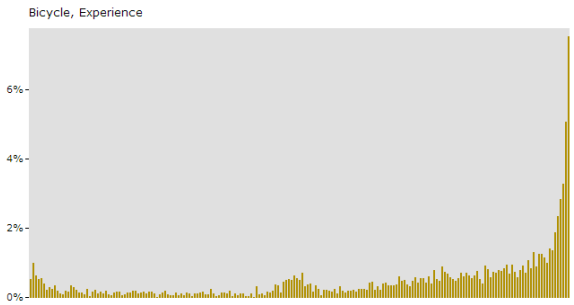
If one's goal is to address safety issues while still wishing to promote cycling, these results indicate a good reason for focusing on the cyclist as an individual and leaving out general references to the risks of cycling.

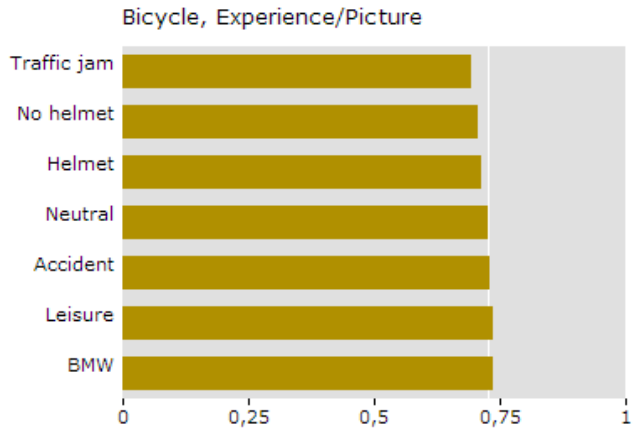
Experience (enjoyment)

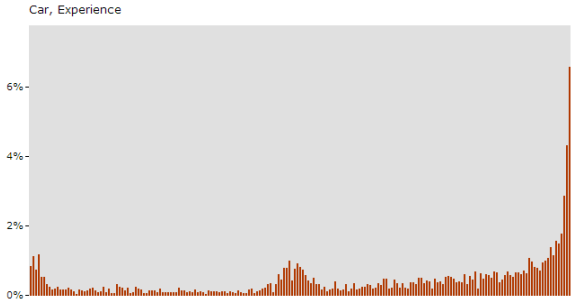
A central question from a marketing point of view was related to *experience* – you could also say enjoyment – on using various transport modes. The question was worded *When in a city, what is your experience travelling by the following modes of transportation?* with VAS scale end point statements *I do not like travelling by […]* and *I enjoy travelling by […]* (*[…]* being *bicycle*, *car*, *bus* and *train* respectively).

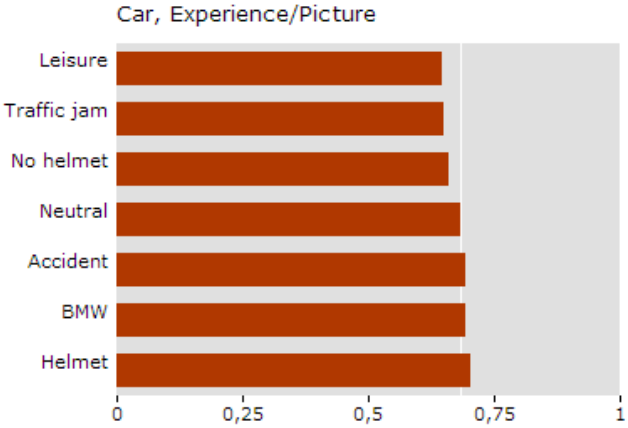
Bicycle and car are in this context surprisingly similar, with many high opinion scores, and cycling having the highest average opinion score of all transportation modes. For cycling, the BMW-picture (quite surprisingly) and the leisure picture (less surprisingly) gave the highest average opinion scores. The BMW-picture also had a positive impact on car experience, while the leisure picture had a negative impact on car, bus and train experience.

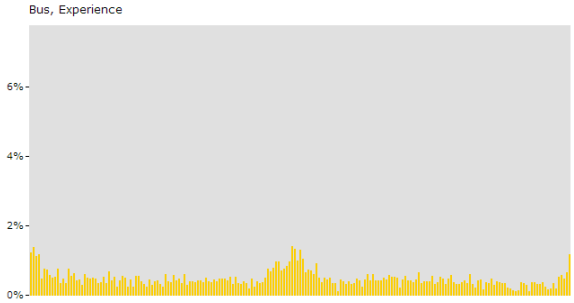
The accident-picture and the picture of a cyclist wearing a helmet had only a minor influence on the average opinion score for cycling experience, but gave the highest average opinion scores for the other transportation modes: car, bus and train. This indicates that typical safety messages (e.g. "always remember to use a helmet", "cycling is dangerous") have an adverse effect on bicycle marketing. Notably the average opinion score for travelling by car was higher after seeing the helmet picture than after seeing the BMW picture.

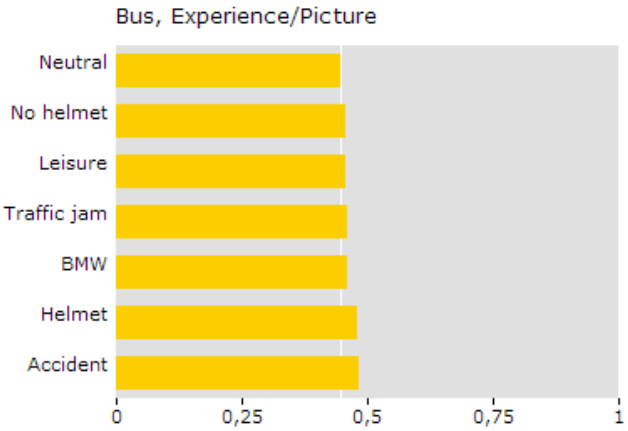


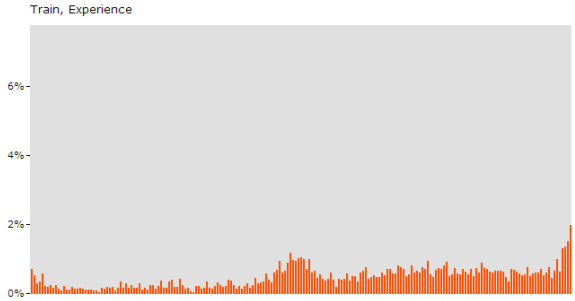


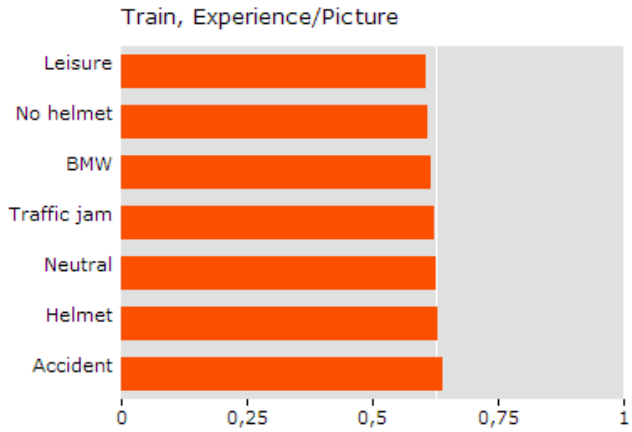












Experience (enjoyment) – distributions (fingerprints) and average opinion score versus picture for four transportation modes. Null hypothesis P-values for average opinion score versus picture: bicycle 0.02, car 0.01, bus 0.04, train 0.08.

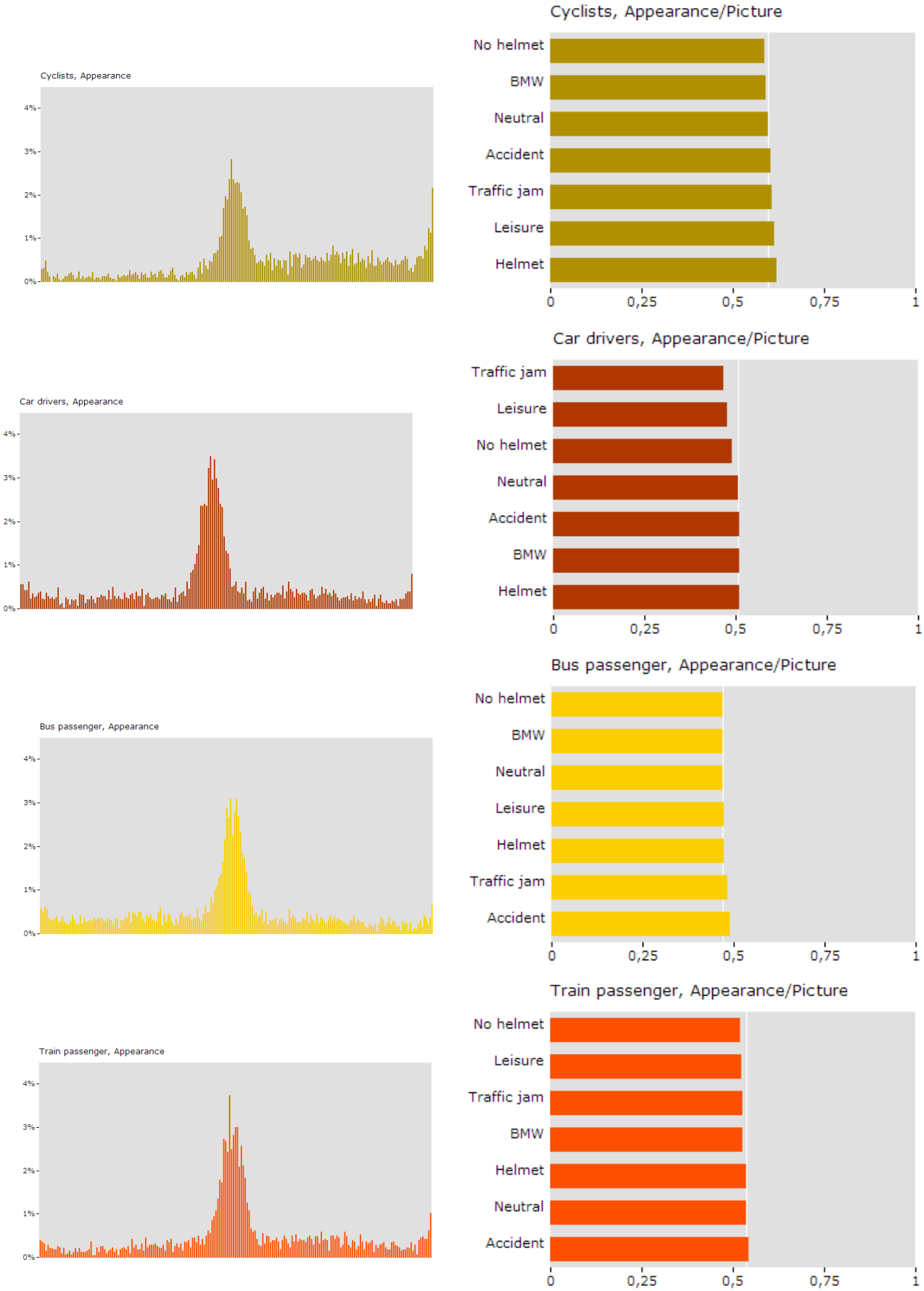
Appearance and Image

A question on appearance was worded *What do you think about the visual appearance of the following road users (in city traffic)?* with VAS scale end point statements *[…] do not look good* and *[…] look good* (*[…]* being *cyclists*, *car users*, *bus passengers* and *train passengers* respectively).

A related question on the respondent's own image was worded *How well do the following modes of transportation fit your 'image'?* with VAS scale end point statements *The […] hurts my image* and *The […] strengthens my image* (*[…]* being *bicycle*, *car*, *bus*, and *train*, respectively).

Both questions gave rise to numerous protests from the respondents in the form of comments to the questions. Most Danish people don't like the idea of image and find appearance to be of no importance. In the responses, this is reflected by many respondents ticking the VAS scales in the middle section.

Nevertheless, the overall outcome was clear: Cyclists are found to look better than users of other modes, and the bicycle is also the mode which strengthens the respondents' own image the most.
In contrast to what was found for experience, the helmet picture was found to be favorable to the average opinion score of appearance as well as the image of cyclists, compared to the no-helmet picture. The same tendency was found for car users. The BMW picture, on the other hand, reduced the average opinion score for cyclists' appearance and increased it for car users.



Appearance – distributions (fingerprints) and average opinion score versus picture for four transportation modes. Null hypothesis P-values for average opinion score versus picture: bicycle 0.02, car 0.002, bus 0.2, train 0.08.

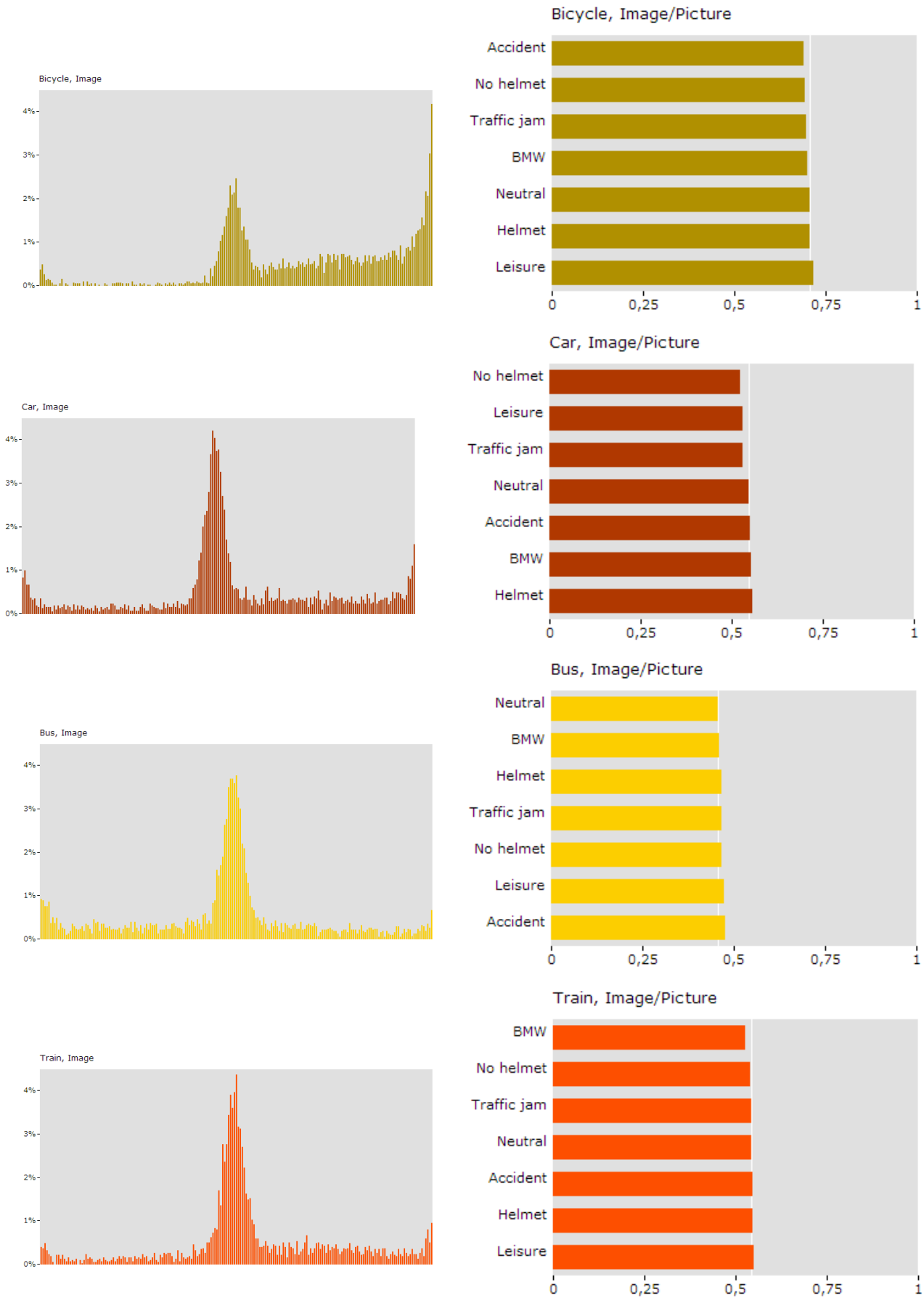
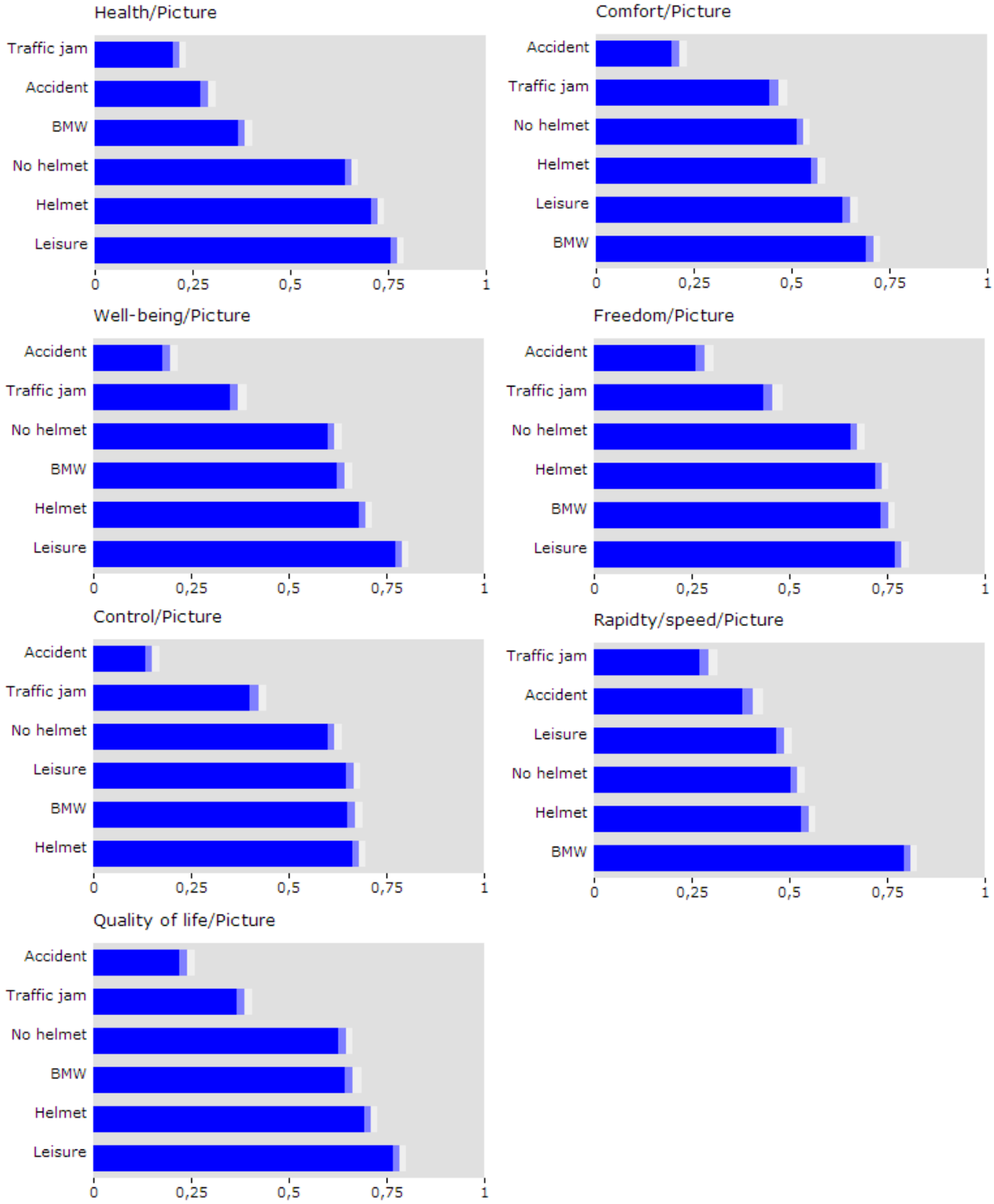


Image – distributions (fingerprints) and average opinion score versus picture for four transportation modes. Null hypothesis P-values for average opinion score versus picture: bicycle 0.06, car 0.02, bus 0.3, train 0.08.

Values Associated with Pictures

As a last question – without the possibility to go back and change previous parts of their response - respondents were asked to indicate to what degree the pictures could be related to the values *Health*, *Comfort*, *Well-being*, *Freedom*, *Control*, *Rapidity/speed* and *Quality of life*.



Average scores for values associated with pictures. 95% confidence intervals indicated.

The *Accident* and *Traffic jam* pictures are, not very surprising, found to score lowest for all values. For several values, *BMW* and *Leisure* scores are found among the highest. Quite surprising, the *Helmet* picture scores higher on all values – even comfort - than the *No helmet* picture. This reflects a high public acceptance of bicycle helmets in Denmark. Wearing a helmet is voluntary, but wearing rates around 25% have been reported (Rådet for Sikker Trafik, 2011).

Discussion

The method used in the Seven Picture Survey yields a lot of interesting information on opinions and how opinions are influenced by different pictures. Basic information is presented here, but a lot more can be drawn out of the responses.

There is a notable difference between the average opinion score for cyclists' general risk and the experienced self-risk as cyclists. Both scores are raised by a picture of a bicycle accident. If one's goal is to address safety issues while still wishing to promote cycling, these results indicate a good reason for focusing on the cyclist as an individual and leaving out general references to the risks of cycling.

From a marketing (bicycle promotion) perspective, a central opinion is experience (enjoyment). If a person's opinion score on the expected experience by cycling is raised, or the opinion scores on the alternatives (car, bus and train) are lowered, the chance that the person will use the bicycle is increased.

A picture of a smiling leisure cyclist has a clear positive marketing effect on cycling. A picture of a bicycle accident or a picture of a cyclist wearing a helmet, on the other hand, has an evident negative marketing effect. In contrast, a traditional car marketing picture has far from the same negative effect, and the pictures of a bicycle accident or a cyclist wearing a helmet has a stronger positive marketing effect on cars than a traditional car advertisement picture.

This speaks for focusing on positive aspects and leave out negative safety issues when marketing cycling. This is not big news for marketing people but still a challenge to be overcome in some Danish campaigns.

If one focuses on appearance and image - which can also be claimed to be of relevance from a marketing point of view - picture impacts point in other directions than is the case for experience (enjoyment). This is indeed the case for opinions on values related to the different pictures. Here, a picture of a cyclist wearing a helmet scores higher on all values - even on comfort - than a picture of the same cyclist without a helmet.

When asked directly respondents are thus in favor of bicycle helmets, but they seem to prefer not using helmets themselves. Further analysis of the data may give deeper insight into this paradox.

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Picture Credits

Leisure: iStockphoto, file #9116292, order no 20044837.
No helmet and Helmet: Copenhagenize Consulting.
Accident: ZNS – Hannelore Kohl Stiftung, Germany.
BMW: BMW, Denmark.
Traffic jam: Sidsel Birk Hjuler.